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"SUITABILITY OF TYPO3 CMS IMPLEMENTATION IN CROATIAN ACADEMIC ENVIRONMENT"

INTRODUCTION

In order to publish a large amount of information on their websites academic institutions need systems that will enable them easy and fast publishing without long periods of education and adaptation. Their practical usage has to be made possible to all subjects inside an organisation instead of being limited to a small group of technologically adept people.

Typo3 CMS is a web content management system published under the GPL license. Its prime potential is in possibility to provide advanced CMS features of high-end CMS systems to users who have high-end needs, but can not afford high-end investments in this field.

The aim of this paper is to test the suitability of the implementation of Typo3 content management systems in the academic institutions in Croatia in order to improve the web publishing process of these organisations. The suitability of this CMS system has been tested by comparing the Typo3 concepts and features with some widely accepted requirements for web content management systems in general and considering the specific conditions found in the Croatian academic network environment.

1. WHAT IS TYPO3

At the beginning there are some basic facts about Typo3 system/framework/cms:

"TYPO3 is a small to medium enterprise class Content Management Framework. It offers the best of both worlds: out-of-the-box operation with a complete set of standard modules *and* a clean and sturdy high-performance architecture to accommodate virtually every kind of custom solution or extension." [1] http://www.typo3.com/About.1231.0.html .

Typo3 is a software published under the GPL licence [2] http://www.gnu.org/license.html which means that there are no ownership costs for a Typo3 powered system, only development/implementation costs. On the other hand this license allows such systems to be expanded in almost any direction. Its feature list positions Typo3 among >10.000,00$ class commercial CMS's.

Other TYPO3 facts:
There are around 36000 installations (estimated by referee to TER)
There are 13678 registered users on TYPO3.org
There are 621 registered consultancies on TYPO3.org
There are 1846 registered reference websites
There are 37 languages for which Typo3 is available

This means that there is a strong and developing community, which is one of the main requirements

when someone considers an open-source project or product.

2. COMMON REQUIREMENTS FOR WEB CMS

In the last few years web content management systems have been thoroughly examined and defined. For the purpose of this research we use the guidelines published in the article "**How to evaluate a content management system"** at:
[3] http://www.steptwo.com.au/papers/kmc_evaluate/

Typo3 is tested against requirements divided in 5 different categories: content creation, content management, publishing, presentation and contract&business. Typo3 experiences necessary for this comparison have been gathered by developing five different websites (2 faculties websites, 1 regional government website and finally 2 news portals). The development requirements were also various: from the conversion of an existing site into a Typo3 powered website to the development of an entirely new website. And finally, some websites had to keep the old table structured html layout, and some had to have a strict separation of content and presentation and to comply to the web standard recommendations from http://www.webstandards.org .

Further explanations about any of the below stated requirements can be found at http://www.steptwo.com.au/papers/kmc_evaluate/.

2.1 Content creation

In this chapter has been stated what requirements a system has to meet in the content creation field to be regarded as a CMS. Every requirement is followed by a flag (YES, NO, PARTIAL) that represents how well Typo3 meets a particular requirement, and after that a short explanation is given.

- **Integrated authoring environment** **YES**

  Typo3 features the integrated authoring environment through its "backend"interface, the access permissions system, the WYSIWYG content editor.

- **Separation of content and presentation** **YES**

  Typo3 uses a complex three layer system for the separation of content and presentation which allows:

  - for content: to be completely XHTML compatible and semantic HTML formatted, meaning that it does not contain any source formatting that has no semantic meaning e.g. layout related formatting.
  - for layout: to be completely CSS formatted and separated from the content
  - for behaviour: to be scripted in TypoScript and JavaScript and again completely separated from the content and layout presentation.

  A complete separation of content and presentation is available by Typo3 CMS implementations, but it should be noted that it depends on the skill of the developer. In our testing we have succeeded in creating a completely webstandards compatible website which used tableless layout, although it required some typoscript experience.

- **Multi-user authoring** **YES**

Typo3 features a full multi-user authoring, allowing different levels of access, different user accounts etc...

