Impost Fostor	ISRA (India) ISI (Dubai, UAE GIF (Australia) JIF	() = 0.829 = 0.564	РИНЦ (Russi	ia) = 0.207 = 3.860	PIF (India)	= 6.630 = 1.940 = 4.260

SOI: <u>1.1/TAS</u> DOI: <u>10.15863/TAS</u>					
International Scientific Journal					
Theoretical & Applied Science					
**					
p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)					
Year: 2017 Issue: 11 Volume: 55					
Published: 29.11.2017 <u>http://T-Science.org</u>					

Petr Alekseevich Boldyrev Director of Research Library Orenburg State University, Russia, Orenburg library@mail.osu.ru

Ivan Borisovich Krylov Head of Information Technology Research Library, applicant Orenburg State University, Russia, Orenburg krilovib@mail.ru

SECTION 4. Computer science, computer engineering and automation.

DEVELOPMENT OF ELECTRONIC LIBRARY OF OPEN ACCESS TO SCIENTIFIC AND EDUCATIONAL RESOURCES FOR THE VILLAGES **OF ORENBURG REGION**

Abstract: The work shows the urgency of creating open scientific and local lore electronic libraries both for the Russian Federation in general and for the Orenburg region in particular. Technical features of the development of an open electronic library of a regional scale are described: the requirements for the selection of hardware and software are defined. The platforms Dspace, EPrints, Greenstone are considered. The choice of the Dspace platform for the development of an open electronic library of scientific and educational resources for the villages of Orenburg region is substantiated.

Key words: Dspace, electronic libraries, local lore materials, village library. Language: English

Citation: Boldyrev PA, Krylov IB (2017) DEVELOPMENT OF ELECTRONIC LIBRARY OF OPEN ACCESS TO SCIENTIFIC AND EDUCATIONAL RESOURCES FOR THE VILLAGES OF ORENBURG REGION. ISJ Theoretical & Applied Science, 11 (55): 234-239. Soi: http://s-o-i.org/1.1/TAS-11-55-30 Doi: crosses https://dx.doi.org/10.15863/TAS.2017.11.55.30

Introduction

The creation of open scientific and local lore electronic libraries has become one of the central directions of information industry development and a priority task for the Russian Federation as a whole and for the Orenburg region. In the whole world, millions of documents and other products of intellectual activity are digitized and organized in the form of public electronic resources.

Materials and Methods

Open electronic libraries are widely used, and their number is growing rapidly. Currently, there are more than two thousand public repositories around the world. One of the most famous of these is the Registry of Open Access Repositories (ROAR) [1], owned by Southampton University (UK). In the Russian Federation there are 21 electronic libraries of open access, including the electronic library of the OSU. Despite this, among them there is not a single electronic library of regional scope providing free access to modern scientific and educational resources and resources of local lore for residents of small towns and rural areas.

The open electronic library of scientific and educational resources for the rural areas of the Orenburg region [2] should provide access to information and knowledge for the population of the rural areas of the Orenburg region, create favorable conditions for the growth of publicity, status and public significance of rural libraries by presenting electronic resources on the Internet in real time.

The development of an open electronic library of regional scope imposes certain limitations and makes special demands on the choice of hardware and software.

Thus, the purpose of this work is to describe the technical features of developing an open electronic library of regional scope by the example of an open electronic library of scientific and educational resources for rural Orenburg region.

As the hardware and technical equipment for the implementation of the open electronic library of scientific and educational resources for the rural Orenburg region, the optimal server configuration was selected (Table 1).



	ISRA (India)	= 1.344	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
Imme et Ee etem	ISI (Dubai, UAE) = 0.829	РИНЦ (Russ	ia) = 0.207	PIF (India)	= 1.940
Impact Factor:	GIF (Australia)	= 0.564	ESJI (KZ)	= 3.860	IBI (India)	= 4.260
	JIF	= 1.500	SJIF (Moroco	co) = 2.031		

Table 1

Server Features

Device	Characteristic	
Platform	Supermicro with rack-mountable (2U), or on the floor	
CPU	2 processors IntelXeon E5-2620 v4 (2.1GHz, 20M cache, 8 cores)	
Memory	RAM DIMM DDR4 (2133) to 16GB (only 32GB)	
Disk space	4 hard drives with a capacity of 2TB each (only 8TB)	
RAID controller	RAID controller with support for levels 0/1/10/5/50	
Drive unit	DVD-RW drive	
Net	3 LAN 1Gbps	

