HOW TO PASS MAGENTO CERTIFICATION EXAM IN 30 DAYS

David Nguyen

For developers who want to get Magento Certificate

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INTRODUCTION

There is no doubt that Magento currently is one of the most powerful and fast-growing ecommerce platforms. Over the past few years, not only the number of websites using Magento, but also the number of developers specialized in this platform have increased dramatically.

In 2012, Magento started Magento Certification Exams which are geared toward professionals who want to differentiate themselves from the competition with the ultimate Magento credential. Store-owners also benefit from this since they can easily find a qualified developer to make sure their website is handled by trusted hands. Magento Certificate becomes valuable and indispensable to developers from all over the world who want to make money in Magento field.

"How to pass Magento Certification Exam in 30 days" is written based on the 10 topics announced in the Study Guide of Magento. This book presents full knowledge of each topic as well as provides useful tips for developers to work with Magento. At the end of some topics, you can find questions that are designed to help revise what you have learned.

ABOUT AUTHOR

If you haven't been familiar with Magestore, we would like to introduce ourselves. We are one of the top Magento Extension providers. Founded in January 2010, until now Magestore has more than 15,000 customers globally. One of the reasons for our success is that we always try our best to provide good support service: lifetime update, lifetime support. You can find customers talk about us at Magestore.com or Magento Connect. Currently, we have about 30 extensions, a lot of them are best-seller for years: *Affiliate Plus*, *One Step Checkout*, *Gift card*, *Reward points*, *Mega menu*, *Auction*, *Store pickup*, *Promotional Gift*, *Web POS*, *etc...*

Right when Magento announced about Magento Certification exam, all developers at Magestore were excited to prepare for the test. We made documents and organized mini class to study together. As we have a Blog favored by many developers for useful Magento tutorials, we thought why didn't publish our Magento certification preparing documents to the Blog as well? After posting the final part to our Blog, we decided to make it to an eBook so that Developers can easily find and study.

This book is mainly written by David Nguyen, Technical Manager at Magestore. He has been the leader for many important projects of Magestore. Last year, he himself took part in Magento Certification exam and scored 66/70.

Besides David, great contributions were also made from other members in the technical team, including: Travis Ngo, Alex Nguyen, Michael Nguyen, Blanka Pham, Adam Pham, Kaka Nguyen and Stephen Nguyen. Content are translated and edited thanks to the Marketing team. As we are not English native speakers, we believe this book still has some errors of expression. Please kindly understand and contact us at support@magestore.com if you have any questions.

David Nguyen

5 developers of Magestore tried to study this book within 30 days before taking Magento Certification exam and all passed. Thus we hope you will also find this book valuable and soon achieve the desired Certificate.

June 10, 2013

Magestore Team

TOPIC 1

Part 1: Fundamentals

Magento is established based on Principles of Object-Oriented Programming on Zend Framework with MVC architecture. It uses Event-Driven Architecture (EDA) to manage events.

In this part, we will talk about:

1. Describe and apply basic principles and processes of Object Oriented Programming (OOP) and Model-View-Controller (MVC) to build Magento websites
2. Identify and describe principles of Event-Driven Architecture (EDA)
3. Sample questions & answers

I - Describe and apply basic principles and processes of Object Oriented Programming (OOP) and Model-View-Controller (MVC) to build Magento websites

1. Object Oriented Programming OOP

- Abstraction

Use function/class without knowing exactly how that function/class accomplishes its tasks. What we concern is parameters sent to it and its returned value.

A typical example is function _init() in class Mage_Core_Model_Abstract, this function will be executed to define with which table in CSDL the model will work.
- Inherited class of Abstract class is just the instance of the abstract class.
- Calling abstract function requires its instance function, which means in the children class you must rewrite this function.

- Encapsulation

Objects are encapsulated. When changing data, you must go through functions to work with that object. In other words, a product cannot know information of another product. The common thing between the 2 products is the method working with them.

- Polymorphism

Object instances of a same class are different. For example, products of different types (simple/grouped/…) have different price calculated methods.

- Inheritance

Inheritance is exploited in Magento, especially Varien_Object class which is inherited by many classes in Magento. (Function setData/getData is inherited from Varien_Object).

2. Model-View-Controller MVC

- Model

Model is the classes providing data, service related to data and business logic. This class works directly with data and provides data for other elements. In a module, these classes are contained in Model folder.

- View

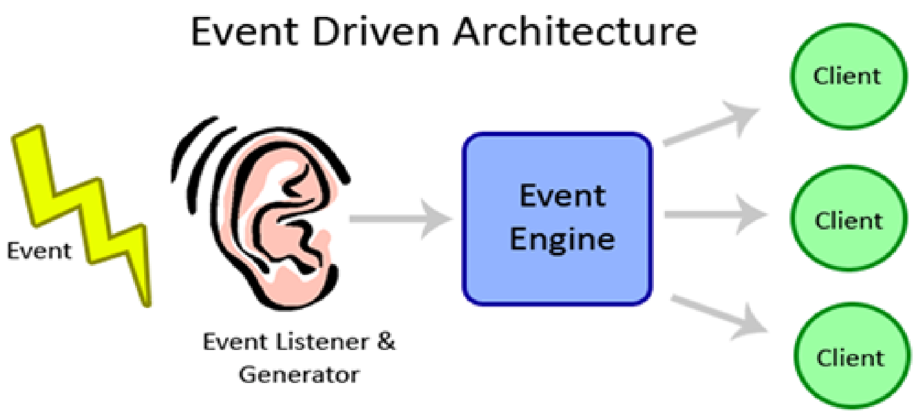
View is the classes which define data presented method (not update data). These classes are contained in the folder Block of module.

- Controller

Controller is the classes which control application stream. They receive input which is requirement of users through HTTP request, transfer those requests to the classes which process the requests directly. From the link, Router will get to Controller which controls that link. In Magento module, these classes are contained in controller folder.

II - Identify and describe principles of Event-Driven Architecture (EDA)

1. Event-Driven Architecture



2. Magento event

- ***Event Listener & Generator***: When an event happens, this element will Listen the event, create signals of that event and send that signal to Event Engine.
- ***Event Engine***: When receiving signals of the event, this element will send them to factor Client to process that event.
- ***Client***: When receiving signals of the event, this element will execute steps to respond to that event.

Question

1. What is static function?

2. The order of events when several modules catch the same event

Answer

1. Static function is silent function of a class, which is stored in the memory space of a class (not objects).

2. Order of event: The first loaded module will get the signals before others. The order of loading modules depends on the name of module and configure of module:

- The module depending on another module will be loaded later than the module it depends.

- Order of loading configure of module is as below:

***Mage_All.xml* will be loaded first, module configure in this file will be loaded first

***Mage_*.xml*

**.xml*

And file.xml will be loaded according to the order of the file’s name.

Part 2: Magento module-based architecture

Magento is built based on module architecture. All activities of Magento are processed by modules.

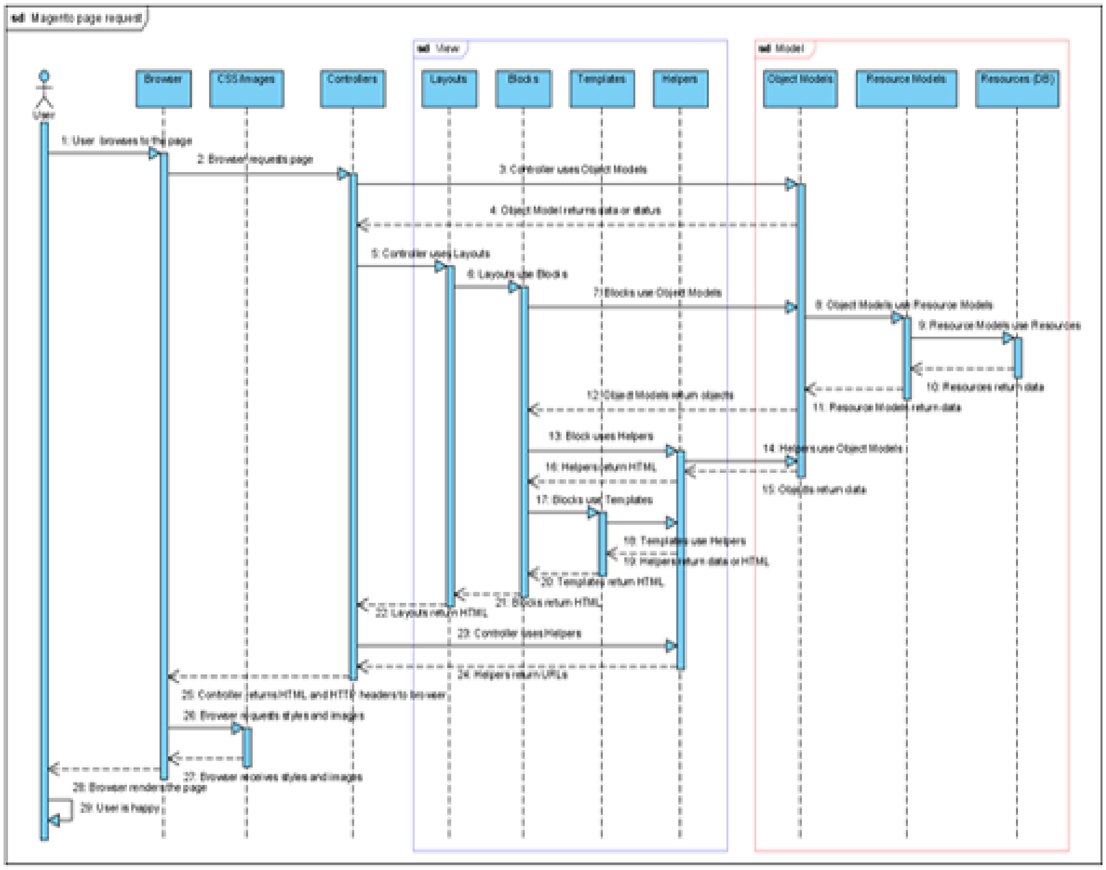
In this part, we will talk about:

- Describe module architecture
- List steps to add a new module
- Describe module limitations
- Sample questions & answers

I - Describe module architecture

A built module of Magento may work following the structure: MVC (model – view – control) with functions of each are below:

- **Model**: is the element which works with data, stores and takes out data. Model will ensure data's performance and accuracy.
- **View**: is the expression of data, showing changes of system to users.
- **Control**: is the element which controls interaction between view and model, processing application stream.


sd Magento page request
sd View
sd Model
User
Browser
CSS/Images
Controllers
Layouts
Blocks
Templates
Helpers
Object Models
Resource Models
Resources (DB)
1: User browses to the page
2: Browser requests page
3: Controller uses Object Models
4: Object Model returns data or status
5: Controller uses Layouts
6: Layouts use Blocks
7: Blocks use Object Models
8: Object Models use Resource Models
9: Resource Models use Resources
10: Resources return data
11: Resource Models return data
12: Object Models return objects
13: Block uses Helpers
14: Helpers use Object Models
15: Objects return data
16: Helpers return HTML
17: Blocks use Templates
18: Templates use Helpers
19: Helpers return data or HTML
20: Templates return HTML
21: Blocks return HTML
22: Layouts return HTML
23: Controller uses Helpers
24: Helpers return URLs
25: Controller returns HTML and HTTP headers to browser
26: Browser requests styles and images
27: Browser receives styles and images
28: Browser renders the page
29: User is happy

MVC in Magento:

Besides, module in magento may be built based on EDA architecture to send and catch events in the system (EDA architecture has been mentioned in part 1-Fundamentals).

II - List steps to add a new module

To add a new module in Magento, we need to follow at least 2 following steps:

Step 1: Register module with the system by naming file configure (e.g. file *Magestore_Test.xml* into the folder */app/etc/modules/*. File *Magestore_Test.xml* with the content like this:

```
<?xml version="1.0"?>

<config>

<modules>

<Magestore_Test>

<active>true</active>

<codePool>local</codePool>
```

```
</Magestore_Test>

</modules>

</config>
```

Step 2: Create code in folder */app/code/local/Magestore/Test*. Files needed for module will be shown in the next parts.

III - Describe module limitations

Limitations of modules:

- All activities of the system must go through modules and an action in Magento may involve some modules, thus the loading and running of Magento system are quite slow.
- Many modules working in the same system can lead to modules' conflict.

Question

When the system runs, does it load all files in module? If not, when creating a new object or extend class from a class without including class's source file, why does the system not show errors?

Answer

When running Magento, the system will just load files including the class which we called.

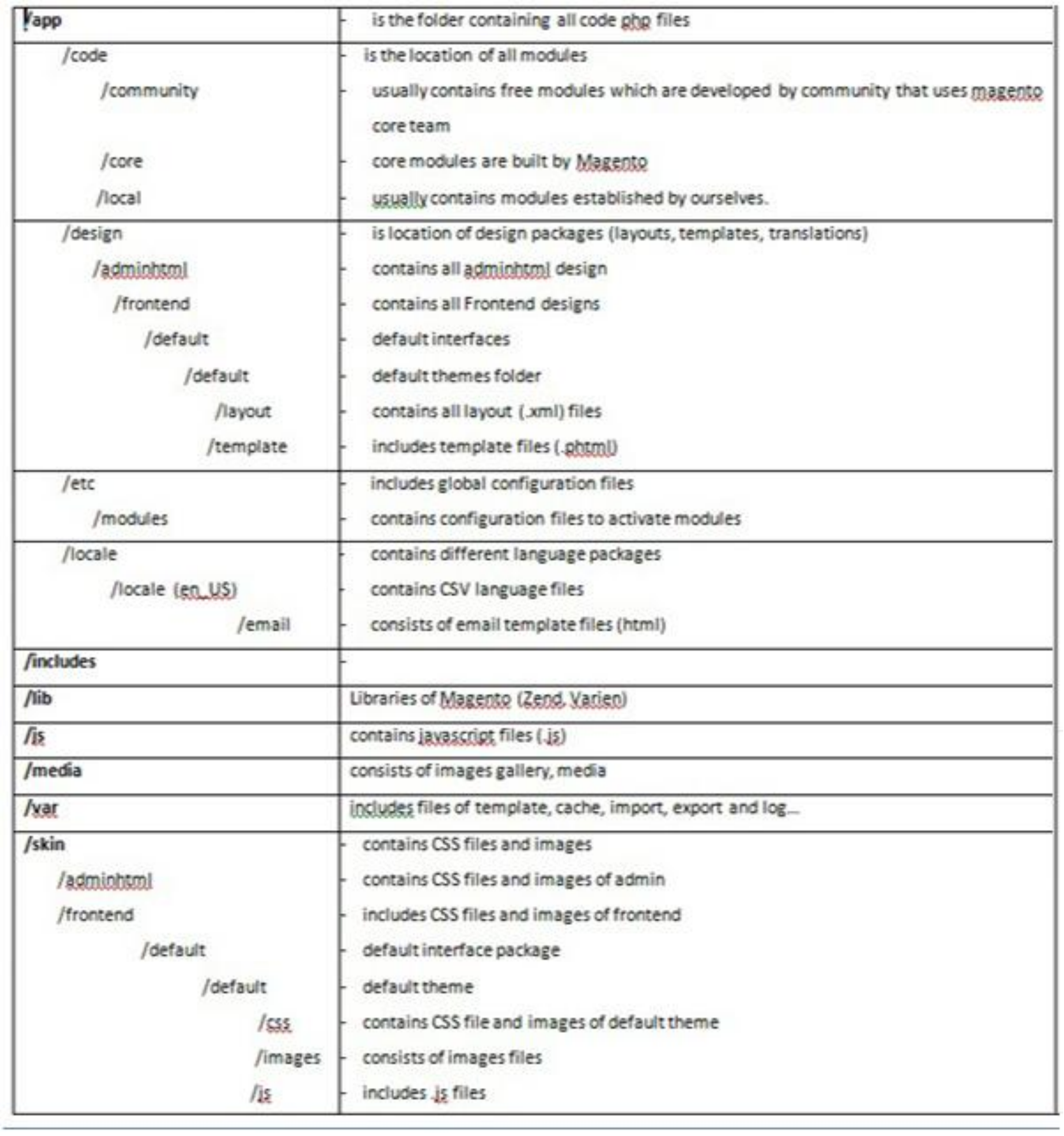
Magento uses a magic function spl_autoload_register('name_function_autoload'); of PHP. When you create a new object or extend class from a class that doesn't exist, the function name_function_autoload will automatically run before adding new or extending from a class.

The function name_function_autoload has parameter named class, so it's the type function name_function_autoload(class). In Magento, from the name of a class, the system can immediately find the path and files including that class (due to rules of naming in Magento).

Part 3: Magento directory structure

Magento is built based on the principle of object-oriented programming with MVC architecture. The code system of Magento is saved in the form of dispersions so as to increase the extension ability for the system. The directory structure is stored as follows:

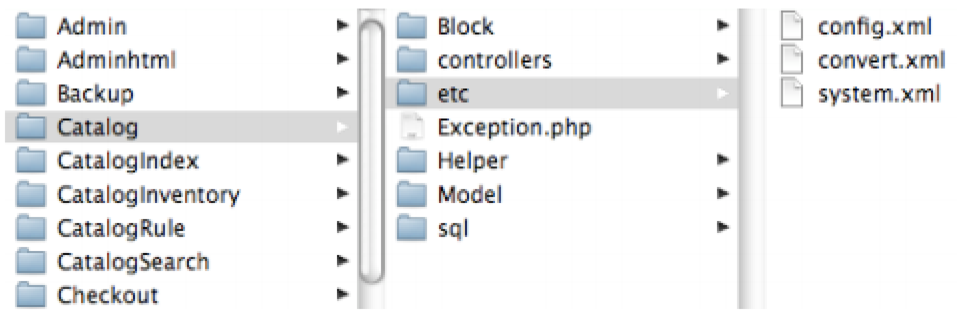
I - Magento directory structure



/app	- is the folder containing all code php files
/code	- is the location of all modules
/community	- usually contains free modules which are developed by community that uses magento core team
/core	- core modules are built by Magento
/local	- usually contains modules established by ourselves.
/design	- is location of design packages (layouts, templates, translations)
/adminhtml	- contains all adminhtml design
/frontend	- contains all Frontend designs
/default	- default interfaces
/default	- default themes folder
/layout	- contains all layout (.xml) files
/template	- includes template files (.phtml)
/etc	- includes global configuration files
/modules	- contains configuration files to activate modules
/locale	- contains different language packages
/locale (en_US)	- contains CSV language files
/email	- consists of email template files (html)
/includes	-
/lib	Libraries of Magento (Zend, Varien)
/js	contains javascript files (.js)
/media	consists of images gallery, media
/var	includes files of template, cache, import, export and log…
/skin	- contains CSS files and images
/adminhtml	- contains CSS files and images of admin
/frontend	- includes CSS files and images of frontend
/default	- default interface package
/default	- default theme
/css	- contains CSS file and images of default theme
/images	- consists of images files
/js	- includes .js files

II – The structure of module

- The best way to understand Magento is to know structures and activities of modules in Magento. The entire code of one module is contained in a directory in app/code/core/Mage
- The following is the structure of a module catalog: You must use an article before a singular noun: a/the/my…



- Block: monitors the template system in Magento. The code in block is used to load database and display of template. This is also the location to edit database if necessary before showing it on the template. The display of which template will be declared in the layout file: *app/design/frontend/default/default/layout/your_module.xml.*

For example:

```
<yourmodule_yourcontroller_youraction>
<reference name="content">
<block type= "yourmodule/yourblock" name= "your_name" template=
"yourmodule/yourtemplate.phtml"/>
</reference>
</yourmodule_yourcontroller_youraction>
```

When clients access the link: http://domain.com/yourmodule/index/index, Magento will analyze this URL to find out names of module, controller and action which are called out. And then, it will search in layout files to view the template which will be used to display.

Here is the file *yourmodule/yourtemplate.phtml*.

- Etc: contains XML files which are used to configure each module. There are three important files:

* *Config.xml*: directly configures module and declares Module, Resource, Block, and Helper…

* *System.xml*: configures default value and display in admin menu.

* *Adminhtml.xml*: creates menu in admin.

- Model: handles the process of the database access. Magento designs database according to the EAV model so the database access is quite complicated. This is the place to write functions which directly carry out queries.
- Controllers: define process to execute request of users. Controllers are classes which inherit from the basic one: *Mage_core_Controller_Varien_Action* (inherits from class *Zend_Controller_Action*).
- Helper: you can add functions here in order to do anything as you wish. To call one function (Ex: helper Test) in Helper, you need to use the command below: *Mage::helper('yourmodule/yourhelp')->helperTest();*
- Sql: contains files to setup database for module which interact with database (create table, update tables…)
- Besides, there are layout and template files for admin and frontend in the folder: *app/design/adminhtml/default/default and app/design/frontend/default/default*.
- To declare Magento a new module you need to create a XML file *Yournamespace_Yourmodule.xml*

Question

1. What is the compilation mode in Magento?

2. When entering the link below into the Address bar of browser, which Module, Controller and Action will Magento calls?

URL: http://domain.com/action/module/controller

a. Module: module Controller: controller Action: action

b. Module: action Controller: controller Action: module

c. Module: action Controller: module Action: controller

Answer

1. The mode inserts class files into a folder in order to speed up in Magento. In order to use this function, you need to go to menu *system->website->compilation* in admin.

2. URL: http://domain.com/action/module/controller

a. Module: module Controller: controller Action: action

b. Module: action Controller: controller Action: module

c. Module: action Controller: module Action: controller

Part 4: Configuration XML

Magento system operates with the configuration set in XML. All activities are controlled via this XML configuration system such as the registration module, database configuration, model, block, controller, etc.

I - Create and register a module

In mounting a module in the operation of the system, the system first has to be aware of the presence of that module. Magento System will recognize the existence of the module by reading all the *. Xml file in the / app / etc / modules

A configured file Magestore_Test.xml to register operation of a new module has the following form:

```
<?xml version="1.0"?>

<config>

    <modules>

        <Magestore_Test>

            <active>true</active>

            <codePool>local</codePool>

        </Magestore_Test>

    </modules>

</config>
```

- Magestore_Test : Name of module
- active : whether configuration of module operate or not (true/false)
- codePool: local => module này được đặt tại thư mục /app/code/***local***

II - Specify option in the config file.

After loading the list of modules, system will find file config.xml in folder module ((*app/code/(codepool)/(NameSpace)/(ModuleName)/etc/config.xml*) to read operation configuration for this module. All configurations are installed in <config></config>:

- **modules**: module configuration as active, depends, version
- **global**: main configuration for models, resources, blocks, helpers, fieldsets, template, events, eav_attributes, custom_variables. These configurations in this part include basic configs for module, configs about folders containing file class for model, block, helper or events (frontend and admin), configures for email template.
- **admin**: containing configures attributes, fieldsets, routers. In this config, we often notice to configure for router of admin.fig.
- **adminhtml**: including configure operation of module in admin. The cards in this part often have layout, translate, events. These configures only have impact on backend in Magento.
- **install**:
- **frontend**: including configure operation of module on frontend such as cards: secure_url, events,routers, translate, layout. The configurations only have impact on frontend.
- **default**: including configures of module for all stores
- **stores**: including configures for each store. In the card store is <store_code> of each store.
- **websites**: including configure for each website. In card website is <(website_code)> of each website.
- **Operate website/stores/stores views**

Configure as configure xml to control websites/stores/stores view is put on value table in cards default, stores and websites.

```
<default>

        <carriers>

                <flatrate>

                        <active>1</active>

                        <sallowspecific>0</sallowspecific>

                        <price>5.00</price>pe>

                </flatrate>
        </carriers>
</default>
```

Configure will have impact on all websites/stores in Magento. However, when we want to have different configure for websites or single store, we can configure as below:

```
<websites>
    <base>
        <carriers>
            <flatrate>
                <active>1</active>
                <sallowspecific>0</sallowspecific>
                <price>5.00</price>pe>
            </flatrate>
        </carriers>
    </base>
</websites>
```

```
<store>
    <english>
        <carriers>
            <flatrate>
                <active>1</active>
                <sallowspecific>0</sallowspecific>
                <price>5.00</price>pe>
            </flatrate>
        </carriers>
    </english>
</store>
```

Changes to these values are made by administrator; we put all values in file system.xml. In system, we will find configures by clicking in menu: **System-> Configuration.**

Questions

When we configure in menu **System -> Configuration, Advance** and choose disable module output, does module operate?

Answers

When we disable module in menu Disable module output, all functions of module still operate normally, except for giving layout of blocks in module. Because block of Magento rendered to html will have this condition:

```
final public function toHtml()

    {

        Mage::dispatchEvent('core_block_abstract_to_html_before',
array('block' => $this));

        if (Mage::getStoreConfig('advanced/modules_disable_output/'.$this-
>getModuleName())) {

            return '';

        }

…
```

Part 5: Functional and Factory class groups

As you know, Magento is built based on module architecture, which leads to the requirement that there must be an interaction among modules. Hence, in this part, we will learn about the way these modules are used.

I - Definition and Examples of Functional and Factory class groups

1. Functional Class

- Class: only contains functions and static attributes? (not sure)
- For example: Mage

2. Factory Class

- Class: consists of functions to create the instance (object) of different Classes. Class depends on input parameters
- For example: class Mage

- Create an instance of class Mage_Catalog_Model_Product

```
Mage::getModel('catalog/product')
```

- Generate an instance of class Mage_Catalog_Block_Product_View

```
Mage::getBlockSingleton('catalog/product_view')
```

II - Definition of Instance, the ways to create the instance object in Magento

- Definition : In OOP, Instance is an Object
- Create an instance object in Magento

```
Mage::getModel('catalog/product');

Mage::getBlockSingleton('catalog/product_view');

Mage::app()->getLayout()-createBlock('catalog/product_view')
```

- The process to generate an instance through the function *Mage::getModel()* is as below:

1) Call function *getModel()* trong class Mage

2) Call function *getModelInstance()* in class *Mage_Core_Model_Config*

3) Call function *getModelClassName()*. This function will return the name of the model with catalog/product is *Mage_Catalog_Model_Product*.

4) Add a new object by the New command:

```
$obj = new $className($constructArguments);
```

In this example, *$className* = *'Mage_Catalog_Model_Product'*

- Get different instances from different places:

- With creating a Instance of a model, the function *Mage::getModel()* always returns a new object (instance).

- Function *Mage::getSingleton()* always gives only one object (instance) back.

III - Study Singleton Pattern

Singleton Pattern makes sure that each Class has a unique Instance. You can use a Global Point to access that Instance (=> it is possible to call Instance anywhere). Mage::getSingleton('checkout/cart') – This function always returns only one Cart object although you call it anywhere.

Question

According to the following command, please define the value printed?

```
$productA = Mage::getSingleton('catalog/product')->load(9);

$productA->setPrice(100);

$productB = Mage::getSingleton('catalog/product');

$productB->setPrice(200)


echo $productA->getPrice();

echo $productB->getPrice();
```

Answer

Print the "200" two times.

Part 6: Class overrides on Magento

There are some functions of Magento core which are written in Block, Model or Helper. When we use these functions for our purposes, we see that they are not suitable and not as we wish. We can utilize Override class feature of Magento to rewrite those functions according to our uses.

I - For Block

For example: If we need to rewrite *app/core/Mage/Catalog/Block/Product/List.php* At first, we have to create a module including at least 3 files:

- *app/code/local/Magestore/Newmodule/Block/Product/List*
- *app/code/local/Magestore/Newmodule/etc/config.xml*
- *app/etc/modules/Magestore_Newmodule.xml*

  - ❖ **Step 1:** Declare the module *(app/etc/modules/Magestore_Newmodule.xml)* as in Configuration XML (in the last part) > Create and register a module.
  - ❖ **Step 2:** Edit the file *config.xml (app/code/local/Magestore/Newmodule/etc/config.xml)*

```
<config>
 <global>
    <blocks>
      <newmodule>
       <class>Magestore_Newmodule_Block</class>
      </newmodule>
      <catalog>
        <rewrite>
              <product_list>Magestore_Newmodule_
              Block_List</product_list>
        </rewrite>
      </catalog>
    </blocks>

  </global>

</config>
```

Through this step, when you call the block 'catalog/product_list' the system will return a block 'newmodule/list'.

- **Step 3** : Override block *(app/code/local/Magestore/Newmodule/Block/List.php)*

```
<?php

Class Magestore_Newmodule_Block_List extends
Mage_Catalog_Block_Product_List{

// function (need be written)

protected function_getProductCollection(){

 //custom code

   }

}
```

II - For Model

For instance: override *app/code/core/Mage/Catalog/Model/Product.php)*

By the file *app/code/local/Magestore/Newmodule/Model/Catalog/Product.php*

- **Step 1**: Create and register a new module (as same as the part above)
- **Step 2**: File config.xml(app/code/local/Magestore/Newmodule/config.xml)

```
<config>

<global>

 <models>

      <newmodule>

       <class>Magestore_Newmodule_Helper</class>

      </newmodule>

      <catalog>

        <rewrite>
```

```
              <product_list>Magestore_Newmodule_Model_

              Product</product_list>

        </rewrite>

     </catalog>

    </models>

  </global>

</config>
```

- **Step3*:*** Override model *(app/code/local/Magestore/Newmodule/Model/Catalog/Product.php)*

```
<?php

class Magestore_Newmodule_Model_Product extends
Mage_Catalog_Model_Product_List

{



         public function isSalable(){

         }

}
```

III - For Resource Models

- For example:

Override *app/code/core/Mage/Catalog/Model/Resource/Eav/Mysql4/Attribute.php***)**

- By the file:

app/code/local/Magestore/Newmodule/Model/Catalog/Resource/Eav/Mysql4/Attribute.php

- **Step 1**: Create and register a new module (as same as the previous part)
- **Step 2**: File *config.xml(app/code/local/Magestore/Newmodule/config.xml)*

```
<config>

 <global>

    <models>
```

```
      <newmodule>
       <class>Magestore_Newmodule_Model</class>
      </newmodule>
      <catalog_resource_eav_mysql4>
        <rewrite>
            <attribute> Magestore_Newmodule_
            Model_Catalog_Resource_Eav_Mysql4
            _Attribute </attribute>
        </rewrite>
     < catalog_resource_eav_mysql4>
    </models>
  </global>
</config>
```

- **Step 3*:*** Override file (as same as the way to conduct with Model)

IV - For Helper

For example: override app/code/core/Mage/Catalog/Helper/Data.php**)**

By the file app/code/local/Magestore/Newmodule/Helper/Catalog/Data.php

- **Step 1*:*** Create and register a new module (as same as the part above).
- **Step 2**: File config.xml(app/code/local/Magestore/Newmodule/config.xml)

```
<config>
 <global>
    <helpers>
      <newmodule>
       <class>Magestore_Newmodule_Model</class>
      </newmodule>
      < catalog>
        <rewrite>
             <data> Magestore_Newmodule_Helper_
             Catalog_Data </data>
        </rewrite>
     <catalog >
    </helpers>
  </global>
</config>
```

- **Step 3*:*** Override helper *(app/code/local/Magestore/Newmodule/Helper/Catalog/Data.php)*

V - Note

Rewriting Modules/Resource models/Helper/Block only has impact on calling objects through Mage classes such as: Mage::getModel(), Mage::getResourceModel(), Mage::helper(), Mage::getSingletonBlock(). With the generation of objects from different ways as new (*$product = new Mage_Catalog_Model_Product();*) or extends rewriting does not have influence. This is exactly the difference when we use direct object-calling from class name and the function which Magento provides.