- **Single-sourcing (content re-use)** **YES**

  The content is stored in the database on a per record and a per page basis, allowing a full reusage.

- **Metadata creation** **YES**

  Typo3 features separate content records for keyword creation and a per template possibility to create metadata at any point in the page tree hierarchy.

- **Powerful linking** **YES**

  It features a powerful internal engine for crosslinking based on a page ID identifier which allows the content to be moved in hierarchy without loosing any already created link connections.

- **Non-technical authoring** **YES**

  The only necessary prerequisites for authors are:

  - they should know how to use a web browser
  - they should know how to use a simple word processor

- **Facility of use & efficiency** **PARTIAL**

  While featuring a very simple and efficient way of content publishing, Typo3 can be at first rather complex and difficult to deploy with a steep learning curve(e.g. WYSIWYG editor configuration). Hence it earns PARTIAL flag here.

In the area of content creation Typo3 passes all requirements with “flying colours”. It surpasses many other popular solutions (open-source and commercial). The only potential problem is the very complex system implementation, but almost every other existing system requires professional knowledge for its implementation. However, this problem will be discussed later in this article.

2.2 Content management

There is a need for advanced ways of content management because of large amounts of published data that most faculties will presumably have. Here are also requirements met with flags (YES, NO, and PARTIAL) followed by short explanations.

- **Version control & archiving** **NO**

  It is possible to obtain a simple method of version controlling and archiving, but, since it depends completely on developer's skills, on the usage of external tools, and since it requires a great amount of manual work, Typo3 clearly falls short in this area.

  The built-in import-export functions are limiting. They can lead to problems with crosslinking and templates. So, an entire database backup were a much more prefered method for archiving.

- **Workflow** **PARTIAL**

  In fact, Typo3 features some simple and rather restricting workflow possibilities that are too

limiting at the moment. However, a complete workflow system is being developed at the moment.

- **Security** **YES**

  Typo3 features a detailed Unix-like permission system as well as some simple auditing possibilities.

- **Integration with external systems** **YES**

  It is possible through extensions (e.g. LDAP extension, phpBB etc.). There is also a DBAL (Database abstraction layer) extension in development.

- **Reporting** **YES**

  There is a history system, a simple hit statistic engine and a few more reporting extensions for various needs.

Typo3 fails to fulfil two important requirements here. However, no matter how much we may miss these functions, the imperfections do not really pose threat to the publishing part (content creation and maintenance). Instead of that their non-existence makes the controlling process harder. While smaller faculties may not find this a problem, larger institutions could miss these functions, and some additional formal procedures may be needed to be put on their place to allow a better control of the publishing process. However, solutions for both problems are being developed.

2.3 Publishing

The publishing requirements section analyses the ways of publishing stored contents (displayed on web pages, served to the browsers etc...). The flags here are changed to YES, NO and POSSIBLE (because some requirements are not featured by default, but may be solved through pre-emptive planning).

- **Stylesheets** **YES**

  A fully featured external stylesheet support with multilevel stylesheets.

- **Page templates** **YES**

  A very powerful templating engine allows a high level of flexibility. There are three main template developing concepts and one of them features a user-friendy GUI. However, its complexity level is rather high. Each concept has been tested and all have been found usable in all situations. However, some are better suited for some kinds of implementations and some for others.

- **Extensibility** **YES**

  Typo3 is one of the most extensible CMS's available today. It is extensible by design which means that almost everything in Typo3 is an extension, thus reducing the core system to a small part of the whole system. An excellent extension concept (featuring extension repository and extension kickstarter) together with the GPL license makes this project one of the livelier CMS's today. There are "**544 extensions for TYPO3 created by 181 developers that are publicly available for everyone. Another 684 extensions are currently in the pipeline and**

1106 might be planned (while a large number of these planned extensions will not go anywhere).". Source [4] http://typo3.org/frontpage-menu-links/statistics/.

- **Support for multiple formats** **YES**

  There are many extensions available that can import, index, display or convert many of today's most important digital data formats (pdf, doc, xls, sxw, sxc, csv, rtf...)