The chosen server configuration is the optimal ratio of price and quality, and also allows to fully meet the necessary requirements for hardware and hardware for the next 7 years, namely:

1) Supermicro platform, 2 IntelXeon E5-2620 processors, as well as 32 GB of RAM allow to withstand tens of thousands of page views per day, while ensuring uninterrupted download of digital content;

2) 4 hard drives with a total capacity of 8TB, as well as a RAID controller with support for levels 0, 1, 10, 5, 50 will allow to organize an effective data storage system, which in case of failure of any of the hard disks will allow hot swapping of the disk without data loss;

3) DVD-RW drive will allow to install the necessary software (software) from disks;

4) 3 network connectors will allow you to organize the necessary network configuration with a bandwidth of up to 1Gbit / s with the ability to access the server through a dedicated channel for recovery.

An interactive uninterruptible power supply will allow to organize the uninterrupted operation of the server in the event of an unexpected power outage for up to 1 hour.

As a virtualization system, the VMWare ESXi 6.0 hypervisor was chosen [3]. The selected software allows you to organize and flexibly configure the necessary virtual network, is highly reliable, and also has a free license.

As the operating system (OS), Ubuntu 14.04 was chosen [4], since this OS is distributed under a license that does not require financial expenses, it has extensive documentation on the Internet and great support for the network community. This OS has proven itself the best way when working with the servers of Web applications Apache and Tomcat.

As a software platform for creating an open electronic library of scientific and educational resources for rural Orenburg region, the Dspace platform was chosen [5]. The appearance of the web application Dspace (jspui) is shown in Picture 1 (jspui) and Picture 2 (xmlui).

i demo.dspace.org/jspui/	C	С Поиск	☆ 🖻	🕂 🏠 🛡 🖇	2 🖗 🗖
асто посещаемые 🧶 Начальная страница 📙 SS	L\TLS 📙 Вёрстка 📙 Windows 📒	Hostcms 📙 JS 📙 Вода	и питание 🔒	Big Data 🔒 Безопасно	ость 📙 Үіі
Плавная страница Просмотр		Поиск в архиве		Q 💄 Войти	
Space сохраняет и позволяет леп ифрового контента, включая текст IPEG и наборы данных Узнать больше			ЭНИЯ,	DSPA	CE
DSpace Demo Repository					
Разделы	Просмотр				
Выберите раздел для просмотра его	Просмотр _{Автор}	Тема		по дате выпуска	
			6	по дате выпуска 2000 - 2012	2
Выберите раздел для просмотра его	Автор		6		2

Picture 1 – Dspace (jspui).



	ISRA (India) =	= 1.344	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
Impost Fostor	ISI (Dubai, UAE)	= 0.829	РИНЦ (Russi	ia) = 0.207	PIF (India)	= 1.940
Impact Factor:	GIF (Australia)	= 0.564	ESJI (KZ)	= 3.860	IBI (India)	= 4.260
	JIF	= 1.500	SJIF (Morocc	(0) = 2.031		

Главная × +	C C Touck	☆ €		^ ♥	2		
часто посещаемые 🥑 Начальная страница 📴 SSL\TLS 🔒						- v:	
	beperka 🔄 windows 🤤 Hosterns 🔄 JS 📑 Бод	а и питание 📒	Dig Data	Beson	асность	U YII	
DSPACE				русски	й .	Войти	
🕈 Главная							
Donaca Dama Banasitan							
DSpace Demo Repository			Поисн	<		Q	
Velcome to the DSpace.org demostration/sample repos	itory (Manakin / XMLUI interface)]		ПРОСМО	DTP			
This repository is currently running on DSpace version			Весь	DSpace			L
Mirage 2 responsive theme			Coof	іщества и	колле	кции	
Authority Control (on Authors and Publishers) in S	ubmission process		Bara				
 Embargo in Submission process Community/Collection/Item Statistics are publicly y 	isible		дата	публика	ции		
OpenSearch			Авто	ры			
 Google Scholar metadata SWORD Client 			Назв	ания			
Mobile Theme Elastic Search Statistics (login as admin and brow	so to any community/collection/item, then choo	oco tho	Тема	THE			
last 'View Usage Statistics' link from the menu)	se to any community/conection/item, then cho	use uie	TEMe	пика			
ORCID integration PDF CoverPage generation			моя уч	ЕТНАЯ ЗАГ	ись		
			Войт	и			
0.0	sers have password equal to the lowercase n	ame or					
The following Demo Users are set up in the system (all units software):	sers have password equal to the lowercase n	ame or	Регис	трация			

Picture 2 – Dspace (xmlui).

