

UNIVERZITET DŽEMAL BIJEDIĆ U MOSTARU
FAKULTET INFORMACIJSKIH TEHNOLOGIJA MOSTAR

SEMINAR

OSS e-commerce rješenje sa sistemom preporuke

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1. Uvod

Cilj ovog seminarskog rada je implementirati webshop rješenje čije su komponente isključivo open source (nadalje OSS) software-a

Firma "bring.out", implementator sistema je bosanski OSS IT provajder.

Kompletan portfolio firme je baziran na OSS-u, tako da i ovo rješenje treba zadovoljiti kriterije otvorenosti izvornog koda.

2. Analiza dostupnih OSS komponenti za gradnju rješenja

2.1. Sistemi preporuke

Najpoznatiji OSS sistemi preporuke su:

- *easyrec*¹
- *Apache mahout*²
- *Lenskit recommender framework*³

Apache mahout je projekat koji ima reputaciju najkopletnijeg i najkompleksnijeg "recommendation engine"-a

Postoji odlična integracija sa drugim projektom popularnim "Apache fondacije" - *hadoop-om*⁴ koji se koristi u za distribuiranu obradu "big data"⁵.

Sva tri pomenuta rješenja su implementirana u programskom jeziku Java.

Lenskit je najmlađi projekat, ali ima veoma aktivnu zajednicu korisnika i programera (eng. "community").

Easyrec je započeo kao komercijalni projekat austrijske firme "Studio Smart Agent Technologies". Naknadno je objavljen kao OSS pod GPLv3 licencom. Dobio je više nagrada za inovaciju na području web-a i multimedije⁶. *Easyrec* je java aplikacija koja sa webshop rješenjima komunicira putem web servisa (REST ili SOAP), tako da je moguća integracija sa bilo kojim third-party sistemom. Sadrži kvalitetan web administrativni interfejs izdvaja od konkurentskih rješenja.

¹<http://easyrec.org/>

²<http://mahout.apache.org/>

³<http://lenskit.grouplens.org/>

⁴<http://hadoop.apache.org>

⁵velike količine podataka, najčešće korišteno u rješenjima "data-mining" sistema

⁶<http://en.wikipedia.org/wiki/Easyrec>

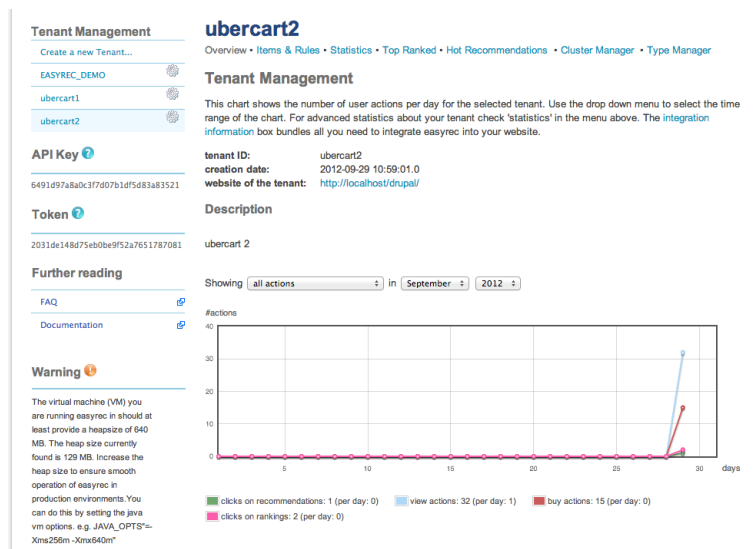


Figure 2.1: Easyrec web interfejs

2.2. Web shop rješenje

Postoji niz OSS rješenja. Međutim, sa stanovišta proširivosti, "drupal"⁷ bazirana rješenja su najpopularnija.

2.2.1. Drupal web content framework

Drupal je "web content framework" napisan u programskom jeziku PHP.

Često se navodi i da je drupal "CMS"⁸ software, međutim framework je definitivno bolji opis drupal-a.

Drupal je razvojna platforma za različite web sadržaje.