- **Personalisation** **POSSIBLE**

  Supported in backend, in frontend further personalisation achievable by careful planning and design.

- **Usage statistics** **YES**

  Exists.

Typo3 gives here outstanding results in meeting requirements.

2.4 Presentation

"The published pages must meet certain standards if they are to be of value to your users. It is important to specify these requirements if you are asking the vendor to design the appearance and layout of the web pages." Source: [5] http://www.steptwo.com.au/papers/kmc_evaluate/

- **Usability** **YES**

  High usability achievable, but it depends entirely on the developer.

- **Accessibility** **YES**

  Same as above.

- **Cross browser support** **YES**

- **Limited client-side functionality** **YES**

  It depends on design methods and developers' skill.

- **Speed** **NO**

  Page size cannot be limited a priori. It depends on design methods and developers' skill and it is not connected to Typo3 in any case.

- **Valid HTML** **YES**

  Contains the tools for reformatting the output in compliance with the desired W3C standard.

- **Effective navigation** **YES**

  TypoScript features methods for a very simple, fast and effective navigation design.

- **Metadata** **YES**

Again, Typo3 gives here very good results. The framework does not in any case limit developers so fulfilling of above mentioned requirement is easily achievable by skilled developer. There is only one requirement that is not automatically fulfilled, but can be solved by design and planning.

2.5 Contract & business (Project management and business requirements)

These are some general requirements that may not be as important to our situation as the requirements from the categories above. However, they have been tested for the sake of completeness. The flags are YES, NO, AVAILABLE and N/A for features that cannot be measured or cannot be answered by a simple flag. Explanations follow the flags.

- **Training** **AVAILABLE**

  Free video and written tutorials available, published under an open-content license. Many consultancies offer training commercially.

- **Documentation** **AVAILABLE**

  Extensive, freely available documentation published under an open-content license.

- **Warranty** **NO**

  None by default. In reality there are various warranties that Typo3 consultancies offer on behalf of their implementation.

- **Maintenance agreements** **NO**

  Entirely dependable on chosen implementers, not on Typo3 community.

- **Resources required** **N/A**

  OS: any

  Web server: Apache/IIS

  Scripting platform: PHP

  Database: MySQL

- **Skills required** **N/A**

  Editor and author level: low (browser and text editor usage)

  Administrator/developer level: high (Unix/windows administration, PHP scripting, database administration, webserver administration.)

- **Cost** **N/A**

  Ownership costs: NONE

  Implementation cost: varies

- **Scalability** **YES**

  Fully scalable system.

- **IT constraints**

  Same as requirements. With larger page trees or modem connection for administration may become too slow.

- **Reference sites** **N/A**

  1846 Registered reference websites. Complete list available at:

http://typo3.org/about/references/

It may be concluded that the content creation and maintenance possibilities of Typo3 are very satisfying, but the publishing control process is somewhat crippled by the non-existence of good workflow and version control systems. Developers seem to have noticed that as well and are therefore preparing solutions.

Considering everything, Typo3 represents a good web content management system that offers more than many similar open-source systems. Because of its great extensibility and flexibility, Typo3 stands out in the commercial arena as well (see Appendix I). Commercial content management systems that offer so many different functionalities and on the other hand such a great upgrade possibility are quite rare. More info can be found at http://www.cmsmatrix.org where Typo3 can be compared with many popular content management systems.

2. SPECIFIC REQUIREMENTS IN THE CROATIAN ACADEMIC ENVIRONMENT

The Croatian Academic and Research Network has provided the Croatian academic society with a common IT infrastructure which represents a common base for CMS implementation. That common base includes many advantages for implementing single CMS solutions on many institutions.