Question

Can overriding a resource model be conducted as same as overriding a normal model (because they are belong to the model area)?

Answer

You cannot configure the override of a resource model the same as a normal model. Because the override only has influence when the system calls the function Mage::getResourceModel(). This function reads the configuration rewrite from the bar of the resource model (for example: catalog_resource_eav_mysql4) but from the bar of the model.

Part 7: Event Observer

I guess you were excited to know how to change the action of a function core in Magento as in the last tutorial, you learned the introduction of Override core class. Now, we continue with another method to conduct: **Event Observer**.

When we want to change the action of a function core in Magento, we can use two ways including: override core class and event-driven architecture. However, Override core has a shortcoming that each class can only override once. Regarding the event, we can run it in different modules.

I - Register an Observer

- **Step 1:** Register an Observer for events by the file config.xml

```
<(scope)>

<events>

<(eventname)>

<observers>

<(observer_identify>

<type>model</type>

<class>Magestore_FeaturedProduct_Model_Observer</class>

<method>methodName</method>

</(observer_identify)>

</observers>

</(eventname)>

</events>

</(scope)>
```

- (scope): may be the global/adminhtml/frontend. It is used to determine the place to set the Observer for an event. Global is to call this observer whenever while with adminhtml, observer is only called in the admin area. And with frontend, observer is only called in frontend.
- (eventname): the event name which the system dispatches.
- type: model/singleton/object – the ways to call the observer.

- class: the class name of the observer. You can use the class name (as above it is Magestore_FeaturedProduct_Model_Observer) or magento's class name (example: featuredproduct/observer).
- method: the client function name which is called.
  - **Step 2:** Write a client function for the Observer

```
<?php
class Magestore_FeaturedProduct_Model_Obeserver
{
 public function methodName($observer){
   //$object== $observer->getEvent()->getObject();
   //$observer is the input parameter of the event
   }
}
```

II – Dispatch events

Dispatching events is carried out through the function dispatchEvent in class Mage. We can use *Mage::dispatchEvent($eventName, array $params)*. For example:

Mage::dispatchEvent('custom_event', array('object'=>$this));

The client function can receive the parameter of this event by using the command: *$object = $observer->getEvent()->getObject();*

III – Cron job

Function: runs a function according to the schedule time.

The configuration in file config.xml

```
<crontab>
<jobs>
<catalogrule_appy_all>
<schedule><cron_expr>0 2***</cron_expr></schedule>
<run><model>catalogrule/observer::dailyCatalogUpdate</model></run>
</catalogrule_apply_all>
</jobs>
```

```
</crontab>
```

In details:

- The tab is to set the running time. The time parameter includes:

(minute) (hour) (day) (month) (year)

- the path to the function that is run

Question

1. Which of the configuration below allows Cron Job to run every 20 minutes?

a. 20 * * * * b. 0,20,40 * * * * c. 0 20 * * * * d. 0:20 * * * *

2. Could you explain the effect of the bar <args> in the event configuration?

Answer

1. b.

Part 8: Methods to resolve the Module conflicts in Magento

The most common conflict happens when two or more modules inherit a module core of Magento at the same time by using the command <rewrite> in the file config.xml of modules.

However, there is a large number of standard modules of Magento which have never had conflicts because Magento designs a plug-in mechanism in add-ons. For example: standard payment and shipping module.

I – How do I identify extension conflicts?

In fact, we cannot find out the conflicts between templates. We can just discover the conflicts between modules. With the discovery of the extension conflict, there is a module that is being used at the moment.

II - How do I resolve the conflicts?

There are 3 solutions to resolve the conflicts between modules.

Solution 1: Merge the code from a conflict file into the remaining and remove the part which is using <rewrite> in that file.

Solution 2: Remove <rewrite> in the config.xml of a module and let the conflict php file of this module inherit the php file of the rest.

For example: we have two modules Extension_A và Extension_B and they have conflicts.

- At first we have:

```
class Extension_A extends Core_Class

class Extension_B extends Core_Class
```

- We need to change into:

```
class Extension_A extends Extension_B

class Extension_B extends Core_Class
```

- And then we remove the parts using <rewrite> that causes the conflict in Extension_B.

Solution 3: Use the depends module configuration in Magento. We need to put the depends module configuration in app/etc/modules/extension_B.xml of Extension_B in order to define that the loading order of Extension_B is after the module Extension_A is loaded.

```
<config>
 <modules>
   <Extension_B>
      <depends>
          <Extension_A/>
      </depends>
   </Extension_B>
 </modules>
</config>
```

Thus, the class of B module can still rewrite the class of the core (through the class of module B). We can use the class inheritance as below:

```
class Extension_B extends Extension_A
class Extension_A extends Core_Class
```

Question

If there are two modules that rewrite a class, which module will be read by the system to run?

Answer

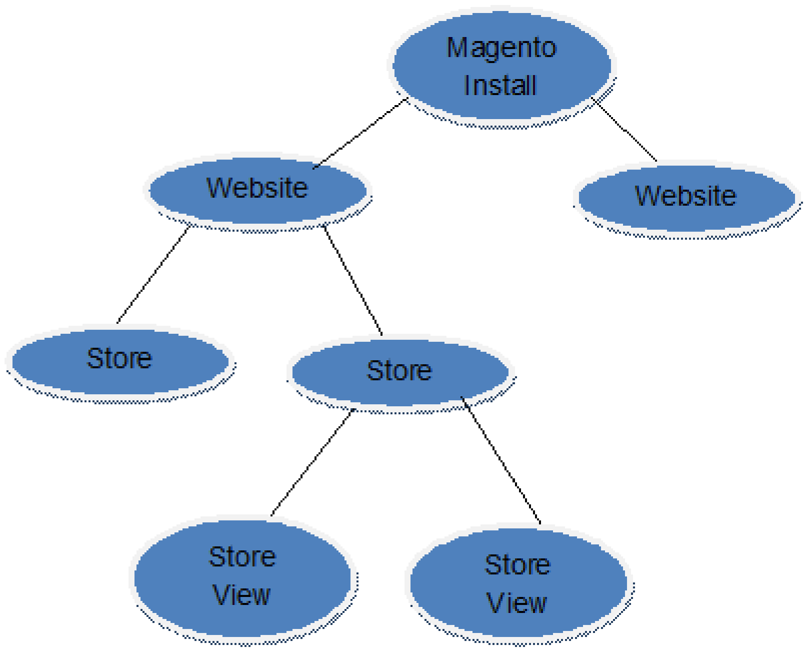
The module that is loaded the configuration first will be overwritten configuration by the next module if there is any duplications of the bar in the xml. The order of loading modules depends on the name of the configuration (depends) of modules as in the last part Fundamentals of the part one.

Part 9: Internationalization

In e-commerce, it is unavoidable that websites are accessed by a large number of people from different countries at the same time. So it is very necessary to develop multi-languages for a website. And Magento supports you in conducting this function on your web-store.

I - How to create a Magento multi-language site

Definition: **website**, **store** and **store view** will be illustrated as below:



- Customers can see Store views which are representatives of stores. The differences between store views are wording, images, and/or design and language (store view is always equivalent to language).
- Behind a store view is a store; products which have a same root category. Stores on a website have same points including customer information, shopping cart, inventory, billing methods and shipping methods.

Steps to create multi-language:

- Download the language package > Copy to the folder app/locale or use magento connector to download.

- Create store (store view) that has store_code
- **System** > **Config** > **General** > **Locale Options** > **Locale**: Select store and then choose the language which has been downloaded. As in Magento default, the link to go to the store is http://site.com/index.php?___store=store_code
- If in the **System** > **Config** > **Web** > **Url Options** > **Add Store Code to Urls**. Afterwards select Default config and then choose Yes. The link to go to the store is: http://site.com/index.php/store_code

For Magento site to run in website mode, we need to take the following steps:

- Link domain to the root category.
- Edit the file index.php: Add the code below:

```
switch($_SERVER['HTTP_HOST']) { case 'shoes.com':
        case 'www.shoes.com':
                $mageRunCode = 'shoes';
                $mageRunType = 'website';
        break;
        case 'hats.com':
        case 'www.hats.com':
                $mageRunCode = 'hats';
                $mageRunType = 'website';
        break;
}
Mage::run($mageRunCode, $mageRunType);
```

Add subdomain, subdirectories:

- For example: themes.magestore.com or magestore.com/themes
- Create a directory: themes directory
- Copy the file index.php and .htaccess from the root directory into themes directory and edit the file index.php:
- Change the line:

```
$mageFilename = 'app/Mage.php';
```

into:

```
$mageFilename = '../public_html/app/Mage.php';
```

- Add before the line below:

```
Mage::run($mageRunCode, $mageRunType);
```

Two following lines:

```
$mageRunCode = themes';

$mageRunType = 'website';
```

II - How to use Magento translate classes and translate files

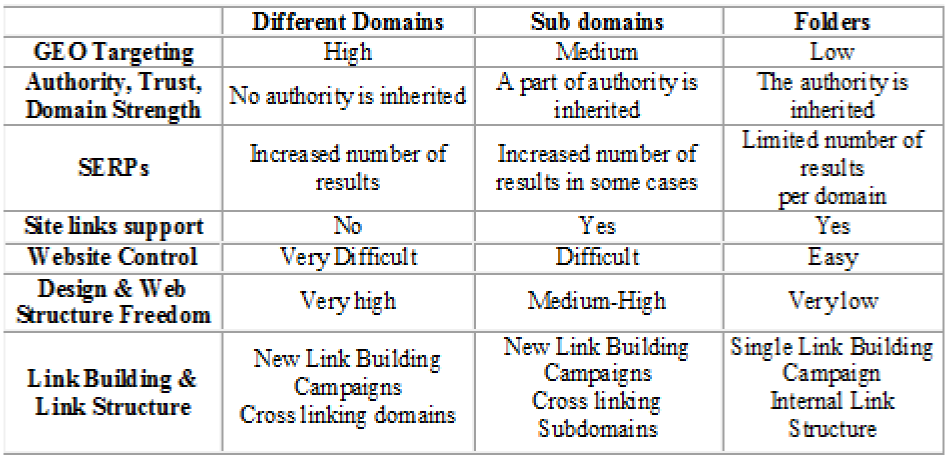
The translation function is **Mage::helper('core')->__()**

This function call to the object Mage::getSingleton('core/translate');

The process to conduct in this class:

- The corresponding CSV file will be loaded (in which locale the store is and which module the store is being called).
- String corresponds with input string which is returned.

III – Compare subdomains and subdirectories with SEO (the details are as the table below):



	Different Domains	**Sub domains**	**Folders**
GEO Targeting	High	Medium	Low
Authority, Trust, Domain Strength	No authority is inherited	A part of authority is inherited	The authority is inherited
SERPs	Increased number of results	Increased number of results in some cases	Limited number of results per domain
Site links support	No	Yes	Yes
Website Control	Very Difficult	Difficult	Easy
Design & Web Structure Freedom	Very high	Medium-High	Very low
Link Building & Link Structure	New Link Building Campaigns Cross linking domains	New Link Building Campaigns Cross linking Subdomains	Single Link Building Campaign Internal Link Structure

Question

What is the load order of the multi-language files?

Answer

The order for the multi-language files to load is:

- CSV in /app/locale
- CSV in /app/design/<area>/<package>/<theme>/locale (theme folder translate)
- Database (table core_translate)

Because the next load will overwrite the last load parts so the priority order is opposite to the load sequence above.

TOPIC 2

Part 1: Application Initialization

We have finished Magento Basics with 9 articles which guide you about fundamentals, configuration XML, and multi-language… in Magento. I will start the next step of Magento Certificate Preparation. You will be introduced the first topic – Application initialization consisting of two parts:

1. *Describe the steps for the application initialization.*
2. *Change a website from within index.php.*

I - Describe the steps for application initialization

- Run the file index.php
- Include Mage.php

  - If not existing => redirect to the downloader of magento

  - If existing a file Mage.php => Conduct the command: Mage::run($mageRunCode, $mageRunType);

- App::run($mageRunCode, $mageRunType)

  - Load configuration files in app/etc/modules

  - Load configuration files in the module (app/code/core/Mage/Customer/etc/config.xml)

  - Update/create version of modules in core_resource

  - Update/create database of modules

- Mage_Core_Controller_Varien_Front::dispatch()

  - Use routers to define the controller and action requested

  - Call dispatch() of the controller that is requested

- Call action of the controller that is requested

- Return HTML code for the browser

II - Change a website from within index.php

Change the website and uses of index.php by the following steps:

Step 1: Create Website

- Generate catalog, root category (***Catalog*** > ***Manage Categories***)
- Manage store, create website, store and store view (***System*** > ***Manage Stores***)
- Configure Base Url for the website which has been created (***System*** > ***Configuration*** tab ***Web***)

Step 2: Insert the code below into index.php before the command:

Mage::run($mageRunCode, $mageRunType);

```
switch($_SERVER['HTTP_HOST']) {

        case 'name_domain_1':

        case 'name_domain_n':

                $mageRunCode = 'website_code';

                $mageRunType = 'website';

        break;

}
```

Part 2: Front Controller

The Front Controller has an array of “routers” that it uses to decide which module the URL should trigger. Therefore, it plays a very crucial role in Magento. Besides, do you know how to locate Front Controller class, or events that Front Controller fires as well as Front Controller’s responsibilities? If you are interested in these issues, please follow this part.

I - Locate Front Controller class

- The position of the directory: app/code/core/Mage/Core/Controller/Varien/Front.php

- Receive all requests from browser and return HTML code.

- Front controller uses routes of the system to define the controller and the action that are called.

- Example: routers in the file config.xml of the Customer module.

```
<routers>

 <customer>

   <use>standard</use>

    <args>

          <module>Mage_Customer</module>

          <frontName>Customer</frontName>

    </args>

 </customer>

</routers>
```

- Routers can receive 3 values for the bar including:

- Standard (class Mage_Core_Controller_Varien_Router_Standard)
- Admin (class Mage_Core_Controller_Varien_Router_Admin)
- Default (class Mage_Core_Controller_Varien_Router_Default)

II - List all events that Front Controller fires

- controller_front_init_before (app/code/core/Mage/Core/Controller/Varien/Front.php)

- 'front' => Mage_Core_Controller_Varien_Front

-controller_front_init_routers (app/code/core/Mage/Core/Controller/Varien/Front.php)

- 'front' => Mage_Core_Controller_Varien_Front

-controller_front_send_response_before (app/code/core/Mage/Core/Controller/Varien/Front.php)

- 'front' => Mage_Core_Controller_Varien_Front

-controller_front_send_response_after (app/code/core/Mage/Core/Controller/Varien/Front.php)

- 'front' => Mage_Core_Controller_Varien_Front

III - Explain Front Controller's responsibilities

- Directly receive the request from browser.

- All requests call the function Mage_Core_Controller_Varien_Front::dispatch()

- URL rewriting process.

- Load the module and action controller corresponding with the requests through routers to process the requirements which are sent from clients.

- Collect routers: admin, standard, default.
- Use the function match() of routers to define the module and controller that are requested.
- Call the function dispatch() of the controller requested.
- Call the action requested.

- Return HTML for browser

- Call the function sendResponse() of Mage_Core_Model_Response_Http (extend from Zend_Controller_Response_Abstract).

- Call the function sendHeaders() – use the header() function of PHP.
- Call the function outputBody() to show the whole content of the body part:

```
echo implode('', $this->_body);
```

Question

Where does the value of $this > _body receive from?

Answer

The variable $_body is an array() and Action controller added value to this variable. For example: When you call $this > renderLayout() in Action controller:

```
$output = $this->getLayout()->getOutput();

Mage::getSingleton('core/translate_inline')

->processResponseBody($output);

$this->getResponse()->appendBody($output);
```

Part 3: URL Rewrite

URL rewrite is something that is not easy to understand. As a developer, you may clearly know the structure, process and others of URL Rewrite. I have made several attempts to get this job done, and I will share with you the materials of URL rewrite to fully exploit it in Magento for the best Search Engine exposure.

I - URL structure/processing in Magento.

- URL structure in Magento

A link in Magento has format as below:

https://user:password@host:443/base_path/[base_script][storeview_path]route_name/controller_name/action_name/param1/value1?query_param=query_value#fragment

- User:password@host:443/base_path/[base_script]: the path to the Script file which runs Magento. Usually, it is an index.php file.
- [storeview_path]: store view code will display here. According to the configuration, this storeview_path is inserted into the link or not.
- route_name/controller_name/action_name: the path to the action which is run by the request of this link.
- param1/value1: name and value of the parameter for the request that is provided by the link.
- ?query_param=query_value#fragment: query

- URL processing in Magento

With the link the same as above, when you request it to run into the index.php file firstly, and then the following files:

- app/Mage.php *(Mage::app()->run())*
- app/code/core/Mage/Core/Model/App.php
- Init and Dispatch controller *($this->getFrontController()->dispatch());*
- app/code/core/Mage/Core/Controller/Varien/Front.php

- Chose the router match for dispatch *($router->match($this->getRequest()))*

• app/code/core/Mage/Core/Controller/Varien/Router/Admin.php

• app/code/core/Mage/Core/Controller/Varien/Router/Standard.php

• …

• app/code/core/Mage/Core/Controller/Varien/Router/Default.php

- app/code/core/Mage/Core/Controller/Varien/Action.php

• Call Action function (Example: indexAction())

- Custom Controller/Action

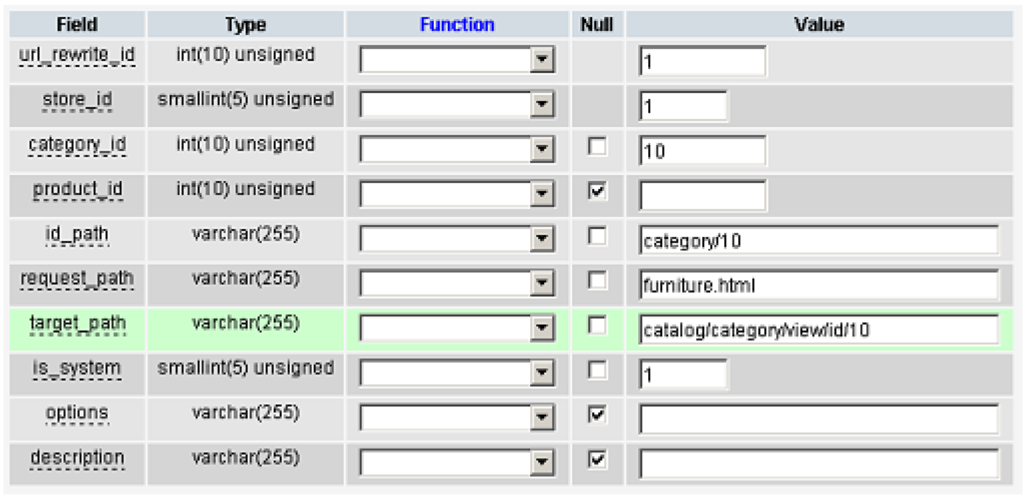
- (app/code/core/Mage/Core/Controller/Response/Http.php)

The link process is primarily conducted in routers (the detail is the function match($request). This function will analyze URL to find out the action to call. When discovering the action, the system will leave the control authority to this action. After carrying out, the action will return the control authority to the system. And then the system returns the response content of that link.

II - URL rewrite process.

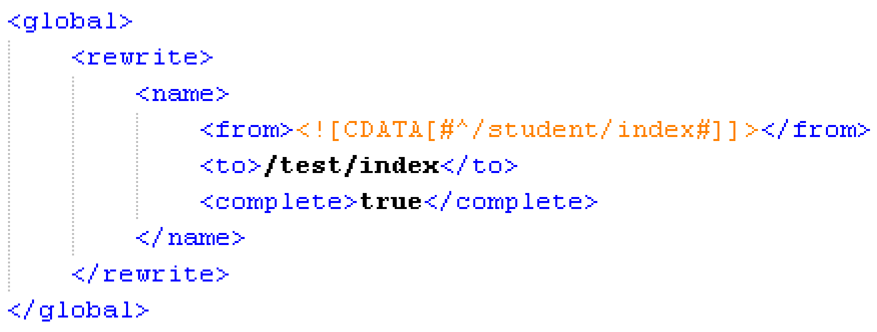
- The URL rewrite process takes place in 3 moments:

- Core URL rewrite: from the request path, the system will find target_path in CSDL and rewrite the request path.



Field	Type	Function	Null	Value
url_rewrite_id	int(10) unsigned			1
store_id	smallint(5) unsigned			1
category_id	int(10) unsigned		☐	10
product_id	int(10) unsigned		☑	
id_path	varchar(255)		☐	category/10
request_path	varchar(255)		☐	furniture.html
target_path	varchar(255)		☐	catalog/category/view/id/10
is_system	smallint(5) unsigned		☐	1
options	varchar(255)		☑	
description	varchar(255)		☑	

- Module configure URL rewrite: is the controller rewrite in the system. From the configuration, the system will rewrite the link.



```
<global>
    <rewrite>
        <name>
            <from><![CDATA[#^/student/index#]]></from>
            <to>/test/index</to>
            <complete>true</complete>
        </name>
    </rewrite>
</global>
```

- Router URL rewrite: Use the router to analyze and rewrite the link. A typical example: the system uses this router to rewrite the link for CMS page (use events to add routers).

III - Rewrite a catalog/ product/ view to a different URL.

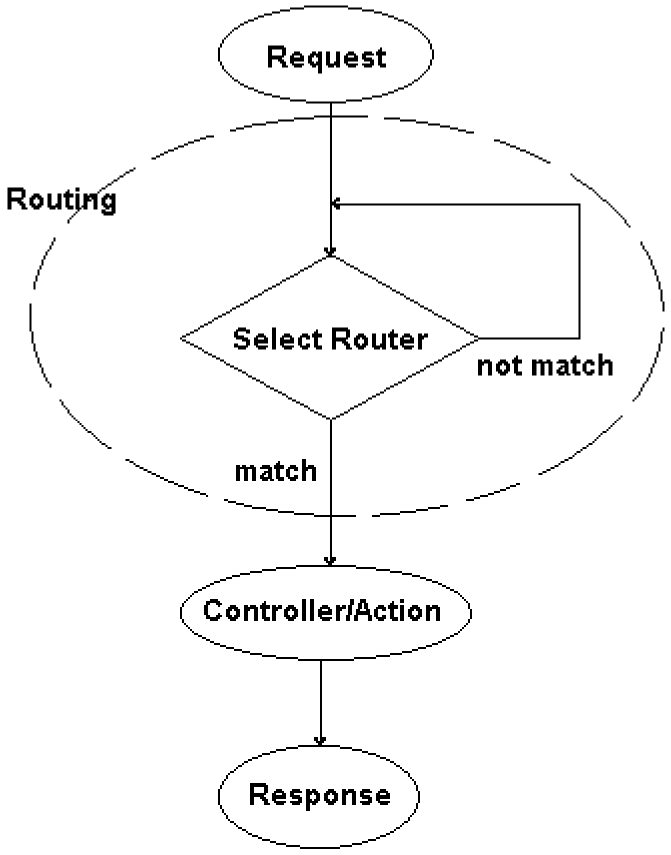
Rewriting catalog/product/view to another URL is used in the Core URL Rewrite process. The link of rewriting catalog/product/view will be stored in the core_url_rewrite table.

Part 4: Request Routing

When there is a request in browser (URL), first Magento uses Request routing to analyze URL and finds out the suitable code to match that request. And then, it defines Controller or Action to return Response. So, Request routing helps you coordinate activities in Magento. You can learn more through this part below.

I - Request routing/flow in Magento

Request flow in Magento:



- Request URL

- index.php (*Mage::run()*)

- app/Mage.php (*Mage::app()->run()*)

- app/code/core/Mage/Core/Model/App.php

+ Install module database (*Mage_Core_Model_Resource_Setup::applyAllDataUpdates()*)

+ Init and Dispatch controller (*$this->getFrontController()->dispatch()*);

- app/code/core/Mage/Core/Controller/Varien/Front.php

+ Chose router match for dispatch (*$router->match($this->getRequest())*)

- app/code/core/Mage/Core/Controller/Varien/Router/Admin.php

app/code/core/Mage/Core/Controller/Varien/Router/Standard.php

…

app/code/core/Mage/Core/Controller/Varien/Router/Default.php

+ dispatch Action (*$controllerInstance->dispatch($action);*)

- app/code/core/Mage/Core/Controller/Varien/Action.php

+ Call Action function (*Example: indexAction()*)

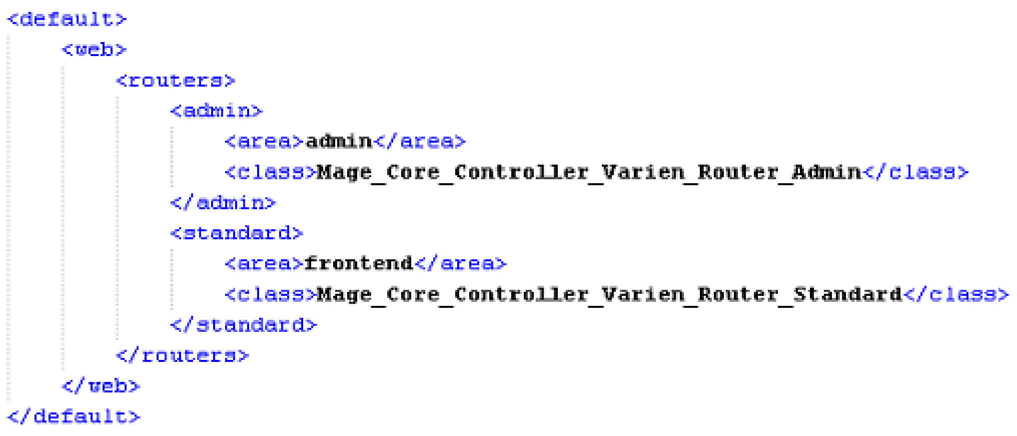
- custom Controller/Action

- (app/code/core/Mage/Core/Controller/Response/Http.php)

Request routing in Magento:

- Init router before using: Mage_Core_Controller_Varien_Front::init()

- Init Router uses configuration file with configuration path: *default/*web/routers

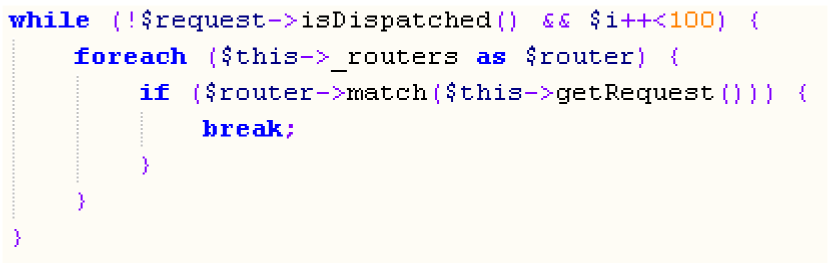


```
<default>
    <web>
        <routers>
            <admin>
                <area>admin</area>
                <class>Mage_Core_Controller_Varien_Router_Admin</class>
            </admin>
            <standard>
                <area>frontend</area>
                <class>Mage_Core_Controller_Varien_Router_Standard</class>
            </standard>
        </routers>
    </web>
</default>
```

- Init the custom router by *event controller_front_init_before, controller_front_init_routers*

- Init the default router

- Try to select router: Mage_Core_Controller_Varien_Front::dispatch()



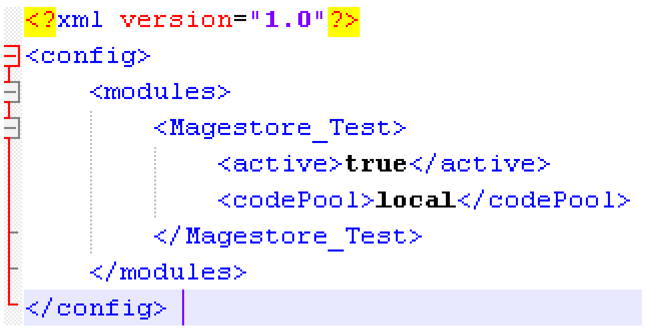
```
while (!$request->isDispatched() && $i++<100) {
    foreach ($this->_routers as $router) {
        if ($router->match($this->getRequest())) {
            break;
        }
    }
}
```

- Function match() of router will chose match controller/action to call. (*$controllerInstance->dispatch($action);*)
  - Predispatch
  - Call Controller Action Method
  - Postdispatch
- Router will try to select router maximum – 100 times.