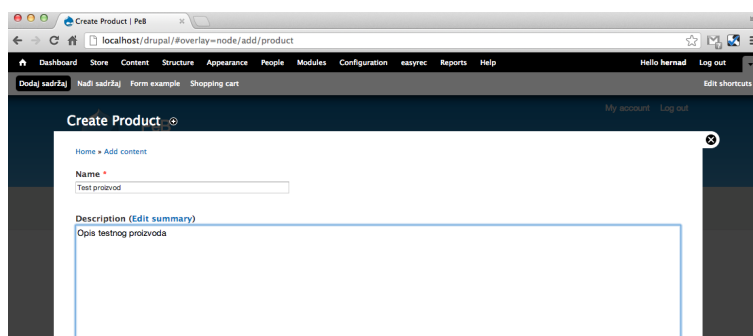


Figure 2.2: Drupal web interfejs dodavanje sadržaja (content)

⁷<http://www.drupal.org>

⁸CMS - Content Management System

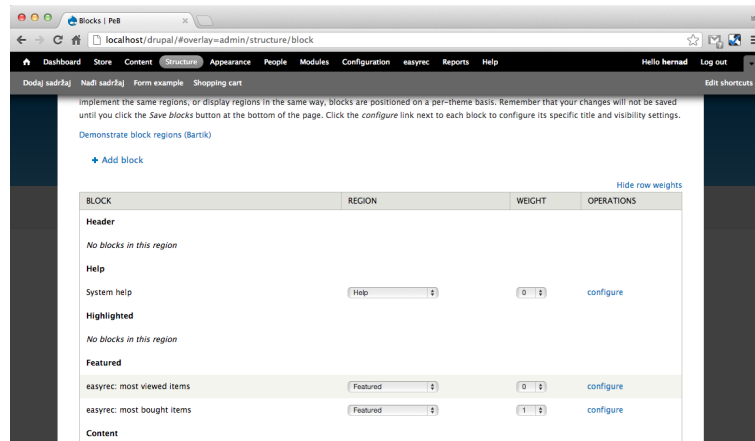


Figure 2.3: Drupal web interfejs - podešanje strukture prikaza (blocks)

2.2.2. E-commerce rješenja

Na tržištu postoji više OSS aktivnih drupal e-commerce projekata:

- drupal commerce⁹
- ubercart¹⁰

"Drupal comerce" je relativno mlad projekat, ali je vrlo brzo stekao vidljivost na tržištu OSS e-commerce rješenja.

Započeli su ga bivši developer "ubercart"-a, koji je opet prvo "ozbiljno" OSS e-commerce rješenje.

Web stranice prokejkta ukazuju da se radi o ozbiljnom projektu sa jakom finansijskom podrškom:

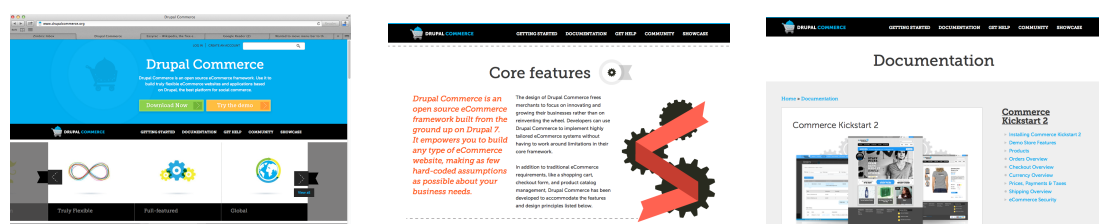


Figure 2.4: Drupal commerce web site

Filozofija razvoja drupal commerce-a je slična razvoju samog drupala. Drupal-commerce je core sistem za nove e-commerce distribucije koje su bazirane na njemu. Source code je GPLv2 licenciran kao i sam drupal.

⁹<http://www.drupalcommerce.org>

¹⁰<http://www.ubercart.org>

Uboercart je svojevrzni "veteran" drupal baziranih e-commerce rješenja. Uboercart v2.x (baziran na drupal 6.x) je vrlo zastupljen e-commerce sistem.

2.2.3. integracijske komponente e-commerce <-> sistem preporuke

Posljednja komponenta u konstrukciji zadanog sistema je integracijska komponenta e-commerce <-> recommender.

Uboercart ima riješenu integraciju sa easyrec-om kao poseban drupal projekat¹¹

2.3. Odabir komponenti

Easyrec se svojom jednostavnošću i fleksibilnošću odmah nametnuo kao dobar izbor za recommender sistem komponentu. Kako za njega postoji i integracijska komponenta sa ubercart-om konačan izbor sistema je:

1. drupal 7.x
2. ubercart 3.x
3. easycart 0.97
4. easyrec_for_ubercart

¹¹http://drupal.org/project/easyrec_for_ubercart

3. Instalacija

3.1. Bazno okruženje

3.1.1. XAMPP PHP, Mysql database server

Drupal instaliramo unutar XAMPP stack-a¹ za Mac OS X 1.7.3 (MySQL 5.1.x, PHP 5.3.x)

Apache web server web root:

```
/Applications/XAMPP/htdocs
```

3.1.2. Easyrec J2EE aplikacija

Easyrec je standardna J2EE aplikacija (WAR), tako da za njegovu instalaciju trebamo j2ee kompatibilan server.

