

APPLICATION OF DIGITAL CYBERSECURITY APPROACHES TO UNIVERSITY MANAGEMENT – VFU SMART STUDENT

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ABSTRACT

This paper suggests digital approaches in university management. Digital transformation requires leadership that can maintain and balance competing interests from faculty, administrators, students and others. The team of Varna Free University designed a flexible proper solution VFU SMART STUDENT aiming at lower operating costs and better performance is application of cloud technologies. It is a web-based information system for provision of e-services to VFU students, which provides comprehensive information about the student from their enrolment until their graduation. Network monitoring system is used to make the transition easier, and to improve network effectiveness. Security policy, procedures and guidelines are adopted to guarantee seamless operating of networks and systems.

KEYWORDS

e-management, cybersecurity, network, servers, digitalization, university

1. INTRODUCTION

In the last few years, technology underpins everything in higher education, administration, academics and IT. The IoT is about every connection on campus and it can drive improved outcomes—intelligent connections deliver efficient operations and improve safety and security, while video and collaboration provide better teaching and learning (Kylie Lacey, 2016). Universities need to accelerate the integration of technology into the institute, enabling students to harness technology in ways that give them more flexibility and increase efficiency. This is an absolute must as students expect to have access to the best tools for collaboration and execution. Technology has changed the face of how this generation called Millennials interact with brands and this is true of universities as well. Digitalization of student services, library facilities and administrative assistance will not only help the institute simplify processes but also help students engage with their university in a more familiar setting.

“There is an urgent and immediate need for educational institutes to start speaking the same language as their students – The digital tongue” (Michelle Melbourne, 2015).

The knowledge based society of the 21st century turns production and knowledge management (KM) into a sector of primary importance. The great potential for synergy between knowledge management and the intelligent approaches to university management seems obvious given the numerous interrelations and dependences in these two areas. The relation between them, however, is not completely understood and mastered. Currently, the e-learning technology is mainly used for preparing teaching courses in topics chosen according to the educational needs. The knowledge management technology is applied for quick mastering, organization and provision of significant quantities of corporate knowledge.

Some authors consider the integration of e-management and knowledge management technologies in order to improve the mastering, organization and provision of significant quantities of corporate knowledge (Miklos and Bence, 2015). In this study, an attempt is made to create a new framework of how universities work and characterize „fourth generation” universities. Nowadays the effective development and advancement of universities is unimaginable, the knowledge management activities need to be integral part of these institutions in everyday life. Student e-services management using e-governance is success story in

many universities (Rahul Kulkarni, 2015). The main objectives are saving on cost, time and efforts of university administration. A project called 'e-Suvidha' for university students is a model for universities in the world. To achieve the world class standard it is necessary to have an improved collaboration and access to information available in all the parts of the world which is possible only by introducing e-governance (Raizada, Saxena and Shrivastava, 2014).

Another point of view states that the success of the e-governance at universities is not only determined by technology but also by the consequences and acceptability by the society in general and stakeholders in particular. Universities image in the society has levitated high and these initiatives taken have played a vital role in university achieving the highest grade accreditation (Er. Maroof Naieem Qadri, 2014)

Many probable benefits from the e-services are reported: for service users in terms of reduced cost of transmitting information and resources accesses, lesser time and cost for services; for service provider, reduced processing time, error rates, complaints; and for government, improved service consistency and equality; and finally, the benefits lead to enhance the outcomes, as well as the performance criteria (Suklabaidya and Sen, 2013).

The main services that can be provided by implementing above type of governance system are connected with the centralized database which provide better opportunities to students and can empower the governing body to plan the development of the education system as a whole (Prateek Bhanti et.al. 2012).

There is much evidence for the benefits from e-governance systems, through improved working operations and lower operational costs. The benefits far outweigh the risks, such as cyber-crime and make it more likely that more institutions will embrace e-governance.

“The only way for a university to grow phenomenally and yet continue to be managed optimally with a clear vision on quality is to embrace e-governance systems immediately,” (Moses Talemwa and Yudaya Nonagonzi, 2016).

2. BACKGROUND

In an era where mobile apps and cloud technology is the norm universities look for ways to implement digital approaches in their management and to deliver more online services to their students, administrative and academic staff. Such a digital transformation requires leadership that can maintain and balance competing interests from faculty, administrators, students and others. Continuous training of ICT skills of all the staff becomes a topic of general importance for higher education institutions (Pfeffer, 2012)

This paper suggests digital approaches in university management. There are good practices for transformation of a small, undistinguished college once criticized as an “admissions bottom-feeder” into a selective university that attracts applicants from around the world” (Leo Lambert, 2016). One of the basic milestones on the way to the success is the campus culture and always be in the process of becoming better and better using the last innovative technologies.