- Dispatch to controller/action (Example: indexAction())

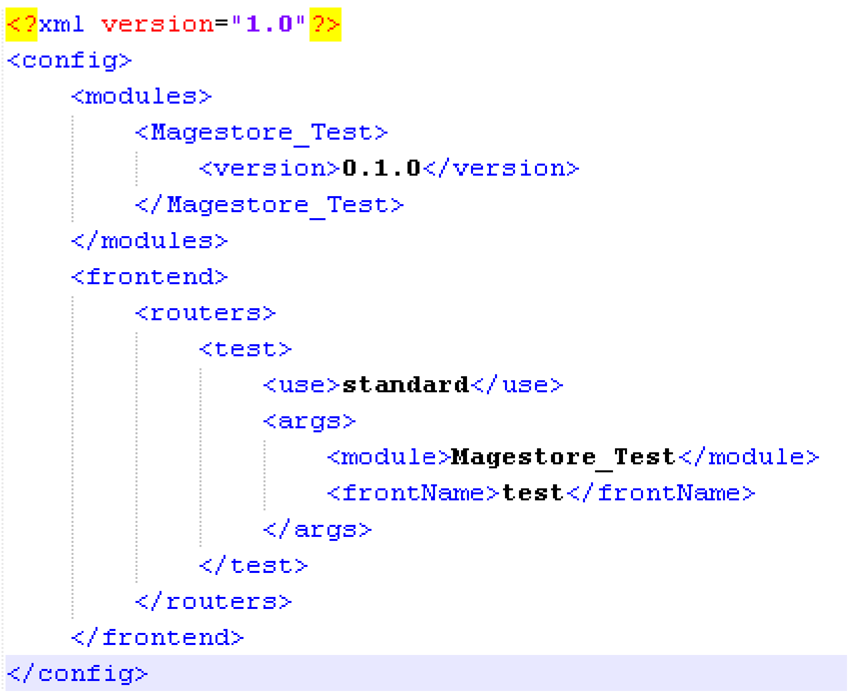
II - Create module with controller

- Register module by file /app/etc/modules/Magestore_Test.xml



```
<?xml version="1.0"?>
<config>
    <modules>
        <Magestore_Test>
            <active>true</active>
            <codePool>local</codePool>
        </Magestore_Test>
    </modules>
</config>
```

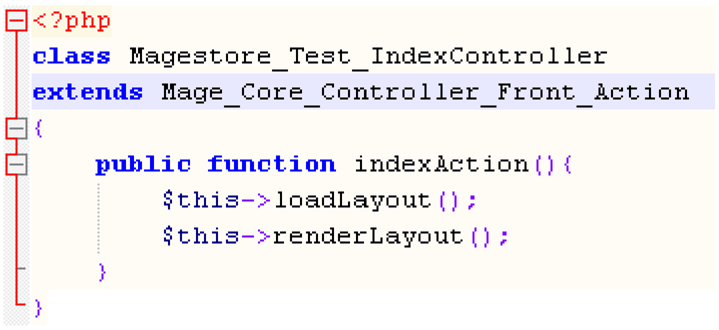
- Configure module /app/code/local/Magestore/Test/etc/config.xml, register router for controller can be used.



```
<?xml version="1.0"?>
<config>
    <modules>
        <Magestore_Test>
            <version>0.1.0</version>
        </Magestore_Test>
    </modules>
    <frontend>
        <routers>
            <test>
                <use>standard</use>
                <args>
                    <module>Magestore_Test</module>
                    <frontName>test</frontName>
                </args>
            </test>
        </routers>
    </frontend>
</config>
```

- Create controller

  /app/code/local/Magestore/Test/controllers/IndexController.php



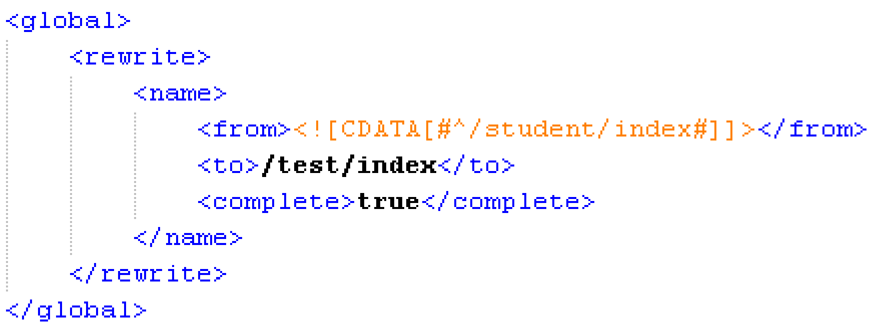
```
<?php
class Magestore_Test_IndexController
extends Mage_Core_Controller_Front_Action
{
    public function indexAction(){
        $this->loadLayout();
        $this->renderLayout();
    }
}
```

III - Override an existing controller

Step 1: Add configure in config.xml file

1. First choice:

Run at \app\code\core\Mage\Core\Controller\Varien\Front.php, function dispatch()



```
<global>
    <rewrite>
        <name>
            <from><![CDATA[#^/student/index#]]></from>
            <to>/test/index</to>
            <complete>true</complete>
        </name>
    </rewrite>
</global>
```

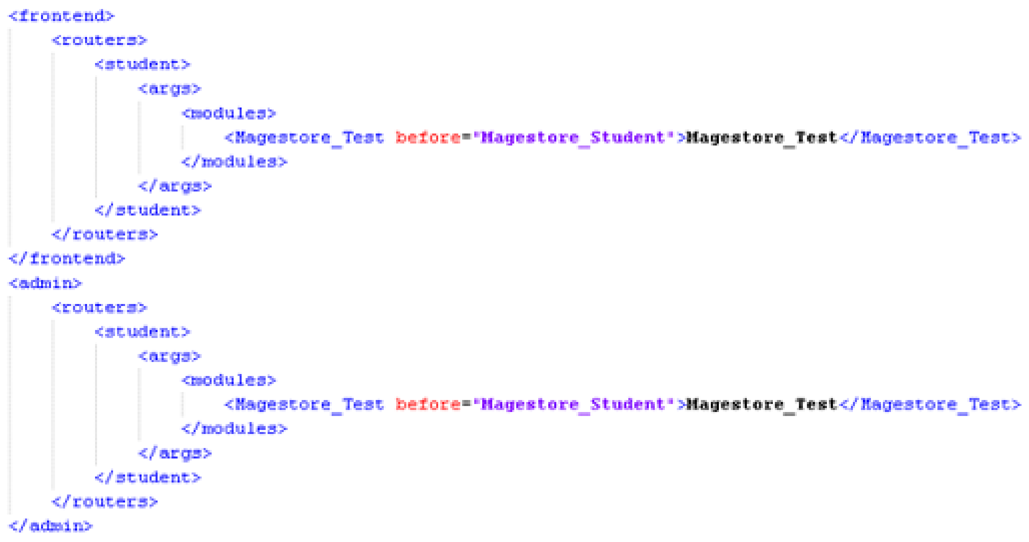
- from: expression to controller link

- to: controller to rewrite

- complete: choose override complete layout handle or controller only

2. *Second choice*:

Run at app\code\core\Mage\Core\Controller\Varien\Router\Standard.php, function collectRouters()

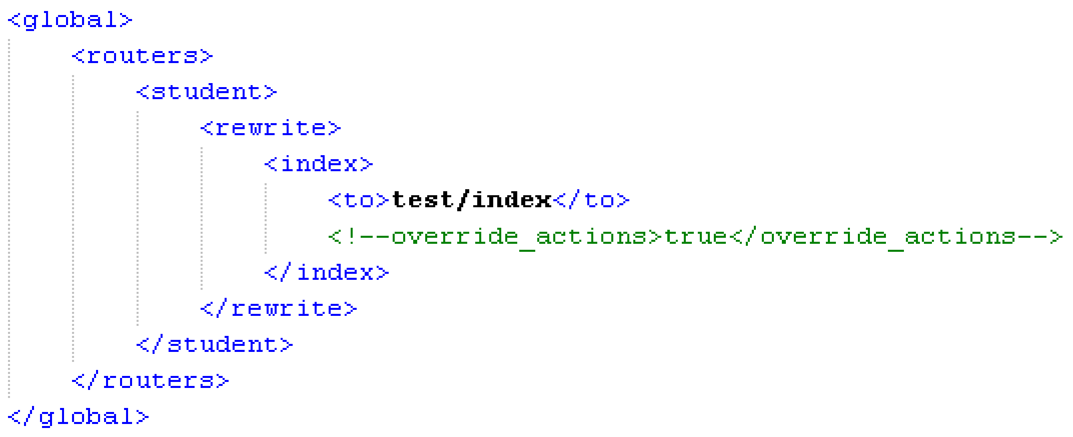


```
<frontend>
    <routers>
        <student>
            <args>
                <modules>
                    <Magestore_Test before="Magestore_Student">Magestore_Test</Magestore_Test>
                </modules>
            </args>
        </student>
    </routers>
</frontend>
<admin>
    <routers>
        <student>
            <args>
                <modules>
                    <Magestore_Test before="Magestore_Student">Magestore_Test</Magestore_Test>
                </modules>
            </args>
        </student>
    </routers>
</admin>
```

***3. Third choice*:**

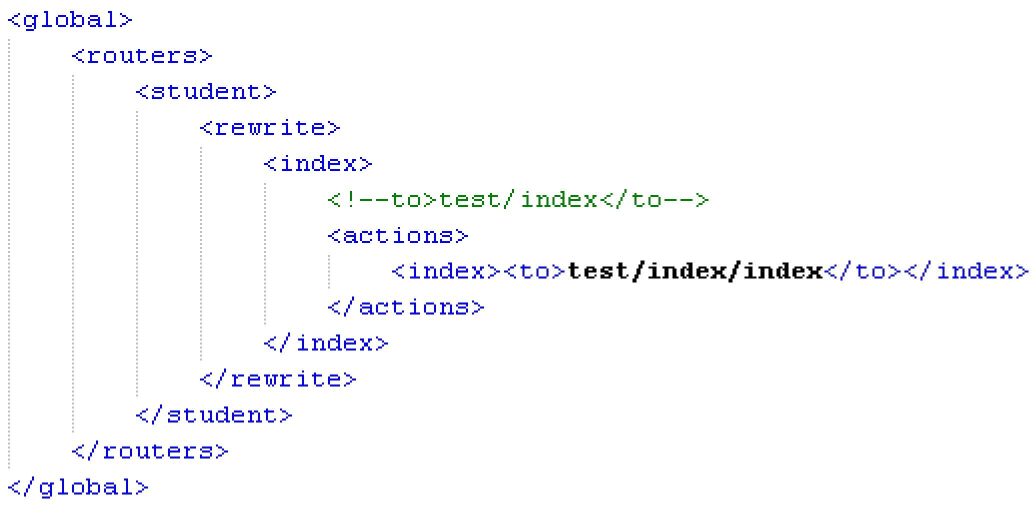
Run at app\code\core\Mage\Core\Controller\Varien\Action.php, function _rewrite()

3.1 Rewrite all actions



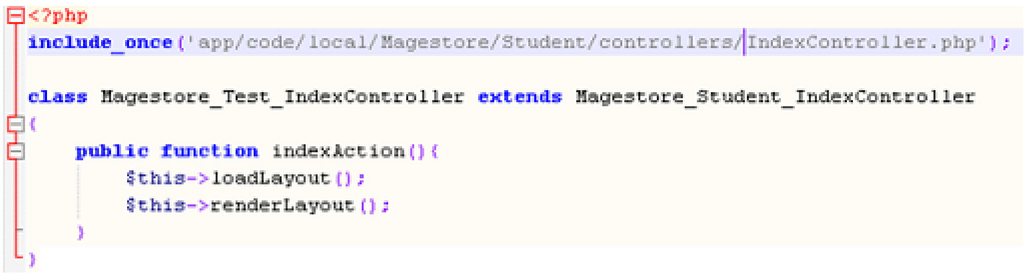
```
<global>
    <routers>
        <student>
            <rewrite>
                <index>
                    <to>test/index</to>
                    <!--override_actions>true</override_actions-->
                </index>
            </rewrite>
        </student>
    </routers>
</global>
```

3.2. Rewrite each action



```xml
<global>
    <routers>
        <student>
            <rewrite>
                <index>
                    <!--to>test/index</to-->
                    <actions>
                        <index><to>test/index/index</to></index>
                    </actions>
                </index>
            </rewrite>
        </student>
    </routers>
</global>
```

Step 2: Write controller file.



```php
<?php
include_once('app/code/local/Magestore/Student/controllers/IndexController.php');

class Magestore_Test_IndexController extends Magestore_Student_IndexController
{
    public function indexAction(){
        $this->loadLayout();
        $this->renderLayout();
    }
}
```

Part 5: Module Initialization

This part will tell you about Module Initialization. This section has 4 contents as below:

- Describe/identify the steps needed to create and register a new module
- Describe/identify module dependencies
- Describe/identify the steps needed to create a controller in a module
- Describe/identify the steps needed to enable and disable a module

I - Describe/identify the steps needed to create and register a new module
Creating a custom module is indispensible to customize Magento. Modules may be from simple forms such as Static Block or quite complicated forms like payment/shipping module and more complex modules (for example: integrating with the 3rd modules).
A custom can do a lot such as impacting database in overriding classes (Blocks, Controllers and Modules)… and more.

How to create a module and use it in a CMS page? We will guide you in this part with simple steps.
We will create Magestore Example module with Magestore is NameSpace and Example is name of the module.

Step 1: Register the module with the system

Create a file app/etc/modules/Magestore_Example.xml with content:

```
<?xml version="1.0>

<config>

<modules>

<Magestore_Example>

<active>true</active>

<codePool>local</codePool>

</Magestore_Example>

</modules>
```

```
</config>
```

The primary parameters of this part are:

- Module name: Name definition of the module
- Active: Status definition of the module
- CodePool: Definition of the folder that stores code of the module. The values are usually: core, local and community.

Step 2: Create file config.xml of the module

Generate file file app/code/local/Magestore/Example/etc/config.xml.

```
<?xml version="1.0>

<config>

<modules>

<Magestore_Example>

<version>0.1.0</version>

</Magestore_Example>

</modules>

<global>

<blocks>

<Magestore_Example>

<class>>Magestore_Example_Block<</class>

</Magestore_Example>

</blocks>

</global>

</config>
```

In this part, we declare the version of the module and block class prefix Magestore_Example_Block

Step 3: Create Block file

Generate file: app/code/local/Magestore/Example/Block/View.php

```
<?php
```

```
class Magestore_Example_Block_View extends Mage_Core_Block_Template

{


    public function sayHello() {

          return "Hello World!";

    }

}

?>
```

Step 4: Create file template (phtml)

Generate file app\design\frontend\default\default\template\example\view.phtml.

```
<div>

<span><strong>This is the output of Magestore example:</strong></span></br>

<?php

echo $this-> sayHello();

?>

</div>
```

We will have a fully-made module after these 4 steps. Now we will test the module action by putting it into a CMS page.

```
{{block type="magestore_example/view" template="example/view.phtml" }}
```

II - Describe/identify module dependencies

Module dependencies is a definition which illustrates the action dependencies of a module on another module. A simple example is as below:

```
<?xml version="1.0>

<config>

<modules>

<Magestore_Bundle>

<active>true</active>

<codePool>core</codePool>

<depends>
```

```
<Mage_Catalog/>

<depends>

<Magestore_Bundle>

<modules>

</config>
```

If the module Mage_Bundle is active and Mage_Catalog does not exist or be inactive, the system will report the issue and stop the execution.

Besides, the module dependency is inserted in code when the system checks the exection or in configuration, for example: configure in the following file adminhtml.xml (Menu CMS in admin will be hidden if the module Magestore_Student does not exist or be inactive).

```
<?xml version="1.0>

<config>

<menu>

<cms>

<depends>

<module>Magestore_Test</module>

<depends>

<Mage_Catalog/>

<depends>

<cms>

<menu>

</config>
```

III - Describe/identify the steps needed to create a controller in a module
In the first part, we have learned how to create a simple module. Now, we keep using the last result and add steps below:

Step 1: Create IndexController

In this step, we create a controller with name Index.

Create file: app/code/local/Magestore/Example/controllers/IndexController.php

Controller will be generated according to a sample with the file name is: xxxxxController.php (this file is put in the category app/code/local/Magestore/Example/controllers).

Each action in the controller is declared based on the sample: yyyyyAction (yyyyyAction is a function in the controller).

```
class Magestore_Example_IndexController extends
Mage_Core_Controller_Front_Action

{

public function sayhelloAction(){

}

}
```

Step 2: Edit Config.xml file

Edit file: app/local/Magestore/Example/etc/config.xml

```
<config>

    ...

    <frontend>

        <routers>

            <example>

                <use>standard</use>

                <args>

                    <module>Magestore_Example</module>

                    <frontName>example</frontName>

                </args>

            </example>

        </routers>

    </frontend>

</config>
```

Some configuration tags used:

- **<frontend>**: Show that this router will be used in frontend of website.
- **<routers>**: The place to define routers.
- **<example>**: The ID value of routers.
- **<use>standard</use>** Can receive values of **standard** (for frontend area) or **admin** (for admin area).
- **<module>Magestore_Example</module>**: Show which module will use this router.
- **<frontName>example</frontName>**: Name of the router which is used on URL

Step 3: Display a template

We need to declare a layout file which is loaded by adding the code below to config.xml (the configuration file of the module):

```
<config>
    ...
    <frontend>
        ...
        <layout>
            <updates>
                <example>
                    <file>example.xml</file>
                </example>
            </updates>
        </layout>
    </frontend>
</config>
```

And then, create the file app/design/frontend/default/default/layout/example.xml with the following content:

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<layout version="0.1.0">

    <example_index_sayhello>

        <reference name="root">

            <action method="setTemplate">

                <template>page/1column.phtml</template>

            </action>

        </reference>

        <reference name="content">

            <block type="example/view" name="example_index_view"
template="example/ view.phtml"></block>

        </reference>

    </example_index_sayhello>

</layout>
```

The major template is used by example/index/sayhello is page/1column.phtml and the template content is displayed on block example_index_view. This block uses the file template example/view.phtml.

There is still a small detail for us to complete the process. We need to edit the function sayhello in controller Index.

```
public function sayhelloAction(){

    $this->loadLayout();

    $this->renderLayout();

}
```

You can view your successful result by requesting to URL (in browser): www.localhost.com/your_website/example/index/sayhello

IV - Describe/identify the steps needed to enable and disable a module

At first, plese take a look at app/etc/modules/Magestore_Example.xml in the first part.

```
<?xml version="1.0"?>

<config>

   <modules>

      <Magestore_Example>
```

```
         <active>true</active>

         <codePool>local</codePool>

      </Magestore_Example>

   </modules>

</config>
```

We have 2 ways to disable a module:

- Change from <active>true</active> to <active>false</active>
- Delete this file Magetore_Example.xml.

Now you can easily create a new module and take necessary actions in Magento for the Initialization.

Part 6: Design and layout initialization

As you may know, layout is built with a small set of XML tags that are simple and interesting to learn. By learning some key concepts and commands of layout, you will soon be equipped with the sufficient knowledge to easily modify your store design according to your desired specifications.

I - Identify the steps in request flow in which

- Design data is populated

- Define the position of template files: block, layout, phtml

- Layout configuration files are parsed

- Parse the layout file

- Layout is compiled

- Determine block and .phtml template file to get html string
- Translate that string

- Output is rendered

- Return html

II - Describe the module layout XML schema

- Layout:

- Layout handles:

- Correspond with a layout page
- Based on the action controller (Module_Controller_Action). Example: category_product_list
- Layout handle is always called in any pages

- label: label of handles

- reference: is used to make reference to assigned block and adds child blocks or updates block. In order to make the reference, you must target the reference to a block by using the “name” attribute.

- block: is the definition of a new block in reference.

- name: shows the name of block (only in a page rendered).
- as: this is the block name. It is used to call blocks in file phtml (only in cha block).
- type: shows the block’s class name (core/template).
- If the type is type or subtype of core/template, blocks will assign “template” attribute to set template.

- remove: deletes an assigned block

- action: calls a mode (function) of instance. Action positions in references or blocks.

- update: loads a handle in a current handle. The handle inherits all handles loaded

- Block types:

- core/template: This block renders a template defined by its template attribute. The majority of blocks defined in the layout are of type or subtype of core/template.
- page/html: This is a subtype of core/template and defines the root block. All other blocks are child blocks of this block.
- page/html_head: Defines the HTML head section of the page which contains elements for including JavaScript, CSS etc.
- page/html_header: Defines the header part of the page which contains the site logo, top links, etc.
- page/template_links: This block is used to create a list of links. Links visible in the footer and header area use this block type.

- core/text_list: Some blocks like content, left, right etc. are of type core/text_list. When these blocks are rendered, all their child blocks are rendered automatically without the need to call thegetChildHtml() method.
- page/html_wrapper: This block is used to create a wrapper block which renders its child blocks inside an HTML tag set by the action setHtmlTagName. The default tag is if no element is set.
- page/html_breadcrumbs: This block defines breadcrumbs on the page.
- page/html_footer: Defines the footer area of page which contains footer links, copyright message etc.
- core/messages: This block renders error/success/notice messages.
- page/switch: This block can be used for the language or store switcher.

III - Describe layout fallback

We have the following files:

- app/design/frontend/magestore/cutepet/catalog/template/product/view.phtml
- app/design/frontend/magestore/default/catalog/template/product/view.phtml
- app/design/frontend/base/default/catalog/template/product/view.phtml
- app/design/frontend/default/default/catalog/template/product/view.phtml

- Base, Default, Magestore: are called package and contain many themes

- Default, cutepet: name of theme

- Base: is called the fall back package

When calling the file product/view.phtml, if the system doesn't see this file in magestore/cutepet, it will find in magstore/default. The system will find in base/default if it also doesn't see in magestore/default. In case the system cannot see the file anywhere, it will report the error.

IV - Describe admin and frontend scopes

When creating a module, we will declare the scope of the layout file in file config.xml

- Layout in admin: use tab <*adminhtml*>

- Layout in frontend: use tab < *frontend* >

```
<layout>

     <updates>

          <module_name>

                <file>file_name.xml</file>

          </ module_name >

     </updates>

</layout>
```

Part 7: Structure of block templates

Following the previous parts, I have now extended the tutorial to bring you handy knowledge about Structure of block templates. Please keep carefully reading this reference for your using of Magento.

This part covers two contents:

- Define root template, non-output block
- Describe how to remove a child block from the template page

I- Define root template, non-output block

- Root template Page.xml – root layout

- Root template will be declared as below:

```
<block type="page/html" name="root" output="toHtml"
template="page/3columns.phtml">
```

Root templates can be the following files:

- 3columns.phtml
- 2columns-left.phtml
- 2columns-right.phtml
- 1colum.phtml
- Empty.phtml
- Popup.phtml
- Print.phtml

- Non-output block

- Non-output block only contains other blocks and cannot be used to render html (left, right, content)

- getChildHtml($name, $useCache, $sorted)
- getChildChildHtml(($name $childName,$useCache, $sorted)

- $name: block’s name (If you leave blank, all blocks are rendered)
- $useCache: (If true, cache will be used)
- $sorted: (If true, child blocks will be rendered in the order of layout)
- $childName (option)
- getBlockHtml($name) (getBlock’s html may not be child block and call whatever blocks)

II- Describe how to render a root template

- In the default theme, “root block” is an “output block”

- Definitions in file page.xml

- Template attributes: 1column, 2 column-left, 2 column-right, 3 column (default).

- Child blocks are: head, header, breadcrumbs, left, right, content, footer.

- Render child blocks by calling $this->getChildHtml(‘header’);\

- The process of rendering is called recursively: root block comes first, then the child block, and so on.

III- Describe how to remove a child block from the template page

Removing a child block in the layout.

```
<remove name="" />(Completely remove all child blocks in a handle)

<action method="unsetChild"> >(The child block can be called back in
another block)
```

Part 8: Flushing data (outputs)

You have experienced 7 steps of **Request Follow** topic; I will complete the Magento knowledge of this topic with Flushing Data. As you may know, Flushing data is an important process in Magento. This function allows you to return browser the HTML code. It means that Flushing output is to display a content of a request in Magento. You can learn more with my following part.

I - Describe how and when Magento renders content to the browser.

- When there is a request from the browser, an action method in Controller is called.

- Layout Instance is initialized (usually in page.xml)

- Layout Update Instance runs, adding all updates to layout Instance.

- Output blocks are automatically rendered. All other blocks are only rendered when they are called by parent block:$this>getChildHtml('head') . The process is described as below:

- Instances of the Layout and Layout Update are created.
- Layout handles are added according to the $handles argument if passed.
- Store layout handle STORE_[store_code] is added to the Layout Update Instance. For example, if the code of the current store is en, then layout handle STORE_en is added.
- Theme layout handle THEME_[area]_[package]_[layout_theme] is added to the Layout Update Instance. For example, if the page rendered is for the frontend area, the name of the current theme package is magebase and the theme name for layout is modern, then the layout handle THEME_frontend_magebase_modern is added.
- Action layout handle is added to the Layout Update Instance. For example, if the page rendered is a category detail page, then Magento is executing the view action of the catalog module's category controller. So it will add an action handle that is catalog_category_view.

- All Layout XML files defined for all active modules are loaded.
- If a layout file named local.xml exists in the current theme's layout folder, it is last loaded.
- Layout updates of all added layout handles from the loaded layout XML are merged
- Layout updates of all added layout handles from the database are merged
- If the $generateXML argument of loadLayout() method is passed as false, the initialization is finished.
- The layout update data is refined by removing all blocks and block references defined with the remove tag. (As discussed in Part 1)
- If $generateBlocks argument is passed as false, the initialization is finished.
- The instances of block classes are created according to the block definitions in the Layout XML.
- The methods are called with specified arguments on the blocks where action tags are defined.

II - Describe how and when Magento flushes output variables using Front_Controller.

In the function dispatch() of Front_Controller, we will see the code below:

```
…
Varien_Profiler::start('mage::app::dispatch::send_response');
$this->getResponse()->sendResponse();
Varien_Profiler::stop('mage::app::dispatch::send_response');
…
```

This function will be called after the system selects controller and runs action corresponding to the request.

Command line $this->getResponse()->sendResponse(); will flush output variables to html for browser.

TOPIC 3

Part 1: Template Structure – Magento Themes

I am going to provide you with further understanding about how to use Magento themes in the easiest way. By giving some main concepts and approach to Structure of Template, this tutorial will certainly be helpful for those who have encountered difficulties when applying Magento Themes as well as wanted to learn more about Magento. Three main following parts will be covered:

• Define and describe how to use Magento themes

• Define and describe how to use design packages

• Define and describe how to use fallbacks

Now let's start with the first section: Define and describe how to use Magento Themes

I- Structure of Magento Theme includes 4 major parts as follows:

● Layout

- Folder: app/design/frontend/{package}/{theme}/layout
- Including the .xml files that define the block according to tree structure

● Template

- Folder: app/design/frontend/{package}/{theme}/template
- Including: the .phtml files. In fact, they are .php files containing HTML + PHP

● Skin

- Folder: skin/frontend/{package}/{theme}
- Including: .css, images, .js files

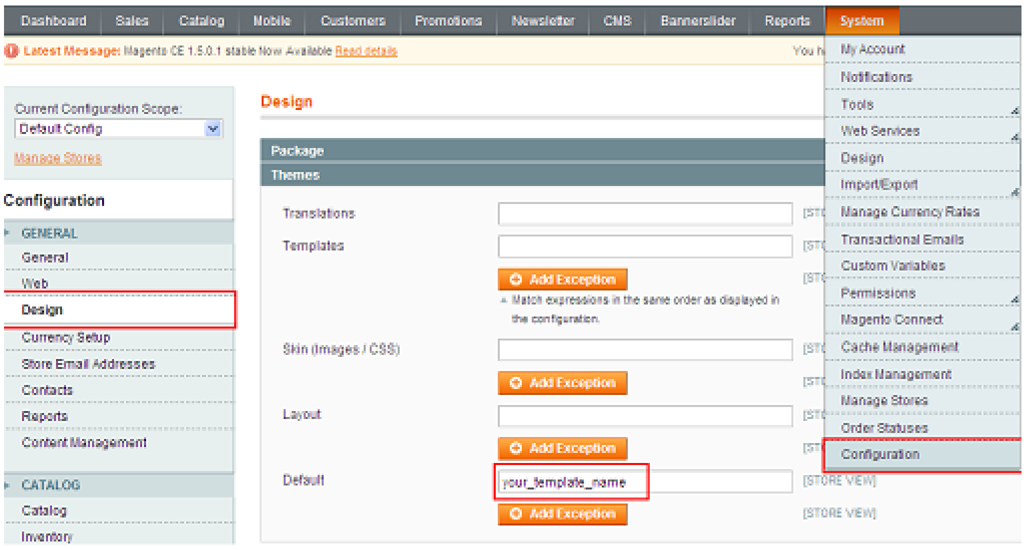
● Locale

- Folder: app/design/frontend/{package}/{theme}/locale
- Including language files

II- How to use Magento Theme

● Steps to set up Magento Theme

- Copy all the files of the theme to Magento set up folder
- Login back-end
- Go to *System* > *Configuration* > *Design*
- Enter the package name, theme name
- Package name shown as blank is seen as "default"



Latest Message: Magento CE 1.5.0.1 stable Now Available Read details

Current Configuration Scope: Default Config

Design

Package

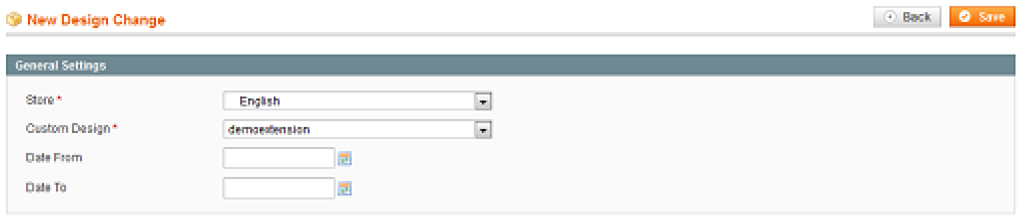
Themes

Translations		
Templates		
Skin (Images / CSS)		
Layout		
Default	your_template_name	[STORE VIEW]

Match expressions in the same order as displayed in the configuration.

Or:

- Go to *System* > *Design* > *Add Design Change*
- Select Store, Theme, Time using theme



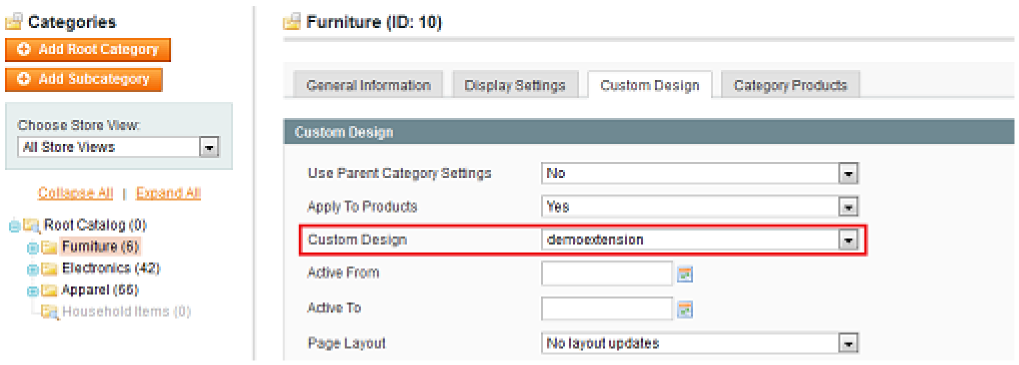
General Settings

Store *	English
Custom Design *	demoextension
Date From	
Date To	

● Using a separate theme for Category

- Go to edit category page

- Choose “Custom Design” tab
- Set “Custom Design” to be the name of the desired theme



Categories
Add Root Category
Add Subcategory
Choose Store View: All Store Views
Collapse All | Expand All
Root Catalog (0)
Furniture (6)
Electronics (42)
Apparel (66)
Household Items (0)

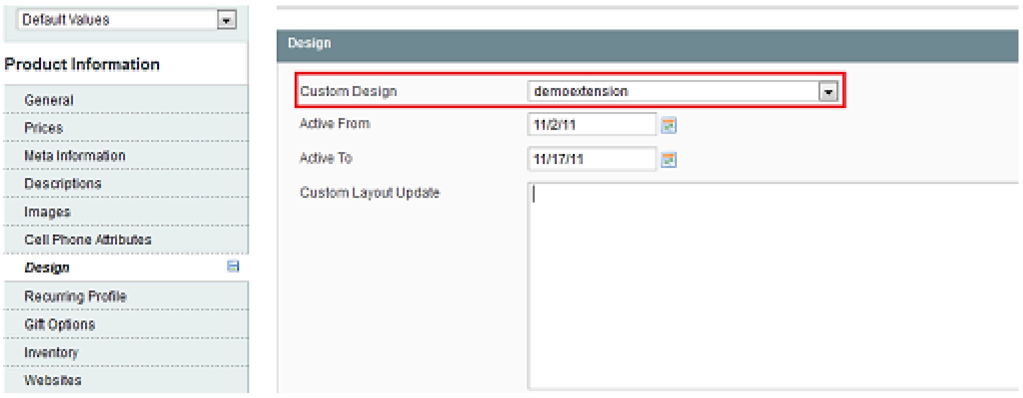
Furniture (ID: 10)
General Information | Display Settings | Custom Design | Category Products

Custom Design

Use Parent Category Settings	No
Apply To Products	Yes
Custom Design	demoextension
Active From	
Active To	
Page Layout	No layout updates

● Using a separate theme for Product

- Go to edit product page
- Choose “Design” tab
- Set “Custom Design” to be the name of the desired theme



Default Values
Product Information
General
Prices
Meta Information
Descriptions
Images
Cell Phone Attributes
Design
Recurring Profile
Gift Options
Inventory
Websites

Design

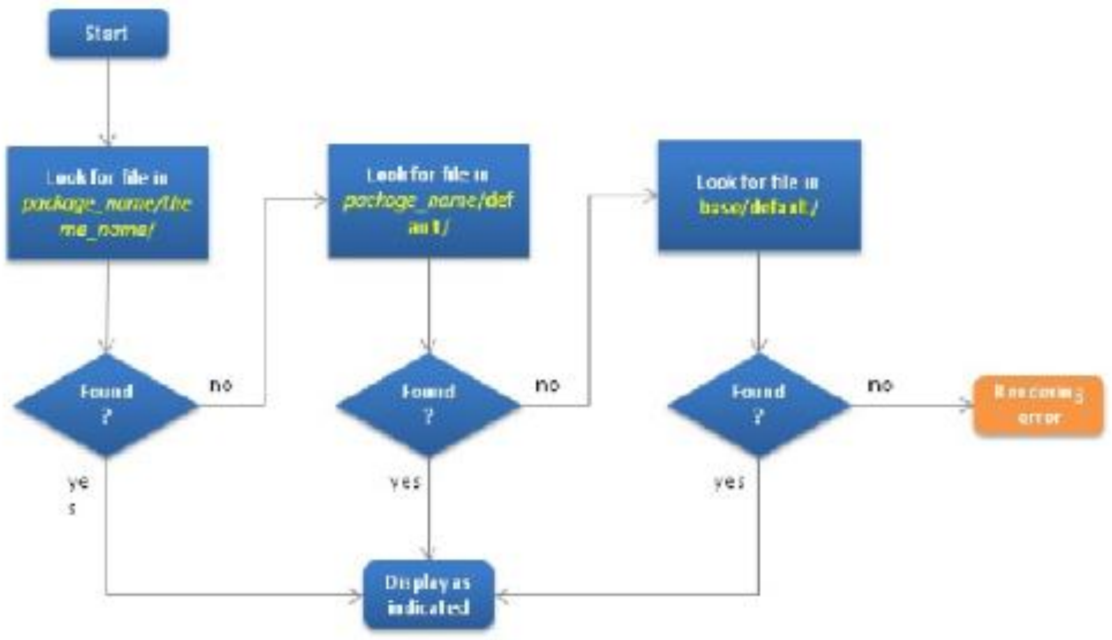
Custom Design	demoextension
Active From	11/2/11
Active To	11/17/11
Custom Layout Update	

Part 2: Template Structure – Fallbacks

As you may know, Magento Design Fall-Back is used to render themes from the Magento basic templates and the most important part of this article will make you focus on the fall-back hierarchy. Let's me show you more details as below:

The fall-back hierarchy is described from Custom_theme -> default_theme -> base -> error.

Please take a look at the following diagram:


Start
Look for file in package_name/theme_name/
Look for file in package_name/default/
Look for file in base/default/
Found ?
no
Found ?
no
Found ?
no
Rendering error
yes
yes
yes
Display as indicated

In a nutshell, Design Fall-Back process includes 4 steps:

- Search the request file in the folder:

  app/design/frontend/custom_package/custom_theme/
  skin/frontend/custom_ package/custom_theme

- If not finding it, please search in the folder:

  app/design/frontend/custom_package/default
  skin/frontend/custom_package/default

- In case you are still unable to look for the request file, continue searching in the folder:

app/design/frontend/base/default

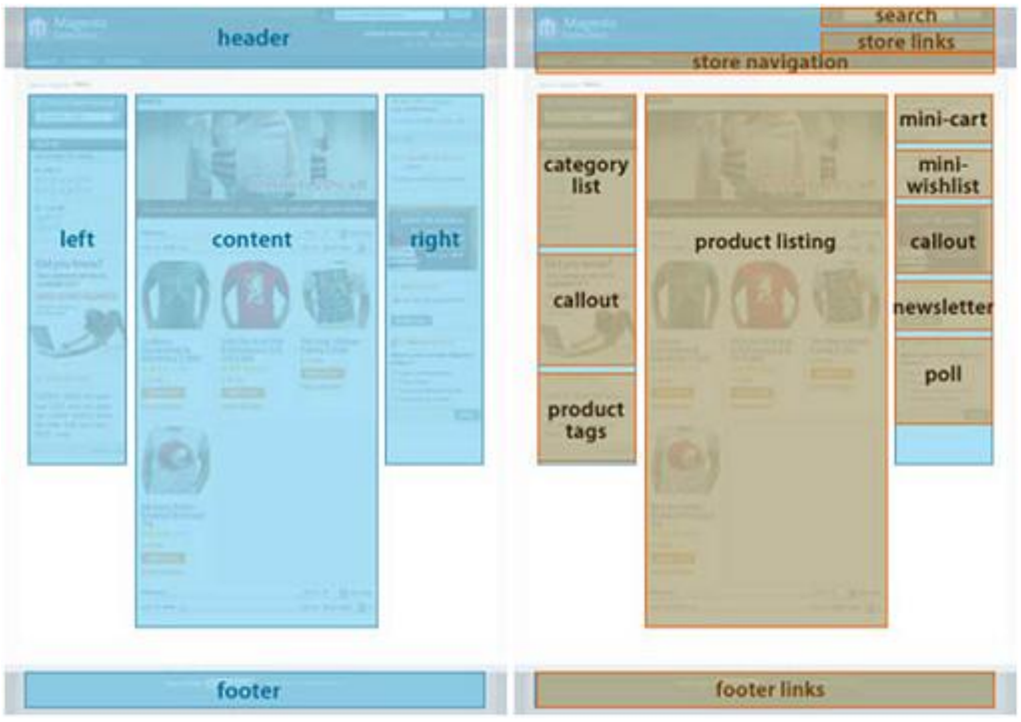
skin/frontend/base/default

- The error notification will be displayed if the file cannot be found.

Part 3: Block Structure

In Magento, block is a View element of MVC (model-view-controller), having the major task to make data displayed to the users. While creating a theme, you are offered many content blocks that are placed in the structural block. If you are not sure about it, please read this part which partly helps you understand the block structure along with the relationship between templates and blocks.

I- The structure of block



All of blocks in Magento are inherited from Mage_Core_Block_Abstract. Blocks requiring template files to be displayed are inherited from Mage_Core_Block_Template.

A general block includes some components as below:

- Code file to get data information
- Functions to work with layout, parent blocks and children blocks
- Template file to render to html

II- The relationship between template and block

A block will be shown by a template file. When a block returns to HTML code by calling toHtml() function, it will get a template file and then flush variables to this file. One block can flush its variables many template files. Similarly, it’s possible for a template to show lots of block types.

A template is maybe unnecessary for one block but one template compulsorily requires a block to be attached to it in Magento. In a template file, we are able to use $this pointer to call functions as well as take the values of the block attached to this template.

Part 4: Blocks

Blocks are a way by which Magento distinguishes the array of functionalities in the system and creates a modular way to manage it from both visual and functional stand point. However, you can accurately hold the block lifecycle or events fired in a block? This part will attempt to give you more knowledge of those so you can change some actions of blocks to adjust your Magento site.

I- Stages in the lifecycle of a block

Block lifecycle starts when the block was generated and ends at the time it was destroyed.

1. Generate a block: Block was generated when:

- The system loads layout and generates resemble blocks declared in layout file (includes implementing the modes when declaring layout – being called when action calls loadLayout() function)

```
<layout>
<adminhtml_sales_order_index>
<reference name="content">
<block type="adminhtml/sales_order" name="sales_order.grid.container" />
</reference>
</adminhtml_sales_order_index>
</layout>
```

- The system calls a function to create a block (maybe in controllers/action or in a parent block)

```
public function indexAction(){
    $block = $this->getLayout()->createBlock('adminhtml/sales_order');
    $this->getResponse()->setBody($block->toHtml());
```

2. ***Use block to:*** Blocks are used to create the interface for the system. Using the block is ordinarily to render ***it*** to html. This rendering is carried out when:

- The system renders layout to html (when action calls renderLayout())

- The parent block calls render function (maybe in block or in template)

```
<?php echo $this->getChildHtml('sales_order.grid.container') ?>
```

3. ***Destroy a block***: After a block render to html, the system doesn't use it. The blocks generared before will be destroyed when the system ends request.

I- Events fired in block

1. *Prepare Layout Event*

core_block_abstract_prepare_layout_before: is fired before calling _prepareLayout function of the block.

core_block_abstract_prepare_layout_after: is fired after calling _prepareLayout function of the block. The parameter of this event is also block.

```
public function setLayout(Mage_Core_Model_Layout $layout){

    $this->_layout = $layout;

    Mage::dispatchEvent('core_block_abstract_prepare_layout_before',
array('block' => $this));

    $this->_prepareLayout();

    Mage::dispatchEvent('core_block_abstract_prepare_layout_after',
array('block' => $this));

return $this;

}
```

2. *Render toHtml Event*

core_block_abstract_to_html_before: is fired before the block is rendered to html. Block is the parameter of this event.

core_block_abstract_to_html_after: The Parameters of this event are block and transport. This event is fired right after the block is rendered to html.

```
final public function toHtml(){

    Mage::dispatchEvent('core_block_abstract_to_html_before', array('block'
=> $this));

    ...

    Mage::dispatchEvent('core_block_abstract_to_html_after',
array('block' => $this, 'transport' => self::$_transportObject));

    $html = self::$_transportObject->getHtml();

return $html;

}
```

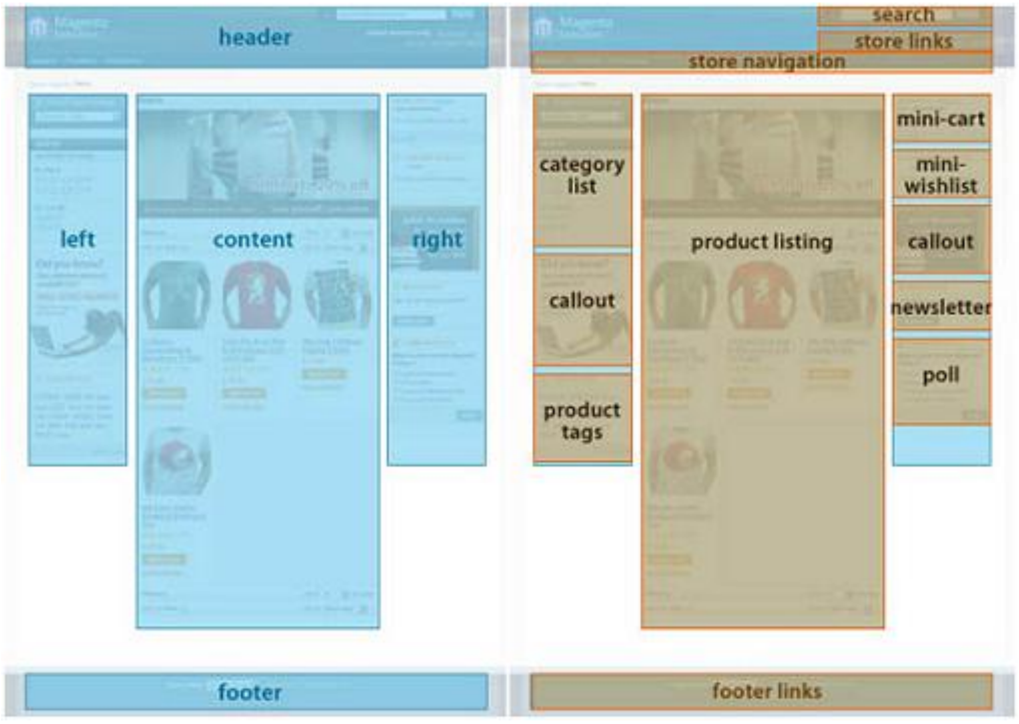
The remaining parts of Block Chapter will be continued for the next Magento Tutorial which must dig more deeply into and expand upon those simple definitions.

Part 5: Blocks (continue)

In this part, I'll continue bringing to you further knowledge of blocks. This tutorial will also be the last part in our series about blocks, covering 3 major contents:

- Identify different types of blocks
- Disable output block
- Describe how a typical block is rendered

I- Identify different types of blocks



1. Structural block

Structural block is used to define the layout/structure for template system in Magento. It's parent block of content block and to locate block area for its content block. As usual, the structural blocks don't work along with data in system. One typical example for the structural block is core/text_list block.

Features of structural blocks:

- No need to accompany with template file
- No display anything if not having children blocks

- Every content block which is children block of this structural block will be shown its content here

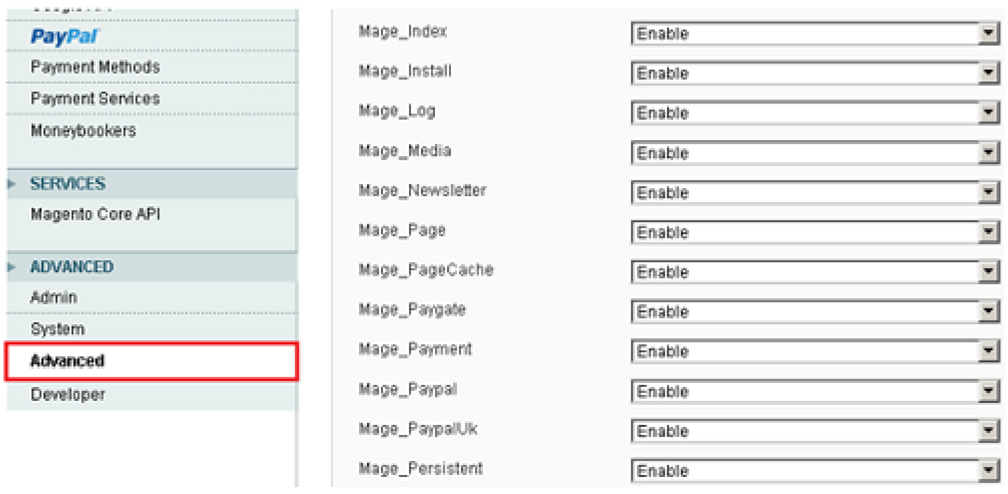
2. *Content block*

Content blocksare used to show the content. These blocks will take data in the system and display them. (In most cases, they will be attached to template file). page/html_welcome block is one of examples for the content block.

- A content block is only displayed when it is attached to a astructural block (or have to be called from cms page)
- Block takeswelcome_messagedatastoredin the system and shows them.

II- Disable output block

To disable output block of module, we can adjust in configuration: System >> Configuration >> Advanced >> Disable modules output. Go to module and disable. At this time, all blocks of module will not be rendered to html.



Mage_Index	Enable
Mage_Install	Enable
Mage_Log	Enable
Mage_Media	Enable
Mage_Newsletter	Enable
Mage_Page	Enable
Mage_PageCache	Enable
Mage_Paygate	Enable
Mage_Payment	Enable
Mage_Paypal	Enable
Mage_PaypalUk	Enable
Mage_Persistent	Enable

1. *Describe how a typical block is rendered*

The process to render a block is as below:

- The layout or a parent block calls toHtmlfunctionof a block to get string html which the block displays.

- Block checks and confirms that the output block was enabled

- Block calls the following functions in turn: _beforeToHtml(), _toHtml(), _afterToHtml().

- The process to output to html:

  - Fetching View is to find the template file which is set for block

  - Block checks configuration template path hint to bring out template path hint for block

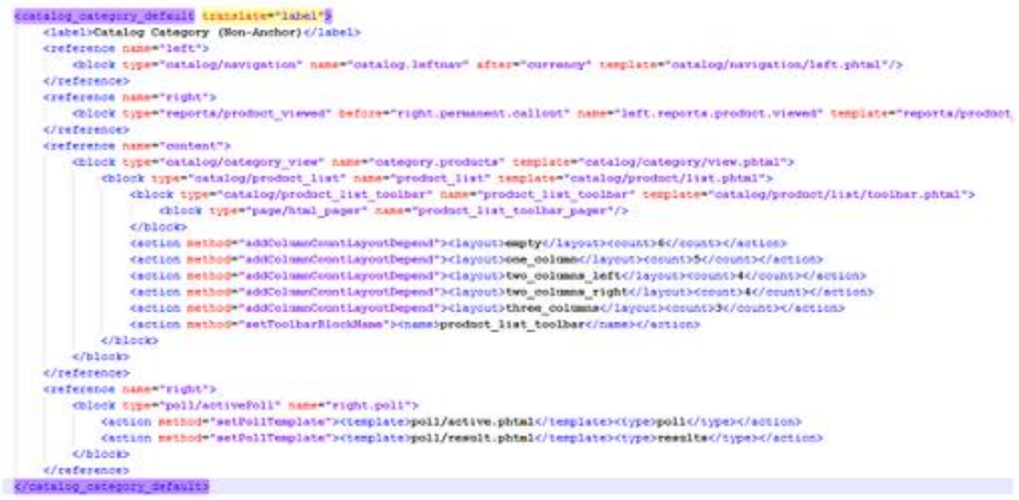
  - Block will include template file to render to html

  - At the end, the block will return html to parent block that called it.

Part 6: Layout XML schema

We have completed a series about Blocks in Magento in the easiest way to understand. Now, let’s start the new tutorial topic of Layout. Layout is the part of template system in Magento written by XML language. The layout XML files are used to define displayed structure in Magento sites. Read now!

Describe elements of layout XML schema:



```
<catalog_category_default translate="label">
    <label>Catalog Category (Non-Anchor)</label>
    <reference name="left">
        <block type="catalog/navigation" name="catalog.leftnav" after="currency" template="catalog/navigation/left.phtml"/>
    </reference>
    <reference name="right">
        <block type="reports/product_viewed" before="right.permanent.callout" name="left.reports.product.viewed" template="reports/product
    </reference>
    <reference name="content">
        <block type="catalog/category_view" name="category.products" template="catalog/category/view.phtml">
            <block type="catalog/product_list" name="product_list" template="catalog/product/list.phtml">
                <block type="catalog/product_list_toolbar" name="product_list_toolbar" template="catalog/product/list/toolbar.phtml">
                    <block type="page/html_pager" name="product_list_toolbar_pager"/>
                </block>
                <action method="addColumnCountLayoutDepend"><layout>empty</layout><count>6</count></action>
                <action method="addColumnCountLayoutDepend"><layout>one_column</layout><count>5</count></action>
                <action method="addColumnCountLayoutDepend"><layout>two_columns_left</layout><count>4</count></action>
                <action method="addColumnCountLayoutDepend"><layout>two_columns_right</layout><count>4</count></action>
                <action method="addColumnCountLayoutDepend"><layout>three_columns</layout><count>3</count></action>
                <action method="setToolbarBlockName"><name>product_list_toolbar</name></action>
            </block>
        </block>
    </reference>
    <reference name="right">
        <block type="poll/activePoll" name="right.poll">
            <action method="setPollTemplate"><template>poll/active.phtml</template><type>poll</type></action>
            <action method="setPollTemplate"><template>poll/result.phtml</template><type>results</type></action>
        </block>
    </reference>
</catalog_category_default>
```

The layout XML file of Magento includes:

I- Layout handles:

- Each of layout handles is proportionate to one page’s layout.
- A layout XML file contains many layout handles
- The Layout handle <*default*> is always called on any pages
- Based on a Controller action and has the form of module_controller_action

For example: category_catagory_default

II- Components of layout handles:

- Label: the label of handles
- Reference: a link to an available block. It is used to add a children block or update a block, having feature name to put pointer to an existing block.

• Block: define a new block. A block consists of:

- name : to show the name of block (unique in a rendered page)
- as: the block’s name, is used to call a block in phtml file (unique in a parent block)
- Type: to show the name of class (core/template). In case it is a type or subtype of core/tempalte, the template feature is added to set the template.
- template: link of phtml file

- Remove: to delete an available block
- Action: to call a function of instance in reference or block
  - Ifconfig

```
<action method="addLink" translate="label title"
module="contacts"
ifconfig="contacts/contacts/enabled"><label>Contact
Us</label><url>contacts</url><title>Contact
Us</title><prepare>true</prepare></action>
```

- Update: to load one handle in one present handle which is inherited all of the loaded handle

Part 7: Layout and CMS

With the last article of Layout XML, it seems that you haven't fully known how the system receives this layout file. Thus, please keep following the Layout and CMS session to learn the way to register layout XML files and how to use it in CMS (content management system) in Magento. It will be helpful for your configuration operations.

I- Register Layout XML files

The code paragraph below is used to declare a layout file for both frontend and backend.