Preporučeni server je tomcat. Instaliramo tomcat, kopiramo easyrec-web.war (ver. 0.97)² u deployment direktorij tomcat servera i na kraju pokrećemo server:

```
1) ~/FIT/PeB/apache-tomcat-7.0.30$ cp ~/Downloads/easy-rec.war ↵  
webapps/  
  
2) ~/FIT/PeB/apache-tomcat-7.0.30/bin$ ./catalina.sh start  
  
> Using CATALINA_BASE: /Users/hernad/FIT/PeB/apache-tomcat-7.0.30  
> Using CATALINA_HOME: /Users/hernad/FIT/PeB/apache-tomcat-7.0.30  
> Using CATALINA_TMPDIR: /Users/hernad/FIT/PeB/apache-tomcat↵  
-7.0.30/temp  
> Using JRE_HOME: /System/Library/Frameworks/JavaVM.framework/↵  
Versions/CurrentJDK/Home
```

¹<http://www.apachefriends.org/en/xampp.html>

²download sa sourceforge repozitorija <http://sourceforge.net/projects/easyrec/files/>


```
> Using CLASSPATH: /Users/hernad/FIT/PeB/apache-tomcat-7.0.30/bin/↵
bootstrap.jar:/Users/hernad/FIT/PeB/apache-tomcat-7.0.30/bin/↵
tomcat-juli.jar
```

Pokrećemo u browseru

```
http://localhost:8080/easyrec-web
```

prolazimo kroz jednostavni install proces koji u easyrec bazu³

Na kraju dobijamo dolazimo na login našeg sistema preporuke:

3.1.3. Kreiranje drupal i easyrec baza

```
/Applications/XAMPP/xamppfiles$ bin/mysql -u root
mysql> create database ubercart3;

> Query OK, 1 row affected (0.07 sec)

mysql> create database easyrec;

mysql> quit
```

3.1.4. Drupal

Drupal core 7.1.15 sa svim potrebni podmodulima nalazi se na hernad github repozitoriju.

Izvršimo kloniranje repozitorija i njegovih podmodula:

```
1) /Applications/XAMPP/htdocs$ git clone git@github.com:hernad/↵
drupal.git

> Cloning into 'drupal'...

/Applications/XAMPP/htdocs$ cd drupal

2) /Applications/XAMPP/htdocs/drupal$ git submodule init

> Submodule 'sites/all/modules/easyrec_for_ubercart' (git@github.↵
com:hernad/easyrec_for_ubercart.git) registered for path 'sites↵
/all/modules/easyrec_for_ubercart'
> Submodule 'sites/all/modules/jcarousel' (git@github.com:hernad/↵
jcarousel.git) registered for path 'sites/all/modules/jcarousel↵
'
```

³koju ranije trebamo kreirati, vidi donji korak "Kreiranje easyrec baze"

```

> Submodule 'sites/all/modules/ubercart' (git@github.com:hernad/↵
  ubercart.git) registered for path 'sites/all/modules/ubercart'

3) /Applications/XAMPP/htdocs/drupal$ git submodule update

> Cloning into 'sites/all/modules/easyrec_for_ubercart'...
> ...
> Submodule path 'sites/all/modules/easyrec_for_ubercart': checked↵
  out '26a96e622be0acee012c4cff85b3e8e4f87cd5e5'
> Cloning into 'sites/all/modules/jcarousel'...
> ....
> Submodule path 'sites/all/modules/jcarousel': checked out '↵
  ef51d00eae77e354c771cf595621971f5f250ac2'
> Cloning into 'sites/all/modules/ubercart'...
> ...
> Submodule path 'sites/all/modules/ubercart': checked out '↵
  e5a4154d8a9fdf6483fabd7e851798f3c88fd623'

```

Poděšenje drupal config fajlova:

```

/Applications/XAMPP/htdocs/drupal/sites$ cp example.sites.php ↵
  sites.php
/Applications/XAMPP/htdocs/drupal/sites$ chmod a+w sites.php
/Applications/XAMPP/htdocs/drupal/sites$ mkdir -p default/files
/Applications/XAMPP/htdocs/drupal/sites$ chmod a+w default/files
/Applications/XAMPP/htdocs/drupal/sites$ cd default
/Applications/XAMPP/htdocs/drupal/sites/default$ cp default.↵
  settings.php settings.php
/Applications/XAMPP/htdocs/drupal/sites/default$ chmod a+w ↵
  settings.php
/Applications/XAMPP/htdocs/drupal/sites/default$ cd ..