In addition to Dspace, such platforms as EPrints [6, 7] and Greenstone [8, 9] are common. The Dspace platform has several advantages over other platforms designed to create open archives of electronic publications. For example, in Dspace, unlike EPrints, there is a more elaborate system of partitions and collections. As weaknesses of the

Greenstone platform, it is possible to distinguish bad conversion of mathematical texts into the internal format of Greenstone, as well as the need to recompile the source code in case of making significant changes to the platform code. The appearance of EPrints is shown in Picture 3, the appearance of Greenstone is shown in Picture 4.

Welcome to Demoprints - De × +		ne autor au	EN ANTES	
(i demoprints.eprints.org	С С Поиск	☆自	∔ ⋒ 🛡	🛠 🥐 =
🙆 Часто посещаемые 🧶 Начальная страница 📙 SS	SL\TLS 📙 Вёрстка 📙 Wi	ndows 📙 Hostcms 📙 .	JS 📙 Вода и питані	ve 🔒 Big Data
Eprints repository software				
Home About Browse				
Login Create Account IRStats2 Demo				Search
	Welcome to Demo	prints		
You may register as an administrate All changes are reset automatically Latest Additions		t which point all data is I		.0 🔊 RSS 2.0
View items added to the repository in the past v	week.			
Search Repository Search the repository using a full range of fields	s. Use the search field at t	he top of the page for a c	quick search.	
Browse Repository Browse the items in the repository by subject.				
About this Repository				

Picture 3 – EPrints.



	ISRA (India) = 1.344	SIS (USA) = 0.912	ICV (Poland)	= 6.630
Impost Fostory	ISI (Dubai, UAE) = 0.829	РИНЦ (Russia) = 0.207	PIF (India)	= 1.940
Impact Factor:	GIF (Australia) = 0.564	$\mathbf{ESJI} (\mathrm{KZ}) = 3.860$	IBI (India)	= 4.260
	JIF = 1.500	SJIF (Morocco) = 2.031		

Greenstone3 Showcase :: Gre × +							
 							
🧟 Часто посещаемые 🜒 Начальная страница 🛄 SSL\TLS 📑 Вёрстка 📑 Windows 📑 Hostcms 📑 JS 📑 Вода и питание 📑 Big Data 📑 Безопасность 🛛 »							
🔒 Login 🖉 🗡 Preferences							
Greenstone3 Showcase							
Quick Search							
Select a collection							
These collections demonstrate different aspects of Greenstone3. Click on a collection to see its description.							
Image Demo Kath's Photo Collection niupepa: māori newspapers							
Kath's Photo Metadata Edit Demo Paradise Gardens							
The next collections all use a different indexing tool, but otherwise have the same content. Do some searches to see the what the different tools offer.							
Lucene Demo SOLR Demo MG demo MGPP demo							
Cross collection search Search over multiple collections							
Administration Page Allows you to manage users							
Register Register as a new user							
powered by greenstone3							

Picture 4 – Greenstone.

For the functioning of Dspace, the following companion software was installed:

- JAVA 8;
- DBMS PostgreSQL 9.6;
- Tomcat 7 web application server;
- Nginx proxy server.

DSpace functions as a centralized service [10]. Different libraries can have their own separate areas within the system. Registered employees of libraries can directly contribute content through the web user interface, which is designed so that making an entry is as simple as possible. Alternatively, the system provides for importing a plurality of items for batch downloading of content. In each library, you can also assign people who can view and edit contributions before they are included in the main repository. DSpace then indexes the metadata that comes with the electronic document, and makes them available according to the access privileges defined for the particular library.

DSpace supports a large number of different file formats: AdobePDF, AIFF, audio / basic, BMP, FMP3, GIF, HTML, image / png, JPEG, LateX, MARC, Mathematica, MicrosoftExcel, Microsoft PowerPoint, Microsoft Project, MicrosoftVisio, MicrosoftWord, MPEG, MPEGAudio, PhotoCD, Photoshop, Postscript, RealAudio, RTF, SGML, TeX, TeXdvi, Text, TIFF, VideoQuicktime, WAV, WordPerfect, XML, and others.

