



**R&D workshop by the Department  
of Information Technologies CULS Prague  
at Vseradice 2017**

**Proceedings of abstracts**

**Vseradice, 2 March 2017**

The book of proceedings contains abstracts of presentations made at the R&D workshop organised by the Department of Information Technologies Czech University of Life Sciences Prague on 2 March 2017 in Vseradice. The presented abstracts are part of diploma theses that were defended and published in line with the §35 of the Act No. 111/1998 Coll. on Higher Education Institutions and on Amendment to Other Acts and in compliance with the Rector's Decree no. 3/2014.

Workshop organisation matches the definition of the result “W – workshop organisation” as described in the Appendix no. 4 (Definitions of the result types) of the Methodology of evaluation of research organizations and programs of purposeful support of research, development and innovation approved by the Czech government resolution on 8 February 2017 no. 107.

The abstract authors are listed in the following order: thesis supervisor, master's student.

Sborník obsahuje abstrakty příspěvků prezentovaných v rámci Vědecko-výzkumného workshopu Katedry informačních technologií ČZU v Praze, který se uskutečnil 2. března 2017 ve Vseradicích. Uvedené abstrakty jsou součástí obhájených diplomových prací, které byly zveřejněny v souladu s §35 zákona o vysokých školách č. 121/2000 Sb. a Směrnicí rektora č. 3/2014 Ochrana duševního vlastnictví na ČZU v Praze.

Uspořádání workshopu odpovídá definici výsledku „W – uspořádání workshopu“ uvedené v samostatné příloze č. 4 (Definice druhů výsledků) Metodiky hodnocení výzkumných organizací a programů účelové podpory výzkumu, vývoje a inovací schválené usnesením vlády ČR ze dne 8. února 2017 č. 107.

Autorský kolektiv abstraktů je uváděn v pořadí: vedoucí závěrečné práce, posluchač navazujícího magisterského studia.

## Contents

Social media in business practice .....	9
Václav Lohr, Ainur Amerkhanova	
Internet Marketing .....	9
Zdeněk Havlíček, Jan Barták	
Design and implementation of private cloud environment for medium-size enterprise .....	9
Jiří Vaněk, Lukáš Bartakovič	
Android Applications - Theory and Practice.....	10
Čestmír Halbich, Michaela Bartůňková	
Usage of Information and Communication Technologies for creative Purpose .....	10
Edita Šilerová, Michal Bauer	
Android application - theory and practice .....	10
Čestmír Halbich, Michal Bečka	
Automated and remote controlled terrarium using Raspberry Pi.....	11
Alexandr Vasilenko, Pavla Beránková	
Internet users privacy protection .....	11
Václav Lohr, Tomáš Berber	
Active Directory in modern IT .....	12
Jiří Vaněk, Jan Bílek	
Software to aid teaching of object oriented programming .....	12
Martin Havránek, Pavel Bory	
Smart house controlled by Raspberry Pi .....	12
Alexandr Vasilenko, Vít Budař	
Open data for Ethiopia .....	13
Miloš Ulman, Leul Challa	
Analysis of effectiveness of the use of drones in terms of cost in various fields of the civilian sector .....	13
Václav Lohr, Barbora Chalupová	
IT infrastructure security in one of the public authorities in the Czech Republic.....	14
Čestmír Halbich, Pavel Charvát	
Methods of Increasing of Advertisement Efficiency on Social Network Sites.....	14
Václav Lohr, Pavla Cinkeis	
Computer security and data protection in small organizations .....	15
Jiří Vaněk, Jaroslav Čech	
The analysis of the EDI system of company by means of business process modeling notation .....	15
Vladimír Očenášek, Daniel Čermák	

Development of eGovernment services .....	16
Jan Jarolímek, Antonín Černý	
Proposal of information system for the chosen organization .....	16
Edita Šilerová, Libor Černý	
Information Systems in Agriculture .....	16
Jan Jarolímek, Hana Dastychová	
Android Applications - Theory and Practice.....	17
Čestmír Halbich, Karel Doležal	
Recording and processing methods of sound recordings .....	17
Pavel Šimek, Stanislav Doležal	
Java applications - theory and practice.....	18
Čestmír Halbich, Aneta Doubková	
Possibilities of using drones .....	18
Jan Jarolímek, Jan Drda	
Configuration of active network components .....	18
Jiří Vaněk, Lukáš Dvořák	
Evaluation of the impact of social media in an organization .....	19
Miloš Ulman, Cynthia Echendu	
Internet of things (IoT) .....	19
Zdeněk Havlíček, Alena Efflerová	
Android Applications - Theory and Practice.....	19
Čestmír Halbich, Petr Erben	
Information technologies and rail transport in the region .....	20
Jiří Vaněk, Karel Fremund	
Integration of information system and e-shop solutions for SMEs.....	20
Zdeněk Havlíček, Jan Fuka	
Attacks and hacking in the online environment and protection against it.....	20
Václav Lohr, Lukáš Gregora	
Security software, Antivirus products, Central solution, Symantec Endpoint Protection, Virus protection, Endpoint Security .....	21
Jiří Vaněk, Jan Gross	
Data security in a small organization .....	21
Jan Tyrychtr, Milan Hora	
Selection and implementation of E-learning System in the High School environment.....	21
Petr Benda, Dan Huml	
The impact of information systems on the quality of the product.....	22
Edita Šilerová, Jan Hurt	

Web applications accessibility of assistance dogs organizations .....	22
Petr Benda, Martina Hybštová	
OTP implementation in a selected information system.....	23
Martin Havránek, Petr Jajtner	
Building a CSS Framework.....	23
Petr Benda, Jan Jeřábek	
Aplikace Android - teorie a praxe .....	23
Čestmír Halbich, Tomáš Jeřábek	
Android Applications - Theory and Practice.....	23
Čestmír Halbich, Tomáš Jirsa	
Protection of personal data in the online environment.....	24
Václav Lohr, Tomáš Klein	
Product photography .....	24
Alexandr Vasilenko, Martin Kochman	
Internet things as a tool for improving household.....	25
Zdeněk Havlíček, Leoš Kopáček	
Systems and applications monitoring in the enterprise environment using IBM Tivoli Monitoring.....	25
Jiří Vaněk, Jiří Kotalík	
UX testing of university information system .....	25
Václav Lohr, Martin Kozák	
ICT in education.....	26
Jan Jarolímek, Jan Kračmer	
ICT in Education .....	26
Jan Jarolímek, František Kubín	
Social Networks Usability.....	26
Václav Lohr, David Kuldán	
The use of electronic signatures .....	27
Jan Jarolímek, Tomáš Kurek	
Network connection monitoring based on Raspberry Pi.....	27
Alexandr Vasilenko, Petr Kyselý	
Electronic services in the sphere of labour and social affairs .....	28
Miloš Ulman, Pavla Lichevníková	
Web application for organizing sports competitions and events.....	28
Vladimír Očenášek, Tomáš Litera	
eIDAS impacts on Czech legislation and EU citizens .....	28
Miloš Ulman, Iveta Macounová	

The Design of the Modern Infrastructure Network.....	29
Jiří Vaněk, Lukáš Mádr	
Java applications - theory and practice.....	29
Čestmír Halbich, Miroslav Mareček	
ICT in Education .....	30
Jan Jarolímek, Jiří Mašek	
Analysis of impacts of deployment of information system in construction company .....	30
Miloš Ulman, Lukáš Matěna	
Performance optimalization of database systems.....	30
Jan Tyrychtr, Jan Mikolášek	
Implementation of VoIP telephony in selected company .....	31
Martin Havránek, Tomáš Mrázek	
Analysis of open source web content management systems.....	31
Miloš Ulman, Taisir Obad	
The development of the integrated operational centres of the Police of the Czech Republic and their importance for society.....	32
Edita Šilerová, Luboš Odcházal	
Realization of e-shop on open source base .....	32
Pavel Šimek, Vladimír Pacejka	
Use of Social Media for Marketing and Promotion of B2C business and its effect on overall reputation in the Czech Republic .....	32
Petr Benda, Yuriy Partala	
Social Network Analysis of University Profiles .....	33
Václav Lohr, Ondřej Peroutka	
OS Google Chrome - theory and practice .....	33
Čestmír Halbich, David Plecháč	
Creation and operation of e-commerce .....	34
Eva Kánská, Jan Pospíšil	
Draft of optical network in country house.....	34
Martin Havránek, Jiří Prek	
The Role of Web Design and Web Accessibility in Attracting New Customers to the Business .....	35
Petr Benda, Sanko Krystyna	
The Swfit Programming Language .....	35
Jiří Vaněk, Soukeník Marcel	
Internet Marketing.....	35
Zdeněk Havlíček, Kamila Spurná	
Application testing in terms of usability .....	36

Zdeněk Havlíček, Tomáš Steska	
Usability of web applications .....	36
Václav Lohr, Tomáš Svěrák	
Implementation of Business Intelligence solution .....	36
Jan Tyrychtr, Petra Šamanová	
Using of PPC systems .....	37
Pavel Šimek, Jiří Šejnost	
Electronic services of the public administration in the resort of the labour and social affairs	37
Miloš Ulman, Pavla Štěpničková	
Electronic services for life events in the public administration .....	38
Miloš Ulman, Martina Šušková	
Electronic communication between public administration and business entities .....	38
Miloš Ulman, Martina Tichá	
Environmental variables acquisition and evaluation .....	39
Alexandr Vasilenko, Vladislav Ulrych	
Use of wireless technology in the home environment .....	39
Jiří Vaněk, Jan Urban	
ICT implementation in selected company .....	40
Martin Havránek, Vácha Lukáš	
Development of web application based on open data .....	40
Miloš Ulman, Villanueva Duran Mario Nivardo	
Security and monitoring of local network .....	41
Martin Havránek, Václav Vítek	
The utilization of unmanned aerial vehicles for aerial mapping .....	41
Jan Jarolímek, Daniel Vobinuška	
Technology platforms for Internet of things .....	41
Zdeněk Havlíček, Darek Vodrážka	
Cloud computing in a sector of small and medium-sized companies .....	42
Edita Šilerová, Votápek Jan	
Web design for disabled users .....	42
Petr Benda, Dana Vykysalá	
Electronic services of public administration for health .....	43
Miloš Ulman, Ph.D., Dita Zarembová	
Graphical representation of identity management data .....	43
Miloš Ulman, Vojtěch Zelený	
Learning application development for Central School of Sokol .....	43
Miloš Ulman, Zíková Kateřina	

Analysis of WiFi security in Czech republic..... 44

Jiří Vaněk, Jakub Zima

## Social media in business practice

Václav Lohr, Ainur Amerkhanova

**Keywords:** social media, social network, facebook, twitter, foursquare, online marketing, communication

**Abstract:** The main aim of this diploma thesis is to create a development strategy for company accounts on social networks. It focuses mainly on Facebook and Instagram. The theoretical part defines the concepts of social media, social networks, characteristics of selected social networks and describes the security threats associated with using social networks. Emphasis is also placed on online marketing tools and the possibility of measuring ROI on social networks. In the practical part author created a development strategy for online profile of Bueno beauty salon. The work also includes a proposal of paid advertising campaigns on Facebook and Instagram, drafts for company posts for reaching the target group and calculations of the minimum number of customers to achieve a stated rate of return on investment.