```

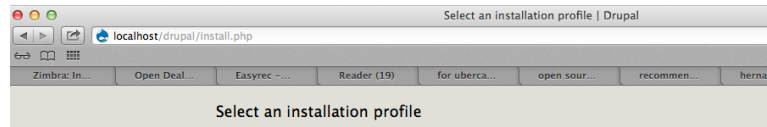


Figure 3.1: Drupal install step 1

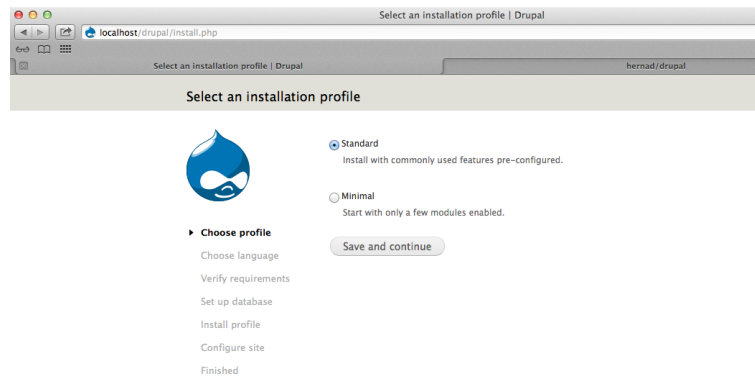


Figure 3.2: Drupal install step 2

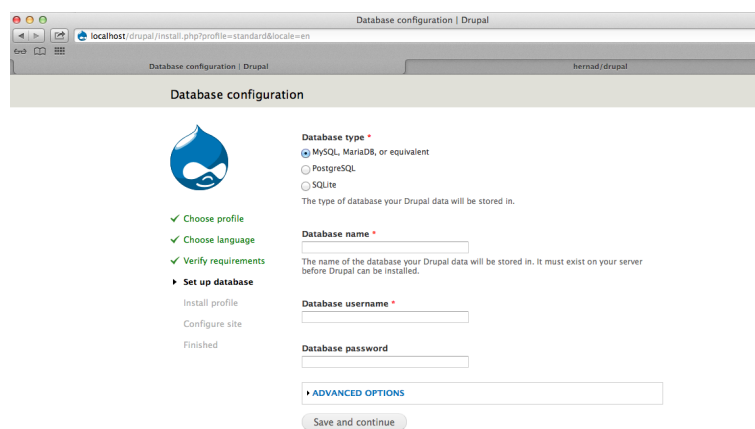


Figure 3.3: Drupal install step 3

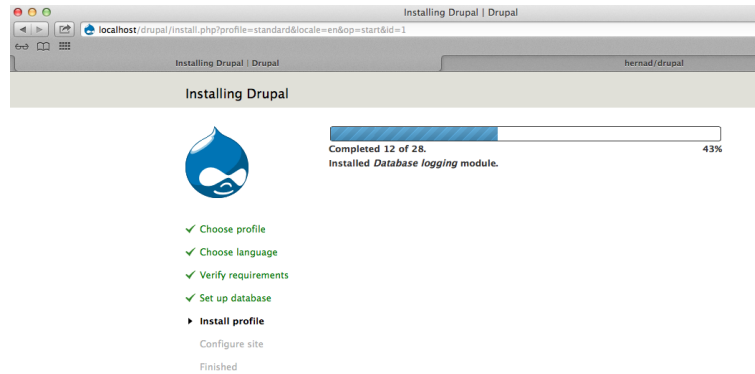


Figure 3.4: Drupal install step 4

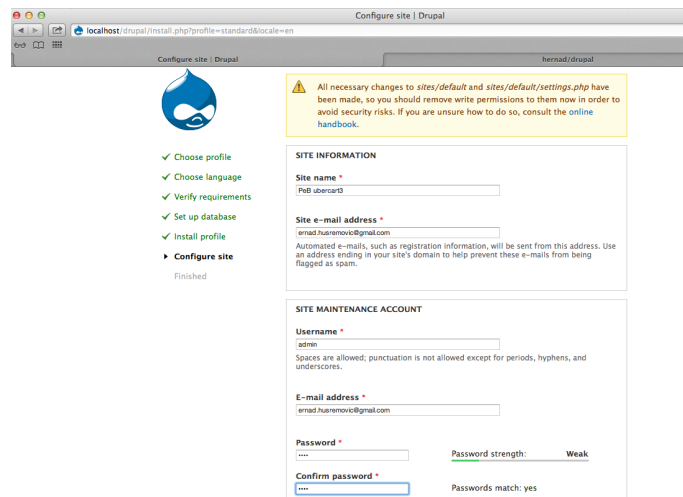


Figure 3.5: Drupal install step 5

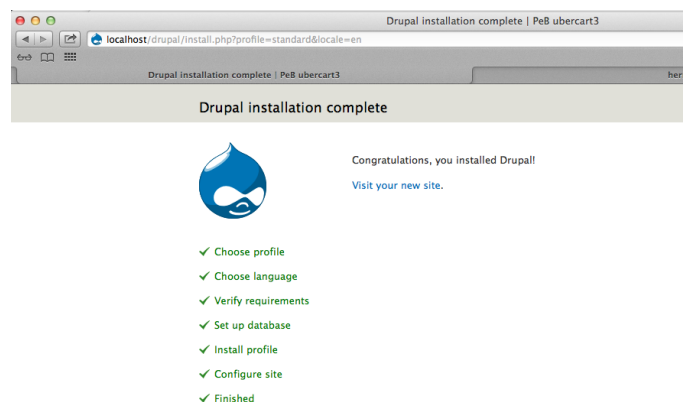


Figure 3.6: Drupal install step 6

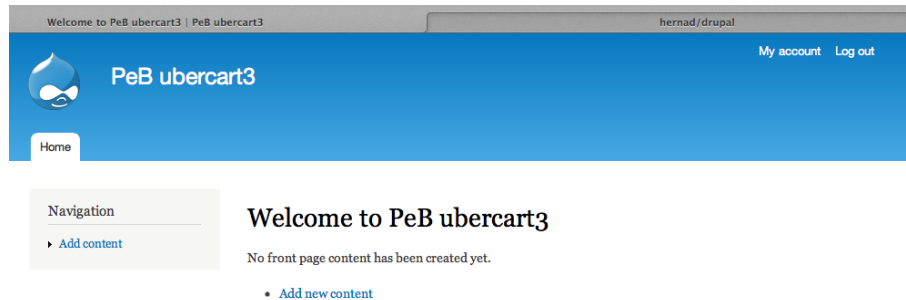


Figure 3.7: Drupal install - napokon "welcome" :)

3.1.5. Aktivacija drupal modula za ubercart i easyrec