In Dspace, the export and import functions are implemented with the help of transition plugins. These are program modules that translate between the metadata of DSpace objects and a specific external view. Typically, this pair of plug-ins for import and export. For example, from the MODS metadata format to the internal format of DSpace and vice versa.

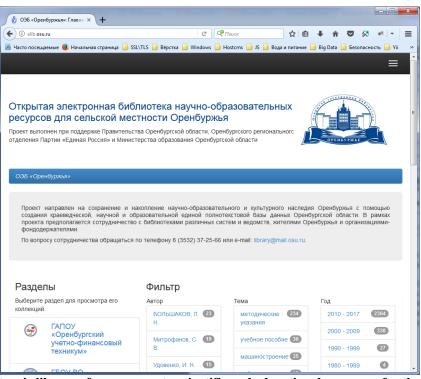
DSpace has an advanced system of rights for the user. Many DSpace functions, for example, browsing and searching documents on the system, can be performed anonymously, but you need to register to perform the documents submission to the user.

The appearance of the open electronic library of scientific and educational resources for rural Orenburg region on the basis of the Dspace platform is shown in Picture 5.



Impact Factor:

ISRA (India) = 1	.344 SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE) = 0	.829 РИНЦ (Rus	ssia) = 0.207	PIF (India)	= 1.940
GIF (Australia) $= 0$.	.564 ESJI (KZ)	= 3.860	IBI (India)	= 4.260
JIF = 1	.500 SJIF (Moro	(cco) = 2.031		



Picture 5 – Electronic library of open access to scientific and educational resources for the villages of Orenburg region.

Conclusion

Thus, in this paper, the technical features of the development of open electronic library of a regional scale are described using the example of open access to scientific and educational resources for the villages of Orenburg region. The choice and justification of hardware and software, as well as other features of the development, were made.

References:

- 1. (2017) Registry of Open Access Repositories. Available: http://roar.eprints.org/. (Accessed: 20.11.2017).
- 2. (2017) Otkrytaja jelektronnaja biblioteka nauchno-obrazovatel'nyh resursov dlja sel'skoj mestnosti Orenburzh'ja. Available: http://elib.osu.ru/. (Accessed: 20.11.2017).
- 3. (2017) VMware Official Site. Available: https://www.vmware.com/./. (Accessed: 20.11.2017).
- 4. (2017) Ubuntu 14.04.5 LTS (Trusty Tahr). Available: http://releases.ubuntu.com/14.04/. (Accessed: 20.11.2017).
- 5. (2017) DSpace. Available: http://www.dspace.org/. (Accessed: 20.11.2017).

- 6. (2017) EPrints Services. Available: http://www.eprints.org/. (Accessed: 20.11.2017).
- 7. Novickij AV, Reznichenko VA, Proskurina GJu (2006)Sozdanie nauchnyh arhivov s pomoshh'ju sistemy EPrints. Jelektronnye biblioteki. V. 9. I. 4. Available: http://www.elbib.ru/content/journal/2006/20060 4/Novitski/novitski.ru.html. (Accessed: 20.11.2017).
- 8. (2017) Greenstone Digital Library Software. Available: http://www.greenstone.org/. (Accessed: 20.11.2017).
- Reznichenko VA, Proskudina GJ, Ovidij OM (2005) Sozdanie cifrovoj biblioteki kollekcij periodicheskih izdanij na osnove Greenstone. Jelektronnye biblioteki. 2005. V. 8, I. 6.



ISRA (India) = 1.344	SIS (USA) = 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE) = 0.829	РИНЦ (Russia) = 0.207	PIF (India)	= 1.940
GIF (Australia) = 0.564	ESJI (KZ) $=$ 3.860	IBI (India)	= 4.260
JIF = 1.500	SJIF (Morocco) = 2.031		

Available:

http://www.elbib.ru/index.phtml?page=elbib/ru s/journal/2005/part6/RPO. (Accessed: 20.11.2017).

10. Jusupova NI, Ahmetova JF, Bogdanova DR (2007) Sravnenie sistem jelektronnyh bibliotek

EPrints 3.0 i DSpace 1.4.1. RCDL2007. Available: http://rcdl.ru/doc/2007/paper_66_v2.pdf. (Accessed: 20.11.2017).