## Internet Marketing

Zdeněk Havlíček, Jan Barták

**Keywords:** big data, state-owned enterprise, directly managed organizations, marketing strategy, internet marketing, tools of internet marketing, measurability, government

**Abstract:** The thesis examines the enterprise of state administration, Institute for Postgraduate Medical Education in Prague, and his possibilities of using Internet marketing. The theoretical part devotes to the concepts such as marketing, marketing environment and marketing strategy. Further explains the concept of Internet marketing, and in details describes a goals of internet marketing tools. In the last part focuses on the problems of measurability, key performance indicators, data and big data marketing.

The practical part describes the characteristics of the enterprise in terms of mission, activities, vision and strategic objectives of the organization. Applied are an analysis of the external environment, internal environment and SWOT. Further was also performed marketing analysis, which examined the current state of marketing and communication mix. SWOT analysis was extended about the observed findings, based on which was designed marketing strategy consisting from the parts: segmentation, targeting and positioning, marketing mix, communication mix, measurement strategy, the draft action plan, the draft budget. In the final part describes the implementation of the strategy. From the executed measurements was created an assessment for a subsequently formulated specific recommendations.

## Design and implementation of private cloud environment for medium-size enterprise

Jiří Vaněk, Lukáš Bartakovič

**Keywords:** virtualization, VMware, vCloud Director, aggregation, on-premise solution, Total cost of ownership, private cloud, MPLS, Virtual Firewall, cloud computing

**Abstract:** The main scope of this study is to explain the options of analysis, design and implementation of private cloud environment. It analyses existing IT infrastructure, and according to the result, designs a private cloud environment. The current IT infrastructure has been analysed through computing, memory, storage capacity and networking. It was also necessary to examine the possibility of licensing programs which runs on current infrastructure and security of the solution. Based on the results of the analysis, the cloud platform has been chosen and provider of cloud services requested for the preparation of the draft resolution. After an introduce to the service provider infrastructure and thoroughly discussed the concept of cloud formation environment for service providers. According to requirements, a draft solutions of a private cloud environment has been made. It has been estimated operation costs, which were compared with the overall costs of running a on-premise IT infrastructure. The next chapter presents a comparison of the performance of the new solution with the original. The last part is a sample procedure for implementation of private cloud environment in vCloud Director environment.

## **Android Applications - Theory and Practice**

**Čestmír Halbich, Michaela Bartůňková**

**Keywords:** Android, Google, mobile operating system, application, development, Java

**Abstract:** The thesis is focused on Android application development including characteristic of application requirement, application parts, possible ways of development and their distribution and marketing. The practical part deals with Android application development. It starts with requirement definition, then comes design, implementation and publication of this application.

## **Usage of Information and Communication Technologies for creative Purpose**

**Edita Šilerová, Michal Bauer**

**Keywords:** graphics, digital painting, multi criteria analysis

**Abstract:** The aim of the diploma thesis is focused on the option of usage of information and communication technologies for creative purpose, especially digital painting. The main objective is to create graphic files for web application. For the creation process, appropriate software and hardware is chosen.

Thesis is divided into two parts. First part contains theoretical basic information acquired from specialised resources necessary for the practical part. Information includes principles of the painting, types of digital graphic and analysis of software and hardware. Second part contains multi criteria analysis of the software, specification of the used hardware, then the creation of the graphic files by using chosen software and hardware.

At the end of the thesis are summarized results and evaluation of usability.

## **Android application - theory and practice**

**Čestmír Halbich, Michal Bečka**

**Keywords:** mobile operating system, Java, Google, Google Play, Android SDK, Eclipse, Android

**Abstract:** This thesis contains comparison of mobile operating systems and the overview of the possibilities and of the architecture of mobile operating system Android. The practical part of this thesis includes analysis, implementation, testing and publishing of application for mobile operating system Android. The developed application aims to allow users to display usually inaccessible data from certain sensors of the mobile phone, information about Wi-Fi and cell connection state as well as detailed information about battery state.

## Automated and remote controlled terrarium using Raspberry Pi

Alexandr Vasilenko, Pavla Beránková

**Keywords:** Raspberry Pi, Linux, GPIO, terrarium, remote control, automation, Python

**Abstract:** This master's thesis deals with creation of functional prototype of automated and remote controlled terrarium using Raspberry Pi. The topic was chosen as a response to the growing interest in home automation, Internet of Things and increase in popularity of breeding terrarium animals. Partial goals of the master's thesis are creating overview of the concerned issues and analysing the possibility of using this prototype in other types of vivariums.

Literature research describes the controller of the prototype, Raspberry Pi, available software and hardware and basic elements and conditions for terrarium animals keeping. The prototype is based on relays controlled over Raspberry Pi's GPIO pins. The prototype controls light and temperature in the terrarium and all the scripts are programmed in Python language. The web interface for remote control runs on the Apache HTTP server and uses PHP. The prototype can be controlled from any place with internet connection. Possibilities of further expansion, economic evaluation of the project and comparison of the new solution to the current one are at the end of the thesis.

This thesis provides open-source solution for breeders and the possibility of automation and remote control. The prototype can be adjusted to the keeper's or specific animal's needs.

## Internet users privacy protection

Václav Lohr, Tomáš Berber

**Keywords:** internet, cookies, personal data

**Abstract:** This thesis is concentrating on internet users privacy protection. Its main objective is to analyze as much types of personal data available on the Internet as possible and create a systematic summary of the tools and methods for improving of user privacy on the Internet. In the theoretical part reader can find analysis of methods of user tracking and their personal data collection. For this purpose different relevant technologies has been used and a summary of them, together with the most common reasons of user tracking and its impact on privacy analysis can be also find in theoretical part. In the practical part author concentrated on identification of online signals that are acquired and collected for internet users, analysis and summary of the identified signals and on a set of recommendations for proactive and reactive approach of protection against misuse of personal and sensitive data on the Internet.

## Active Directory in modern IT

Jiří Vaněk, Jan Bílek

**Keywords:** Active Directory, Cloud, Single Sign On

**Abstract:** Active Directory in modern IT thesis describes Active Directory directory service from Microsoft company and its current development in area of cloud services. Goal of this thesis is not to generally describe cloud services from wide point of view, but describes only components regarding directory services - Active Directory. These components are however corner stones of most of cloud services as they are often using Active Directory as a service providing authentication, authorization and Single Sign on functionality.

Active Directory directory service, however it was introduced in 1999, is based on technology from early 1970s and was not basically intended to be used in internet environment. Trend in modern IT however is, to use cloud IT services and Active Directory had to be adjusted so it can be used in this environment.

Practical part of this thesis describes using Active Directory in real world scenario – using on-premise Active Directory service to authenticate cloud services.

## Software to aid teaching of object oriented programming

Martin Havránek, Pavel Bory

**Keywords:** Java, Ruby, JRuby, JavaFX, JUnit, programming, teaching of programming, object oriented programming, software design, software implementation

**Abstract:** This thesis addresses design and development of the application to aid teaching of object oriented programming. In the thesis's practical part the prototype of the application will be implemented. The application will display a configurable grid containing an image representing the actor of the simulation, that could be programmed by the user. The actor will be able to move within the grid and interact with other objects represented by images, that will be arranged in the grid. Key technologies selected for the implementation of the application are the Java programming language, the GUI framework JavaFX, the Ruby programming language and JRuby, that is the technology for Java and Ruby integration. In the thesis, the log4j for logging and JUnit for unit tests implementation are used. These technologies are analyzed in the theoretical part of the thesis and the appropriate strategy for Java and Ruby is chosen. In the initial part of the practical part, the functional and nonfunctional requirements for the application's prototype are defined. Then the user interface is designed, the application's architecture is designed as well as the most important classes for the application's prototype. After the design, the application's prototype is implemented, documented and tested manually as well as by the unit tests. The thesis also contains an example of the usage of the prototype in the teaching of object oriented programming.

## Smart house controlled by Raspberry Pi

Alexandr Vasilenko, Vít Budař

**Keywords:** ESP 8266, Loxone Smart home, smart house, sensor, Arduino, Raspberry Pi, Apple HomeKit, iNELS, ABB i-bus KNX, information systém

**Abstract:** The internet of things and the smart devices are a current trend. These concepts are used among others in the houses and homes. They allow the increasing of the comfort of the living and the lowering of the energy consumptions of the household. They can be also used in the field of the protection of the habitants and their property.

The different smart devices are offered individually, however even the interconnected systems of these devices exist. The connected devices create so called Smart houses. As the commercial systems are expensive (some of them are mentioned and compared in this work), this thesis sets the goal to come with a design and a realisation of the alternative product. The aim is to create a system providing the services set by a customer at a lower price.

The designed conception of the Smart house is presented in this thesis. The realization is mentioned as well. The monitoring of the environmental quantities and the electric energy consumption, the detection of the dangerous gasses and the control of the electric devices are done with the different sensors connected to the microcomputer Raspberry Pi with the programmed system of the control. The elements of the system are controlled by the programs running in the background. The programs collect the data from the sensors, process them and save the results to the external MySQL database. The user interface is realised as a web interface and works on the external server.

## Open data for Ethiopia

Miloš Ulman, Leul Challa

**Keywords:** Open data, Open government, Right to Information, Data for development, Government data, Data portal

**Abstract:** Governments are responsible for collecting, organising and disseminating data on different aspects of their country. This data can be accessed openly by the public or through an official inquiry. There is a recent trend of more and more governments and institutions opening up their data to the public. Therefore, open government data is not just a buzz word anymore but an essential resource for creating new business values. This thesis analyses the importance of open data and its implications for development. It discusses the open data movement, how to start an open data initiative, its demand and civic engagement. Case studies from Africa have been examined to converse the impact of open data on development. The recent open data initiative by the Ethiopian government, the Ethiopian open data portal, its merits and shortcoming were studied. This thesis also provides an analysis of open data in the current context of the country including law, technology, economy, society and organisations. Furthermore, it includes the design and implementation of an open data-driven web application on food security. The implementation also shows how a new value can be added to openly accessible data sets using freely available software tools.

## Analysis of effectiveness of the use of drones in terms of cost in various fields of the civilian sector

Václav Lohr, Barbora Chalupová

**Keywords:** RPAS, UAV, UAS, Civil Aviation Authority, flexibility of use, operation safety of UAV, economy of operation of UAVs, appendix X

**Abstract:** The diploma thesis is focused on the efficient use of UAVs in selected fields of civil sector. The theoretical part deals with basic related terms, drone categories and equipment and software. Furthermore, it is interpreted legislative framework, which extensively regulates possibilities of using drones in the EU, and the expected easing of laws in the manner of the US. In conclusion, the theoretical part is focused on the specific possibilities of using UAVs in fields divided into sectors of the national economy and the advantages and disadvantages arising from the usage.