Thanks to the fact that all Croatian academic institutions share the same Internet provider (which provides them with similar equipment and infrastructure), it should not be very difficult to outline the general technical restrictions under which CMS should operate. Other requirements may depend on various factors like: the size of the institution, the human resources structure, the type of the academic program, the type of the institution's departmentalization etc. But, in order to make a CMS implementation successful on all institutions, there are some common requirements that have to be met:

a) **Common and simple installation process:** Regarding the very similar infrastructure, CMS should be easily installed on all servers .
b) **No additional requirements regarding hardware, software or infrastructure needed** than that which already exist.
c) **Simple implementation process:** Once installed, CMS should be easily deployable.
d)**Non-restrictive publishing:** It is this system's great advantage that any employee (professor, assistant, or administrative staff) should be able (if allowed) to publish any contents without new skills required. Only a short training course would be necessary. A high foreign-format re-usage would have to be made possible since it shortens the data conversion process.
e) **Flexible permission system:** Different levels of organization would have access to different sections of the page tree. Permissions system should be simple and easily deployable even by non-technical users (chief editor).
f) **Easy startup:** Meaning that CMS should contain ready templates, scripts and a sample navigation to make it possible for less demanding institutions to have an out-of-the box experience
g) **Unlimited extensibility:** Larger institutions may have some very specific needs that CMS could be expected to fulfill which no CMS can do outright. Therefore, the development of additional functionalities must be easily achievable and should not be restricted by any licensing agreement.
h) **Good documentation:** The chosen CMS has to be extensively documented to facilitate the usage

and further development.

i) **Long product life:** The chosen system should have clear indicators which would guarantee that its development would not be stopped or abandoned within a reasonable time-limit (a large development community for open-source, a stable and respected brand of detailed warranties for commercial software). In case of development suspension, some continuative strategies should exist (like project forking or relicensing, for example).

The following section offers an analysis of Typo3 according to the above stated additional requirements. Explanation will be given how to fulfill each of these requirements or, in case Typo3 already has this capacity, how well it performs.

3. MOST IMPORTANT FEATURES AND OVERALL PERFORMANCE

Since the above mentioned specific requirements are the key for a successful implementation of single CMS in the Croatian academic environment, they will be dealt here to the full extent to show how Typo3 fit in it. Besides that, some suggestions that are most closely related to the listed specific requirements are given here as a possible solution.

3.1 Specific requirements

a) **Common and simple installation process:** Typo3 excels by default among other CMS's by an outstanding user-friendly installation procedure. However, since all institutions share the same server platform (GNU Debian Linux), the installation process can be even more simplified by creating a preconfigured installation package. Even better, Typo3 does not require any non-standard software packages or webserver configurations which makes it ideal for a simple installation.

b) **No additional requirements regarding hardware, software or infrastructure needed than that which already exist:** It performs fairly well on relatively old servers (for small to medium appliances) and it does not require specific OS. On one of the tested sites it works among many other services, not interrupting their performance. The tested server specifications follow:

Hardware: 1.3 Ghz PIII Intel server with 1GB RAM

Active services:

- ❑email server (approx. 400 active users)
- ❑POP, IMAP, webmail services
- ❑spam filter -> amavis
- ❑DNS server
- ❑firewall for approx. 100 PC clients
- ❑LDAP server
- ❑Radius server

Website visits:

- ❑around 700 website visits a day or approximately 4000 – 5000 page-clicks a day

Results:

- ❑Memory consumption enlarged for about 10-15% at peek time
- ❑Processor consumption enlarged at content creation time for about 5-8% with two to fours editors and normal site access at the same time.

c) **Simple implementation process:** The basic implementation can be pre-configured into an installation package together with basic templates, a simple pagetree, navigation etc. Therefore, it can be filled with data and immediately deployed. Pre-configuring requires high skill level, but once done implementation is easy and simple achievable on any institution.

d) **None-restrictive publishing:** Typo3 has a very good OS independent WYSIWYG editor, with advanced features like MS office source cleaning and a detailed configuration. Typo3 is also localized to Croatian and features an extensive on-line help system together with a configurable interface. All this enables almost any even barely computer literate user to publish his work.

e) **Flexible permission system:** It has an Unix-like permission system, a possible extensive groups configuration and a page tree access as well as a file access that are fully configurable by default.

f) **Easy startup:** As stated above, this is easily achievable by preparing and pre-configuring the installation package. The package can contain a few immediately deployable design templates as well as a basic page tree with usegroups and access pre-configured. Such a system can be available for content creation and publishing immediately after the installation.