1. locale
2. chaost-tools
3. easyrec
4. rules
5. cart
6. store
7. order
8. product
9. views
10. views-ui

3.1.6. Podešenje drupal blokova za prikaz ubercart i easyrec elemenata

Prikaz sadržaja na drupal stranicama se podešava unutar admin interfejsa.

Mi želimo na "featured" sekciju (vrh web stranice) staviti prikaz najviše kupovanih i najviše gledanih artikala u toku dana⁴

⁴Podešavamo dnevnu statistiku u testnom okruženju zato što se ona najprije ažurira

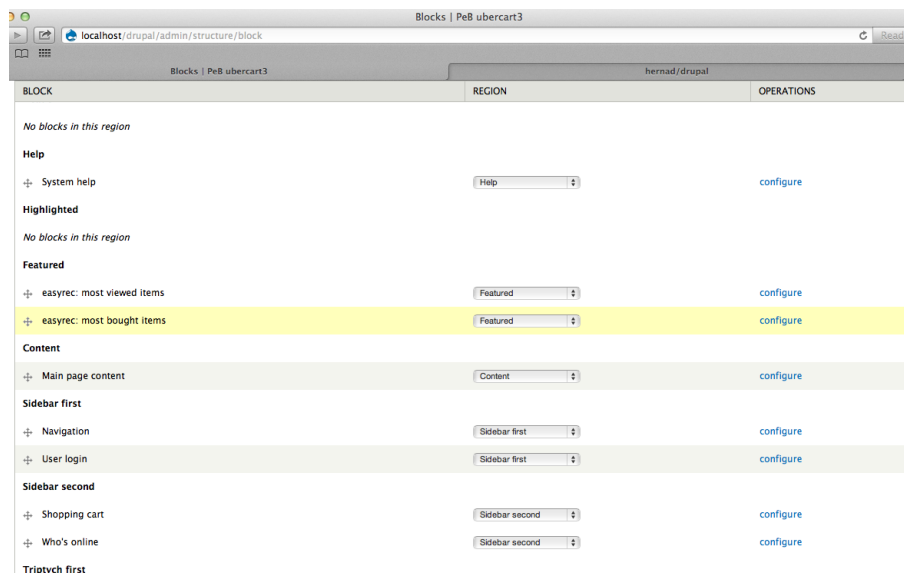


Figure 3.8: Drupal block config

Ovako podešavamo prikaz najviše kupovanih artikala:

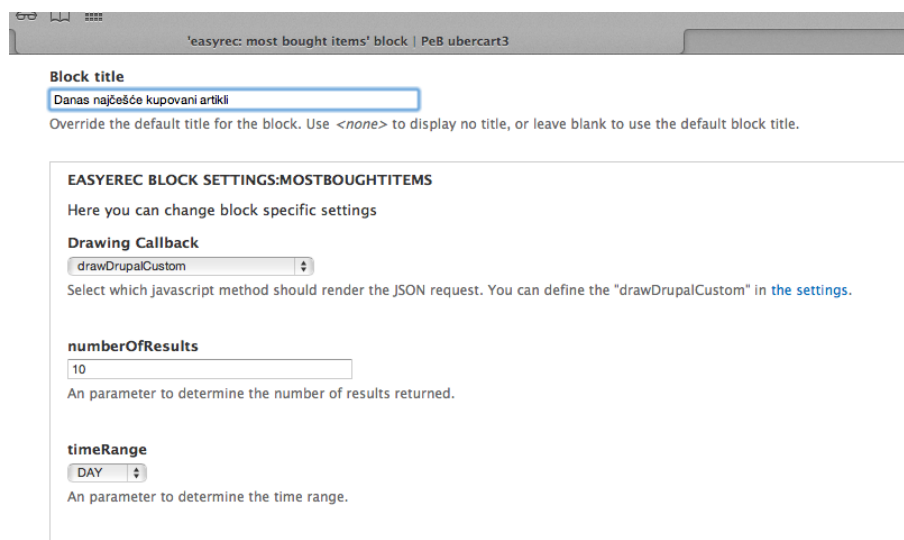


Figure 3.9: Konfiguracija drupal blokova - prikaz sistema preporuke

Analogno se podešava i prikaz artikala koje su korisnici najviše pregledali.

4. Easyrec sistem preporuke

Easyrec¹<http://en.wikipedia.org/wiki/Easyrec> je kompletna aplikacija koja pored implementacije algoritama preporuke ima sopstvenu bazu podataka u koju arhiva i web interfejs za administraciju i monitoring sistema.

Na njihovoj web stranici²<http://easyrec.org> stoji:

easyrec is:

- easy to use - personalize your application within minutes
- easy to integrate - due to plugins, a REST API or placing javascript codesnippets in your web pages.
- easy to scale - due to distributed architecture
- easy to maintain - with the included management application
- easyrec is OPEN SOURCE and FREE!

Može se reći da su većinu od ovih "easy" obećanja uspjeli postići.