In the practical part are determined particular cost items that are reflected in the purchase and operation of the drones, and the cost of renting. The following are case studies of selected companies, where in addition to the costs, benefits and revenues for the duration of the project are determined and quantified. For this purpose, is mainly used cost-benefit analysis, or methods for evaluating the effectiveness of investments, if the project is not beneficial for the public. Based on the results, an evaluation of the project follows and the results are used as source data for creating a calculator where new applicants can determine whether it is perspective to use the drones in their field of activity.

## **IT infrastructure security in one of the public authorities in the Czech Republic**

**Čestmír Halbich, Pavel Charvát**

**Keywords:** risk analysis, the cybersecurity act, security incident, monitoring, security

**Abstract:** This thesis deals with the way the securing the environment and information systems of the public authority. It is primarily based on the requirements of the Act No. 181/2014 Coll., the Cybersecurity Act. The main objective is to design specific security measures to ensure the highest possible compliance with the requirements of this Act. The theoretical part analyses the requirements of the Decree no. 316/2014 Coll., the Cybersecurity Decree, which is implementing the Cybersecurity Act and its impact on the public authority.

The practical part presents the authority's state of security measures comparative analysis results with legal requirements. These results indicates the need for elaboration of a missing documentation, setting out the organizational measures and the need for appropriate configuration of the security events collection, detection and evaluation tools. The increased level of compliance with legal requirements, after the implementation of the designed measures, is assessed in the discussion part of he thesis. The further steps necessary to achieve the full compliance are outlined there as well.

## **Methods of Increasing of Advertisement Efficiency on Social Network Sites**

**Václav Lohr, Pavla Cinkeis**

**Keywords:** Facebook, Twitter, LinkedIn, effective advertisement, social network, advertisement methods, social groups, marketing, internet

**Abstract:** This diploma thesis contains description of the social networks from marketing tool point of view. Based on the analysis of the selected companies and feedback evaluation from the addressed respondents, contains prepared recommendations for effectivity improvement of

the social networks usage for selected products and services support in connection to selected companies using social networks for promotion within Czech market. This drafted content is manual for promotion sponsors and promoters as well, which helps through examples and related rules how to manage this marketing channel.

Theoretical part starts with the marketing definition in relation to marketing mix and further on communication mix. In relation to the thesis purpose is described in further chapters mostly internet marketing communication, its realisation and new trends. Logically following part is focused in the social networks from high-level view, followed by concrete data about the Facebook, Twitter and LinkedIn networks.

Theoretical findings mentioned in the initial parts are used as the source of the own work finished by findings, analysis and measures. Practically are evaluated results from the addressed social groups of the marketing content recipients via social networks. These findings are compared to the theoretical sources and there are proposed several recommendation for the effective marketing communication via social networks on the end, with validity not only for mentioned subjects, but applicable widely for other companies using social networks as marketing channel.

## **Computer security and data protection in small organizations**

**Jiří Vaněk, Jaroslav Čech**

**Keywords:** Computer security, Data protection, Security

**Abstract:** This thesis is focused on computer security and data protection in small organizations. In the theoretical part are characterized selected security areas. The basic concepts for the creation of computer networks and services are introduced. Consequently there are defined security threats and prevention possibilities before them. The practical part is focused on the analysis security and data protection in real business environment. The evaluation of the areas is part of analysis where could be created a safety threat. On the basis of this analysis are applied changes in the company, which are required to improve safety. The part of the changes are the configuration of existing equipment and recommendations of purchase new hardware. The result is an overall improvement in computer security and data protection of the company.

## **The analysis of the EDI system of company by means of business process modeling notation**

**Vladimír Očenášek, Daniel Čermák**

**Keywords:** communication, BPMN, process, EDI, costs

**Abstract:** Thesis on The analysis of the EDI system of company by means of business process modeling notation based on model documentation for EDI system in selected company, looking for optimization ways for effective management with help by EDI. The theoretic part focused on explaining two areas. First of them is EDI environment and business modeling notation by standard BPMN2.0 as a second one. The practical part is deeply focused on the characteristics of an EDI system from point of view company organization. So company management achieves

a comprehensive overview of the processes with possibility to evaluate their effectiveness. The conclusion is that recommendation, based on theoretical knowledge and practical experience of author.

## Development of eGovernment services

**Jan Jarolímek, Antonín Černý**

**Keywords:** eGovernment, information system, public administration, computerization

**Abstract:** Diploma thesis deals with the analysis of eGovernment in the Czech Republic. The theoretical part characterizes eGovernment, then the thesis represents development, the most important laws and the symbols. The main part analyzes the most important projects and service of Czech eGovernment. The next section briefly introduced eGovernment in the European Union, especially projects from Estonia and Great Britain. In the first chapter of the practical part is based on statistical data analyzed state of eGovernment in the Czech Republic and In the following section, this condition is analyzed in an international comparison based on selected globally recognized ratings. On the basis of these analyzes in the third section with a SWOT analysis, characterized the current state of eGovernment in the Czech Republic. Finally are formulated recommendations that would significantly help to further development of Czech eGovernment.

## Proposal of information system for the chosen organization

**Edita Šilerová, Libor Černý**

**Keywords:** information system, proposal, projecting IS, analysis, specification of requests, life cycle, database, information

**Abstract:** Among the methods used to achieve this goal is SWOT and risk analysis, analysis of processes and user's requests and analysis of relevant documents. This diploma thesis will be used as a case study, project plan and documentation.

After realization of SWOT and risk analysis we can conclude, that implementation of information system (even for small village office) has its own real usability and solvability. Village is not in financial troubles and implementation system can be donated from own financial sources. Among the most benefits of implementation information system belong streamline of organizational processes, faster and more effective availability of requested data and informations and on-line access from everywhere. After realization of available products on the market was the village proposed for the implementation of information system use products of company GORDIC and village will this step really realize.

## Information Systems in Agriculture

**Jan Jarolímek, Hana Dastychová**

**Keywords:** Farmers Portal, Farmers Portal SZIF, LPIS, Livestock registry, Records, Subsidy, PRV 2014-2020

**Abstract:** This diploma thesis aims at exploitation of information systems in agriculture. Main goal is to analyse user interface of particular agricultural information system Portál farmáře (Farmers Portal), whose task is to provide information on agriculture and opportunity for keeping relevant records.

Theoretical part of the diploma thesis analyses development of agricultural subsidy policy and its connection to formation of agricultural information system. This part also includes the structure and emergence of presentive information system Farmers Portal, in detail on major registers: Soil Registry LPIS, Livestock Registry, Records of Fertilizers and Plant Protection Products Use. As a conclusion of a theoretical part there is a summary of general requirements for user interface and target user group of Farmers Portal is defined.

Practical part describes needs of target user group of Farmers Portal and analyzes the user interface. Particular applications of selected key parts of Farmers Portal are analyzed and according to the results, the sticking points solutions in concerned application user interface are drafted.

## **Android Applications - Theory and Practice**

**Čestmír Halbich, Karel Doležal**

**Keywords:** mobile operating system, Java, smart home, Android, Raspberry Pi, Arduino, TCP/IP, bluetooth

**Abstract:** This diploma thesis characterizes development of application for the Android operating system, distribution and application of various Android versions to the market. The first part describes of analysis requirements for high quality Android application and summary of the various views of them. The next part includes a detailed description of the architecture and development of applications for the Android operating system. The practical part is contains a description of the creation of applications for smart home, which is divided on the design and implementation of client and server. In this chapter is described communication method TCP/IP, serial communication via Bluetooth, video stream, temperature sensing and control switching components. The conclusion summarizes theoretical findings, recommendations and results thesis.

## **Recording and processing methods of sound recordings**

**Pavel Šimek, Stanislav Doležal**

**Keywords:** sound, audio formats, audio signal, compression, analog sound recording, digital sound recording, audio signal processing, microphones

**Abstract:** This diploma thesis deals with the acquisition and processing of audio recordings. First part of thesis characterized by sound and its acoustic properties. The following part of thesis describes the construction of the human ear and way how it perceives sound. Following chapters presents the digitization of sound recording and compares the most commonly used digital audio formats, which in turn are divided into several categories. Practical part of thesis compares the size of digital audio files, and presents methods for processing sound recordings that tests on model cases. Methods of processing sound recording point to the possibility of

working with the software used by the Český Rozhlas and conclude the practical part of thesis. Results are formulated based on the synthesis of theoretical and practical part of the thesis.

## Java applications - theory and practice

Čestmír Halbich, Aneta Doubková

**Keywords:** Java, JavaFX, IntelliJ IDEA, Ant, Maven, UDP, HTTP, network printing

**Abstract:** The thesis is focused on application development in programming language Java. Firstly was done the analysis of the current Java technologies, followed by the analysis of concrete application for OS Windows. According the performed analysis were chosen suitable technologies for practical solution of this thesis. The chosen technologies were used for realisation of the application primarily designed for Mac OS.

## Possibilities of using drones

Jan Jarolímek, Jan Drda

**Keywords:** Drone, quadcopter, RC model, unmanned aircraft, remote control, Agricultural, Cameras, Eachine, Spider, Syma, ICT, Europea Union, law

**Abstract:** This master's project addresses the problematics of the possibility of using drones, another objective is to analyze and compare the different three free to buy drones between himself and built one, in three different categories. Subsequently, using multi criteria analysis to formulate the results and choose the best option for the acquisition the drone. The final objective is to formulate recommendations for the using drones. Based on the data, it is possible to choose the best drone for different activity. The main result of the recommendations formulated using drones when they are acquisitioned, and when and where they are used. It is important to focus on law legislation in each country of use.

## Configuration of active network components

Jiří Vaněk, Lukáš Dvořák

**Keywords:** Alcatel, Meraki, router, switch, network, configuration, IOS, TiMOS, JunOS, Aruba, Cisco

**Abstract:** This work aims to demonstrate possibilities and ways to configure active network elements. The first part is focused on familiarization with active network elements and their importance for network. The types of operating systems, which use these elements, are presented as well. In the next part the author deals with practical configuration of the selected network. Using selected examples the network is configured by means of software utilities with real images of operating systems and even by using real hardware provided by CESNET, z. s. p. o Company. The final part discusses development in the field of operating systems of network elements backbone, corporate and home networks and basic types of these systems are compared. In the conclusion, the study evaluates the contribution of the correct choice of network operating systems based on its configuration options.

## Evaluation of the impact of social media in an organization

Miloš Ulman, Cynthia Echendu

**Keywords:** Faculty of Economics and Management, Content Management, Brand awareness, Digital Marketing, Social Media, Organization

**Abstract:** Social media has increasingly become a source of information for tech-savvy individuals hence the reason why organizations exploit its growth as a good source of marketing. This study gives an overview of why the use of social media platforms is beneficial to an organization with a focus on Faculty of Economics and Management, Czech University of Life Science. Through illustrative research of the target audience and the use of mixed techniques of analysis such as web analytics and an online survey, the research is aimed to investigate various factors that influence social media usage. The theoretical part of the research would consist of a literature review that would support the quantitative and qualitative analysis that would aid in developing recommendations which would show how to optimize the use of social media in creating a good brand image while achieving the organizational goals.