```
<layout>
        <updates>
                <module_name>
                        <file>your_layout_file_name.xml</file>//(Ex:
module_name.xml)
                </ module_name >
        </updates>
</layout>
```

- To declare layout file in frontend, you can put this code paragraph into tag <frontend>
- To declare layout file in backend, you can put this code paragraph into tag <adminhtml>

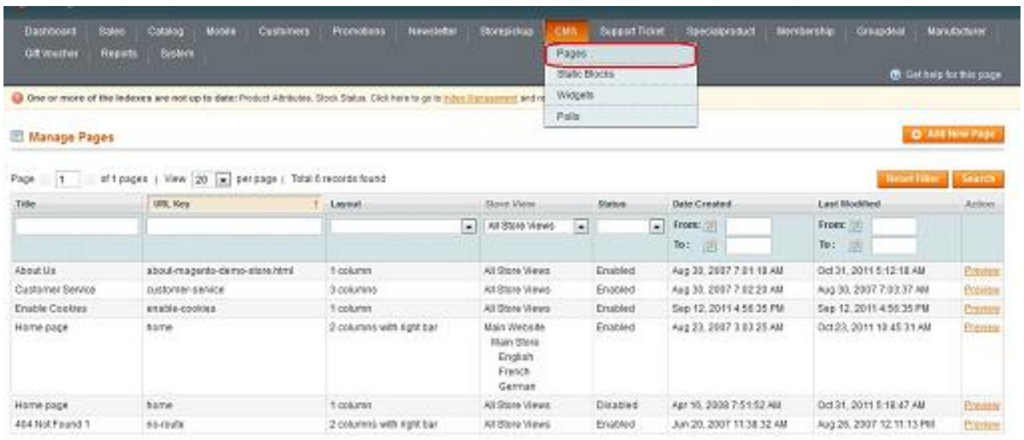
System will read this configuration and load the layout file to get layout configuration for rendering page.

II- Create and add the code to pages

- Steps to create a CMS page:

- Login Back-end

- Select menu CMS/Pages



One or more of the indexes are not up to date: Product Attributes, Stock Status. Click here to go to Index Management and re

Page 1 of 1 pages | View 20 per page | Total 6 records found

Title	URL Key	Layout	Store View	Status	Date Created	Last Modified	Action
About Us	about-magento-demo-store.html	1 column	All Store Views	Enabled	Aug 30, 2007 7:01:18 AM	Oct 31, 2011 5:12:18 AM	Preview
Customer Service	customer-service	3 columns	All Store Views	Enabled	Aug 30, 2007 7:02:29 AM	Aug 30, 2007 7:03:37 AM	Preview
Enable Cookies	enable-cookies	1 column	All Store Views	Enabled	Sep 12, 2011 4:56:35 PM	Sep 12, 2011 4:56:35 PM	Preview
Home page	home	2 columns with right bar	Main Website Main Store English French German	Enabled	Aug 23, 2007 3:03:25 AM	Oct 23, 2011 10:45:31 AM	Preview
Home page	home	1 column	All Store Views	Disabled	Apr 16, 2008 7:51:52 AM	Oct 31, 2011 5:18:47 AM	Preview
404 Not Found 1	no-route	2 columns with right bar	All Store Views	Enabled	Jun 20, 2007 11:38:32 AM	Aug 26, 2007 12:11:13 PM	Preview

- Click on "Add New Page" button to create a new page

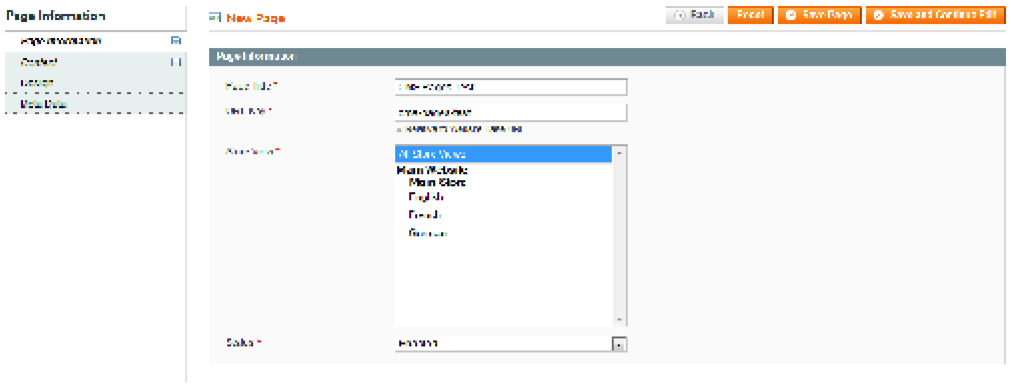
- In "page information" Tab, fill in the page's information including Page title, Page Url Key, Store view, Status

+ Page title will be used to show the title of the page

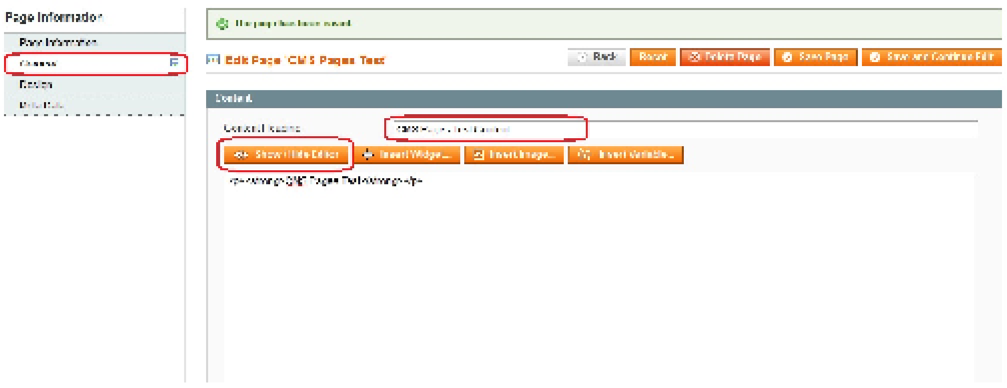
+ Page Url Key: is the Url typed in the browser to display the page which has been created

+ Store View: the limitation of displaying page. If choosing "All Store views", the page will be displayed in every store view

+ Status: shows whether the page is enabled or not. The page will only be displayed in frontend if the status is set as "enable"



- After that, choose"Content" Tab to enter the displayed text of the page


The page has been saved.

Edit Page 'CMS Pages Test'

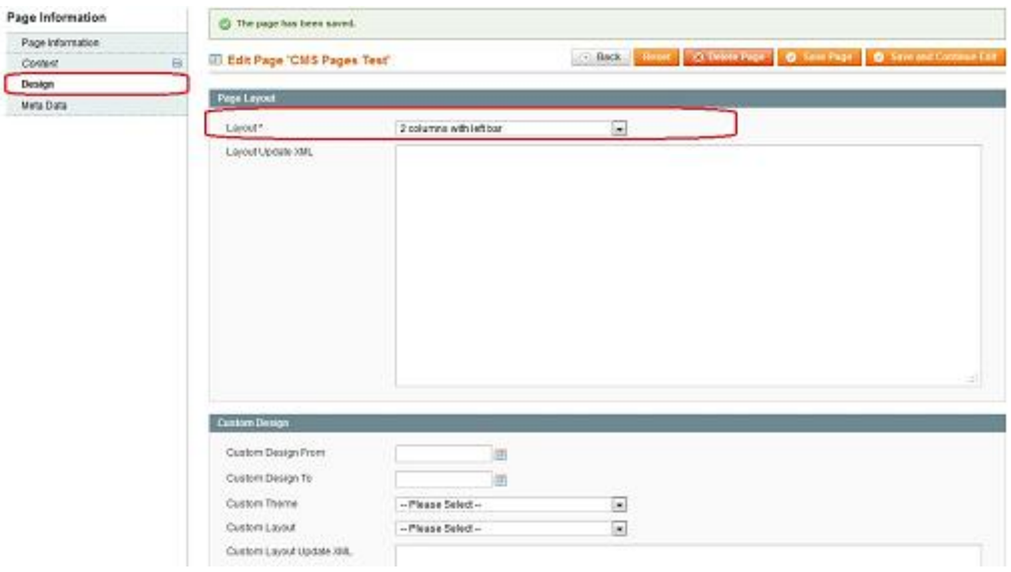
Content Heading: [illegible]

<p><strong>CMS Pages Test</strong></p>

+ Content Heading: is shown in the header of the page

+ Enter the content to display in the text area

- Choose “Design” Tab in order to select 1 column, 2 columns-right and 2 columns-left or 3 columns for the page’s layout


The page has been saved.

Edit Page 'CMS Pages Test'

Page Layout

Layout*: 2 columns with left bar

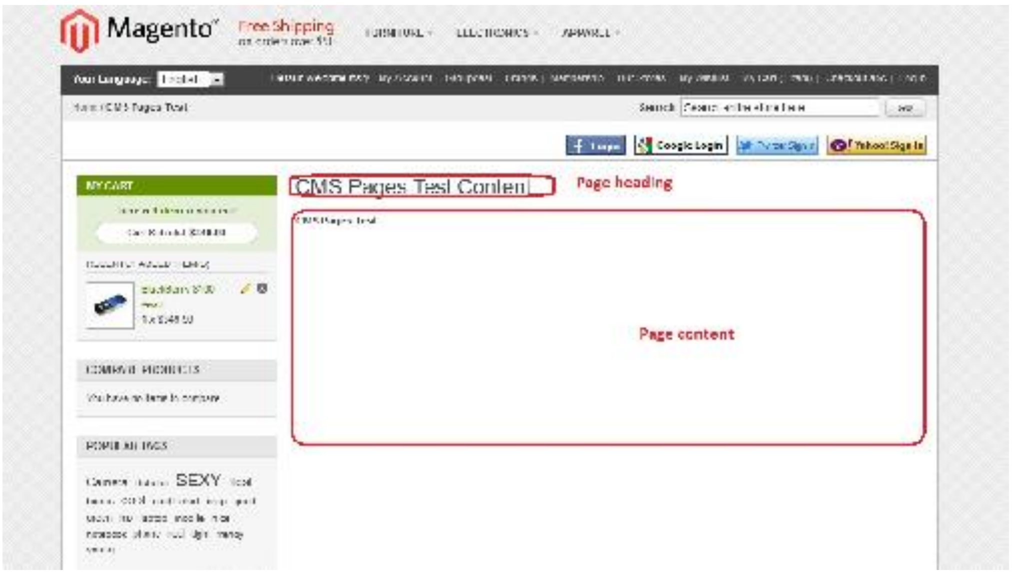
Custom Design

Custom Theme: -- Please Select --

Custom Layout: -- Please Select --

- And then, click on “Save page” button to save

- In frontend, to access to the page, you can use the following URL: (cms-pages-test is CMS page’s url key)

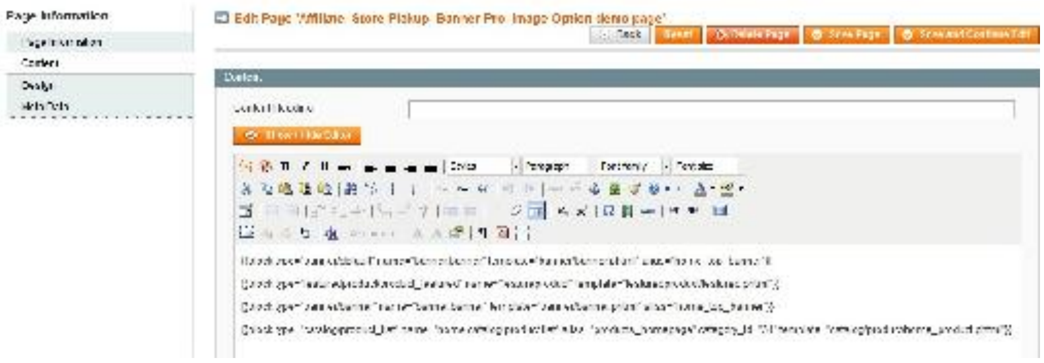


- Add the code to pages

There are 2 ways to add the code to the pages: Directly add to Content in “Content” Tab or Add to Layout Update XML in “Design” Tab.

- To add the code to the content, it’s possible to use the code paragraph below:

```
{{block type="banner/default" name="banner.banner"
template="banner/banner.phtml" alias="home_top_banner"}}
```


Page Information
Edit Page 'Affiliate Store Pickup Banner Pro Image Option demo page'
Back
Reset
Delete Page
Save Page
Save and Continue Edit

[illegible]

-To add the code to Layout Update XML in “Design” Tab, you can use the code in the same way to declare in the layout file:

```
<reference name= “content”>

        <block type= “bannerslider/bannerslider” template=
“bannerslider/bannerslider.phtml”/>

</reference>
```

Part 8: Pass variables from layout to block

Through the last sessions, you can learn about Magento layout XML schema, the way to register layout XML files, create and add the code to pages. In order to keep sharing you knowledge of Magento layout, in this part, I will show you how to pass variables from a layout to a block.

I- Pass variables from a layout to a block

- It's possible to insert variables into a block from a .xml file by using:

```
<action method="setData"><name>category_id</name><value>3</value></action>
```

- Use the action tag with the method=”setData” attribute (setData method of block is called when the system loads layout)
- Children tags are name, value (they are also parameters of setData method)
- In the block file, this value is taken by:

```
$categoryId = $this->getCategoryId();

$categoryId = $this->getData('category_id');
```

- Besides, we can put variables into a block by {{block}} structure (used in CMS page)

```
{{block type="catalog/product_list" manufacturer_id=14

template="catalog/product/brand.phtml"}}
```

II- Add and customize Javascript

- Use the action tag with the method=”addJs” attribute

For example:

```
<reference name="head">

<action method="addJs"><script>test/test.js</script></action>

</block></code>
```

- Or you can use action tag with the method=”addItem” attribute if your javascript file is in the skin folder.

For example:

```
<reference name="head">
```

```
<action
method="addItem"><type>skin_js</type><name>js/test.js</name><params/></acti
on>

</block>
```

TOPIC 4

Part 1: Models, resource models, and collections

Through this topic, your can enrich your knowledge of the Model element in the MVC (Model – View – Controller). This part will basically starts with some main concepts of models, resource models, and collections.

- **Describe basic concepts of models, resource models, and collections**

A “model” is used to store data, and perhaps performs some business logics against that data.

A “resource model” is used to interact with the database (or maybe other types of persistent data) on behalf of the “model”. The “resource model” actually performs the CRUD operations.

A “collection model” holds from one to many “models” and knows how to tell the “resource model” to get rows in the basis of information it is given.

There’s a basic ActiveRecord-like/one-object-one-table Model, and there’s also an Entity Attribute Value (EAV) Model.

- **Configure a database connection**

```
<resources>
            <affiliateplus_setup>
                <setup>
                    <module>Magestore_Affiliateplus</module>
                </setup>
                <connection>
                    <use>core_setup</use>
                </connection>
            </affiliateplus_setup>
            <affiliateplus_write>
                <connection>
```

```
                    <use>core_write</use>

                </connection>

            </affiliateplus_write>

            <affiliateplus_read>

                <connection>

                    <use>core_read</use>

                </connection>

            </affiliateplus_read>

        </resources>
```

- **Create and register new entities**

```
<entities>

<account>

               <table>affiliateplus_account</table>

       </account>

  </entities>
```

- **Use the Zend_Db classes to query the Database**

• Connect to database by 1 adapter

```
$db = new Zend_Db_Adapter_Pdo_Mysql(array(

    'host'     => '127.0.0.1',

    'username' => 'webuser',

    'password' => 'xxxxxxxx',

    'dbname'   => 'test',

         'profiler' => true,

));
```

• Returns to the information of queries.

```
$profiler = $db->getProfiler();
```

- getTotalElapsedSecs() returns the total number of seconds elapsed for all profiled queries.

- getQueryProfiles() returns an array of all query profiles.

- getLastQueryProfile() returns the last (most recent) query profile, regardless of whether or not the query has finished (if it hasn't, the end time will be NULL)

- clear() clears any past query profiles from the stack.

• Zend_Db_Statement

```
$sql = 'SELECT * FROM bugs WHERE reported_by = ? AND bug_status = ?';

$stmt = new Zend_Db_Statement_Mysqli($db, $sql);
```

• Zend_Db_Table: Each class interacts with one table in the database, and you need to declare the database table for which this class define.

Example:

```
class Bugs extends Zend_Db_Table_Abstract

{

    protected $_name = 'bugs';

}

$table = new Bugs(array('db' => $db));
```

With $table object, you can use some methods to operate with the database such as: insert, update, delete.

• Zend_Db_Table_Row: is a record object in the table

```
$bugs = new Bugs();

$row = $bugs->fetchRow($bugs->select()->where('bug_id = ?', 1));

$rowArray = $row->toArray();
```

• Zend_Db_Select:

```
$select = $db->select()

    ->from( ...specify table and columns... )

    ->where( ...specify search criteria... )

    ->order( ...specify sorting criteria... );
```

• **Database collection in Magento**

The collection in Magento usually extends from class

Mage_Core_Model_Resource_ Collection_Abstract or Mage_Core_Model_Mysql4_ Collection_Abstract.

The collection has some methods for you to filter, sort and specify the selected values:

• addFieldToFilter(,): used to filter data

• setOrder(): used to sort data

• getSelect(): returns the selected query (is instance object of class Varien_Db_Select) to this collections. And you are able to use it to add specific selected value.

• Database resource

The database model and the collection connect to database through database resource layer. The resource class extends from an abstract class:

abstract class Mage_Core_Model_Resource_Abstract

abstract class Mage_Core_Model_Mysql4_Abstract

In this class, you need to declare your database table and the id field of this table.

For example:

```
public function _construct(){

        $this->_init('affiliate/program', 'program_id');

}
```

- Use and resolve existing table names without hard coding them

```
$resource = Mage::getSingleton('core/resource');

$eavAttributeTable = $resource->getTable('eav/attribute');
```

“eav/attribute” here is your configuration for table eav_entity_attribute in your database.

Part 2: Magento Object Relational Mapping (ORM)

Magento Object Relational Mapping (ORM) plays a vital role in the process of working with database. So, I have now extended the tutorial to help you more deeply understand ORM.

I- What is ORM

Object Relational Mapping (ORM) is a programming technique for converting between types of data and objects in OOP. There are 2 types of ORM:

- Convert different types of data to objects
- Convert objects to various types of data

II- ORM in Magento

In Magento, ORM is shown as Models (in Magento design pattern MVC). Most of the models are inherited from the Varien_Object class, along with using PHP magic _get and _set functions to set and retrieve the data of the object:

```
$product = Mage::getModel('catalog/product')->setPrice(100);

echo $product->getPrice();
```

Models in Magento are divided into 3 types:

- *Models working with incoherent data*: The typical example for this type is*adminhtml/system_config_source_yesno* model with the content below:

```
class Mage_Adminhtml_Model_System_Config_Source_Yesno

{

    public function toOptionArray(){

        return array(

            array('value' => 1, 'label'=>Mage::helper('adminhtml')-
>__('Yes')),

            array('value' => 0, 'label'=>Mage::helper('adminhtml')-
>__('No')),

        );

    }
}
```

Data that this type of models works with is 0/1 value and Yes/No label. The model doesn't get data from the database and doesn't write data in the database as well.

- *Models working with XML database*: such as *core/config* model. This model works with XML files which are configuration files in Magento. The loading data function of the model is as follows:

```
public function loadBase(){
        $etcDir = $this->getOptions()->getEtcDir();
        $files = glob($etcDir.DS.'*.xml');
        $this->loadFile(current($files));
        while ($file = next($files)) {
            $merge = clone $this->_prototype;
            $merge->loadFile($file);
            $this->extend($merge);
        }
        if (in_array($etcDir.DS.'local.xml', $files)) {
            $this->_isLocalConfigLoaded = true;
        }
        return $this;
    }
```

The model working with XML database converts the data stored by XML configuration file to working objects. There are separated methods to work with theXML database like getNode, getSectionNode…

- *Models working with SQL database*: take and write data in the database through the SQL structure query demand. The responsibility of these models is to change actions to the data query demands.

• Models working with one database table (such as *core/website* model). This model works with one table in database. Loading or saving the data will just relate to this table. For instance:

```
$website = Mage::getModel('core/website')->load(0);

$website->setId(1)->save();
```

• Models working with multi – database table: work with EVA database. For example: *catalog/product*model. In this case, loading or saving data will be relevant to a set of table. This model has to map the data of multi-table to its object. The data query will be implemented during using this model.

```
$product = Mage::getModel('catalog/product')->load(1);

$product->setId(2)->save();
```

Part 3: Install/Upgrade Scripts

This part will provide you with further knowledge of the install/upgrade workflow of Magento module and guide you how to write install and upgrade scripts using set-up resources.

I- The install/upgrade workflow of Magento module

When having a request, the system will check your module's version in the file:*/app/code/local/Magestore/Mymodule/etc/config.xml*

```
…
    <modules>
        <Magestore_Mymodule>
            <version>0.1.3</version>
        </Magestore_ Mymodule>
    </modules>
```

Magento will continue checking in the *core_resource* table. The current version is on the*mymodule_setup* line of the database.
The folder: */app/code/local/Magestore/Mymodule/sql/mymodule_setup* includes script files creating database for the module:

```
     mysql4-install-0.1.0.php
     mysql4-install-0.1.1.php
     mysql4-install-0.1.2.php
     mysql4-install-0.1.3.php
     mysql4-upgrade-0.1.0-0.1.1.php
     mysql4-upgrade-0.1.1-0.1.2.php
     mysql4-upgrade-0.1.2-0.1.3.php
     …
```

If *mymodule_setup* doesn't exist in the *core_resource* table, Magento will run the installation script file which is compatible with the current version of the module. (In this case, it's *mysql4-install-0.1.3.php*).
What happens if the lower version of the module was installed? The answer is that

Magento will run the upgrade script files in turn from the current version (in *core_resource* table) to the version which has been set up.

II- Guide to write install and upgrade scripts using set-up resources

The Script to install and upgrade the workflow using sql is as below:

```
<?php
$installer = $this;
$installer->startSetup();
$installer->run("

DROP TABLE IF EXISTS {$this->getTable(mymodule)};
CREATE TABLE {$this->getTable(mymodule)} (
  `mymodule_id` int(11) unsigned NOT NULL auto_increment,
  `title` varchar(255) NOT NULL default '',
  `description` text NOT NULL default '',
  `status` smallint(6) NOT NULL default '0',
  `created_time` datetime NULL,
  `update_time` datetime NULL,
  PRIMARY KEY (`mymodule_id`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;
");
$installer->endSetup();
```

Basically, it has 3 main parts:

- Declaring the $install variable

```
$installer = $this;
$installer->startSetup();
```

- Writing the sql code to create the database

```
$installer->run("
        //sql code here
");
```

- Ending

```
$installer->endSetup();
```

Part 4: Install/Upgrade Scripts (continue)

Have you known much about the DDL class in Magento? This part is intended to answer all frequent questions of using the DDL class in setup scripts and obviously makes you more understand about it.

I- What is the DDL?

DDL stands for Data Definition Language or Data Description Language. It's the language to define data, like programming language. The SQL command is a form of DDL.

II- What is the DDL class in Magento?

• The only DDL class in Magento is Varien_Db_Ddl_Table

• The DDL class consists of a const variable corresponding with types of data (Boolean, smallint, integer) and some keywords in SQL (CASCADE, RESTRICT,…

• The DDL class includes functions to work with the Table object in the database such as:

- addColumn()
- addForeignKey()
- addIndex()

III- Where does Magento use the DDL class?

Magento uses the DDL class in setup files to create or update the data tables.

IV- How to use the DDL class in creating and editing Table?

• For example, the command paragraph to create the data table for a static blog is as follows:

```
$table = $installer->getConnection()

    ->newTable($installer->getTable('cms/block'))

    ->addColumn('block_id',    Varien_Db_Ddl_Table::TYPE_SMALLINT,    null,
array(
        'identity'  => true,

        'nullable'  => false,

        'primary'   => true,

        ), 'Block ID')

    ->addColumn('title', Varien_Db_Ddl_Table::TYPE_TEXT, 255, array(

        'nullable'  => false,

        ), 'Block Title')

    ->addColumn('identifier', Varien_Db_Ddl_Table::TYPE_TEXT, 255, array(

        'nullable'  => false,

        ), 'Block String Identifier')

    ->addColumn('content', Varien_Db_Ddl_Table::TYPE_TEXT, '2M', array(

        ), 'Block Content')

    ->addColumn('creation_time', Varien_Db_Ddl_Table::TYPE_TIMESTAMP, null,
array(

        ), 'Block Creation Time')

    ->addColumn('update_time',  Varien_Db_Ddl_Table::TYPE_TIMESTAMP,  null,
array(

        ), 'Block Modification Time')

    ->addColumn('is_active',    Varien_Db_Ddl_Table::TYPE_SMALLINT,    null,
array(

        'nullable'  => false,

        'default'   => '1',

        ), 'Is Block Active')

    ->setComment('CMS Block Table');

$installer->getConnection()->createTable($table);
```

• Some important functions in the DDL class:

- **addColumn**($name, $type, $size = null, $options = array(), $comment = null)

    1. $name: the name of a field (column)
    2. $type: the type of data. For instance: TYPE_BOOLEAN, TYPE_SMALLINT, TYPE_INTEGER…

3. $size: the size of a field (0, 255, 2M,…)
4. $option: identity (true/false), nullable(true/false), primary (true/false), default (value)
5. $comment: add comments to the field

- **addForeignKey**($fkName, $column, $refTable, $refColumn, $onDelete = null, $onUpdate = null)
    1. $fkName: the name of the foreign key
    2. $column: the name of the field (column) set into the foreign key
    3. $ refTable: the name of the reference table
    4. $ refColumn: the name of the column table
    5. $onDelete: identify an action needs to be implemented when the data of the reference table is deleted (ACTION_CASCADE, ACTION_SET_NULL, ACTION_NO_ACTION, ACTION_RESTRICT, ACTION_SET_DEFAULT)
    6. $onUpdate: : identify an action needs to be implemented when the data of the reference table is updated (ACTION_CASCADE, ACTION_SET_NULL, ACTION_NO_ACTION, ACTION_RESTRICT, ACTION_SET_DEFAULT)
- **addIndex**($indexName, $fields, $options = array())
    1. $ indexName: the name of index
    2. $fields: the name/ array of field which is set into index (array or string)

TOPIC 5

Part 1: EAV Model Concepts

Working with EAV Model in Magento seems to be a quite complicated issue but you can totally make it easier with our new series of tutorials. This part will start with some main concepts of EAV

I- Definition of EAV

According to Wikipedia: *Entity-Attribute-Value model (EAV), also known as object-attribute-value model and open schema is a data model that is used in circumstances where the number of attributes (properties, parameters) that can be used to describe a thing (an "entity" or "object")* is *potentially very vast, but the number that will actually apply to a given entity is relatively modest. In mathematics, this model is known as a sparse matrix*.

The main features of EAV can be summarized as follows:

• EAV is a data model describing the organization of data

• Display the data of an object or entity

• Ability to expand the attribute set without changing the table structure

• Flexibility in storing data

• Suitable to entities having different attribute sets

II- Description of the EAV hierarchy structure

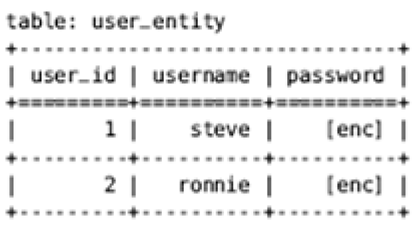
The EAV hierarchy structure includes these components:

• Entity: Lines in this table are displayed objects of an entity

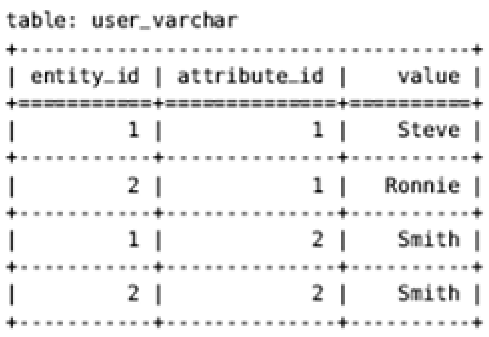
• Attribute: Attributes of the object are lines in this table

• Value: Lines in this table contain the attribute values of objects

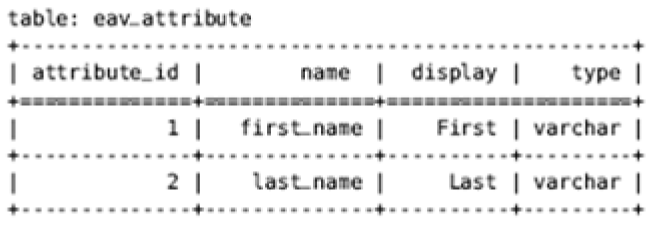
For instance, the object which is the users is stored as below:



```
table: user_entity
+-----------------------------+
| user_id | username | password |
+=========+==========+==========+
|       1 |    steve |    [enc] |
+---------+----------+----------+
|       2 |   ronnie |    [enc] |
+---------+----------+----------+
```



```
table: user_varchar
+-----------------------------------+
| entity_id | attribute_id |   value |
+===========+==============+=========+
|         1 |            1 |   Steve |
+-----------+--------------+---------+
|         2 |            1 |  Ronnie |
+-----------+--------------+---------+
|         1 |            2 |   Smith |
+-----------+--------------+---------+
|         2 |            2 |   Smith |
+-----------+--------------+---------+
```

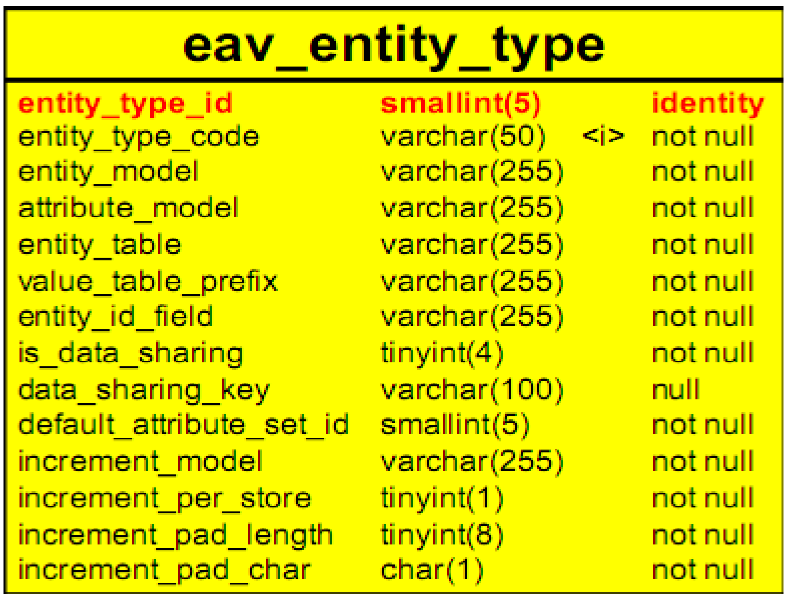