Varna Free University (VFU) is among the first educational institutions in Bulgaria that decided to introduce e-services in order to optimize the university management. The team of the Institute of Technology at VFU set up a project to create a support model for instructors when innovating their training process. The project started with a formulation made by the instructors of the hypotheses concerning the possible added value of an e-management platform.

3. OBSERVATIONS AND DISCUSSIONS

The team of Varna Free University designed a flexible proper solution aiming at lower operating costs and better performance is application of cloud technologies. The IT infrastructure of VFU consists of 36 virtual servers and only 3 physical servers. Network monitoring system is used to make the transition easier, and to improve network effectiveness. Security policy, procedures and guidelines are adopted to guarantee seamless operating of networks and systems. After testing a variety of offerings, we settled on a product that could provide unified IT monitoring and management.

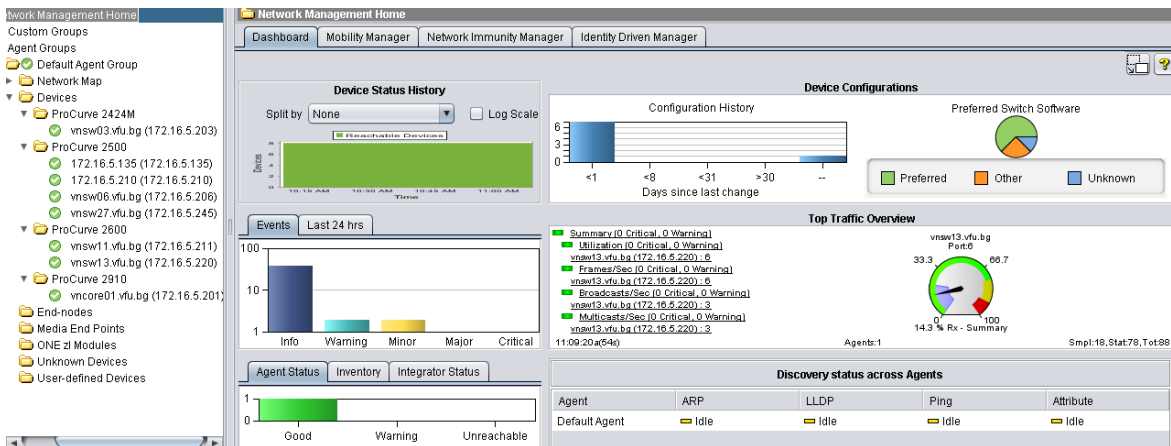


Figure 1. Network monitoring

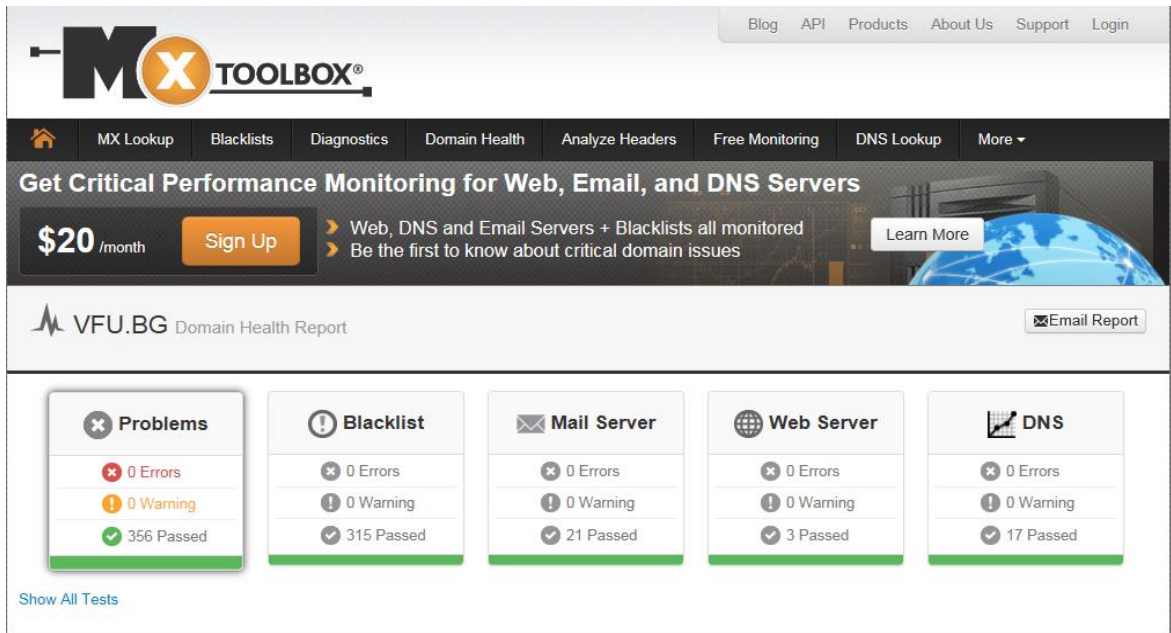


Figure 2. Web instrument for monitoring of vfu.bg

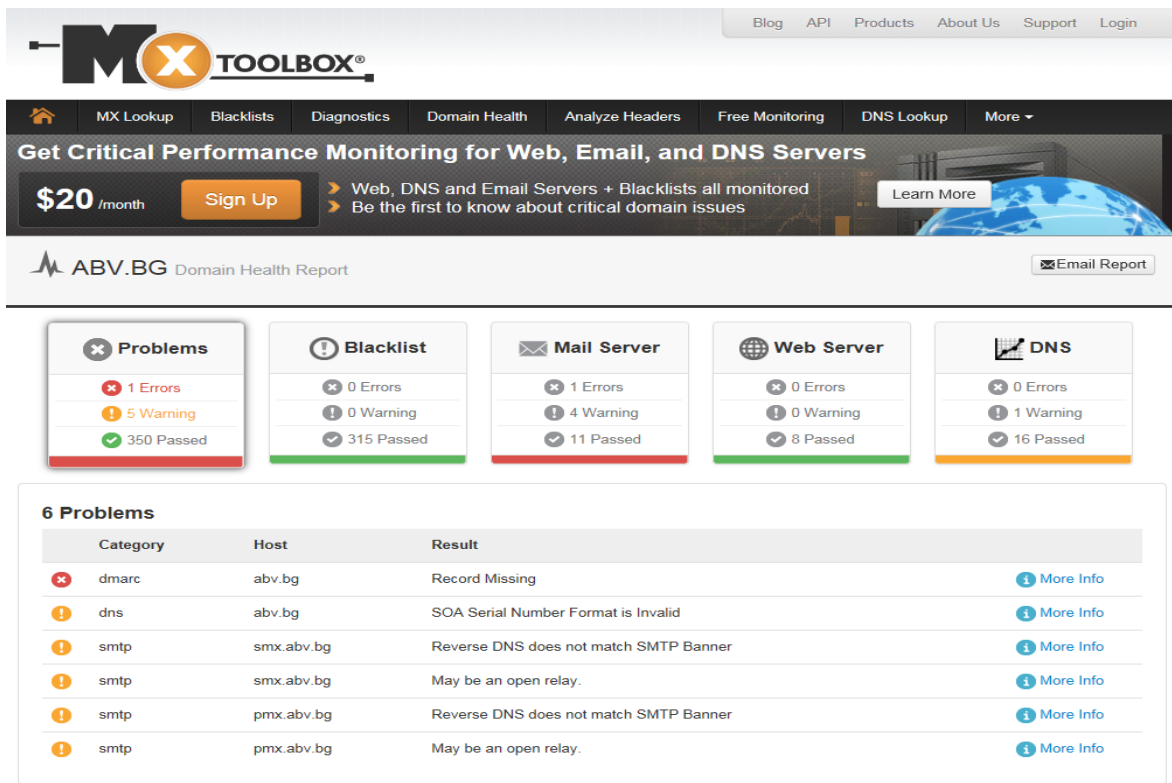


Figure 3. Web instrument for monitoring of abv.bg (comparison)