## Internet of things (IoT)

Zdeněk Havlíček, Alena Efflerová

**Keywords:** Fibaro, Somfy, Smart home, Smart things, Z-wave, IO-homecontrol, IoT, Internet of things

**Abstract:** This thesis analyzes the current and the developing situation of the Internet of things. It focuses on the historical development, the corresponding technologies and how it represents a supplier of complex solutions, or just components of the IoT solution. This document specifies a list of options that can be used in this new direction in Informatics. These options are applied to a particular house and selected the main current solutions providers for smart home with the ability to meet these options in a satisfactory manner. From these providers, the best is selected focusing on special variants with specific criteria. These solutions are described in detail and are chosen by multi-criteria selection.

## Android Applications - Theory and Practice

Čestmír Halbich, Petr Erben

**Keywords:** Android, The mobile operating system, Java

**Abstract:** This diploma thesis very closely follows my previous bachelor thesis, which had the same topic.

The theoretical part contains an extended, updated and revised version of the theory of BT. It analyzes the OS Android in terms of history, architecture, versions, data protection, competition and new technology, which runs on Android, or will be.

But practical part is already focused on the development of applications for OS Android.

Applications are created in a different development environments. In the end there is evaluation and conclusion.

## Information technologies and rail transport in the region

Jiří Vaněk, Karel Fremund

**Keywords:** railways, transport, infrastructure, region, IT, efficiency

**Abstract:** The object of this work is to provide an overview of the development and current state of information technology, which are used for organizing and managing rail transport. Specific parts of the railway infrastructure of the region show yet underestimated the potential of this type of transport. Then to show how the introduction of information technologies in the process of organizing and managing the railway transport has a direct impact on the economic operation of regional infrastructure.

## Integration of information system and e-shop solutions for SMEs

Zdeněk Havlíček, Jan Fuka

**Keywords:** SME, Information systems, e-shop, integration

**Abstract:** The theoretical part proposal of the thesis is to analyze the e-commerce market and to integrate selected e-shop with the information system in the environment of SME. Additionally, it will focus on the general characteristics of enterprise information systems, analysis of operations and activities preceding the implementation of new system and a general description of solution selection. This thesis highlights the importance of small businesses, their characteristics and it provides the set of current data on corporate information systems on the Czech market.

The second part of this thesis focuses the thesis author's practical experience obtained through the integration of e-shop and information system of Ruzovka s.r.o. Practical part will further incorporate the e-shop creation during which the chosen solution was further adapted to the changing conditions and improved. Since the implementation was actually undertaken, its real benefits for the company will be also assessed.

## Attacks and hacking in the online environment and protection against it

Václav Lohr, Lukáš Gregora

**Keywords:** attacks, hacking, security, protection, online, internet technology, WiFi

**Abstract:** The diploma thesis is focused on the attacks and hacking in online environment and protection against them. In the theoretical part was the definition of the hacking and related terms with him, including a distribution of hackers by their behaviour and mentality. In other parts was captured historical, current and future developments of hacking, with important insight into law legislation, that is different from the perspective of legal systems. With use of the current technologies used by hackers were summarized current types of attacks and for selected types, has performed their implementation in the isolated web pages with the subsequent summary of possible protections. The practical part is focused on the use of WiFi Pineapple equipment to analyse the current situation of users utilizing public WiFi networks and their devices. Using the above-mentioned apparatus was conducted research through experimental measurements and on the basis of statistical and analytical analysis showed that

up to 20 % of the recorded devices (users) is potentially countervailable by selected form of attack. In a follow-analysis was evaluate the hypotheses, expectations and assumptions, which were focused on the effects of environmental aspects and price values of devices using public WiFi networks.

## **Security software, Antivirus products, Central solution, Symantec Endpoint Protection, Virus protection, Endpoint Security**

**Jiří Vaněk, Jan Gross**

**Keywords:** Security software, Antivirus products, Central solution, Symantec Endpoint Protection, Virus protection, Endpoint Security

**Abstract:** The thesis summarizes the very basic description of the computer. It also explains the problems of security software and its individual safety components. The next section outlines the problems of cyber threats and explains in detail the different types of threats, including their behavior.

The practical part deals the actual deployment of security product to enterprise environment. His subsequent configurations for optimal use in a corporate environment in terms of security policies, communication of individual agents and the subsequent routine administration. In practical part is further analysis of the impact on customers in terms of performance and comparison the product with alternative products . In conclusion, the author summarizes all of his results of the implementation and analysis.

## **Data security in a small organization**

**Jan Tyrychtr, Milan Hora**

**Keywords:** Microsoft Windows 2012R2, security baseline, firewall, penetration test, domain policy, Active Directory, Local Security Policy, Microsoft Baseline Security Analyzer, ITIL

**Abstract:** Work is concerned in data security in small and medium business side companies. Work is focused on process creation, definition of roles, activities and responsibilities related to the data security. Work is also dealing with proposal of security baseline for application server, its creation, implementation and verification by Microsoft software products. Theoretical part is focused on description of the process creation and overview of recommended settings for security baseline. Application and verification of these knowledge are demonstrated on case study in practical part of the work. The assets for the small and medium size companies are evaluated in the conclusion of the work.

## **Selection and implementation of E-learning System in the High School environment**

**Petr Benda, Dan Huml**

**Keywords:** e-learning, LMS, education, decision management

**Abstract:** This diploma thesis is focused on modern form of education through e-learning courses. Its aims to identify and implement appropriate forms and contents of e-learning in the

organization and subsequent evaluation of deploying e-learning with respect to the future employment of the participants.

The theoretical part deals with the meaning and forms of e-learning, as well as setting criteria of a specific form and content of the e-learning system, with regard to needs of organization and requirements of its management. In the practical part, there is the selection of the most appropriate solutions, the model of implementation and at last evaluation based on feedback from the participants using the survey. Based on a synthesis of theoretical knowledge and practical results of the conclusions are formulated thesis.

## **The impact of information systems on the quality of the product**

**Edita Šilerová, Jan Hurt**

**Keywords:** Quality, Product, information systém

**Abstract:** This master's dissertation deals with the issue of linking information systems with product quality in manufacturing industry. The main goal of this dissertation is to monitor and evaluate the quality of products after a manual and software controlled production process with the help of information technology. The theoretical section explains key concepts and fundamental aspects. The empirical section evaluates measured quality of products using control charts. The company and products which are the subject of this research are also presented in this section. Subsequently, the quality of products is evaluated using graphical output and if appropriate, the deviation from the required quality is recorded. The final chapter interprets the results and the achievements of the research.

This thesis should serve as a valuable source of information for the company and it should help to assess which manufacturing process is better for their purpose and whether the information technologies affected product quality. Furthermore, it should make this issue which is very relevant today and hard to grasp more accessible. In order to protect internal information, after consulting with the company, a fictitious name for the company where the project was conducted was used in this research.

## **Web applications accessibility of assistance dogs organizations**

**Petr Benda, Martina Hybštová**

**Keywords:** Accessibility, Web, Webdesign, Accessibility guidelines, Assistance dogs, User

**Abstract:** This diploma thesis is focused on the accessibility of the internet applications. Its main goal is the analysis of the websites of the organizations dedicated to training assistance dogs for people with disabilities. The first part is the theoretical background about the issue of accessibility. The practical part contains the analysis of the three organizations in the Czech republic and that are Helpes o. p. s., Pomocné tlapky o. p. s. and Pes pro tebe z.s.. For the analysis is selected Accessibility Guidelines anchored in decree no. 64/2008 Coll, which is for public administrations and can be used for another subjects too. The actual testing is use for the detection of the accessibility barriers and on the results are make recommendations for corrections.

## OTP implementation in a selected information system

Martin Havránek, Petr Jajtner

**Keywords:** information system, implementation, security, authentication, authorisation, time-based, web-based, token, one-time password, OTP

**Abstract:** At present, it is necessary to protect sensitive data against abuse, but also allow authorized persons to change these data. To increase the security of logging for authorized persons we often introduce a two-factors authentication, where the first step is verification of the user's identity and in a second step is required to insert a one-time password called OTP. This thesis deals with implementation of OTP and integration into the selected system. It also includes test and verification of the functionality of the selected solution.

## Building a CSS Framework

Petr Benda, Jan Jeřábek

**Keywords:** Frontend, Responsive Design, Webdesign, CSS3, HTML5, Bootstrap, Javascript, SASS, LESS, UI

**Abstract:** In the theoretical part of this diploma thesis, there is given an analysis of responsive web design using CSS3. Then the CSS precompilers are analysed as well, including their functionality and advantages over traditional CSS.

Practical part includes a design of a CSS framework, described in detail, its comparison to another frameworks and overall pros of this solution.

## Aplikace Android - teorie a praxe

Čestmír Halbich, Tomáš Jeřábek

**Keywords:** Google, Smartphone, Java, Android, Vývojové prostředí, Android studio, LibGDX

**Abstract:** Tato diplomová práce se zabývá vývojem aplikací pro mobilní operační systém Android. Teoretická část práce se zabývá možnostmi při vývoji Android aplikací. Věnuje se také charakteristice vývojových prostředí a následně je porovnává. Jsou zde též analyzovány distribuční kanály pro šíření aplikací. Nechybí ani analýza konkurence mezi aplikacemi, jejich uplatnění anebo analýza obecných požadavků na Android aplikace. Teoretickou část ukončuje charakteristika monetizačních možností aplikace. Praktická část práce demonstruje využití těchto znalostí při tvorbě aplikace. Toho je docíleno vývojem nativní aplikace pro operační systém Android. Jeho výsledkem je charakteristika vývoje aplikace, a to od výběru nástrojů přes návrh aplikace, její implementaci až po distribuce aplikace.

## Android Applications - Theory and Practice

Čestmír Halbich, Tomáš Jirsa

**Keywords:** Android, mobile operating system, Java, smartphone, Google, Android SDK, Android Studio

**Abstract:** This diploma thesis is focused on the mobile operating system Android, and particularly the development of applications for the platform. The theoretical part is structured from general knowledge of mobile operating systems to chapters dealing primarily with the Android OS, which introduces the history of the platform, the architecture of the system itself, and last but not least the changes that each individual version of the system brought. The final chapters of the theoretical part are introducing the main competitors on the market for operating systems for mobile devices and typical intergrated development environments for creating applications for the Android OS.

The practical part is focused on creating a simple prototype of application with the widget for a main screen on a mobile device. It includes detailed development of application using knowledge from the theoretical part and one of the earlier mentioned development environments. The practical part also includes a successful demonstration launch of the application on the market.