```
table: eav_attribute
+--------------------------------------------+
| attribute_id |       name | display |   type |
+==============+============+=========+========+
|            1 | first_name |   First | varchar |
+--------------+------------+---------+--------+
|            2 |  last_name |    Last | varchar |
+--------------+------------+---------+--------+
```

III- How EAV data storage works in Magento

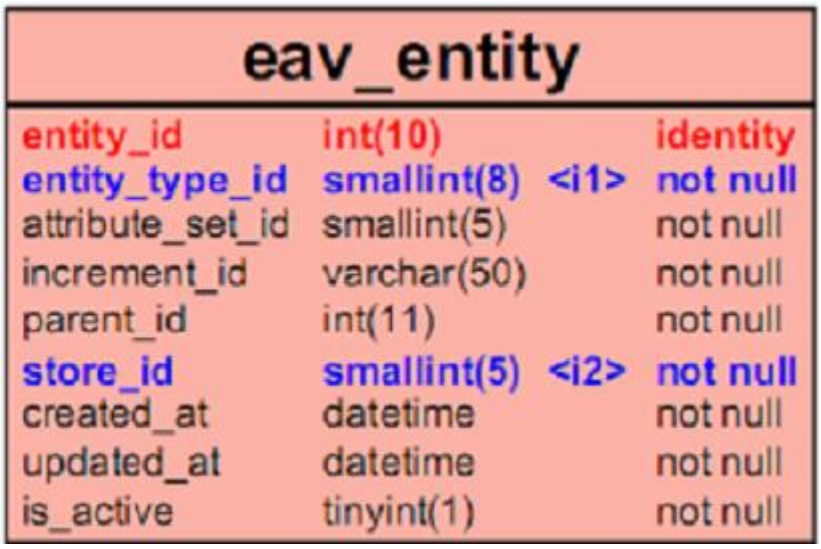
The EAV data storage in Magento seems quite complicated with the separated data for each store. There are some data storage tables:

- EAV entity type: stores the entity type including the information of model for the entity or the default attribute set



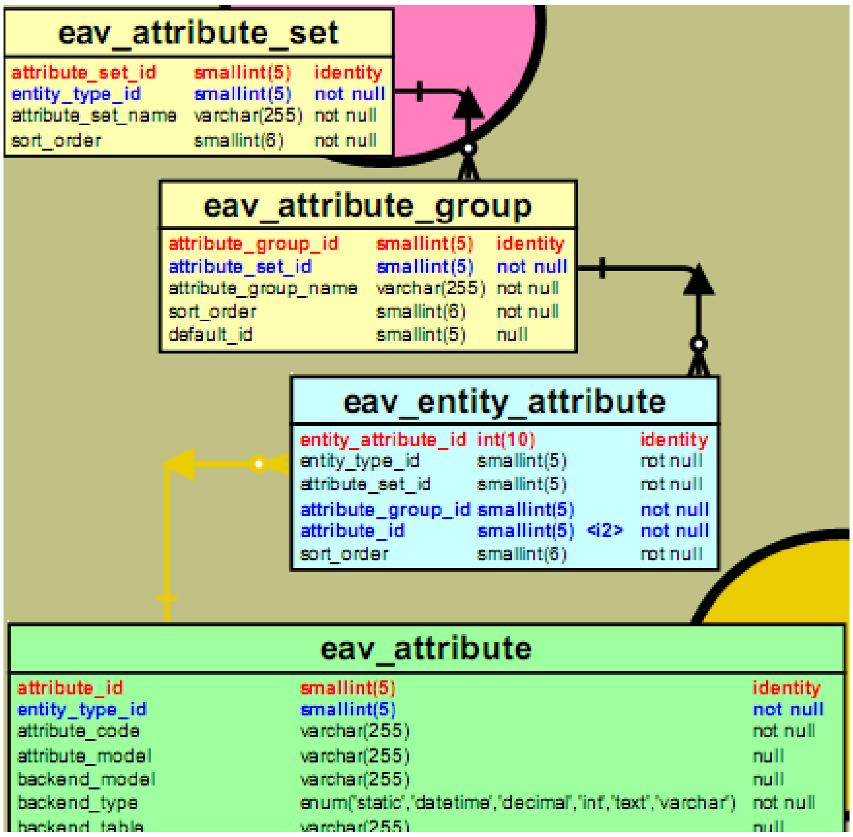
eav_entity_type			
entity_type_id	**smallint(5)**		**identity**
entity_type_code	varchar(50)	<i>	not null
entity_model	varchar(255)		not null
attribute_model	varchar(255)		not null
entity_table	varchar(255)		not null
value_table_prefix	varchar(255)		not null
entity_id_field	varchar(255)		not null
is_data_sharing	tinyint(4)		not null
data_sharing_key	varchar(100)		null
default_attribute_set_id	smallint(5)		not null
increment_model	varchar(255)		not null
increment_per_store	tinyint(1)		not null
increment_pad_length	tinyint(8)		not null
increment_pad_char	char(1)		not null

- EAV entity: Contains an eav_entity table storing objects of a certain entity type



eav_entity			
entity_id	int(10)		identity
entity_type_id	smallint(8)	<i1>	not null
attribute_set_id	smallint(5)		not null
increment_id	varchar(50)		not null
parent_id	int(11)		not null
store_id	smallint(5)	<i2>	not null
created_at	datetime		not null
updated_at	datetime		not null
is_active	tinyint(1)		not null

- EAV entity attribute: Attributes are divided into groups (one group may have a lot of attributes and one attribute may be in a lot of group). An attribute set includes the number of group. An object has an attribute set.



eav_attribute_set		
attribute_set_id	smallint(5)	identity
entity_type_id	smallint(5)	not null
attribute_set_name	varchar(255)	not null
sort_order	smallint(6)	not null

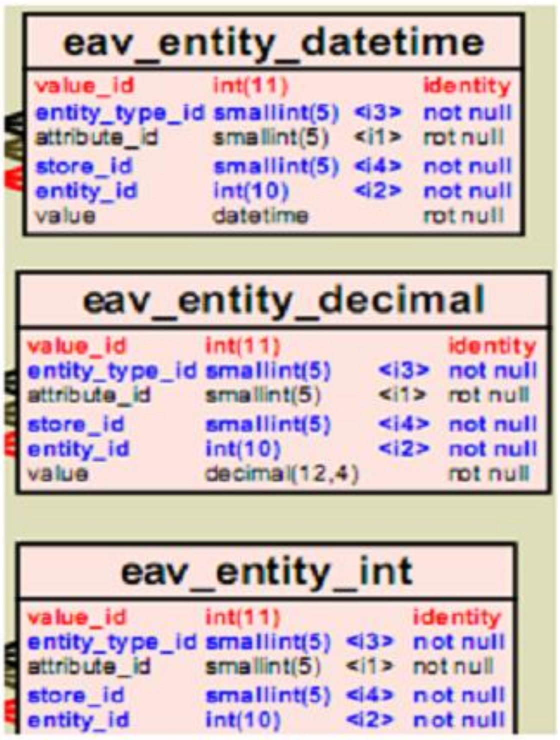
eav_attribute_group		
attribute_group_id	smallint(5)	identity
attribute_set_id	smallint(5)	not null
attribute_group_name	varchar(255)	not null
sort_order	smallint(6)	not null
default_id	smallint(5)	null

eav_entity_attribute			
entity_attribute_id	int(10)		identity
entity_type_id	smallint(5)		not null
attribute_set_id	smallint(5)		not null
attribute_group_id	smallint(5)		not null
attribute_id	smallint(5)	<i2>	not null
sort_order	smallint(6)		not null

eav_attribute		
attribute_id	smallint(5)	identity
entity_type_id	smallint(5)	not null
attribute_code	varchar(255)	not null
attribute_model	varchar(255)	null
backend_model	varchar(255)	null
backend_type	enum('static','datetime','decimal','int','text','varchar')	not null
backend_table	varchar(255)	null

- EVA entity value: Magento optimizes the data storage by providing value tables corresponding to the data types such as:

eav_entity_datetime, *eav_entity_varchar*, *eav_entity_int*…



eav_entity_datetime

value_id	int(11)		identity
entity_type_id	smallint(5)	<i3>	not null
attribute_id	smallint(5)	<i1>	not null
store_id	smallint(5)	<i4>	not null
entity_id	int(10)	<i2>	not null
value	datetime		not null

eav_entity_decimal

value_id	int(11)		identity
entity_type_id	smallint(5)	<i3>	not null
attribute_id	smallint(5)	<i1>	not null
store_id	smallint(5)	<i4>	not null
entity_id	int(10)	<i2>	not null
value	decimal(12,4)		not null

eav_entity_int

value_id	int(11)		identity
entity_type_id	smallint(5)	<i3>	not null
attribute_id	smallint(5)	<i1>	not null
store_id	smallint(5)	<i4>	not null
entity_id	int(10)	<i2>	not null

IV- EAV data access process in Magento

Taking the EAV data out requires querying multiple tables continuously. Therefore, the data mapping will be implemented on multiple databases by models.

Reading data: To read the data from the database to the object, the model takes these steps:

- Read the data from the main table or the entity table
- Identify the attribute set of the object
- Read the values of the attribute for the object
- Change the value of the attribute (through the attrubute's backend_model)
- Map data to the object

Write data: The process of writing the EAV object's data to the database is as below:

- Take mapping data of the object
- Change the value of the attribute (through the attrubute's backend_model)
- Save the data to the main table or the entity table
- Save the data to the value attribute table

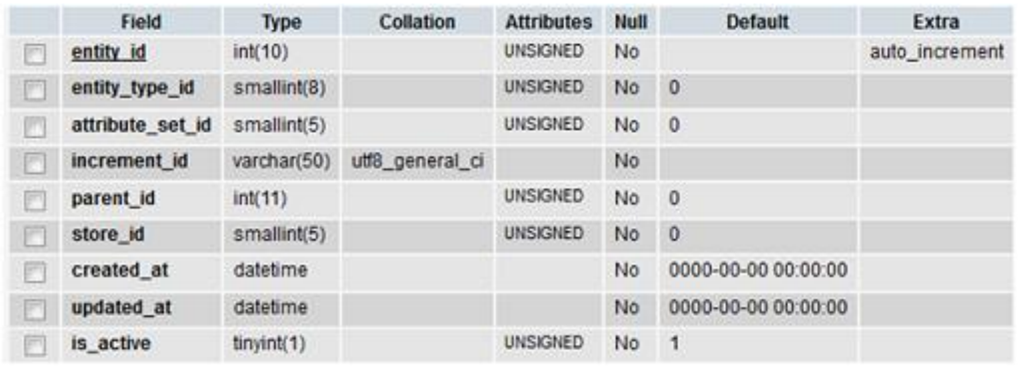
Part 2: Database tables for EAV entities

In the previous article, we provided you with the basic principle of EAV but have you concretely known how Magento stores the data according to the EAV model and how to create an EAV entity in Magento? If not, this part will surely be a good reference for you.

I- Describe the database tables for EAV entities and how to create them

• Table Eav_Entity

This table includes the basic information of entities.

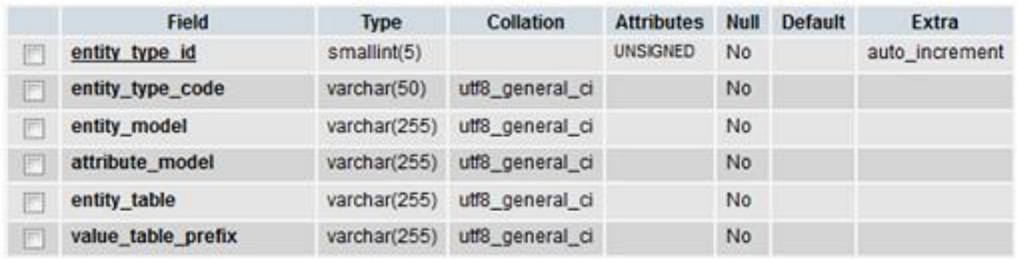


	Field	Type	Collation	Attributes	Null	Default	Extra
☐	entity_id	int(10)		UNSIGNED	No		auto_increment
☐	entity_type_id	smallint(8)		UNSIGNED	No	0	
☐	attribute_set_id	smallint(5)		UNSIGNED	No	0	
☐	increment_id	varchar(50)	utf8_general_ci		No		
☐	parent_id	int(11)		UNSIGNED	No	0	
☐	store_id	smallint(5)		UNSIGNED	No	0	
☐	created_at	datetime			No	0000-00-00 00:00:00	
☐	updated_at	datetime			No	0000-00-00 00:00:00	
☐	is_active	tinyint(1)		UNSIGNED	No	1	

- entity_id: the ID of the entity
- entity_type_id: the ID of the entity type. To get this ID, it's necessary to add a new type of entity to the table eav_entity_type
- attribute_set_id: the ID of the attribute set used for the entity

• Table Eav_entity_type

The table Eav_entity_type contains the information of the entity types such as: customer, product, order…



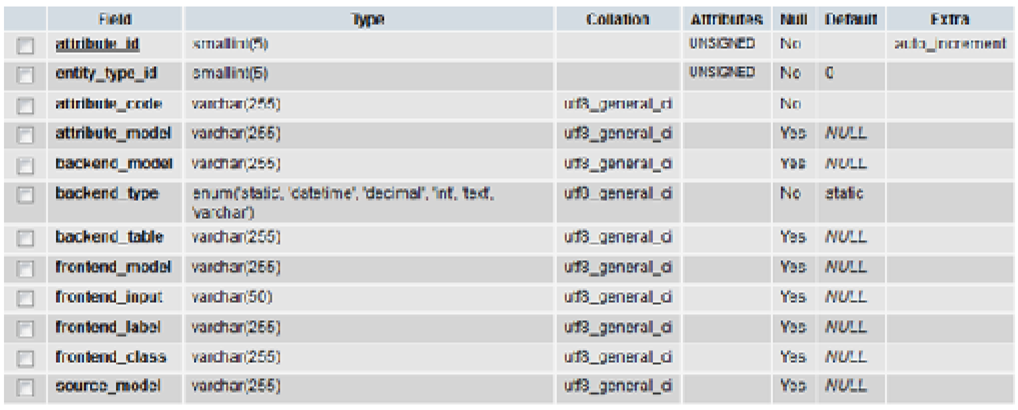
	Field	Type	Collation	Attributes	Null	Default	Extra
☐	entity_type_id	smallint(5)		UNSIGNED	No		auto_increment
☐	entity_type_code	varchar(50)	utf8_general_ci		No		
☐	entity_model	varchar(255)	utf8_general_ci		No		
☐	attribute_model	varchar(255)	utf8_general_ci		No		
☐	entity_table	varchar(255)	utf8_general_ci		No		
☐	value_table_prefix	varchar(255)	utf8_general_ci		No		

- entity_type_id: the ID of the entity type

- entity_type_code: the code of the entity type. For instance: customer, catalog_product
- entity_model: The model used to work with this entity type (customer/customer, catalog/product)
- attribute_model: The model used to work with the attribute of this entity type (to add, edit, delete). For example: customer/attribute, catalog/resource_eav_attribute
- entity_table: The table which stores entities (catalog_product_entity)

• Table Eav_attribute

This table includes the attributes' information



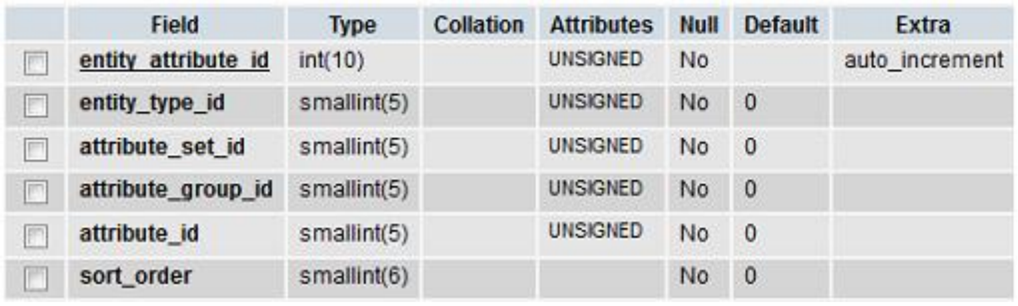
	Field	Type	Collation	Attributes	Null	Default	Extra
☐	attribute_id	smallint(5)		UNSIGNED	No		auto_increment
☐	entity_type_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_code	varchar(255)	utf8_general_ci		No		
☐	attribute_model	varchar(255)	utf8_general_ci		Yes	*NULL*	
☐	backend_model	varchar(255)	utf8_general_ci		Yes	*NULL*	
☐	backend_type	enum('static', 'datetime', 'decimal', 'int', 'text', 'varchar')	utf8_general_ci		No	static	
☐	backend_table	varchar(255)	utf8_general_ci		Yes	*NULL*	
☐	frontend_model	varchar(255)	utf8_general_ci		Yes	*NULL*	
☐	frontend_input	varchar(50)	utf8_general_ci		Yes	*NULL*	
☐	frontend_label	varchar(255)	utf8_general_ci		Yes	*NULL*	
☐	frontend_class	varchar(255)	utf8_general_ci		Yes	*NULL*	
☐	source_model	varchar(255)	utf8_general_ci		Yes	*NULL*	

- attribute_id: the ID of the attribute
- entity_type_id: the ID of the entity type having this attribute
- attribute_code: the code of the attribute
- attribute_model
- backend_model
- backend_type
- backend_table
- frontend_model
- frontend_input
- frontend_lable

- frontend_class
- source_model

• **Table Eav_Entity_attribute**

The table Eav_Entity_attribute contains information of the Attribute Group and the Attribute Set of attributes

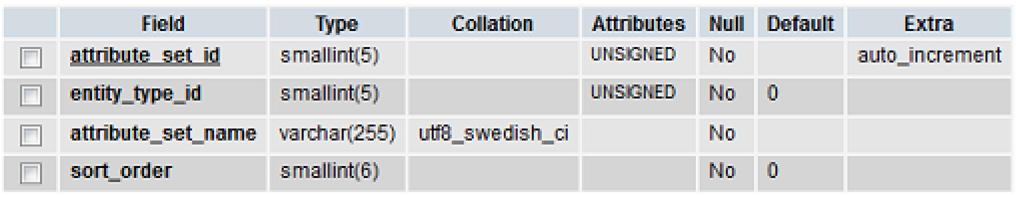


	Field	Type	Collation	Attributes	Null	Default	Extra
☐	entity_attribute_id	int(10)		UNSIGNED	No		auto_increment
☐	entity_type_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_set_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_group_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_id	smallint(5)		UNSIGNED	No	0	
☐	sort_order	smallint(6)			No	0	

- entity_attribute_id
- entity_type_id: the ID of the entity type
- attribute_set_id: the ID of the attribute set
- attribute_group_id: the ID of the attribute group
- attribute_id: the ID of the attribute

• **Table Eav_attribute_set**

This table includes information of the attribute sets.

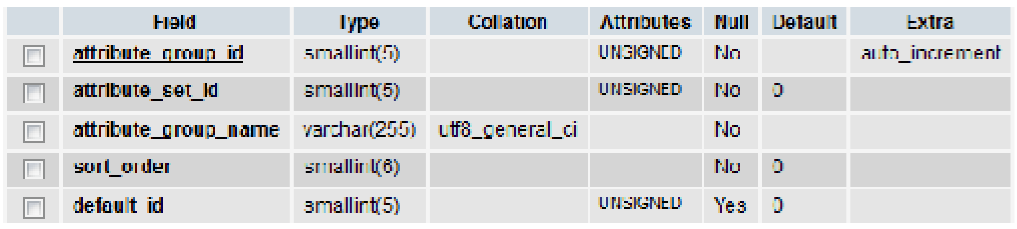


	Field	Type	Collation	Attributes	Null	Default	Extra
☐	attribute_set_id	smallint(5)		UNSIGNED	No		auto_increment
☐	entity_type_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_set_name	varchar(255)	utf8_swedish_ci		No		
☐	sort_order	smallint(6)			No	0	

- attribute_set_id
- entity_type_id: the ID of the entity type
- attribute_set_name: The name of the attribute set

• **Table Eav_attribute_group**

The table Eav_attribute_group contains the information of the attribute group.



	Field	Type	Collation	Attributes	Null	Default	Extra
☐	attribute_group_id	smallint(5)		UNSIGNED	No		auto_increment
☐	attribute_set_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_group_name	varchar(255)	utf8_general_ci		No		
☐	sort_order	smallint(6)			No	0	
☐	default_id	smallint(5)		UNSIGNED	Yes	0	

- attribute_group_id: the ID of the attribute group
- attribute_set_id: the ID of the attribute set
- attribute_group_name: The name of the attribute group

• Tables stored the value of the attribute

Eav_entity_int

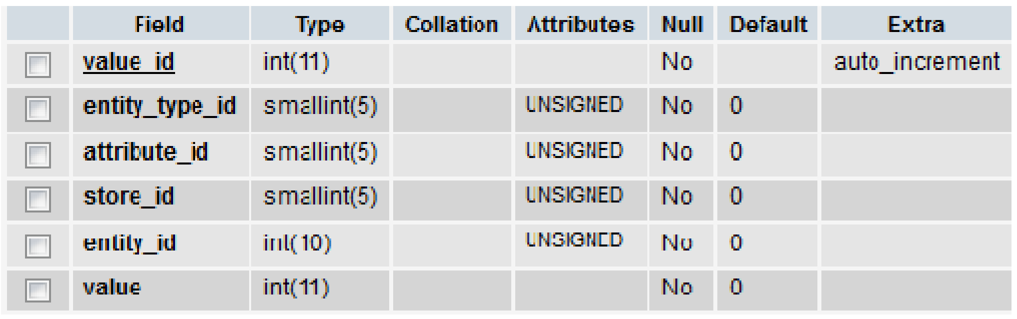
Eav_entity_datetime

Eav_entity_decimal

Eav_entity_text

Eav_entity_varchar

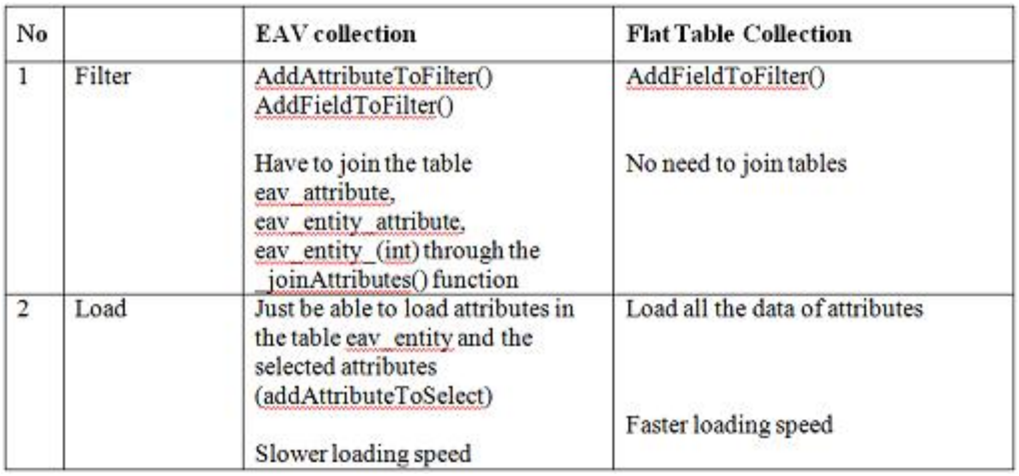
The table Eav_entity_int stores the value of the “int” type of attributes.



	Field	Type	Collation	Attributes	Null	Default	Extra
☐	value_id	int(11)			No		auto_increment
☐	entity_type_id	smallint(5)		UNSIGNED	No	0	
☐	attribute_id	smallint(5)		UNSIGNED	No	0	
☐	store_id	smallint(5)		UNSIGNED	No	0	
☐	entity_id	int(10)		UNSIGNED	No	0	
☐	value	int(11)			No	0	

- entity_type_id: the ID of entity type
- attribute_id: the ID of the attribute
- store_id: the Store ID
- entity_id: the ID of the entity
- value: the attribute’s value of the entity

II- Key differences between EAV and Flat Table collections



No		EAV collection	Flat Table Collection

1	Filter	AddAttributeToFilter()
		AddFieldToFilter()
		
		Have to join the table eav_attribute, eav_entity_attribute, eav_entity_(int) through the _joinAttributes() function
			AddFieldToFilter()
			
			No need to join tables

2	Load	Just be able to load attributes in the table eav_entity and the selected attributes (addAttributeToSelect) Slower loading speed	Load all the data of attributes Faster loading speed

III- Give a new entity, identify the factors that influence the choice of the resource type to use (EAV vs. flat)

For example:

The Banner Entity

Attributes: Title, Images, Link, Status, Description

- The number of attribute: small (5 attributes)
- Attributes are fixed and there's no need to create more attributes.

→ Use the flat table

The Customer Entity

Attributes: First Name, Last Name, Email, Password, Group, Gender, Birthday, Tax Number

- The number of attributes: small (about 10 attributes)
- Need to create more attributes: Company, Interested…

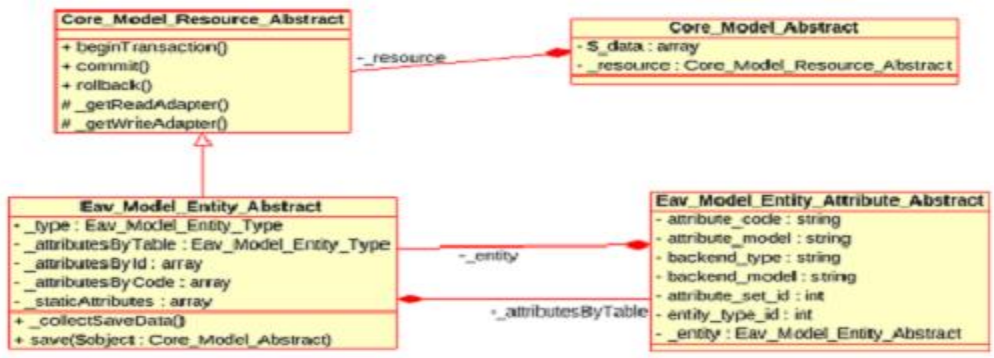
→ Use the EAV model

Part 3: Load and save EAV entities

We will explore our journey through Magento's EAV Model further by showing how we can easily load and save an EAV entity. First, let's discover the EAV entity's structure and then I'll show you the way to load and save entities in details.

I- Structure of an eav entity

- An entity contains data taken from different tables. When you call a load command, tables will join together to provide data for this entity.
- Objects are entities, and object properties are attributes.



Core_Model_Resource_Abstract
+ beginTransaction()
+ commit()
+ rollback()
# _getReadAdapter()
# _getWriteAdapter()
-_resource
Core_Model_Abstract
- $_data : array
- _resource : Core_Model_Resource_Abstract
Eav_Model_Entity_Abstract
- _type : Eav_Model_Entity_Type
- _attributesByTable : Eav_Model_Entity_Type
- _attributesById : array
- _attributesByCode : array
- _staticAttributes : array
+ _collectSaveData()
+ save($object : Core_Model_Abstract)
-_entity
-_attributesByTable
Eav_Model_Entity_Attribute_Abstract
- attribute_code : string
- attribute_model : string
- backend_type : string
- backend_model : string
- attribute_set_id : int
- entity_type_id : int
- _entity : Eav_Model_Entity_Abstract

- The differences between the entity eav and the resource model

Entities extend Magento's resource objects and resources simply connect with the database (actually they manage the different reading/writing connections and automatically figure out table names based on the convention). Basically, Entities are core things that pair up to selected Models and help them save to the database.

II- Load and save an entity

• Load: Load entity's attributes into the object

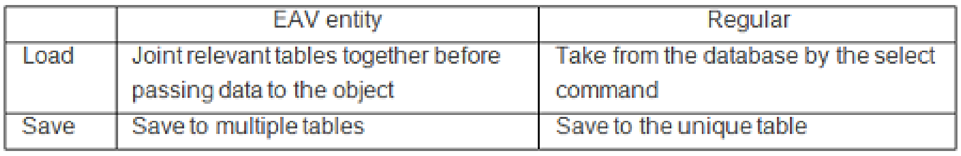
- Read data from the main table (main table or entity table)
- Define the attribute set of the object
- Read the attribute's value of the object
- Change the attribute's value (through the backend_model of the attribute)
- Map date into the object

```
public function load($object, $entityId, $attributes=array())

    {

        Varien_Profiler::start('__EAV_LOAD_MODEL__');

        /**

         * Load object base row data

         */

        $select = $this->_getLoadRowSelect($object, $entityId);

        $row = $this->_getReadAdapter()->fetchRow($select);

        //$object->setData($row);

        if (is_array($row)) {

            $object->addData($row);

        }


        if (empty($attributes)) {

            $this->loadAllAttributes($object);

        } else {

            foreach ($attributes as $attrCode) {

                $this->getAttribute($attrCode);

            }

        }


        /**

         * Load data for entity attributes

         */

        Varien_Profiler::start('__EAV_LOAD_MODEL_ATTRIBUTES__');

        $selects = array();

        foreach ($this->getAttributesByTable() as $table=>$attributes) {

            $selects[] = $this->_getLoadAttributesSelect($object, $table);

        }

        if (!empty($selects)) {
            $select = $this->_prepareLoadSelect($selects);

            $values = $this->_getReadAdapter()->fetchAll($select);

            foreach ($values as $valueRow) {

                $this->_setAttribteValue($object, $valueRow);

            }

        }


        Varien_Profiler::stop('__EAV_LOAD_MODEL_ATTRIBUTES__');


        $object->setOrigData();

        Varien_Profiler::start('__EAV_LOAD_MODEL_AFTER_LOAD__');

        $this->_afterLoad($object);

        Varien_Profiler::stop('__EAV_LOAD_MODEL_AFTER_LOAD__');


        Varien_Profiler::stop('__EAV_LOAD_MODEL__');

        return $this;

    }
```

Save: Save entity's attributes into the object's resource

- Take data mapped in the object
- Change the attribute's value (through the backend_model of the attribute)
- Save data to the main table (main table hay entity table)
- Save data to the attribute's value table

• The differences in loading and saving between eav entities and normal models



	EAV entity	Regular
Load	Joint relevant tables together before passing data to the object	Take from the database by the select command
Save	Save to multiple tables	Save to the unique table

Part 4: Magento EAV Attribute Management

Magento is designed to work with EAV database model and an attribute management is the indispensable part for developers to customize the system. I spent quite long time on researching on EAV Attribute Management and I am very delighted to share my experience and knowledge of this important issue with you. I will also guide you how to create and customize an attribute by your code.

I- EAV Attribute

EAV attribute in Magento is stored quite complicatedly (as we mentioned in the previous part). But Magento provides some interfaces in order to work with EAV attribute easily. There are some needed models for an EAV attribute:

- *Attribute model:* extends from class Mage_Eav_Model_Entity_Attribute_Abstract, provides functions to work with the EAV attribute.
- *Backend model*: extends from class Mage_Eav_Model_Entity_Attribute_Backend_Abstract, provides functions to work directly with database data. It is used to convert the custom type to the database type (for storage) and vice versa (to be compatible with entity attribute value in the object). The most important function of this class is to guarantee data is stored correctly. For example:

```
class Mage_Eav_Model_Entity_Attribute_Backend_Store extends
Mage_Eav_Model_Entity_Attribute_Backend_Abstract

{

    protected function _beforeSave($object)

    {

        if (!$object->getData($this->getAttribute()->getAttributeCode())) {

            $object->setData($this->getAttribute()->getAttributeCode(),
Mage::app()->getStore()->getId());

        }

    }
}
```

- *Frontend model*: extends from class

  Mage_Eav_Model_Entity_Attribute_Frontend_Abstract, provides functions to work with the frontend. It is used for the user interface programming. For instance:

```
class Mage_Eav_Model_Entity_Attribute_Frontend_Datetime extends
Mage_Eav_Model_Entity_Attribute_Frontend_Abstract

{

public function getValue(Varien_Object $object)

{

$data = '';

$value = parent::getValue($object);

$format = Mage::app()->getLocale()->getDateFormat(

Mage_Core_Model_Locale::FORMAT_TYPE_MEDIUM

);


if ($value) {

try {

$data = Mage::getSingleton('core/locale')->date($value,
Zend_Date::ISO_8601, null, false)->toString($format);

} catch (Exception $e) {

$data = Mage::getSingleton('core/locale')->date($value, null, null, false)-
>toString($format);

}

}


return $data;

}

}
```

- *Source model*: extends from class

Mage_Eav_Model_Entity_Attribute_Source_Abstract, provides the data source for an attribute. It is usually used for an option attribute. And a source model needs the override function getAllOptions() and getOptionText() for an attribute model to get all available options and option text.