g) **Unlimited extensibility:** As already stated, Typo3 features one of the most advanced development concepts available today. New modules and applications can be simply created using PHP. The author has created two extensions, one of which is publicly available at http://www.typo3.org/extensions. Its extensive documentation and helper tools such as the Extension Kickstarter Module make the development process very comfortable.

h) **Good documentation:** Typo3 is one of the most thoroughly documented open-source projects at the moment. The core documentation, references, tutorials, the extension documentation, video tutorials, and sample websites are available. Also, there are few very active mailing lists and a huge development community.

i) **Long product life:** A large developer community and a strong commercial background of web consultancies together with a very open GPL license stand as arguments for expecting a long enough product life. However, the strong dependency on the project leader can be understood as a possible threat in this case. Nevertheless, it seems that the core group of developers has become larger with time, thus lowering this kind of risk.

Typo3 again performs well meeting all requirements by default. Furthermore, its performance in this area can easily be improved by specially configuring and preparing Typo3 installation package for our specific needs before initial deployment. All this makes Typo3 and excellent candidate for possible single CMS deployment.

Final conclusion is of course possible only by comparing Typo3 with other possible candidates, but judging on www.cmsmatrix.org comparisons, and on results Typo3 accomplished in this paper its reasonable to expect Typo3 earning high scores in such comparison.

CONCLUSION

This article is focused mainly on the Typo3 suitability to be employed as a single CMS solution in the Croatian academic environment in order to simplify the web publishing process and enhance the quality of web published documents and information in the academic community. The aim of the article is not to compare Typo3 with other systems. It has to be mentioned that the author has tested and in some cases worked with some other open-source CMS systems (midgrad-project.org, php-nuke and clones, Drupal, web-GUI etc...) for a long time and he finds Typo3 ahead of all other available content management systems at the moment because of its excellent extensibility and remarkable level

of completeness. As an illustration, a comparison with IBM's own content management system WEBSPHERE is attached in the Appendix I.

Typo3 has good results when analyzed according to most of the defined requirements. However, it fails badly in one aspect - in publishing process controlling tools. This can pose a problem in larger publishing communities, but it can be very well handled with other means in the academic community until good workflow and versioning systems are at hand.

The GPL license adds more facts in Typo3's favor. It renders the ownership costs to nothing, it allows (even promotes) any desired changes and upgrades, and it favors local (and global) development communities instead of global software moguls. However, it disallows the selling of developed code (modules and applications based on Typo3 framework), but that is not its purpose in the situation we have analyzed.

As to finally conclude, the author finds Typo3 well suited for its employment as a single CMS solution in the Croatian academic environment. It does not exclude other CMS solutions, since some other systems may be also suitable for this function. Some of them may be even better then Typo3 in some particular areas, but it seems that Typo3 offers the most complete solution available at the moment.

REFERENCES

[1] About Typo3 http://www.typo3.com/About.1231.0.html

[2] GPL licence http://www.gnu.org/license.html

[3] How to evaluate a content management system. http://www.steptwo.com.au/papers/kmc_evaluate/

[4] Typo3 usage statistics. http://typo3.org/frontpage-menu-links/statistics

[5] Various CMS comparisons: http://www.cmsmatrix.org

APPENDIX I

Table 1: Comparision between Typo3 3.6.2. and IBM Websphere EIP 8.1
source: http://www.cmsmatrix.org/matrix