## Protection of personal data in the online environment

**Václav Lohr, Tomáš Klein**

**Keywords:** protection, personal data, Law on Personal Data Protection, the Office for Personal Data Protection, closed circuit television

**Abstract:** The thesis titled Protection of personal data in the online environment is divided into several parts. The first part contains literature review of Act no. 101/2000 Coll., personal data protection and on amending some laws. This part is followed by closed circuit television (CCTV) problematics. This section is divided into subsection use of CCTV in practice, then use according to the environment and subsection about the technology of CCTV.

The practical part deals with analysis of two firms possessing CCTV. It provides information about CCTV and about the purpose of its installation. Follows up appropriate information to assess compliance with the legislativ. Following documentation of technical and organizational measures and technological charakteristics of CCTV system in selected subjects.

In the last part is created a set os recommendations applicable in general for the company, which wants to establish a CCTV as kind of its security.

## Product photography

**Alexandr Vasilenko, Martin Kochman**

**Keywords:** Product photography, e-shop, user experience testing, A/B testing, product, quality, conversion rate, profit

**Abstract:** This thesis deals with options for use of product photography for improving product presentation in specific market segment. It focuses especially on the relation between photo quality and the ability to satisfy a customer. The requirements of traders and customers gained from many resources are defined as well. Due to experiences from previous photographing, there is also evaluation of recommended approach and technique. Chosen pictures demonstrate mistakes, that have been made by the photographer. In conclusion there is a comparison of different methods of getting product photos based on economic analysis.

## Internet things as a tool for improving household

Zdeněk Havlíček, Leoš Kopáček

**Keywords:** Internet of things, Modern living, Internet, Smart home, Mobile health, Security

**Abstract:** Thesis deals with Internet of Things as a tool for improving living and security conditions in the household. The work is divided into the two parts. The first section defines Internet of Things, including the most widely used wireless technology. Then are analysed software applications for remote control of Internet of Things in household. At the end of the theoretical part is formed an overview of currently used Internet of Things devices, which is complemented by a prediction and risks associated with the use of this phenomenon. In the second part are described disposition of flat and requirements for project, which are basic materials for forming a design of smart home. For the selection suitable devices is used method of multi-criteria analysis with emphasis on compatibility of applications for managing household and voice assistant. The result of the project is remotely controllable flat with security features and fully automated environment.

## Systems and applications monitoring in the enterprise environment using IBM Tivoli Monitoring

Jiří Vaněk, Jiří Kotalík

**Keywords:** SNMP, MIB, agent, server, monitoring system, situation, event, log

**Abstract:** The diploma thesis deals with the monitoring of systems and applications in the enterprise environment. Its theoretical background characterizes technologies used for the monitoring and for a custom agent development. Introduced are the SNMP and MIB files, logging systems, the IBM Tivoli Monitoring platform, the IDE IBM Agent Builder, regular expressions, and the recommended programming languages. The thesis discusses both the agent and agentless approaches. The practical part shows a model example of the custom agent. After the task analysis, the monitoring agent is created, integrated into the IBM Tivoli Monitoring and tested. Recommendations for the logging, development, integration, and testing the agents are summarized.

## UX testing of university information system

Václav Lohr, Martin Kozák

**Keywords:** testing, UX, task scenario, usability, user experience, user-centered design

**Abstract:** This diploma thesis is focused on usability testing of University information system. The goal is to improve the user experience of such a complex system, as is.czu.cz is. This goal should be achieved through newly created design, that will be based on current design and will take into account the most commonly used functionalities by end users of information system.

## ICT in education

**Jan Jarolímek, Jan Kračmer**

**Keywords:** ICT, LMS, secondary schools

**Abstract:** The diploma thesis titled "ICT in education" is focused in first part on e-learning, mainly on LMS, used in education. Chapters deal with history, present and also future of these technologies.

In second part, thesis deals with analysis of usage of LMS at secondary schools in Prague and factors which have something to do with it. Several chapters in thesis try to compare two of LMS (Moodle and Claroline). Finally, some suggestion for proper implementation of LMS, are stated.

In the end results are compared with another authors and surveys from abroad, which deals with this topic.

## ICT in Education

**Jan Jarolímek, František Kubín**

**Keywords:** Control, Financed, Project

**Abstract:** This diploma thesis deals with the implementation of multiprojects management into the conditions of ICT in education. The aim of this work is to describe the current status of project management in the ICT in education, using the process methodology and financing the purchase of ICT equipment to schools from different financial sources. The first part of the work is focused on the description and defyning the financing of the individual types of schools and the description of the project phasing. The practical part deals with the analysis of selected primary and secondary schools and issues connected with ICT financing. The practical part of the work also compares the funding of individual schools and the way of gaining money for the purchase of ICT. The conclusion of the thesis is devoted to a summary of the achieved results and proposals for change which should upgrade the management and form better project financing and purchase of ICT. In conclusion, the author sets and proposals to improve the efficient financing of information and communication technologies in education.

## Social Networks Usability

**Václav Lohr, David Kuldan**

**Keywords:** Social network, UI specification, user, profile

**Abstract:** This diploma thesis has main goal to create UI specification of design for social networking aggregator. The first part of the theoretical basis of the work is devoted to an analysis of the current state of social networks in terms of usability. The analysis includes survey with the task to find out which social network is the most used site by users, what time they spend on sites and for what they used them. The second part is dedicated to the user interface, the principles of design and usability testing.

The practical part consist UI specification that is formed on the basis of information contained in the theoretical part. The aggregator design was given for user testing by questionnaire. Final part of work contains test results and design solutions.

## The use of electronic signatures

Jan Jarolímek, Tomáš Kurek

**Keywords:** electronic, signature, certificate, information, qualified, commercial, guaranteed, recognized, Ministry of defence, encryption, application, provider

**Abstract:** This diploma thesis focuses on the issue of electronic signature, which for the larger part of the civilized population is becoming daily a matter of course. Describes its origin, the principle and the sequence in its creation and application.

Due to the processing time of this work, when there is a change in how national and european normative acts, it is an essential part of this work an analysis of the new at the same time validly legislation, which provides for and regulates existing rules for the delivery of the certificate of electronic signature.

Thematically it focuses on the supply and use of certificates of electronic signature in the Ministry of defence. Here is described the complete process of obtaining a certificate, which starts with the selection of the provider of this service and ends with the issuing itself a certificate of electronic signature. As a downstream target, an analysis was made of information system and applications that make use of electronic signature not only in the context of the ministry itself, but even outside of it.

In conclusion, the work is evaluated the procedure of the issuance of the certificate of electronic signature, determining the number of necessary certificates, as a basis for the processing specifications of a public contract for the acquisition of an electronic signature, determining the type certificate for the specific application or information system and assessment of the readiness of the ministry to the arrival of new legislation.

## Network connection monitoring based on Raspberry Pi

Alexandr Vasilenko, Petr Kyselý

**Keywords:** internet speed, Raspbian, signal strength, Elasticsearch, Kibana, Logstash, ELK stack, connection monitoring, RaspberryPi

**Abstract:** The diploma thesis is focused on problematics of fluctuating Internet connection speed. Structurally, it is divided into two parts, namely an theoretical overview of the solced problem and own work. The theoretical part was further divided into 3 subchapters. The first chapter deals with Raspberry Pi 3 itself, which is used to a prototype creation. It is compared with competing devices and it characterizes the different operating systems which can be used. The second chapter is focused on the used tools, including the Bash shell, the Cron program and the Speedtest-cli script. The third subchapter deals with the other programs associated in the ELK Stack package. It includes Elasticsearch, Logstash and Kibana. The individual programs are briefly characterized and there are other official or unofficial tools for working with ELK Stack also included.

Author's own work deals with the construction of the speed measuring device itself. The first chapter deals with the installation and general configuration of the used equipment. The second chapter is dedicated to installing all ELK stack components and their configuration. Cron and Bash Script are also used. The following chapter deals with the problematics of measuring and recording the signal quality. Obtained outputs and the results are reviewed in the Results Evaluation chapter. The chapter Summary summarizes the benefits of the work and evaluates

the fulfillment of the stated goals of the work and it judges the correctness of the used methodology.

## **Electronic services in the sphere of labour and social affairs**

**Miloš Ulman, Pavla Lichevníková**

**Keywords:** data box, e-Government, electronic filing, forms, public administration portal, living conditions, CzechPOINT

**Abstract:** The diploma thesis is focused on electronic services of Ministry of Labour and Social Affairs. The aim is to assess the extent and possibilities of electronic submissions within the sector Ministry of Labour and Social Affairs in the Czech Republic and the Slovak Republic. Partial objectives are to characterize e-Government, electronic filing, electronic services and analyse the conditions that the selected countries develop for citizens in order to solve life situations electronically. Particular life situations are published on the portals of the public administration by selected countries. A summary list of life situations is created from data taken from the portal of the Government of the Czech Republic and portals of both countries are described in detail and compared from the user's perspective.

The practical part consists of a review of electronic services of the resort relating to state social support and foster care in both countries. The review assesses the extent and conditions of offered services to solve life situations online. The selected life situations of the area of social support foster care are explored in detail and there are proposed recommendations that could lead to complete electronic submission.

## **Web application for organizing sports competitions and events**

**Vladimír Očenášek, Tomáš Litera**

**Keywords:** Frontend, Webdesign, Cache, Mobile devices, Responsive design, Javascript, CSS, Agile methodologies, UX

**Abstract:** This thesis deals with the development of information systems, which are designed for organizing races and sports events. At this point this thesis builds on the bachelor thesis Information system for real-time processing of sports events and it expands it further. Technologies and methodologies for development of dynamic web pages with focus on the frontend application are described in this thesis. Thus on its design, user friendliness and simplicity, speed and ultimately to adapt to the wealth of today existing mobile devices. There are also outlined the methodologies of how to plan and control implementation of such project. And one of the agile methodologies is used and tested.

## **eIDAS impacts on Czech legislation and EU citizens**

**Miloš Ulman, Iveta Macounová**

**Keywords:** regulation eIDAS, electronic communication, electronic signature, e-Government

**Abstract:** The diploma thesis deals with eIDAS regulation focusing on its impact on the Czech legislation and EU citizens. The theoretical part defines basic terms and creates a theoretical

framework of the Digital Single Market within the European Union. There is also an analysis conducted on the regulation itself. The practical part is based on a case study of the impact of eIDAS regulation on the legislation of the Czech Republic. Furthermore, two selected cases examine the impact of this regulation on the daily life of EU citizens in the area of labour and social affairs. The case study had examined the impacts of eIDAS on the existing legislation of the Czech Republic in this area and on the newly adopted laws. The degree of harmonisation of domestic legislation with regulation eIDAS was assessed and it was evaluated whether it has achieved the required level of security, interoperability and reliability. In terms of its impact on EU citizens, it was assessed whether simplification in addressing specific life situations through the web portal of the Ministry of Labour and Social Affairs of the Czech Republic and the Czech Social Security Administration was achieved.