¹\unskip\penalty\@M\vrulewidth\z@height\z@depth\dp,

²\unskip\penalty\@M\vrulewidth\z@height\z@depth\dp,

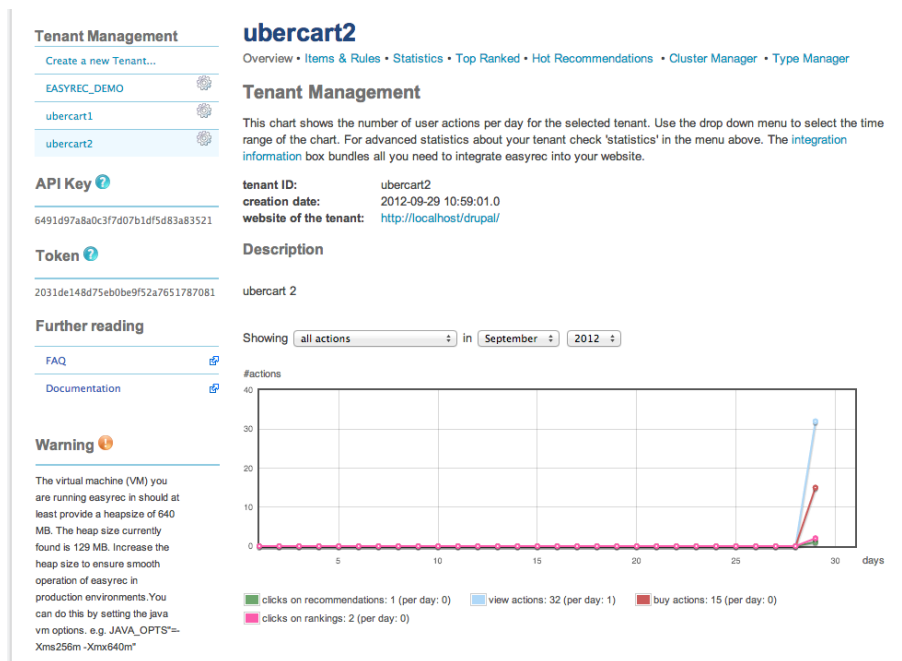


Figure 4.1: Easyrec "tenant" ubercart2

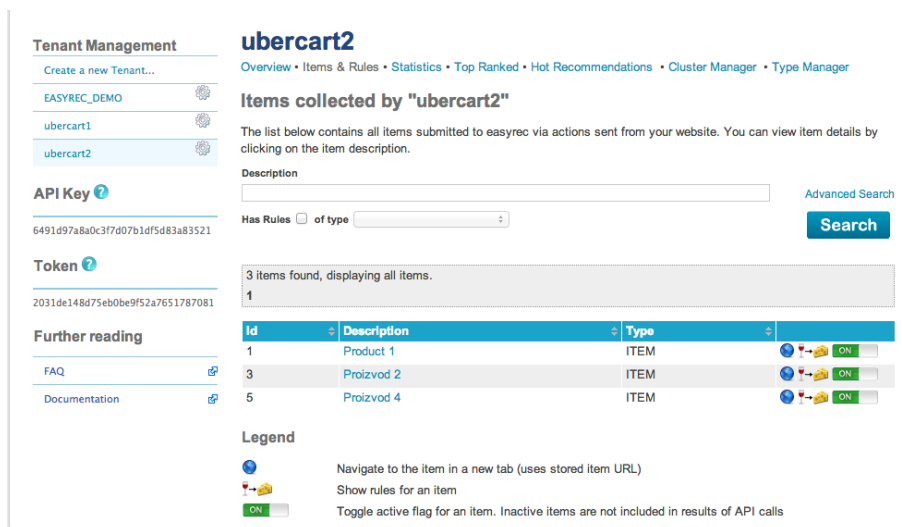


Figure 4.2: Easyrec "items" koje "tenant" ubercart2 bilježi

Proizvod 4

Edit

Details

Rules

Statistics

Here you find some details about the selected item. Use the Edit tab to modify the values.

ID:	5
Type:	ITEM
Description:	Proizvod 4
Creation Date:	2012-09-29 11:00:59.0
URL:	http://localhost/drupal/node/5
Image URL:	http://localhost/drupal/sites/default/files/Screen Shot 2012-09-27 at 1.04.51 PM.png
Active:	true
Clusters:	None

Forma prikaza: a

Warning

Warning is not allowed to use this form.

Valid time

00:00:00

Warning: warning after this

Submit

Figure 4.3: Easyrec prikaz jednog "item"-a

ubercart2

[Overview](#) • [Items & Rules](#) • [Statistics](#) • [Top Ranked](#) • [Hot Recommendations](#) • [Cluster Manager](#) • [Type Manager](#)

Top Ranked Items on "ubercart2"

Top Ranked Items shows the items most often acted on within the selected time range.

Notice: Rankings are updated every 24 hours.

showing **Most Viewed Items** from **last 31 days**

Id	Description	Type	
5	Proizvod 4	ITEM	
3	Proizvod 2	ITEM	

Figure 4.4: Easyrec "top ranked" artikli

ubercart2

[Overview](#) • [Items & Rules](#) • [Statistics](#) • [Top Ranked](#) • [Hot Recommendations](#) • [Cluster Manager](#) • [Type Manager](#)

Hot Recommendations on "ubercart2"

The hot recommendations list shows the most popular recommended items, i. e. items that easyrec presented to the user as part of a recommendation and were then clicked on by a user. The hot recommendations list shows the most popular recommended items.



Id	Description	Type	
1	Product 1 (3 recommendation hits)	ITEM	
5	Proizvod 4 (3 recommendation hits)	ITEM	
3	Proizvod 2 (2 recommendation hits)	ITEM	

Figure 4.5: Easyrec preporučeni ("hot recommend") artikli

Type Manager

Use the to create different types used within your easyrec instance.

Item Types


Action Types

Assoc Types


Item Type Manager

Use the item type manager to create [Item types](#). Item types are the main categories of your items, e.g. Books, Music or Movies. After creating an item type you are ready to use it in API calls.

(Clusters can be managed in the [Cluster Manager](#) and describe custom collections of items. Use it to create subcategories of item types (like "Pop", "Rock", "Alternative" as subcategories of Music items) or to create special recommendations like "Christmas" or "Spring Collection".)

 **Note:** Once an itemtype has been created it cannot be removed!

Item Types for ubercart2

 [add new Item Type](#)

Item Type Name
ITEM

Figure 4.6: Easyrec tipovi "itema" (stavki koje ocjenjujemo i preporučujemo)

Type Manager

Use the to create different types used within your easyrec instance.


Item Types

Action Types

Assoc Types

Action Type Manager

Use the item type manager to create [Action types](#). Action types are the types of your actions you send to easyrec. After creating an actions type you are ready to use it in API calls.

 **Note:** Once an actiontype has been created it cannot be removed!

Item Types for ubercart2

+ add new Item Type

Item Type Name	Has Value
BUY	false
RATE	false
VIEW	false

Figure 4.7: Easyrec akcije koje se bilježe za stavke

Type Manager

Use the to create different types used within your easyrec instance.