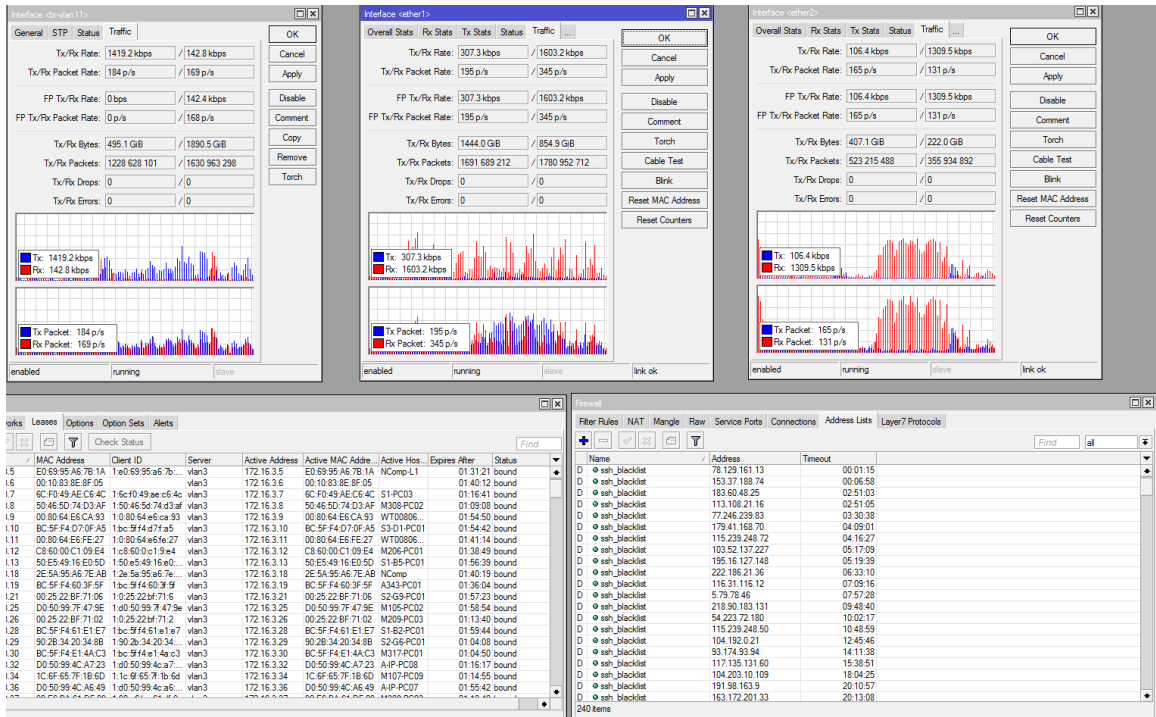


Figure 4. External traffic monitoring system for real-time preventing of attacks

cleaned up many performance issues, and quickly identified points of poor performance. Cloud scalable servers are used to meet the growing needs for online services.

It is imperative for education providers to digitalize, empower their workforce and make their processes more efficient. An important element of that processes is the digitalization of the core university administration tasks that can be split in to front and back office tasks. Front office admin tasks can be student admission, course change, fees payment plans and student appeal forms while back office admin tasks can be HR contracts for staff, HR performance reviews, etc. Different universities have different applications, closed platforms that hinder data sharing and need specialized IT training to operate but most of them choose open formats like HTML, PDF and XML that allow easily to use legacy systems together to share data.

4. RESULTS

The complete e-provision of e-services to VFU students will be performed through VFU SMART STUDENT system. Its application will help to:

- provide quality administrative e-services at any time, at any place and through alternative access channels;
- optimally use the existing applications in order to increase their stability, reduce the time and means to develop new ones, as well as reduce the maintenance and servicing costs (“E-planning” System);
- achieve complete digitalization of data – step by step transition to entirely digital form of all data in student servicing, as well as to a more active electronic exchange of documents among VFU units;
- implement software solutions with open code in order to solve the license issues in the university;
- introduce in accelerated way cloud technologies for remote access to share resources - Cloud Computing, in order to improve security and reduce costs;
- provide maximum protection of processed and stored data.

4.1 Goals

- improving the quality of offered services;
- providing transparency and accountability;
- achieving maximum effect and sustainable development while optimizing costs and working processes;
- providing information security management and information protection;
- introducing integrated e-servicing environment and single entry point (VFU Hub);
- single collection of data by the administration and its multiple usage to generate various reports;
- gradually moving to paperless turnover of documents, modeling and change of working processes, and orientation towards organizational efficiency;
- introducing priority e-services;
- development and usage of network and information resources.

4.2 Implementation Approach and Types of Services

4.2.1 VFU Hub Smart Student

A major element of the “digital transformation” is adopting technology and applying it to the very core of how various systems work in a university setting. A working example is the application of VFU SMART STUDENT solution at Varna Free University. VFU SMART STUDENT is a web-based information system for provision of e-services to VFU students, which provides comprehensive information about the student from their enrolment until their graduation. The aim of “Smart Student” is to provide quick, suitable, easy,

comprehensive and secure provision of services to students by giving them access to VFU information resources.

The advantage is that there is a constant access to data and changes are reflected in real time.

VFU hosts internal support systems from document management systems to e-learning management, which are currently hosted in the cloud. Constant monitoring and maintenance is needed.