## **The Design of the Modern Infrastructure Network**

**Jiří Vaněk, Lukáš Mádr**

**Keywords:** LAN, switch, active components, passive components, copper cables, network design, topology

**Abstract:** Diploma thesis Design of the Modern Network Infrastructure deals with the design of a model of the network infrastructure for the Police of the Czech Republic, taking into account the specific features and needs of the organization. The theoretical part contains basic theoretical background of network technology, its components and topologies. In the practical part there is an analysis of the needs and specificities of the computer network in the environment of the Police of the Czech Republic and its implementation into the building, where it will be involved, with emphasis on its security, speed and redundancy. The work also includes evaluation of the proposed options with regard to their quality and price.

## **Java applications - theory and practice**

**Čestmír Halbich, Miroslav Mareček**

**Keywords:** Java, computer architecture, GUI, interface

**Abstract:** The aim of this thesis is to characterize the foundational aspects of the Java programming language and the development of applications with it. As an exemplary application on which to demonstrate the findings, we will use Nand2Tetris playground, a simple education application, some of which's aspects will be analyzed within the thesis. The aim of the Nand2Tetris Playground project will be to propose and implement a graphical user interface for the first part of the Nand2Tetris computer architecture course, created by Noam Nisan, Ph.D. and Simon Schocken, Ph.D. In this part of the course, the student is tasked with assembling all the basic boolean logic gates and several other basic parts using only NAND gates. Software for this part already exists, but can be user unfriendly, especially for a student not well versed in computer science. This is why the GUI that will be proposed and implemented will make the course more accessible even to students not very proficient in the area.

## ICT in Education

Jan Jarolímek, Jiří Mašek

**Keywords:** ICT, education, teacher, student, ICT coordinator, eEducation, teaching aids

**Abstract:** This thesis deals with the issue of information and communication technologies in education. The first part is focused on definition of ICT, historical progress and meaning in education. Next part is summary of sorts of use information and communication technologies in the educational process.

The practical part of this work is focused on analysis of selected high schools and describe their use usage of information and communication technologies in the educational process. Next practical part is comparison of selected high schools and their procedures of integration of ICT including practical examples. There are some suggestions for improvement of effective integration of ICT in the educational process written by author of thesis.

## Analysis of impacts of deployment of information system in construction company

Miloš Ulman, Lukáš Matěna

**Keywords:** company, criteria, effectiveness, information system, construction

**Abstract:** This thesis analyzes the impact of the introduction of an information system in a construction company, evaluates the entire process of managing construction contracts. The main group are described construction companies and processes from tendering zjištění contract, its implementation after the handover. The main priority was to study the issue, from which it is then based on the analysis and processing of the topic. A secondary aim was to compare the services of individual information systems and determine how building firmám suit. First, Qualitative investigation was conducted in a given building company, followed by a quantitative survey using a questionnaire and among users of information system in building companies on a variety of job titles. In the end, there is statistical analysis.

## Performance optimalization of database systems

Jan Tyrychtr, Jan Mikolášek

**Keywords:** performance, relation, database, table, database index, search, sorting, compression, optimal path, query, time complexity

**Abstract:** The main goal of this thesis is to identify the appropriate means for performance tuning of relational databases. A relational database is the foundation of almost any information system, and hence its performance affects the overall performance of the system. The performance is based on physical and logical draft of database architecture and also a regular verification of the design and reaction to changing requirements. The aim of this study is to determine the correct procedure for designing relational databases, to identify key areas that need to be addressed in the design. These areas will then be practically verified on a fictitious database using database systems from IBM, Oracle and Microsoft. At the beginning methodology for this work will be specified to achieve the main objective of this thesis. The following section will describe the theoretical foundations of the individual components of the

relational database and the parts that have the impact on relational database performance. There will be a fictitious database which will be used in practical part to examine behavior in different situation. In conclusion, the results will be used to determine the proper process of relational database design provides optimal performance in a variety of ways of implementation.

## **Implementation of VoIP telephony in selected company**

**Martin Havránek, Tomáš Mrázek**

**Keywords:** VoIP, telecommunication, Asterisk, FreePBX, Cisco VoIP, virtual PBX, digital telephony, computer networks, SIP, implementation

**Abstract:** The thesis is focused on the selection and implementation of VoIP in the company Kolektory Praha, a.s.. In the theoretical part are defined basic concepts of VoIP technologies, describes the history, the operating principle of this technology and presents selected manufacturers in this field. In the practical part is the selection of components for the design of a new telecommunications system for the selected company. Subsequently described the implementation of PBX and configure each phone device. Finally, it assesses the functionality of the implemented solution and discussed issues related to the implementation and operation of VoIP telephony.

## **Analysis of open source web content management systems**

**Miloš Ulman, Taisir Obad**

**Keywords:** CMS, Open Source, CMS Comparison, PHP, Modx, Drupal, Joomla, WordPress

**Abstract:** The diploma thesis primary objective is to analyse and evaluate of open source web content management systems (WCMSs) based on approaches of design and implementation methods. These methods were evaluated using decision making scoring (Multiple Attribute Decision Making - MADM) and criteria are chosen according to ISO/IEC 25010 quality standards and many features from the website's business perspectives. For the analysis, comparison and evaluation, four content management systems (CMSs) were chosen (Modx, Drupal, Joomla and WordPress) which are popular nowadays. Based on the research results, WordPress was indicated as the most suitable CMSs.

Partial objectives of the thesis are to compare different design approaches, implementation of web presentation using CMS and practices of manual coding. First website was built using the selected CMS and in the last sections, the second website was built by manual coding (HTML5, CSS3, JavaScript and PHP) to analyse the details and results were summarized. The website was hosted on a real domain supplied by the web hosting provider. This work covered major areas of design and implementation of web application built in CMS. The research concludes that all four CMSs are powerful tools to manage the websites. These tools have different functionalities and capabilities based on diverse scenarios which make one of these four CMS options a perfect fit for the key web functionalities.

## The development of the integrated operational centres of the Police of the Czech Republic and their importance for society

Edita Šilerová, Luboš Odcházal

**Keywords:** operational centre, Police of the Czech Republic, information systems, integration

**Abstract:** At the Police of the Czech Republic there has been the process of integration of its operating centres in recent years. The thesis analyzes this process, which was considered to be an important and inevitable part of the evolution of these centers. The reference is, in particular, the transition from the original communication and information system Dispečer - Maják 158 on the new information system JITKA - uniform systemic information technology and communications platform. These systems represent the original work of operating centres and the new system implemented after integration of the operational centres of the Czech Republic Police. The subject of the work is the comparison of the two systems, the appreciation of differences and laying out the benefits of the new system against the original. The general focus of policing concerns priority ensure safety within the society. The result of this work is the appreciation of the importance and benefits of this change within the Police of the Czech republic for the society.

## Realization of e-shop on open source base

Pavel Šimek, Vladimír Pacejka

**Keywords:** Content management system, Open source, E-shop, E-commerce, PHP, HTML, CSS, XML, CMS

**Abstract:** This diploma thesis is thematically focused on realization of e-shop based on open source solution. The goal is to analyze the possibilities of realization of a working e-shop solution with specific realization based on chosen open source e-commerce solution with the realization of connection with and accounting software for the use of small and mid-sized companies. The thesis with the use of PHP, HTML, CSS and XML demonstrate the realization of e-shop using a content management system and its extensions. Suggested solution satisfies the requirements for a functional e-shop, its administration, order creation and the creation of invoices and also the synchronization of the stock items with the accounting software. The solution is open source based and it's suitable for beginning and small companies and it could be used as a manual for making an equivalent or similar e-shop.

## Use of Social Media for Marketing and Promotion of B2C business and its effect on overall reputation in the Czech Republic

Petr Benda, Yuriy Partala

**Keywords:** social media, business, company, advertising, budget, B2C, propagation, campaign, strategy

**Abstract:** The main goal of the thesis is to compare several B2C companies in the Czech Republic, determine how they use widely social media in business, and analyze their marketing campaigns. Partial goals can be characterized as follows: to analyze how these companies differ in ways of using media promotions, to determine which social media is more widely used in

the Czech Republic, to ascertain which type of advertising is more popular across these companies.

The methodology of this study is based on analysis and synthesis of technical information resources dealing with selected issues. The theoretical part analyzes the literature of Czech and foreign authors. The main method of gathering information for a practical part is the visual analysis of marketing campaigns. The practical part of the diploma work is based on SWOT analysis, benchmarking, financial analysis and regression. The last chapter of the work is a discussion chapter.

## Social Network Analysis of University Profiles

Václav Lohr, Ondřej Peroutka

**Keywords:** Social Network, Facebook, College, University, Marketing, Promotion, Communication, Efficiency, Data Envelopment Analysis, DEA

**Abstract:** The purpose of this master thesis is to verify the communication efficiency of certain faculties of public universities in Prague via the social network Facebook. In the theoretical part of the thesis, terms such as social media, social networks and viral social sharing are defined. The thesis continues with a description of the history of social networks and characterisation of the most popular social networks, social media marketing and its use in the educational sector. The last part of the thesis focuses on public universities in Prague, their various faculties and their social network accounts that are being administered by them.

In the practical part of the thesis, the criteria for the data selection from identified social network pages are defined. Subsequently, such data are statistically described. To determine the communication efficiency, the Data Envelopment Analysis (DEA) method has been chosen. The DEA-based output-oriented CCR model, which assumes constant returns to scale, is applied. Another DEA-based output-oriented BCC model, which considers variable returns to scale, is also applied. Specific recommendations are formulated based on identified values of efficiency.

## OS Google Chrome - theory and practice

Čestmír Halbich, David Plecháč

**Keywords:** Google Chrome, Google Chrome OS, Chromium, Chromium OS, IoT, M2M, Chrome management console, Chromebook, Chromebox, Chromecast, Chromebit

**Abstract:** The thesis is focused on the characteristics of the key features of the operating system Google Chrome OS and on the evaluation of deployment of this operating system in practise. The theoretical part describes the purpose and philosophy of the commercial operating system Google Chrome OS and its relation with Chrome web browser. The connection with open-source projects Chromium and Chromium OS is explained. Details of application development and deployment options, in the form of virtualization and domain administration, are analysed. The practical part applies theoretical knowledge from the development of applications for Chrome OS to create thin client application for remote control of hardware sensor over the internet. This sensor is designed and built on the platform Arduino. The sensor measures the temperature and humidity of the ambient air and remote controls high-voltage switching relays.

Communication over TCP/IP uses modern MQTT protocol, for which the server is configured with MQTT Broker Mosquitto.

The next section demonstrates the procedure for building a customized build of Chromium OS from the publicly provided Google source codes. Based on the evaluation of the acquired theoretical and practical knowledge, I assess the possibility of deploying the Chrome OS in private and commercial areas.

## Creation and operation of e-commerce

**Eva Kánská, Jan Pospíšil**

**Keywords:** E-commerce, E-business, Online marketing, Marketing mix

**Abstract:** The main purpose of this thesis is to define the key phases of creating and managing successful e-commerce business. Further on, the thesis concentrates on the analysis of factors which have crucial influence on these phases. All the particular steps are monitored on GameKing.cz, as a real online store, created for the purpose of practical process and improvement analysis during its operation. The conclusion is an evaluation of the improvement results, which are based on comparison of key parameters of the store's success within the same period in two years in a row. The thesis represents a complex methodology of starting up an online store for aspiring entrepreneurs.