Last Updated	8/31/2004	12/6/2002
System Requirements	**TYPO3**	**Websphere EIP**
Application Server	PHP 4.1.2+	Websphere
Approximate Cost	Free	10k per processor
Database	MySQL	DB2
Product	TYPO3 3.6.2	Websphere EIP 8.1
Operating System	Any	Windows, AIX, Solaris
Programming Language	PHP	Java, C++
Web Server	Apache, IIS	Webshere, Apache
Security	**TYPO3**	**Websphere EIP**
Audit Trail	Yes	Yes
Content Approval	Yes	Yes
Granular Privileges	Yes	Yes
Kerberos Authentication	No	
LDAP Authentication	Free Add On	Yes
Login History	Yes	Yes
NIS Authentication	No	
NTLM Authentication	No	
Pluggable Authentication	Free Add On	Limited
Problem Notification	No	
Sandbox	Yes	Yes
Session Management	Yes	Yes
SMB Authentication	Free Add On	
SSL Compatible	Limited	
SSL Logins	Yes	
SSL Pages	No	
Versioning	Limited	Yes
Support	**TYPO3**	**Websphere EIP**
Certification Program	No	Yes
Commercial Manuals	No	Yes
Commercial Support	Yes	Yes
Commercial Training	Yes	Yes
Developer Community	Yes	Yes

Online Help	Yes	Yes
Pluggable API	Yes	Yes
Professional Hosting	Yes	Yes
Professional Services	Yes	Yes
Public Forum	Yes	Yes
Public Mailing List	Yes	Yes
Third-Party Developers	Yes	Yes
Users Conference	Yes	
Features	**TYPO3**	**Websphere EIP**
Advanced Caching	No	
Advertising Management	Free Add On	No
Affiliate Tracking	Free Add On	No
Asset Management	Yes	Costs Extra
CGI-mode Support	Yes	No
Clipboard	Yes	No
Content Reuse	Yes	Yes
Content Scheduling	Yes	Costs Extra
Content Staging	No	
Content Syndication (RSS)	Limited	
Database Replication	No	
Drag-N-Drop Content	No	
Email To Discussion	Free Add On	Costs Extra
Extensible User Profiles	Free Add On	Costs Extra
Friendly URLs	Yes	Limited
FTP Support	Yes	
Inline Administration	Yes	Yes
Interface Localization	Yes	Yes
Load Balancing	No	
Macro Language	Yes	No
Metadata	Limited	
Multi-lingual Content	No	
Multi-lingual Content Integration	Yes	
Multi-Site Deployment	Yes	
Online Administration	Yes	No
Package Deployment	Yes	No
Page Caching	Yes	
Server Page Language	Yes	Yes
Sub-sites / Roots	Yes	Limited
Template Language	Yes	Yes
Themes / Skins	Yes	No

Trash	Limited	No
UI Levels	Yes	No
Undo	Yes	
URL Rewriting	Yes	No
UTF-8 Support	Yes	
WAI Compliant	Free Add On	
Web Statistics	Free Add On	No
Web-based Style/Template Management	Yes	Costs Extra
Web-based Translation Management	Yes	No
WebDAV Support	No	
Wiki Aware	No	
Workflow Engine	Limited	Costs Extra
WYSIWYG Editor	Yes	Yes
XHTML Compliant	Yes	
Built-in Applications	**TYPO3**	**Websphere EIP**
Blog	Free Add On	No
Chat	Free Add On	Costs Extra
Classifieds	Free Add On	No
Contact Management	Free Add On	Costs Extra
Data Entry	Limited	No
Database Reports	Free Add On	Costs Extra
Discussion / Forum	Free Add On	Costs Extra
Document Management	No	Costs Extra
Events Calendar	Free Add On	Costs Extra
Expense Reports	No	Costs Extra
FAQ Management	Free Add On	No
File Distribution	Free Add On	Yes
Graphs and Charts	Free Add On	
Groupware	No	Costs Extra
Guest Book	Free Add On	No
Help Desk / Bug Reporting	No	Costs Extra
HTTP Proxy	No	No
In/Out Board	No	
Job Postings	No	No
Link Management	Free Add On	No
Mail Form	Yes	No
My Page / Dashboard	Free Add On	Yes
Photo Gallery	Yes	No
Polls	Free Add On	No
Product Management	Free Add On	Costs Extra

Project Tracking	No	No
Search Engine	Free Add On	
Shopping Cart / Ecommerce	Free Add On	Costs Extra
Surveys	Free Add On	Costs Extra
Syndicated Content (RSS)	Free Add On	Yes
Tests / Quizzes	Free Add On	No
Time Tracking	No	Costs Extra
User Contributions	Yes	No
Web Services Front End	Free Add On	No