5. CONCLUSION

The future of Bulgaria as an emerging destination for international students will largely depend on how well educational institutions in Bulgaria adapt and respond to students' expectations and provide a value proposition as technology and business models evolve. One of the main factors for success is increasing the efficiency and effectiveness of provision of administrative services and achieving maximum effect with minimum resources. Also there is an opportunity for 24/7 working cycle and the realization of e-services provokes quality change in working processes. The proposed solution guarantees information security with the necessary basic infrastructural components for protection of information assets.

6. THE FUTURE

This work-in-progress paper looked at the design of integrating platform web 2.0 tools with the existing LMS to create a "learning 2.0 as a platform. The next steps are to evaluate the design through data collected from multiple sources like student logs, Facebook feeds, focus group, reflections, and student satisfaction data. On the basis of statistics and analysis an optimization will be made in response to changing input from students and the arrival of new technologies.

REFERENCES

- Anna Rozeva, Roumiana Tsankova. *Challenges, Solutions, Knowledge Models in e-Governance*. [ONLINE] Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2328065 [Last visited August 2016]
- Er. Maroof Naieem Qadri, 2014. *e-Governance at University of Kashmir: Bringing Efficiency & Transparency International Journal of Information and Computation Technology*. ISSN 0974-2239 Volume 4, Number 2, pp. 119-126 © International Research Publications House <http://www.irphouse.com/ijict.htm> [ONLINE] Available at: http://www.ripublication.com/irph/ijict_spl/ijictv4n2spl_03.pdf [Last visited August 2016]
- Kylie Lacey, University Business Magazine. 2016. *Technology providers on Internet of Things | University Business Magazine*. [ONLINE] Available at: <http://www.universitybusiness.com/article/technology-providers-internet-things-0>.
- Leo Lambert, *UBTech 2016: Shaping the future of higher education*. [ONLINE] Available at: <https://www.universitybusiness.com/article/ubtech-2016> [Last visited August 2016]
- Michelle Melbourne, Intelledox. 2016. *The campus of the future: Digital transformation in the Australian education sector - Intelledox*. [ONLINE] Available at: <http://intelledox.com/ix-connect/blog/the-campus-of-the-future-digital-transformation-in-the-australian-education-sector/>.
- Miklos, L. Z. Bence, 2015. *Modern Universities in a Digital Environment*. [ONLINE] Available at: https://www.academia.edu/23942848/Modern_universities_in_a_digital_environment?auto=download [Last visited August 2016]
- Moses Talemwa, Yudaya Nongonzi, *Universities tackle next frontier, E-governance*, [ONLINE] Available at: <http://www.observer.ug/education/43080-universities-tackle-next-frontier-e-governance> [Last visited August 2016]
- Pfeffer Thomas, 2016. *Virtualization of Universities: Digital Media and the Organization of Higher Education Institution - Thomas Pfeffer - Google*. [ONLINE] Available at: goo.gl/m5BEle. [Last visited August 2016]
- Prateek Bhanti et.al. August 2012. *E-Governance: An Approach towards the Integration of Higher Education System in India*, International Journal of Emerging Technology and Advanced Engineering

- Website: www.ijetae.com (ISSN 2250-2459, Volume 2, Issue 8, [ONLINE] Available at: http://www.ijetae.com/files/Volume2Issue8/IJETAE_0812_36.pdf [Last visited August 2016])
- Rahul Kulkarni, 2015. *E-Governance in Universities for Student e-Services Management, A Case of Indian University*, LAP Lambert Academic Publishing, p.448. [ONLINE] Available at: <https://www.lap-publishing.com/catalog/details//store/gb/book/978-3-659-69091-4/e-governance-in-universities-for-student-e-services-management>. [Last visited August 2016]
- Raizada A.K., N. Saxena, R. Shrivastava, 2014. *Role of e-Governance to strengthen higher education system in India*, IOSR Journal of Research & Method in Education (IOSR-JRME) e-ISSN: 2320-7388,p-ISSN: 2320-737X Volume 4, Issue 2 Ver. I (Mar-Apr.), pp 57-62 [ONLINE] Available at: <http://www.iosrjournals.org/iosr-jrme/papers/Vol-4%20Issue-2/Version-1/J04215762.pdf> [Last visited August 2016]
- Suklabaidya S., A. Maan Sen, May – June 2013. *Challenges and Prospects of E-governance in Education*, *International Journal of Emerging Trends & Technology in Computer Science (IJETTCS)* Volume 2, Issue 3, [ONLINE] Available at: <http://www.ijettcs.org/Volume2Issue3/IJETTCS-2013-06-24-124.pdf> [Last visited August 2016]