## Draft of optical network in country house

**Martin Havránek, Jiří Prek**

**Keywords:** Optical access network, light, single-mode, multi-mode, optical fiber, optical cables, ending, fiber protection, connector, FTTx

**Abstract:** This work is focused on suggestion and realization of an optical connection in a country house. These technologies are getting more and more to foreground due to its typical quality. The object was connected by wireless fidelity network (Wi-Fi) until now and owner was not satisfied with such a kind of connection. It was really necessary to construct and then realize some special suggestion for this customer to provide him fast internet connection even though he lives in a small village. After successful implementation of suggestion there was made final configuration of optical elements and carefully tested functionality of connection.

During construction was taken emphasis on simplicity and efficiency of solution and thoughtful putting and hiding cables at the same time, so the customer almost didn't know about it. In the final part, customer informed a company about the functionality of a network after some time of using.

## The Role of Web Design and Web Accessibility in Attracting New Customers to the Business

Petr Benda, Sanko Krystyna

**Keywords:** Web Design Web Accessibility spending power, disabled people HTML CSS Java Script PHP, Web Content Accessibility Guidelines Survey Business Click Away

**Abstract:** The Role of Web Design and Web Accessibility in Attracting Customers to the Business the purpose of the given Diploma Thesis is to analyze the benefits of improved Web Accessibility and Web Design not only for the users with special access needs, but also for the organizations. The Thesis is composed of theoretical and practical parts. In theoretical part the essences of both Web Design and Web Accessibility are introduced, their definitions, main elements, and techniques are demonstrated. Last subchapters of theoretical chapters are analyzing the impact of Web Accessibility and Web Design on organizations performances, and how firms can benefit from improved Web Accessibility and Web Design of their websites. The practical part of this paper is devoted mostly to Click Away Crown Research 2017 and its results interpretation, its background, aims and findings. Click Away Crown 2017 is a research Survey, aimed to investigate the online shopping experience of people with physical impairments in the Czech Republic, and thus, analyze the costs for the organizations of neglected Web Accessibility compliances, and Web Design conformities of commercial web pages. The last chapters of the Thesis Conclusions and Results & Discussions are devoted to summing up both theoretical and practical chapters and to analyzing the results of the knowledge gained in all chapters of the Thesis.

## The Swfit Programming Language

Jiří Vaněk, Soukeník Marcel

**Keywords:** Apple, Swift, Mac, Programming languages, Computer Science, Open Source

**Abstract:** This thesis topic is about The Swift programming language. The main aim of the thesis is to provide defining functionality of the Swift language and complete research about this language. Also on practical examples demonstrate syntax and use of the Swift language. The thesis has several sections. The theoretical section is to provide all information about the topic. The practical section is to show: an analysis of source code and syntax, implementation covering features of the language and comparing syntax and performance of other languages. Final section summarizes all results and observations.

## Internet Marketing

Zdeněk Havlíček, Kamila Spurná

**Keywords:** Marketing, Internet Marketing, SEM, SEO, PPC Advertising, Facebook, Sklik

**Abstract:** The thesis focuses on the issue of internet marketing. The theoretical part delimits the term marketing and internet marketing in detail. In the thesis individual tools for internet marketing are characterized and described according to their usage. In the practical part of the paper, the subject requiring a proposal of online marketing strategy, which is later implemented by using chosen tools of internet marketing, is characterized. In the proposal the mental framework See-Think-Do-Care by Avinash Kaushik is used. The success rate is subsequently

evaluated by the chosen metrics. On the grounds of results recommendations for optimization and further development of the strategy are drawn up. In the conclusion the findings following from the implementation of the marketing strategy and its evaluation are summed up.

## Application testing in terms of usability

Zdeněk Havlíček, Tomáš Steska

**Keywords:** Testing, Analysis, Reporting, Test analysis, Project, Methodics

**Abstract:** Nowadays, software is becoming a standard of our daily lives. With growing number of technologies around us, we are relying more and more on their functioning. Due to that greater emphasis is placed on testing, which should secure good functionality using various metrics and methods.

In the framework of the research the essential summary of testing is provided ranging from terminology, basic descriptions of test models, stages or types of tests, to complex chapters focusing on creation of analysis, design of tests, and compilation of test plan as the core of the project. The last part of the theoretical chapter is devoted to methods for evaluation of quality and usability.

Practical part uses the theoretical framework in order to create testing plan with all its requirements, analysis, settings of reporting, and quality evaluation applied on the case from banking sector. As a component of analysis proposal various test cases including suggestion for automatization are prepared.

The expected outcome of this thesis is the testing scenario, which includes proposal of reports and methods for future testing of graphical interface.

## Usability of web applications

Václav Lohr, Tomáš Svěrák

**Keywords:** Human centered design, user experience, user testing, usability, utility, interaction design, user interface, information architecture

**Abstract:** This thesis concerns usability of web applications and method of qualitative user testing. The theoretical part presents the concept of usability in the context of the field of user experience and its disciplines.

The practical part presents the application of the method of qualitative user testing by Steve Krug of University information system of the Czech University of Life Sciences in Prague. By the application of this method are identified usability problems of University information system. The result of the thesis is interactive prototype that suggest how to fix found errors.

## Implementation of Business Intelligence solution

Jan Tyrychtr, Petra Šamanová

**Keywords:** implementation, OLAP, data warehouse, data mart, analysis, decision, reporting, project management, Business Intelligence, data mining, ETL, BI

**Abstract:** The aim of this diploma thesis is to describe current state of field of Business Intelligence solution and its implementation in the corporate environment. The theoretical part of the thesis explains concept of Business Intelligence (hereinafter BI). The thesis covers characteristics of BI solution, its every single step of development from analysis and design through the implementation in the company.

The thesis also pays attention to every part of BI. From the data sources, data warehouses, data marts, components allows to transform data between the systems and the data warehouse, further to the analytical layer and tools providing system to end users, explanation of data processing and methods of presentation. Last but not least it summarizes the main benefits of BI solutions.

As the thesis focuses on the use for analytical data processing in the company one part of thesis pays attention to the development and use of reporting for the purposes of presentation and planning. The output of the analytical part of the thesis will be successful development of BI tool for the company and at the conclusion of its overall evaluation and use.

## Using of PPC systems

**Pavel Šimek, Jiří Šejnost**

**Keywords:** Campaign, Optimization, E-shop, Internet shop, Internet marketing, Online sales, Adwords, PPC, Google, Seznam.cz, Sklik, Zbozi.cz, Heureka.cz

**Abstract:** This thesis is about using of PPC system in practise. Work describe realizing 6 PPC campaigns of electronic shop NejlepsiAutozarovky.cz.

First part describes the theoretical background in chapters' internet marketing, website as primary communication channel, online marketing tools, online advertising, web analytics and PPC systems define given problematics.

In practical part of own work is described the implementation of individual campaigns in different PPC systems. There is described creating, checking and optimizing all campaigns. In part results and discussion is a comparison of each campaign, evaluation of the advantages and disadvantages and complete results, including financial results.

The main objective is comparison different PPC systems for selected e-shop. Partial goals are: implementation of individual PPC systems, optimization and evaluation of each campaigns and characterize principle of PPC systems.

## Electronic services of the public administration in the resort of the labour and social affairs

**Miloš Ulman, Pavla Štěpničková**

**Keywords:** data boxes, a valid qualified certificate, Social Security, Czech Social Security Administration, Labor Office of the Czech Republic, electronic services, Czech Republic, electronic communication

**Abstract:** The diploma thesis deals with the evaluation of electronic public administration services in the Ministry of Labour and Social Affairs, which offers Czech Social Security Administration and the Labour Office.

The work is divided into two parts. The first part focuses on the issue of Social Security and its components, the Czech Social Security Administration, Office of the Czech Republic labor and services currently offered by the two institutions.

The second part deals with the evaluation of electronic services qualitative and quantitative data collection method. As a quantitative method used questionnaires, as a qualitative method was used shopping mystery. The conclusions of the evaluation are summarized in the SWOT analysis.

The final section summarizes the results arising from the questionnaire, mystery shopping and SWOT analyzes and recommendations are designed to improve electronic services and increase the number of users of these services. Such recommendations are designed electronic identity cards, mandatory data boxes for individuals to create a portal where the services of the Czech Social Security Administration and the Office of the Czech labor available in one place.

## **Electronic services for life events in the public administration**

**Miloš Ulman, Martina Šušková**

**Keywords:** Information system, public administration, e-Government, Czech POINT, data boxes, electronical signature, electronic submission, regulatory costs, labour costs, overhead costs

**Abstract:** The topic of the diploma thesis is Electronic Services for Life Events in Public Administration. The aim of the work is to analyse and assess costs on electronic services provision for chosen life events in public administration. The thesis is divided into two parts, theoretical and practical. The theoretical part is focused on eGovernment and its parts, further, the structure, organization and central agencies of public administration are described. Next section of the literature review is focused on the Methods for Measurement of Total Costs on Implementation of Duties Given by the Regulator developed by the government. In the practical part, costs for provision of chosen services will be compared and then evaluated with a SWOT analysis from the office perspective and from the user perspective.

## **Electronic communication between public administration and business entities**

**Miloš Ulman, Martina Tichá**

**Keywords:** open data, Czech POINT, data box, basic registers, e-Government

**Abstract:** The aim of this thesis is to identify the basic obstacles leading to more effective electronic communication between business people and state administration. Patrial goal of the thesis is the analysis of the current state of the e-Government and the analysis of its strong and weak points, possibilities and dangers.

The accomplished SWAT analysis in the Czech Republic, concerning the development of the e-Government, has shown both conceptual and technical imperfection. The reform of the public administration has not been finished yet and the e-Government infrastructure goes hand in hand with it. This state has negative impact on the effectiveness of the state administration, on sharing information between individual offices and also on the quality of service and activities which are being offered to the clients of the state administration - to citizens and business people. The analysis has offered suggestions and recommendations of further development of the e-communication.

The research of the quality of the case study of two business entities has shown the unprofessionalism and unwillingness of the clerks of the state administration to communicate electronically with their clients. Both the clients and the clerks of the state administration are not motivated by any resort of the public administration to use the e-communication. The amount of using the e-communication effectively and the number of complete e-submissions is very low.

Valid legislative, which is being implemented within the European Union, and also the standards of the cyber security are on a good level in the Czech Republic. The big obstacle for the business people is being represented by current state of paperwork which is growing and therefore limiting the business freedom.