Item Types

Action Types

Assoc Types

Assoc Type Manager

Use the assoc type manager to create [Assoc Types](#). Assoc types are used to define the relation between two items. As an Administrator you can set specific Plugins for each assoc type.

 **Note:** Once an Assoc Type has been created it cannot be removed!

Assoc Types for ubercart2

+ add new Assoc Type

Assoc Type Name
BOUGHT_TOGETHER
GOOD_RATED_TOGETHER
IS_RELATED
VIEWED_TOGETHER

Figure 4.8: Easyrec asocijacije između stavki

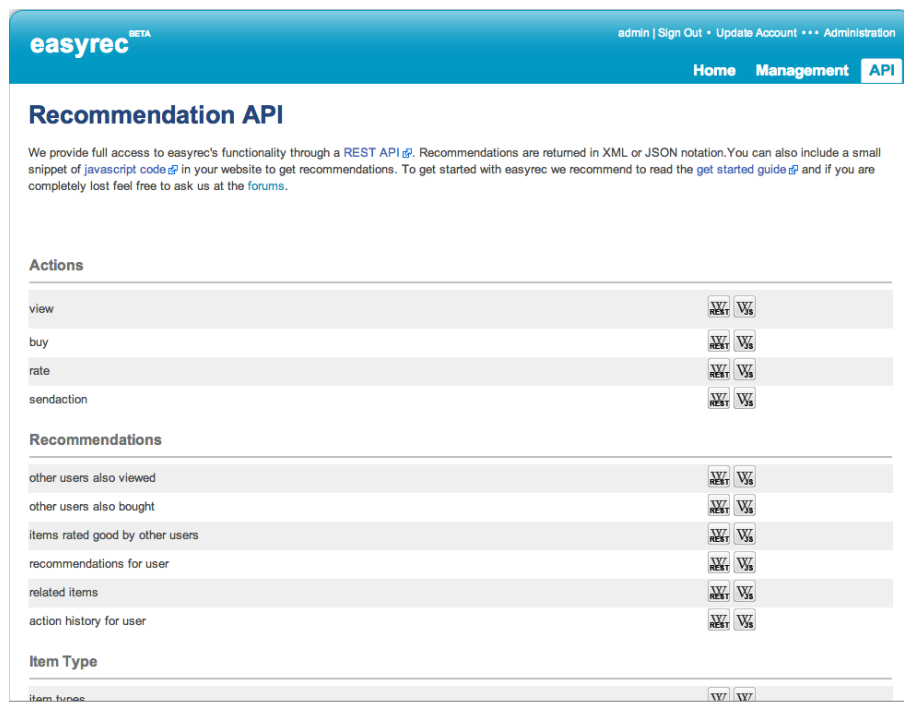


Figure 4.9: Easyrec API putem koje "third-party" e-commerce aplikacija pristupa

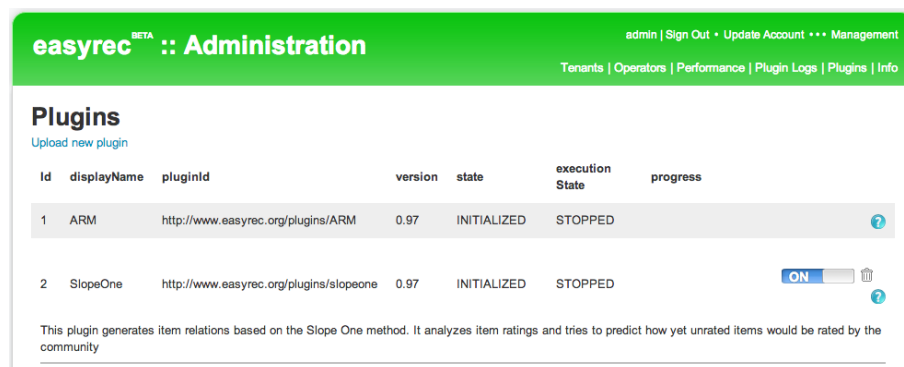


Figure 4.10: Algoritmi koji se primjenjuju su easyrec plugin-ovi

5. Bibliography

Appendix A

Software toolset

1. Mac OS X 10.8.2
2. mvim, vim tekst editor ver 7.3
3. MacTex (TeX Live 2012)

Appendix B

Software repozitoriji

- PeB izvorni kod seminarskog rada https://github.com/hernad/FIT_PeB
- drupal 7.15 php web content framework <https://github.com/hernad/drupal>
- easyrec <https://github.com/hernad/easyrec>