## **Environmental variables acquisition and evaluation**

**Alexandr Vasilenko, Vladislav Ulrych**

**Keywords:** sensor, station, minicomputer, monitoring

**Abstract:** The thesis is devoted to monitoring environmental values especially in an environment of small technological room. This work contains a description of space in technology rooms, method of calculations and proposals for correctly dimensioned cooling and determining ideal places for measure. After description of space in the room individual sensors and detectors are selected. There are introduced physical principles, use and meaning. Thesis also includes exploration of current market - individual company portfolios that offers ready-made solutions. Assembling of measure device is implemented in steps, namely the physical assembling of hardware components, probes preparation, operation system installation and network configuration. Installation of a web server and settings components that provides web presentation of measured physical values. Measuring device is linked to centralized monitoring system Zabbix with widespread SNMP communication protocol. Output of thesis can be used for monitoring fundamental quantities in a small server room or switch room.

## **Use of wireless technology in the home environment**

**Jiří Vaněk, Jan Urban**

**Keywords:** Wi-Fi, Smart home, ICT, ZigBee, Bluetooth

**Abstract:** The diploma thesis deals with the issue of wireless technologies and their using in the homes. The theoretical part is consists of describing wireless technologies that are nowadays commonly used, including their evolution to the present. And then the smart home is introduced with all the possibilities which can be used by the presented technologies.

In the practical part there are described fictive homes located in a block of flats on which the design of two smart homes is realized. These designs are complemented by plotting individual elements to plan as well as financial requirements for the variant. The first variant is characterized by the needs of installation by an authorized technician whereas the second one can be installed on your own. Then the both variants are multicriteria analyzed and by the selected criteria the first option is the better one.

## ICT implementation in selected company

**Martin Havránek, Vácha Lukáš**

**Keywords:** ICT, hardware, computer network, multi-criteria decision analysis

**Abstract:** The thesis is dedicated to the ICT infrastructure and multi-criteria decision analysis. The first part deals with comprehensive information on standards, hardware, software, computer networks and security. Based on scientific literature and define the knowledge and theoretical principles of computer network infrastructure. The second part is devoted to the implementation of the proposal itself infrastructure for a private company. Based on the theoretical research is a comprehensive network design that is appropriately designed preselected spaces and requirements of the customer. Furthermore, made the selection of appropriate software and the methods of multi-criteria decision analysis performed a selection of important hardware components.

## Development of web application based on open data

**Miloš Ulman, Villanueva Duran Mario Nivardo**

**Keywords:** Data set, Open Data, Reuse and Redistribution Data, Foreigners in the Czech Republic, Open Data, CEZET Map, HTML5, CSS3, Web Application, JavaScript, Highcharts JS, Software development process

**Abstract:** This thesis attempts to explore and provide an overview of Open Data in Czech Republic. Mainly focused on data set of registered foreigners living in Czech Republic based on open data set of Czech Statistical Office CZSO.

A web application will be developed using a responsive design based on the software development process (SDLC) using HTML5, CSS3 and JavaScript. In order to make an interactive application will be used CEZET Map to create an interactive map of the Czech Republic and Highcharts JS to create an interactive charts which makes the statistics more understandable in the eyes of any user without the need to have knowledge in statistics because users has the options to interact with the Charts to focus on the statistic they are interested in. Furthermore concepts about open data and how it can be useful in different areas will be explained with examples of applications using open data. In this digital age open data is very likely to increase with the rise of the Internet, because it stands for the changing relation between citizens and government. In these days many citizens no longer accept the passive stance representative democracy held for them. Open Government is to be seen in the context of citizens rights: the right to actively participate in the process of agenda-setting and decision-making.

## Security and monitoring of local network

Martin Havránek, Václav Vítek

**Keywords:** LAN security, Wi-Fi, WEP, WPA, WPS, HTTPS, Sniffing, Phishing, Dictionary attack, Man in the middle, Brute force, ARP spoofing, DNS spoofing, Social Engineering

**Abstract:** This thesis describes the problem of computer network security and data transfer security in local area networks. It is mainly aimed on wireless networks, which are more vulnerable against threats and attacks from outside the network, compared with wired local networks.

The work analyses options of a network communication sniffing methods and a wireless security. It looks for threats in mentioned security options and warns against possibly attacks, which can break through or bypass these security options.

In the practical part of this thesis are realized penetration attacks against various security settings and perform sniffing methods on a wireless local network.

At the end of the thesis are made suggestions how to proper secure wireless local network for personal or business usage.

## The utilization of unmanned aerial vehicles for aerial mapping

Jan Jarolímek, Daniel Vobinuška

**Keywords:** drone, UAV, mapping, ArduPilot, maps, autonomous flight system, Unmanned vehicle, multicopter, hexacopter

**Abstract:** This master's project is focused on the demonstration of the utilization of unmanned aerial vehicles (UAVs) for aerial mapping and continuous map created of captured images. In theoretical part is first explained the definition of unmanned vehicles. Followed by the introduction to the history of drones, including the beginning of the use of these vehicles for mapping. In the following sections are described the types of UAVs, legislative restrictions for its use (especially in the Czech Republic), deployment of drones for aerial mapping, other possible use of output data, difference drones to conventional aerial vehicles, other possible use of drones and its basic parameters. At the end of the theoretical part is described the control system and introduced expected future of drone evolution.

Practical part describes the used drone and its necessary accessories. The following chapters explain pre-flight preparation, including recommended parameters option of the camera. There are described methods used to perform the mapping in the next chapter. Followed by the description of mission perform and analysis of output data. Acquired data is processed in several software tools and the output consists of a continuous map. The outputs are compared per selected criteria. The end of the practical part contains the final summary of this master's project.

## Technology platforms for Internet of things

Zdeněk Havlíček, Darek Vodrážka

**Keywords:** Internet of Things, sensor, wireless data transmission, Sigfox, LoRa, IoT

**Abstract:** This diploma thesis discusses wireless communication technologies that uses Internet of Things. Mobile networks LTE-M, NB-IoT and wireless LAN are described. But mainly it is dedicated to Low-Power Wide-Area Network technology problematic and it presents major representatives of LPWAN: IQRF, Sigfox and LoRaWAN. Attributes, topologies and significant techniques of those representatives were explored. Furthermore, it describes primary aspects of radio wave transmission, its parameters and effects that affect them, unlicensed frequency bands, IoT safety, possible areas of use and application of Internet of Things technology. At last the thesis is dedicated to Sigfox and LoRaWAN service verification, with use of measurement and analyzation of signals and is evaluated viability of using those communication technologies for reading data from electricity meter, gas meter and hydrometer in block of flats typed house in Prague.

## Cloud computing in a sector of small and medium-sized companies

**Edita Šilerová, Votápek Jan**

**Keywords:** Cloud computing, cluster, data security, deployment, private cloud, availability, SaaS, TCO, thin client, virtualization

**Abstract:** The data stores available via internet connection is what cloud represents for majority of people. Cloud computing in a sector of small and medium sized companies is the main focus of submitted thesis. Presented technology allows distributing computing power over the Internet. The main aim of the thesis is to process analysis of the cloud computing solution in the selected company and to compare with previously used solution. According to the analysis results are presented the key features of examined technology. The theoretical part analyzes the current state of cloud computing, closely related technologies and processes. The inductory part is supplemented by development of surveyed field and all aspects of financial analysis. In the application part is analyzed in detail the Eurowag Company Inc and its cloud solution. Initially is the system divided into user and administrator environment. Admin part is further divided into hardware, virtualization and software part. The following cost analysis focuses to the financial aspect of the selected solution and compare it with the previously used solution. In the end are defined the key characteristics of cloud computing that are based on the previous analysis. The thesis is concluded with the final assessment and recommendations.

## Web design for disabled users

**Petr Benda, Dana Vykysalá**

**Keywords:** Web design, disability, HTML, CSS, visually impaired, accessibility

**Abstract:** The main objective is to introduce the creation of accessible websites for visually impaired users by using currently available technologies.

The theoretical part consists of characterizing groups of disabled people, visually impaired work with the Internet and available technology and equipment. Another objective was to characterize the concepts of HTML and CSS, its structure, rules and accesible pages methods.

The practical part consists of a separate creation of websites for the visually handicapped with regard to accessibility guidelines. Subsequently were described the problems that arise with creating the pages and their subsequent solutions. Also in this section the site was made accessible through manual and automatic controls.

## Electronic services of public administration for health

Miloš Ulman, Ph.D., Dita Zarembová

**Keywords:** IT technology, electronic services, public administration, medical field, health, healthcare, eHealth, electronic health record (IZIP), telemedicine

**Abstract:** The present Masters thesis focuses on computerization of a public administration in the health care. The research section of the thesis describes basic terms and aspects needed for understanding the topic. Further, the research describes the current state of the health care, especially on the electronic receipts for medications. The data for description was obtained by questionnaire of broad public and doctors. The key information were obtained by discussion with MUDr. Miroslav Ouzký, one the co-founders of IZIP company. The additional information were taken from two practitioner doctors. The aim of the thesis is analysis of the nowadays services in the health care in Czech Republic.

## Graphical representation of identity management data

Miloš Ulman, Vojtěch Zelený

**Keywords:** Active Directory, Identity management, graphical presentation, Facility management, web development, windows server, information system, thin client

**Abstract:** The thesis Graphical representation of identity management data deals with the implementation process and design of a web based application for employee seating and printer locating. The thesis is divided into two main sections, theoretical and practical. The theoretical part introduces essential terms and methods related to identity management. It focuses mainly on identity management methods and technology, which is implemented in practical part and on describing of third party solutions on market. The practical part applies the gathered and analysed information from the theoretical part. Its goal is developing of a web based system in ICZ company for given requirements. The development began by selecting and engaging key project stakeholders. Then process analysis was created, system designed, and its influence on business processes described. The conclusion describes how the project goals were achieved and what issues were encountered during the development. Then future development and its cost is proposed.

## Learning application development for Central School of Sokol

Miloš Ulman, Zíková Kateřina

**Keywords:** Central school of Sokol, educational software, design

**Abstract:** The aim of this master thesis is creation of the educational app for Central school of Sokol, versatility section. The app should aid current and future trainers in their practice.

The thesis is divided into two main sections. Theoretical section describes problems during the training of future trainers, theoretical findings needed for designing the program, as modeling using the UML, database types and graphic design. Practical section is dedicated to the design of program itself, creation of diagrams, design of database and programming of the educational app.

## **Analysis of WiFi security in Czech republic**

**Jiří Vaněk, Jakub Zima**

**Keywords:** WiFi, security, network, analysis, wireless network, monitoring, Czech Republic

**Abstract:** Wireless WiFi networks are very important element of today society. They are used in households and in companies too. This networks usually transfer important and sensitive data, which can be abused by potential attacker. So, it's important to protect these networks with strong security, which will protect them before abusing. In author's opinion these WiFi networks in Czech republic are very vulnerable.

Primary goal of this thesis is to analyze security of WiFi networks in street Evropská in Prague. This street contains great amount of accessible networks, which can be analyzed. Analysis results will provide information, which encryptions are used in these networks. These types of encryptions will be pentested on local network. Pentesting will reveal weak spots and possible threats. At the conclusion of this work will be proposed recommendations that could improve the effectiveness of existing security to help protect sensitive data.