```
class Mage_Eav_Model_Entity_Attribute_Source_Boolean extends
Mage_Eav_Model_Entity_Attribute_Source_Abstract

{

    public function getAllOptions()

    {

        if (is_null($this->_options)) {

            $this->_options = array(

                array(

                    'label' => Mage::helper('eav')->__('Yes'),

                    'value' =>  1

                ),

                array(

                    'label' => Mage::helper('eav')->__('No'),

                    'value' =>  0

                ),

            );

        }

        return $this->_options;

    }


    ..............


    public function getOptionText($value)

    {

        $options = $this->getAllOptions();

        foreach ($options as $option) {
            if ($option['value'] == $value) {
                return $option['label'];
            }
        }
        return false;
    }
}
```

II- Create and customize an attribute by your code

An EAV attribute in Magento can be managed easily in the backend. But when you need to create/update an attribute for your module, you can use some function provided by Magento. Magento provides the class Mage_Eav_Model_Entity_Setup for you to customize an EAV attribute.

- If you want to add a new attribute, you can use function addAttribute() of the class above. Example:

```
$setup = new Mage_Eav_Model_Entity_Setup('catalog_setup');
$attr = array(
    'group'      => 'Prices',
    'type'       => 'text',
    'input'      => 'textarea',
    'label'      => 'Gift amount',
    'backend'    => '',
    'frontend'   => '',
    'source'     => '',
    'visible'    => 1,
    'user_defined'          => 1,
    'used_for_price_rules'  => 1,
    'position'              => 2,
    'unique'                => 0,
    'default'               => '',
    'sort_order'            => 101,
);
$setup->addAttribute('catalog_product','gift_amount',$attr);
```

- In case you want to update an attribute, you are able to use the model to change it. For example:

```
$setup = new Mage_Eav_Model_Entity_Setup('catalog_setup');
$giftAmount = Mage::getModel('catalog/resource_eav_attribute')-
>load($setup->getAttributeId('catalog_product','gift_amount'));
$giftAmount->addData(array(
    'is_global'     =>
Mage_Catalog_Model_Resource_Eav_Attribute::SCOPE_STORE,
    'is_required'   => 0,
    'apply_to'      => array('giftvoucher'),
    'is_configurable'   => 1,
    'is_searchable'     => 1,
    'is_visible_in_advanced_search' => 1,
    'is_comparable'     => 0,
    'is_filterable'     => 0,
    'is_filterable_in_search'   => 1,
    'is_used_for_promo_rules'   => 1,
    'is_html_allowed_on_front'  => 0,
    'is_visible_on_front'       => 0,
    'used_in_product_listing'   => 1,
    'used_for_sort_by'          => 0,
    'backend_type'              => 'text',
))->save();
```

- And if you want to update an attribute value in the entity, it’s possible to use the function updateAttribute(). The prototype function is as below:

```
/**
 * Update Attribute data and Attribute additional data
 *
 * @param mixed $entityTypeId

 * @param mixed $id

 * @param string $field

 * @param mixed $value

 * @param int $sortOrder

 * @return Mage_Eav_Model_Entity_Setup

 */

public function updateAttribute($entityTypeId, $id, $field, $value=null,
$sortOrder=null)

{

    $this->_updateAttribute($entityTypeId,     $id,     $field,     $value,
$sortOrder);

    $this->_updateAttributeAdditionalData($entityTypeId,    $id,    $field,
$value);

    return $this;
```

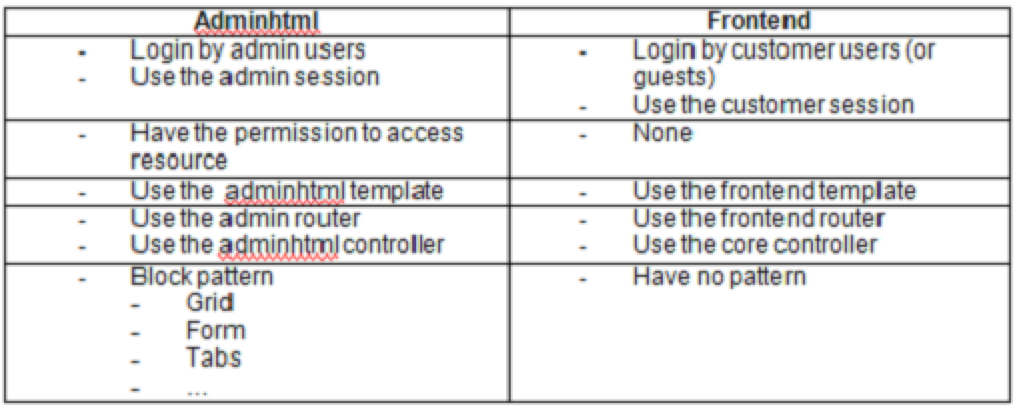
Well, I've given you the last part of the EAV model topic. The Adminhtml is also a very interesting issue and don't forget to follow it in next tutorials.

TOPIC 6

Part 1: Common structure/architecture

In Magento, the Adminhtml (Backend) is used to manage the website. Magento builds a template pattern, helping developers easily program the Adminhtml. Thus, the information I'm about to provide will certainly a good reference for those who are the administrators or developers of Magento sites or simply want to have further understanding about Magento as well.

I- Differences between the adminhtml and the frontend



Adminhtml	Frontend
- Login by admin users - Use the admin session	- Login by customer users (or guests) - Use the customer session
- Have the permission to access resource	- None
- Use the adminhtml template	- Use the frontend template
- Use the admin router - Use the adminhtml controller	- Use the frontend router - Use the core controller
- Block pattern - Grid - Form - Tabs - ...	- Have no pattern

II- Components of the admin structure

In general, a page in Magento's backend has the following parts:

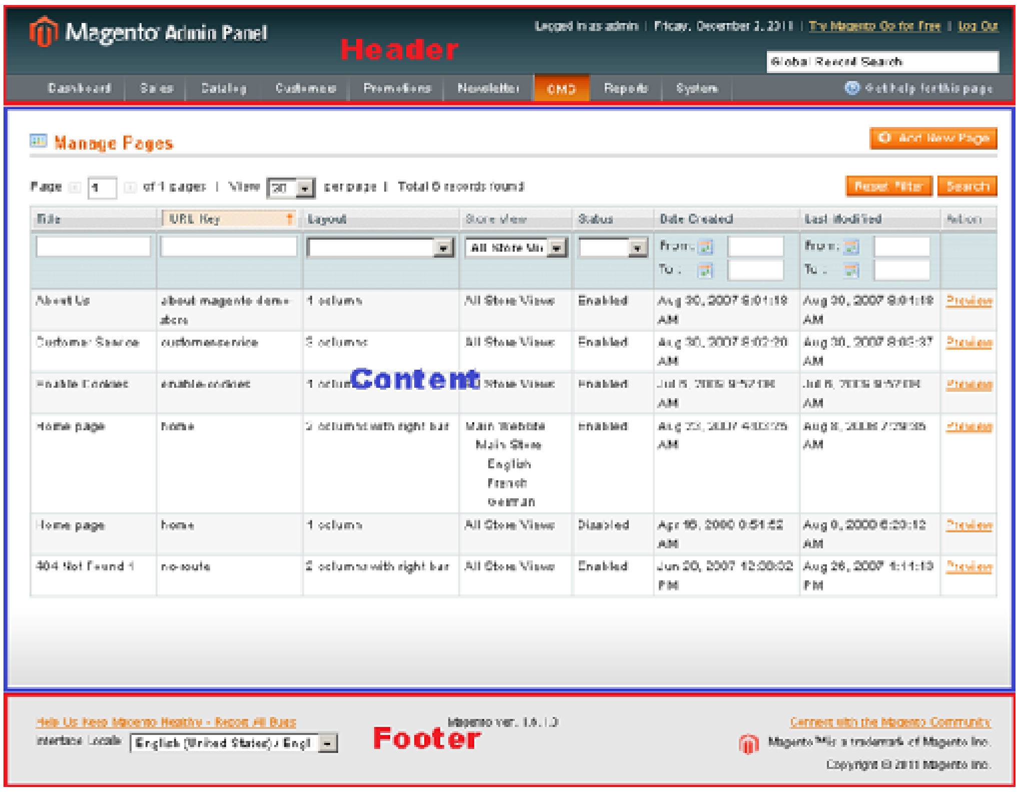
• Header of admin:

- Global search
- Admin menu

• Content:

- Grid Widget
- Form view
- Tabs in left panel
- …

• Footer: select a box to choose locale and the other information.



Page 1 of 1 pages | View 20 per page | Total 6 records found

Title	URL Key	Layout	Store View	Status	Date Created	Last Modified	Action
			All Store Views		From: To:	From: To:	
About Us	about-magento-demo-store	1 column	All Store Views	Enabled	Aug 30, 2007 8:01:18 AM	Aug 30, 2007 8:01:18 AM	Preview
Customer Service	customer-service	3 columns	All Store Views	Enabled	Aug 30, 2007 8:02:20 AM	Aug 30, 2007 8:05:37 AM	Preview
Enable Cookies	enable-cookies	1 column	All Store Views	Enabled	Jul 5, 2008 9:57:08 AM	Jul 5, 2008 9:57:08 AM	Preview
Home page	home	2 columns with right bar	Main Website Main Store English French German	Enabled	Aug 23, 2007 4:03:25 AM	Aug 8, 2008 7:29:35 AM	Preview
Home page	home	1 column	All Store Views	Disabled	Apr 16, 2008 0:51:52 AM	Aug 9, 2008 6:20:12 AM	Preview
404 Not Found 1	no-route	2 columns with right bar	All Store Views	Enabled	Jun 20, 2007 12:08:02 PM	Aug 26, 2007 4:14:19 PM	Preview

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III- Create a controller for admin router

- **Step 1:** Create a module (similar to chapters above)
- **Step 2:** Register an admin router for the module (use the configuration)

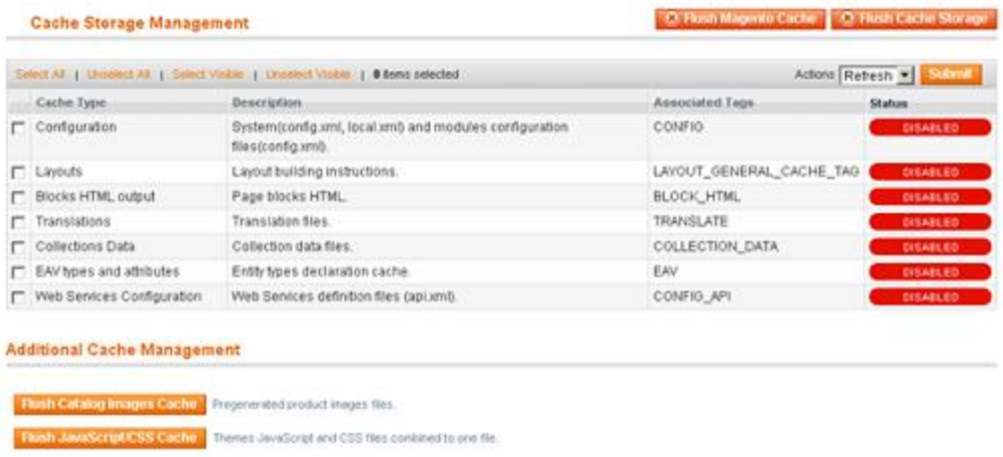
```
<config>
    ...
    <admin>
        <routers>
            <(modulename)>

                <args>
                    <module>(Namespace_Modulename)</module>
                    <frontName>(frontname)</frontName>
                              </args>
            </(modulename)>
        </routers>
    </admin>

    ...

</config>
```

- **Step 3:** Create a controller. An admin controller class needs to be extended from class Mage_Adminhtml_Controller_Action:

```
<?php


class (Namespace_Modulename)_IndexController

 extends Mage_Adminhtml_Controller_Action{

    public function indexAction(){

        // code for admin action here...

    }

}
```

IV- How to operate with cache clearing

To clear cache in admin, you can go to menu *System > Cache Management*.


Flush Magento Cache
Flush Cache Storage
Select All | Unselect All | Select Visible | Unselect Visible | 0 items selected
Actions Refresh
Submit
Flush Catalog Images Cache
Flush JavaScript/CSS Cache

Cache Storage Management

	Cache Type	Description	Associated Tags	Status
☐	Configuration	System(config.xml, local.xml) and modules configuration files(config.xml).	CONFIG	DISABLED
☐	Layouts	Layout building instructions.	LAYOUT_GENERAL_CACHE_TAG	DISABLED
☐	Blocks HTML output	Page blocks HTML.	BLOCK_HTML	DISABLED
☐	Translations	Translation files.	TRANSLATE	DISABLED
☐	Collections Data	Collection data files.	COLLECTION_DATA	DISABLED
☐	EAV types and attributes	Entity types declaration cache.	EAV	DISABLED
☐	Web Services Configuration	Web Services definition files (api.xml).	CONFIG_API	DISABLED

Additional Cache Management

Pregenerated product images files.

Themes JavaScript and CSS files combined to one file.

Then you may take these actions:

- Flush Magento Cache: clear all frontend caches
- Flush Cache Storage: all cache files in the folder /var/cache/* will be removed
- Refresh/Disable/Enable cache for the configuration, layouts, …

- Refresh: All caches except for enabled aspects will be cleared.

- Disable: Disable all caches
- Enable: Enable all caches

  - Flush image/javascript/css cache

V- How to clear the cache using code

To clear cache in Magento using code, you can use one of some methods below:

- Clear all cache files of Magento by the command: ***rm -rf var/cache/****

```
<?php
system("rm -rf var/cache/*");
?>
```

- Clear by Magento's code
- Clear all frontend caches:

```
Mage::app()->cleanCache();
```

- Clear cache by tag:

```
$tags = array("CONFIG");
Mage::app()->cleanCache($tags);
```

- Clear all caches:

```
Mage::app()->getCacheInstance()->flush();
```

Part 2: Form and grid widgets

In previous article, I wrote about some basic concepts of Adminhtml's architecture. I aim to dig deeper into the form and grid widgets and show you the easiest way to use them in your extension.

I- Structure and template

Firstly, I will talk about Grid Widgets in Magento back-end. The Grid Widgets in Magento have some blocks as below:

- Grid container: extended from the class Mage_Adminhtml_Block_Widget_Grid_Container with the default template *widget/grid/container.phtml*. The grid container contains the grid's header (title and buttons) and the grid's content
- Grid content: extended from the class Mage_Adminhtml_Block_Widget_Grid and its default template is *widget/grid.phtml*. The grid content includes a data grid, paging grid, filter data and massaction for grid. An important method of grid is addColumn.
- Massaction: based on Mage_Adminhtml_Block_Widget_Grid_Massaction with the default template: *widget/grid/massaction.phtml*. Massaction is used to operate a list of data in a grid.
- Serializer: works with grid data (by javascript) and transforms it to serial.

In Magento, the grid container automatically finds the grid content block (based on two protected attributes: _blockGroup, _controller) to render grid to HTML.

Secondly, the Form in Magento back-end is a basic template. The Form Widgets in Magento have some blocks as the followings:

- Form container: extended from the class Mage_Adminhtml_Block_Widget_Form_Container with the default template: *widget/form/container.phtml*. The Form container includes form's components such as header, content, footer and javascript.

- Form content: extended from the class Mage_Adminhtml_Block_Widget_Form with the default template: *widget/form.phtml*. The Form content includes form's elements such as fieldset, text… (the list of form's elements in the folder lib/Varien/Data/Form/Element).
- Form tabs: extended from class Mage_Adminhtml_Block_Widget_Tabs with the default template:*widget/tabs.phtml*. Form tabs are used to divide a long form to multiple tabs. It uses Javascript to add the content for the form.

Similar to the grid container, the form container automatically finds the form content block (based on protected attributes: _blockGroup and _controller) to render form to HTML.

II- How to use a grid in your extension

Now, we will create an adminhtml grid with some steps below:

Step 1*:* Create a grid container block. For example:

app\code\local\Magestore\Tests\Block\Adminhtml\Tests.php

```
<?php


class Magestore_Tests_Block_Adminhtml_Tests extends
Mage_Adminhtml_Block_Widget_Grid_Container

{

    public function __construct(){

        $this->_controller = 'adminhtml_tests';

        $this->_blockGroup = 'tests';

        $this->_headerText = Mage::helper('tests')->__('Item Manager');

        $this->_addButtonLabel = Mage::helper('tests')->__('Add Item');

        parent::__construct();

    }

}
```

In this block, we need to declare some protected attributes:

_blockGroup: offen is module name

_controller: offen is controller name

_headerText: header text for grid

Step 2*:* Create a grid block

Because the grid container above has the attribute _controller equal *'adminhtml_test'*, so we need to create a grid block app\code\local\Magestore\Tests\Block\Adminhtml\Tests\Grid.php

```
<?php


class Magestore_Tests_Block_Adminhtml_Tests_Grid extends
Mage_Adminhtml_Block_Widget_Grid

{

    public function __construct(){

        parent::__construct();

        $this->setId('testsGrid');

        $this->setDefaultSort('tests_id');

        $this->setDefaultDir('ASC');

        $this->setSaveParametersInSession(true);

    }


    protected function _prepareCollection(){

        $collection = Mage::getModel('tests/tests')->getCollection();

        $this->setCollection($collection);

        return parent::_prepareCollection();

    }


    protected function _prepareColumns(){

        $this->addColumn('tests_id', array(

            'header'    => Mage::helper('tests')->__('ID'),
            'align'  =>'right',

            'width'  => '50px',

            'index'  => 'tests_id',

        ));


        $this->addColumn('title', array(

            'header'    => Mage::helper('tests')->__('Title'),

            'align'  =>'left',

            'index'  => 'title',

        ));


        return parent::_prepareColumns();

    }


    protected function _prepareMassaction(){

        $this->setMassactionIdField('tests_id');

        $this->getMassactionBlock()->setFormFieldName('tests');


        $this->getMassactionBlock()->addItem('delete', array(

            'label'     => Mage::helper('tests')->__('Delete'),

            'url'       => $this->getUrl('*/*/massDelete'),

            'confirm'   => Mage::helper('tests')->__('Are you sure?')

        ));

        return $this;

    }


    public function getRowUrl($row){

        return $this->getUrl('*/*/edit', array('id' => $row->getId()));

    }

}
```

Step 3: Show the grid in a controllers/action by editing the layout file: app\design\adminhtml\default\default\layout\tests.xml

```
<?xml version="1.0"?>

<layout version="0.1.0">

    <testsadmin_adminhtml_tests_index>

        <reference name="content">

            <block type="tests/adminhtml_tests" name="tests" />

        </reference>

    </testsadmin_adminhtml_tests_index>

</layout>
```

III- How to use a form in your extension

To use a form in your extension, it's necessary to create form's blocks and attach them to your controller.

Step 1*:* Create a form container block

(app\code\local\Magestore\Tests\Block\Adminhtml\Tests\Edit.php)

```
<?php

class Magestore_Tests_Block_Adminhtml_Tests_Edit extends
Mage_Adminhtml_Block_Widget_Form_Container

{

    public function __construct(){

        parent::__construct();

        $this->_objectId = 'id';

        $this->_blockGroup = 'tests';

        $this->_controller = 'adminhtml_tests';

        $this->_mode = 'edit';



        $this->_updateButton('save', 'label', Mage::helper('tests')-
>__('Save Item'));

        $this->_updateButton('delete', 'label', Mage::helper('tests')-
>__('Delete Item'));
```

```
    }


    public function getHeaderText(){
        if(Mage::registry('tests_data') && Mage::registry('tests_data')->getId())
            return Mage::helper('tests')->__("Edit Item '%s'", $this->htmlEscape(Mage::registry('tests_data')->getTitle()));
        return Mage::helper('tests')->__('Add Item');
    }
}
```

Similar to the grid container, you have to declare some protected attributes, besides you can set _mode attribute (default is '*edit*').

Step 2: Create a form content block

Because form container attribute _mode is '*edit*', you need create form block:

(app\code\local\Magestore\Tests\Block\Adminhtml\Tests\Edit\Form.php)

```
<?php
class Magestore_Tests_Block_Adminhtml_Tests_Edit_Form extends Mage_Adminhtml_Block_Widget_Form
{
    protected function _prepareForm(){
        $form = new Varien_Data_Form(array(
            'id'         => 'edit_form',
            'action'     => $this->getUrl('*/*/save', array(
                'id'     => $this->getRequest()->getParam('id'),
            )),
            'method'     => 'post',
            'enctype'    => 'multipart/form-data'
        ));
        $form->setUseContainer(true);
        $this->setForm($form);
        return parent::_prepareForm();

    }

}
```

This block only defines a form that has no items. The form item will be added by a Tabs block as below:

Step 3: Create a Tabs block

(app\code\local\Magestore\Tests\Block\Adminhtml\Tests\Edit\Tabs.php)

```
<?php

class Magestore_Tests_Block_Adminhtml_Tests_Edit_Tabs extends
Mage_Adminhtml_Block_Widget_Tabs

{

    public function __construct(){

        parent::__construct();

        $this->setId('tests_tabs');

        $this->setDestElementId('edit_form');

        $this->setTitle(Mage::helper('tests')->__('Item Information'));

    }


    protected function _beforeToHtml(){

        $this->addTab('form_section', array(

            'label'  => Mage::helper('tests')->__('Item Information'),

            'title'  => Mage::helper('tests')->__('Item Information'),

            'content'    => $this->getLayout()-
>createBlock('tests/adminhtml_tests_edit_tab_form')->toHtml(),

        ));

        return parent::_beforeToHtml();

    }

}
```

In this block, we add tab form_section to a form ‘*tests/adminhtml_tests_edit_tab_form*‘, so we need to create that block: (app\code\local\Magestore\Tests\Block\Adminhtml\Tests\Edit\Tab\Form.php)

```
<?php
class Magestore_Tests_Block_Adminhtml_Tests_Edit_Tab_Form extends
Mage_Adminhtml_Block_Widget_Form
{
    protected function _prepareForm(){
        $form = new Varien_Data_Form();
        $this->setForm($form);

        if (Mage::getSingleton('adminhtml/session')->getTestsData()){
            $data = Mage::getSingleton('adminhtml/session')-
>getTestsData();
            Mage::getSingleton('adminhtml/session')->setTestsData(null);
        }elseif(Mage::registry('tests_data'))
            $data = Mage::registry('tests_data')->getData();

        $fieldset = $form->addFieldset('tests_form',
array('legend'=>Mage::helper('tests')->__('Item information')));

        $fieldset->addField('title', 'text', array(
            'label'     => Mage::helper('tests')->__('Title'),
            'class'     => 'required-entry',
            'required'  => true,
            'name'      => 'title',
        ));

        $form->setValues($data);
        return parent::_prepareForm();
    }
}
```

Step 4*:* Add a form to controllers/action in the controller file

```
public function editAction() {
    $id  = $this->getRequest()->getParam('id');
    $model  = Mage::getModel('tests/tests')->load($id);
    if ($model->getId() || $id == 0) {
        $data = Mage::getSingleton('adminhtml/session')->getFormData(true);
        if (!empty($data))
            $model->setData($data);
        Mage::register('tests_data', $model);

        $this->loadLayout();
        $this->_setActiveMenu('tests/tests');
        $this->getLayout()->getBlock('head')->setCanLoadExtJs(true);
        $this->_addContent($this->getLayout()-
>createBlock('tests/adminhtml_tests_edit'))
            ->_addLeft($this->getLayout()-
>createBlock('tests/adminhtml_tests_edit_tabs'));
        $this->renderLayout();
    } else {
        Mage::getSingleton('adminhtml/session')-
>addError(Mage::helper('tests')->__('Item does not exist'));
        $this->_redirect('*/*/');
    }
}
```

Here you can see two functions: _addContent and _addLeft to add the form's content and tabs for the controllers/action.

Part 3: System configuration XML

The information contained in this tutorial is designed to help you obtain further knowledge of System Configuration XML in Magento Adminhtml with a minimum of time and effort. First, I will present the basic terms and elements of system configuration XML and then different methods to fetch a variable from the system configuration.

I- Basic terms and elements of system configuration XML

Magento provides the system configuration for you to configure your system and your modules as well. You are able to add your custom module configuration via *system.xml* file in the folder *etc* of your module folder, such as the file

app/code/local/Magestore/Ajaxcart/etc/system.xml

```
<?xml version="1.0"?>
<config>
    <tabs>
        <magestore translate="label">
            <label>Magestore Extension</label>
            <sort_order>400</sort_order>
        </magestore>
    </tabs>
    <sections>
        <ajaxcart translate="label" module="ajaxcart">
            <class>separator-top</class>
            <label>Ajax Cart</label>
            <tab>magestore</tab>
            <frontend_type>text</frontend_type>
            <sort_order>299</sort_order>
            <show_in_default>1</show_in_default>
            <show_in_website>1</show_in_website>
            <show_in_store>1</show_in_store>
            <groups>
                <general translate="label">
                    <label>General Configuration</label>
                    <frontend_type>text</frontend_type>
                    <sort_order>1</sort_order>
                    <show_in_default>1</show_in_default>
                    <show_in_website>1</show_in_website>
                    <show_in_store>1</show_in_store>
                    <fields>
                        <enable translate="label">
                            <label>Enable Ajax Cart</label>
                            <frontend_type>select</frontend_type>
                            <sort_order>1</sort_order>
                            <source_model>adminhtml/system_config_source_ye
sno</source_model>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                            <comment>Enable using Ajaxcart</comment>
                        </enable>
                    </fields>
                </general>
            </groups>
        </ajaxcart>
    </sections>
</config>
```

In this file, you can view some basic tags:

• *tabs*: tabs of the configuration showed on the left column of the configuration form.

- *magestore*: tab’s identity
- *label*: tab’s label

- *sort_order*: order to show tabs

• *sessions*: sessions of your configuration, each session corresponds with a configuration form

- *ajaxcart*: session's identity
- *tab*: its value is tab's identity linking to session
- *show_in_default*, *show_in_website*, *show_in_store*: the scope of this configuration

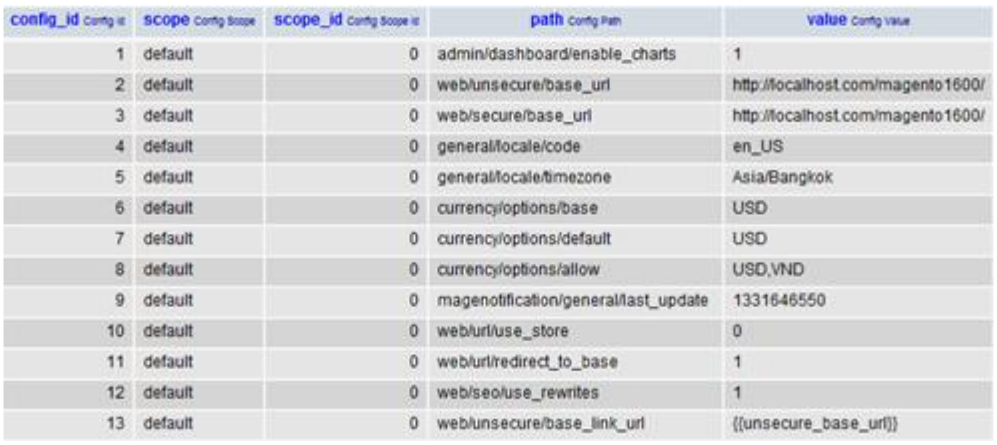
• *groups*: define groups of your configuration form. Each group corresponds with a form fieldset
• *fields*: define fields of your configuration form

- *frontend_type*: the type of fields (similar to form field in previous chapter)
- *source_model*: the source providing data for the field (only some types need sample data like select, multiselect…)
- *comment*: the comment to explain the field

Besides, you can use some tags such as *frontend_model,backend_model,upload_dir,base_url*…, depending on your field. Default, Magento use Mage_Adminhtml_Block_System_Config_Form Mage_Adminhtml_Block_System_Config_Form_Fieldset and Mage_Adminhtml_Block_System_Config_Form_Field blocks to render to HTML form. However, it's possible to use your custom block to render via the configuration tag *frontend_model*. You are able to refer to classes above to write your custom block. If data of the form and database is not compatible, you can use tag *backend_model* to convert.
Your configuration maybe needs the default value for working. In this case, you can add it to config.xml file. For example: the default value is added to the file*app/code/local/Magestore/Ajaxcart/etc/config.xml*

```
<config>

    ...
    <default>
        <ajaxcart>
            <general>
                <enable>1</enable>
                <timeout>10</timeout>
                <cart>1</cart>
            </general>
        </ajaxcart>
    </default>
</config>
```

That configuration values will be overridden if you save your custom value by the admin form and Magento will store that values to the table *core_config_data* in database**.**



config_id Config Id	scope Config Scope	scope_id Config Scope Id	path Config Path	value Config Value
1	default	0	admin/dashboard/enable_charts	1
2	default	0	web/unsecure/base_url	http://localhost.com/magento1600/
3	default	0	web/secure/base_url	http://localhost.com/magento1600/
4	default	0	general/locale/code	en_US
5	default	0	general/locale/timezone	Asia/Bangkok
6	default	0	currency/options/base	USD
7	default	0	currency/options/default	USD
8	default	0	currency/options/allow	USD,VND
9	default	0	magenotification/general/last_update	1331646550
10	default	0	web/url/use_store	0
11	default	0	web/url/redirect_to_base	1
12	default	0	web/seo/use_rewrites	1
13	default	0	web/unsecure/base_link_url	{{unsecure_base_url}}

• *scope*: the scope of the configuration (default,website,store)

• *path*: the path of the configuration, it equals *<session_id>/<group_id>/<field_id>*

• *value*: the value of the configuration

II- Fetch a variable from System configuration

It's necessary to get the configuration value of fields above. To do that, you can choose one of the following methods provided by Magento.

Method 1: Mage::getStoreConfig($path,$store)

• $path: is the path to your configuration which is similar to the path stored in database, it equals<*session_id*>/<*group_id*>/<*field_id*>

• $store: a store to get configuration. It can be a store object, store id or store code.

For instance:

```
 $enable =
Mage::getStoreConfig('socialrecommend/general/enable','default');
```

Method 2: getConfig

You can use the method *getConfig* of a store/website object with the *$path* parameter (as same as above). For example:

```
$enable = Mage::app()->getStore()->
getConfig('socialrecommend/general/enable');
```

Method 3: getNode

It's also possible to use the method getNode of the configuration model. This function has three parameters:

• $path: a path to the configuration. If $scope is store or website, this path will be similar to two methods above. On the other hand, $path will be the path from tag to your tag that you want to get configuration.

• $scope: not required. It can be store or website

• $scopeCode: not required. It can be store/website code.

For example:

```
$enable = Mage::getConfig()->
getNode('socialrecommend/general/enable','store','default');
```

Or getting the configuration by the path from tag:

```
$enable = Mage::getConfig()->
getNode('stores/default/socialrecommend/general/enable');
```

Part 4: Access Control Lists (ACL) permissions

As you may know, Magento uses an Access Control Lists (ACL) to authorize and control user access within the system with the purpose of effectively managing the site. This part will demonstrate the ACL in details and guide you how to setup and authorize a backend menu.

I- Define the ACL

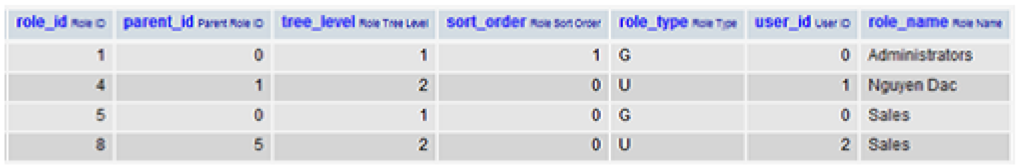
According to www.techterms.com: *ACL stands for "Access Control List". An ACL is a list of user permissions for a file, folder, or other object. It defines what users and groups can access the object and what operations they can perform. These operations typically include read, write, and execute. For example, if an ACL specifies read-only access for a specific user of a file, that user will be able open the file, but cannot write to it or run the file*.

In Magento, ACL is a list of user permissions for a resource path (link to menu entry or action), allowing users to access a resource or not. In ACL, there are some basic terms and elements as the followings:

- ***User***: the entity that has an authority to use the system. The user that we mention in Magento is the backend user.
- ***Role***: the role of the user when logging in to the system. In Magento, a user has only a role.
- ***Rule***: the rule set of user and role. It defines user's permission or role's permission to access the resource.
- ***Assert***: the condition to active an item in ACL. It is used for a special control when checking permission by ACL.

II- Magento stores ACL in the database

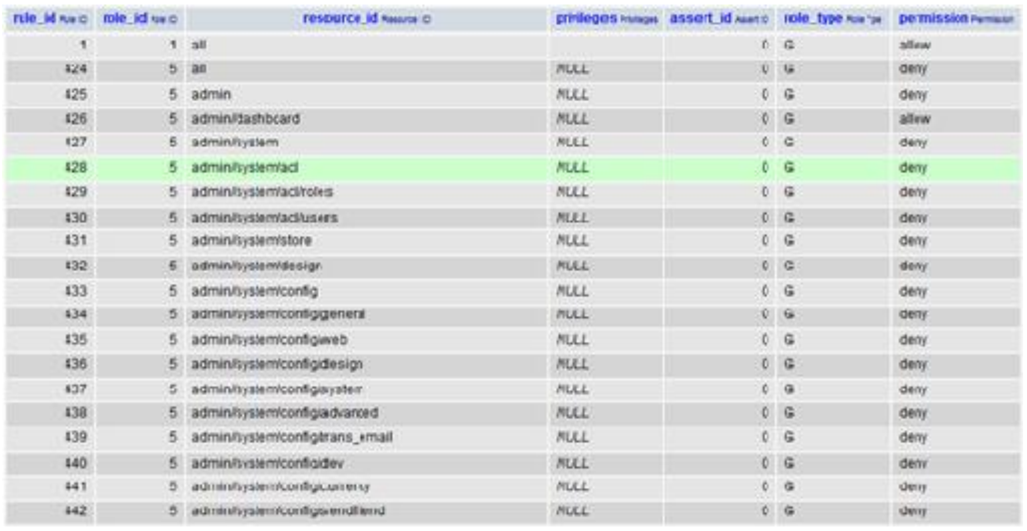
Magento stores the role in the table admin_role:



role_id Role ID	parent_id Parent Role ID	tree_level Role Tree Level	sort_order Role Sort Order	role_type Role Type	user_id User ID	role_name Role Name
1	0	1	1	G	0	Administrators
4	1	2	0	U	1	Nguyen Dac
5	0	1	0	G	0	Sales
8	5	2	0	U	2	Sales

- parent_id: the parent role of the current role
- role_type: the user role or the group role

The important table of ACL is the admin_rule table which stores the list of permissions of a user or a role with the resource:



rule_id Rule ID	role_id Role ID	resource_id Resource ID	privileges Privileges	assert_id Assert ID	role_type Role Type	permission Permission
1	1	all		0	G	allow
424	5	all	NULL	0	G	deny
425	5	admin	NULL	0	G	deny
426	5	admin/dashboard	NULL	0	G	allow
427	5	admin/system	NULL	0	G	deny
428	5	admin/system/acl	NULL	0	G	deny
429	5	admin/system/acl/roles	NULL	0	G	deny
430	5	admin/system/acl/users	NULL	0	G	deny
431	5	admin/system/store	NULL	0	G	deny
432	5	admin/system/design	NULL	0	G	deny
433	5	admin/system/config	NULL	0	G	deny
434	5	admin/system/config/general	NULL	0	G	deny
435	5	admin/system/config/web	NULL	0	G	deny
436	5	admin/system/config/design	NULL	0	G	deny
437	5	admin/system/config/system	NULL	0	G	deny
438	5	admin/system/config/advanced	NULL	0	G	deny
439	5	admin/system/config/trans_email	NULL	0	G	deny
440	5	admin/system/config/dev	NULL	0	G	deny
441	5	admin/system/config/currency	NULL	0	G	deny
442	5	admin/system/config/sendfriend	NULL	0	G	deny

- role_id: the id of the role to apply in the ACL
- resource_id: the resource to access the system
- permission: permission for a role to access the resource

III- Create a menu and setup permission for it

In Magento, you can easily add the backend menu item and ACL resource for that menu to your extension by adding the following code into the adminhtml.xml file:

```
<?xml version="1.0"?>

<config>

    <menu>

        <socialrecommend module="socialrecommend" translate="title">

            <title>Recommend</title>

            <sort_order>71</sort_order>
            <children>
                <settings module="socialrecommend" translate="title">
                    <title>Settings</title>
                    <sort_order>1000</sort_order>
                    <action>adminhtml/system_config/edit/section/socialreco
mmend</action>
                </settings>
            </children>
        </socialrecommend>
    </menu>
    <acl>
        <resources>
            <admin>
                <children>
                    <system>
                        <children>
                            <config>
                                <children>
                                    <socialrecommend
module="socialrecommend" translate="title">
                                        <title>Social Recommend</title>
                                        <sort_order>71</sort_order>
                                    </socialrecommend>
                                </children>
                            </config>
                        </children>
                    </system>
                    <socialrecommend module="socialrecommend"
translate="title">
                        <title>Recommend</title>
                        <sort_order>71</sort_order>
                        <children>
                            <settings module="socialrecommend"
translate="title">
                                <title>Settings</title>
                                <sort_order>1000</sort_order>
                            </settings>
                        </children>
                    </socialrecommend>
                </children>
            </admin>
        </resources>
    </acl>
</config>
```

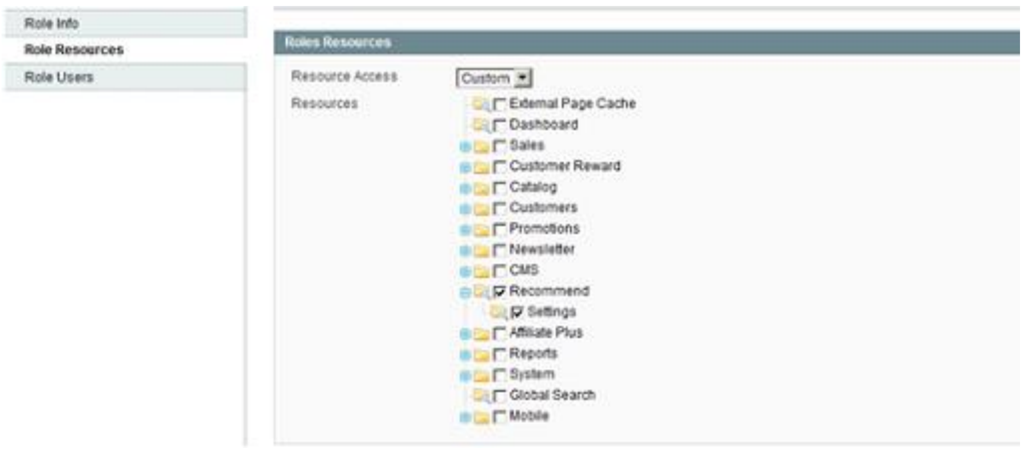
- <menu> tag: defines menu entry in the backend

- <title>: the menu title
- <sort_order>: the order to show menu
- <action>: the link of the menu

- <acl> tag: defines the ACL entry to access to backend menu above

- <title>: the title to show in ACL's resource list
- <sort_order>: the order to show in ACL's resource list

Now, when adding a role to your system, you can see the ACL item in the list and select the checkbox corresponding with the resource that allows the role to access:


Role Info
Role Resources
Role Users

Roles Resources

Resource Access: Custom

Resources:
- [ ] External Page Cache
- [ ] Dashboard
- [ ] Sales
- [ ] Customer Reward
- [ ] Catalog
- [ ] Customers
- [ ] Promotions
- [ ] Newsletter
- [ ] CMS
- [x] Recommend
  - [x] Settings
- [ ] Affiliate Plus
- [ ] Reports
- [ ] System
- [ ] Global Search
- [ ] Mobile

When the user logs in to the backend, the backend menu will be shown depending on the user's permission. If the user runs an action request, the system will check the user's permission before running an action by function *_isAllow()* of ***Action*** class. For example:

```
/**

 * Check is allow modify system configuration

 *

 * @return bool

 */

protected function _isAllowed()

{

    return Mage::getSingleton('admin/session')->isAllowed('system/config');

}
```

Part 5: Magento extensions

We will continue to explore the Adminhtml by discussing Magento extensions – the issue that always grabs a lot of attraction and interest of many people. Three main following parts will be covered in this tutorial:

- Magento extensions
- Decouple extensions from Magento
- Install extensions from Magento Connect

Are you ready? Let's get started!

I- Magento extensions

Magento primarily works on a base of modules. An extension is one or more modules providing new features and functionalies for a Magento site.

Magento extensions are divided into 3 types: community, core, commercial.

- *core*: extensions developed by Magento core team. These extensions are located in the*app/code/core* directory. You need to keep your extensions out of the core to avoid any conflicts with core extensions or any future updates.
- *community*: community-distributed extensions developed by Magento community members or partners. These extensions are located in the *app/code/community* directory. You can install them through Magento Connect or download from a source.
- *commercial*: extensions developed by 3rd party. They are often located in the *app/code/local*directory and offered for sale. To install these extensions, you can purchase them from the seller then upload the codes to your site.

II- Decouple extensions from Magento

There are two methods for you to choose in order to decouple extensions from a Magento site.

The first way: You can copy the codes of your extension from the Magento site then paste these code files to a folder through a structured directory.

The second way: Use the *Package* function in the backend of your Magento site.

• **Step1**: Login to the backend and select the menu *System > Magento Connect > Package Extensions*

• **Step 2**: Complete the form with the information:

- The package info: includes fields as name, description… for the extension package
- Release info: releases information for the extension as a released versions, released stability and notes.
- Author: the author's information (name, user, email) of the extension
- Dependencies: the extension's dependencies
- Contents: contains the information of extension's folders and files that will be exported to a package from the Magento site

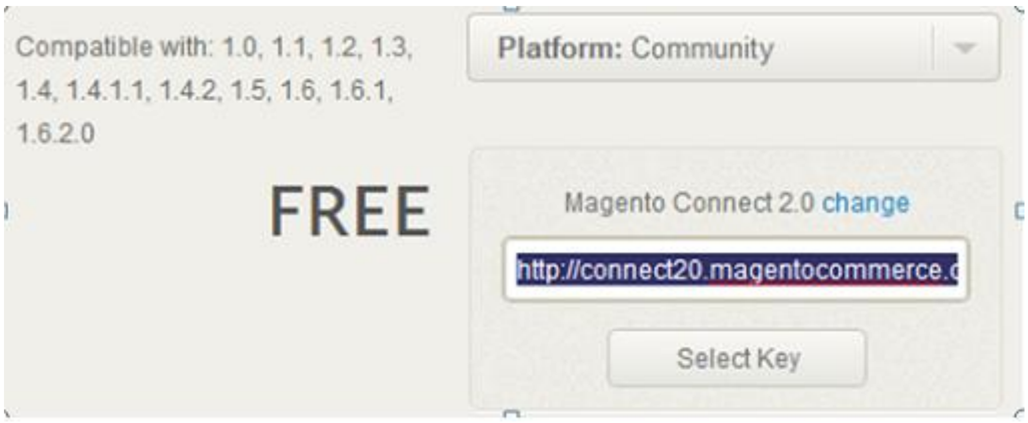
• **Step 3:** Click on *Save Data and Create Package* button to create a packaged extension from your site.

You can use the extension that has been decoupled to set up it into another Magento site.

III- Install extensions from Magento Connect

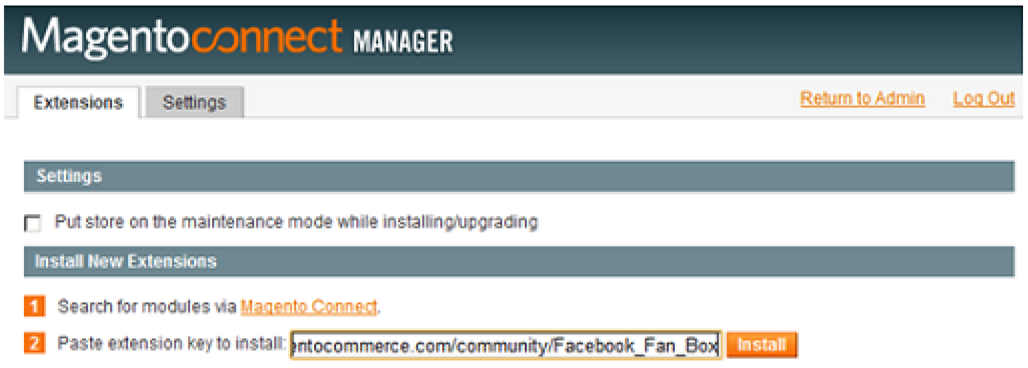
• **Step 1**: Go to http://www.magentocommerce.com/magento-connect/ and search for the extensions that you need. In the extension view page, you can get the extension's key:

You can use the extension that has been decoupled to set up another Magento site.


Compatible with: 1.0, 1.1, 1.2, 1.3, 1.4, 1.4.1.1, 1.4.2, 1.5, 1.6, 1.6.1, 1.6.2.0
FREE
Platform: Community
Magento Connect 2.0 change
http://connect20.magentocommerce.c
Select Key

• **Step 2**: Login to the backend of your site and select the menu *System > Magento Connect > Magento Connect Manager*

• **Step 3**: Paste your extension's key to the input box then click on Install button


Magentoconnect MANAGER
Extensions
Settings
Return to Admin
Log Out
Settings
Put store on the maintenance mode while installing/upgrading
Install New Extensions
1 Search for modules via Magento Connect.
2 Paste extension key to install: ntocommerce.com/community/Facebook_Fan_Box
Install

Then just wait for the extension installed on your site.

Why don't you try installing some modules for your site now? It'll really be very interesting.

TOPIC 7

Part 1: Product Types

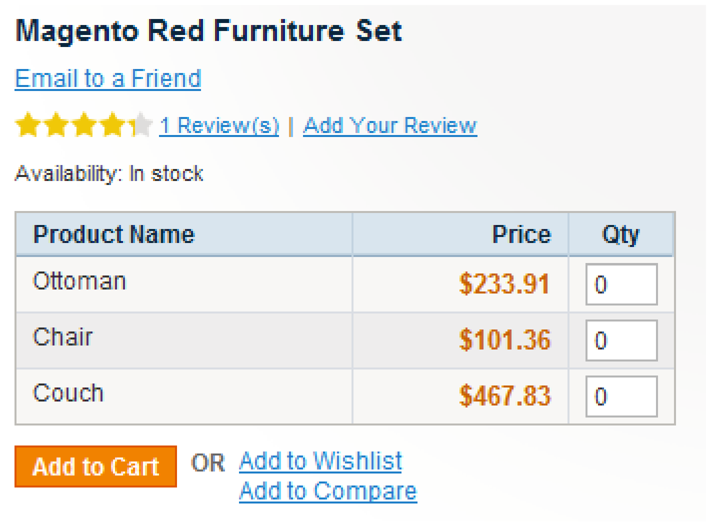
Magento provides users with different product type profiles to select when creating a new product. Choosing the right product type is very important for accessing the appropriate set of features required to sell your items. This part is designed to help you understand the differences among product types and what they're intended to set up your Magento products.

I- Standard Product Types

Magento has 6 standard product types, including: Simple product, grouped product, configurable product, virtual product, bundle product and downloadable product.

• ***Simple product***: is an instance of physical products, having a single configuration (one-size-fits-all). For example: a cell-phone, a monitor…

• ***Grouped product***: is a product type that allows you to create a new product using one or more existing products, such as ***Magento Red Furniture Set*** product in Magento's sample data. This product group has 3 separated products: ***Ottoman, Chair, Couch*** and each one is available for purchases. When buying a grouped product, customers can choose each separated product to add to cart:


Magento Red Furniture Set

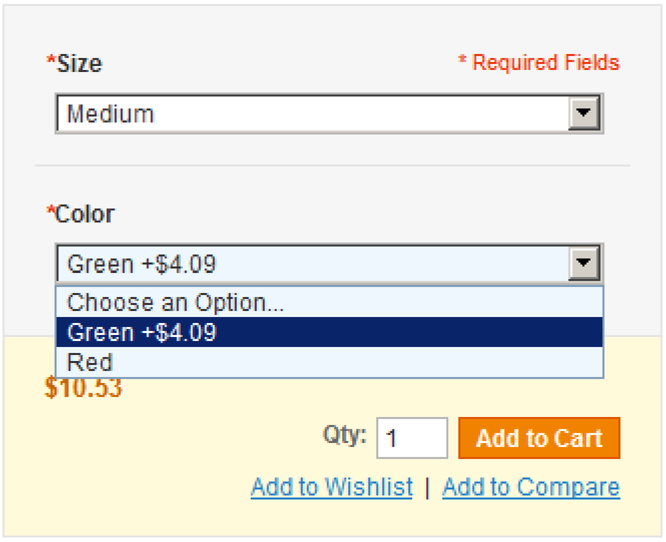
Email to a Friend

1 Review(s) | Add Your Review

Availability: In stock

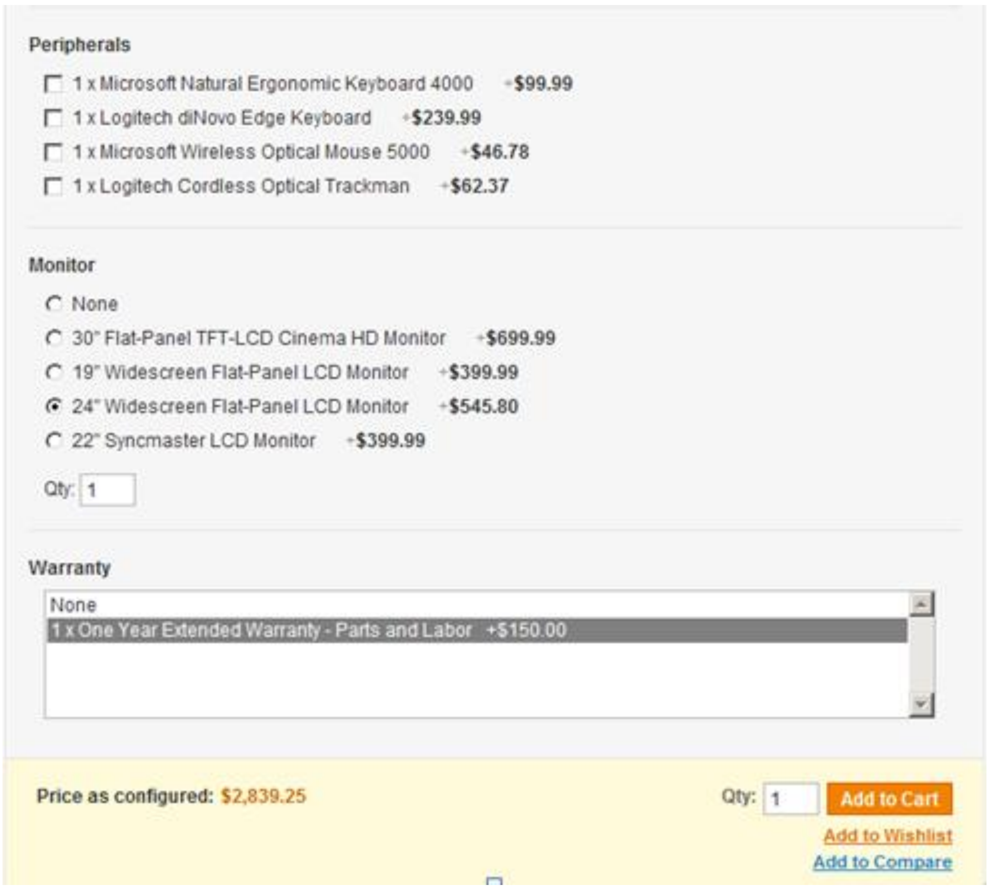
Product Name	Price	Qty
Ottoman	$233.91	0
Chair	$101.36	0
Couch	$467.83	0

• ***Configurable product***: is a product type allowing customers to select the variant that they want by choosing options. For instance: ***Zolof The Rock And Roll Destroyer: LOL Cat T-shirt*** has its ***size*** and***color*** for customers to choose. A simple way in this case is that you can create some simple products with different colors and sizes to sell. However, configurable product type helps you create the product more convenient, faster, and easier to manage products.



• ***Virtual product***: is a product type used for products that don't have a physical instance. It's always used for service products or intellectual products (as software). Those products don't need to be shipped.

• ***Bundle product***: is also known as a ***kit***. A bundle product is one product in the customer's shopping cart but in fact, it is made of a number of other products. Magento's sample data has ***Computer***product which is bundled from other products: Case, Processor, Memory…


Peripherals

- [ ] 1 x Microsoft Natural Ergonomic Keyboard 4000 +$99.99
- [ ] 1 x Logitech diNovo Edge Keyboard +$239.99
- [ ] 1 x Microsoft Wireless Optical Mouse 5000 +$46.78
- [ ] 1 x Logitech Cordless Optical Trackman +$62.37

Monitor

- ○ None
- ○ 30" Flat-Panel TFT-LCD Cinema HD Monitor +$699.99
- ○ 19" Widescreen Flat-Panel LCD Monitor +$399.99
- ● 24" Widescreen Flat-Panel LCD Monitor +$545.80
- ○ 22" Syncmaster LCD Monitor +$399.99

Qty: 1

Warranty

None
1 x One Year Extended Warranty - Parts and Labor +$150.00

Price as configured: $2,839.25

Qty: 1

• ***Downloadable product***: is similar to the virtual product (like an instance of the virtual product). But these products have one or more digital files for download. This is great for software, digital music files and other electronic products. Otherwise, downloadable files can be used as a configuration for customers to choose when adding to cart.

II- Product type's modules

Magento has 6 standard product types, but just 4 product types are implemented as the parts of the Mage_Catalog module. The bundle product and downloadable product are implemented in the separated modules (Mage_Bundle and Mage_Downloadable). A product type needs to be configurated (in global node) as same as below:

```
<catalog>

<product>

<type>

<configurable translate="label" module="catalog">

<label>Configurable Product</label>
```

```
<model>catalog/product_type_configurable</model>

<price_model>catalog/product_type_configurable_price</price_model>

<composite>1</composite>

<allow_product_types>

<simple/>

<virtual/>

</allow_product_types>

<index_priority>30</index_priority>

<price_indexer>catalog/product_indexer_price_configurable</price_indexer>

</configurable>

</type>

</product>

</catalog>
```

<model>: a model to work with the product type

- <composite>: product is simple or composite
- <price_model>: a model to work with the product type's price

If you want to add a new product type, you can use these configurations to register with the system. The detail instruction for Magento themes will be available in the next tutorials. Stay tuned!

Part 2: Product Types (continued)

In the previous lession, we discovered 6 standard product types in Magento and the configuration of each one. In this part, I will guide you how to modify an existing product type and introduce how a product type interacts with the database.

I- How to modify an existing product type

After creating a new product type, you can modify it if you want. For example, you have generated the *simple* product type then you need to modify this type, there'll be 2 methods for you to choose as follows:

- Method 1: override the model of *simple* product type (*catalog/product_type_simple*)
- Method 2: reconfigure the product type. In this method, you need to create a module and add the configuration to modify the default configuration:

```
<config>
...
<global>
...
<catalog>
<product>
<type>
<simple translate="label" module="catalog">
<label>Simple Product</label>
<model>newmodule/product_type_simple</model>
</simple>
</type>
</product>
</catalog>
</global>
</config>
```

Then create the model newmodule/product_type_simple as below:

```
<?php

class Magestore_Newmodule_Model_Product_Type_Simple extends
Mage_Catalog_Model_Product_Type_Simple

{

public function isVirtual($product = null){

// custom code to detect product is virtual or not

}

public function isSalable($product = null){

// check product is salable

}

...

}
```

II- How one product type interacts with the database

When a product model (Mage_Catalog_Model_Product) saves data to the database, it calls the function _afterSave():

```
protected function _afterSave(){

$this->getLinkInstance()->saveProductRelations($this);

$this->getTypeInstance(true)->save($this);


/**

* Product Options

*/

$this->getOptionInstance()->setProduct($this)

->saveOptions();

return parent::_afterSave();

}
```

As you can see, this function contains the command: *$this->getTypeInstance(true)->save($this);*

This command will save custom product type data to the database. For instance, if a product type is configurable, it'll save the function as below:

```
/*
* @class Mage_Catalog_Model_Product_Type_Configurable
*/
public function save($product = null)
{
parent::save($product);
/**
* Save Attributes Information
*/
if($data = $this->getProduct($product)->getConfigurableAttributesData()){
foreach ($data as $attributeData) {
$id = isset($attributeData['id']) ? $attributeData['id'] : null;
Mage::getModel('catalog/product_type_configurable_attribute')
->setData($attributeData)
->setId($id)
->setStoreId($this->getProduct($product)->getStoreId())
->setProductId($this->getProduct($product)->getId())
->save();
}
}

/**
* Save product relations
*/
$data = $this->getProduct($product)->getConfigurableProductsData();
if (is_array($data)) {
$productIds = array_keys($data);
Mage::getResourceModel('catalog/product_type_configurable')
->saveProducts($this->getProduct($product), $productIds);
}
return $this;

}
```

Part 3: Price Generation

As we know, price is an important attribute of a product. However, have you known how Magento stores and calculates the price or how to adjust the price of products? In this part, we will solve these issues.

I- Basic concepts of price generation

Price is the basic attribute of a product and it's stored in the database. The price of an instance product is calculated based on many factors. Magento uses the price model of each product type to calculate the price. The final price is used as the final price of products when products are added to cart (maybe it's after discounting, applying the special price, tier price…).

In product model (*catalog/product*), you can see the function getPrice() as below:

```
/**
* Get product price throught type instance
*
* @return unknown
*/
public function getPrice()
{
return $this->getPriceModel()->getPrice($this);
}
```

The price model depends on the product type. The default price model is *catalog/product_type_price*and it has two important functions: getPrice() and getFinalPrice().

```
/**
* Default action to get price of product
*
* @return decimal
*/
public function getPrice($product)
```

```
{
return $product->getData('price');
}
/**
* Get product final price
*
* @param   double $qty
* @param   Mage_Catalog_Model_Product $product
* @return  double
*/
public function getFinalPrice($qty=null, $product)
{
if (is_null($qty) && !is_null($product->getCalculatedFinalPrice())) {
return $product->getCalculatedFinalPrice();
}

$finalPrice = $product->getPrice();
$finalPrice = $this->_applyTierPrice($product, $qty, $finalPrice);
$finalPrice = $this->_applySpecialPrice($product, $finalPrice);
$product->setFinalPrice($finalPrice);

Mage::dispatchEvent('catalog_product_get_final_price',
array('product'=>$product, 'qty' => $qty));

$finalPrice = $product->getData('final_price');
$finalPrice = $this->_applyOptionsPrice($product, $qty, $finalPrice);

return max(0, $finalPrice);
```

The price model calculates the price and returns it to the instance product.

However, when Magento loads a product collection, the price calculation for each product will make the system runs slowly. Thus Magento uses *catalog/product_indexer_price* model to index and*catalog/product_index_price* table to store the index result. When product collection is loaded or filtered (by price), the index table is used to join with product table, so the collection will be loaded (filtered) faster.

II- Adjust price generation for products

When you develop a module or custom your Magento site, if you need to adjust the price for products, you can choose one of the following methods:

• ***Method 1***: If you want to adjust the price for a product type, you can change the configuration of that product type. For example:

```
<config>
...
<global>
...
<catalog>
<product>
<type>
<simple translate="label" module="catalog">
<price_model><!-- YOUR_PRICE_MODEL --></price_model>
</simple>
</type>
</product>
</catalog>
</global>
</config>
```

YOUR_PRICE_MODEL is your custom model to calculate the price. You can write this model as below:

```
<?php
```

```
class /*YOUR_PRICE_MODEL*/ extends Mage_Catalog_Model_Product_Type_Price
{
public function getPrice($product){
// your custom calculate price
}
public function getFinalPrice($qty=null, $product){
// your custom calculate final price
}
}
```

• ***Method 2***: Override the product model or price model. Please read our tutorial guiding how to override a model in Magento. It's possible to write your own custom code to calculate the price into the override model.

• ***Method 3***: You see that the function getFinalPrice() in model *catalog/product_type_price* has an event*catalog_product_get_final_price*, so you can use this event to adjust the product price. We have provided you with a tutorial which guides you how to catch an event in Magento already. With this event, you can set the final price for product as you want.

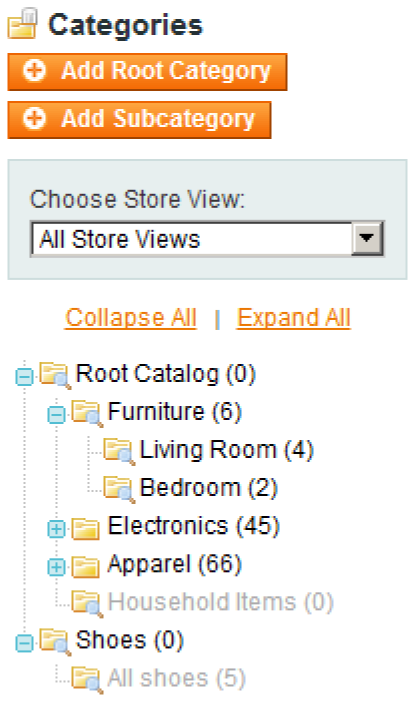
Part 4: Category Structure

In this part, we will explore how Magento works with a category which helps customers easily find products that they need.

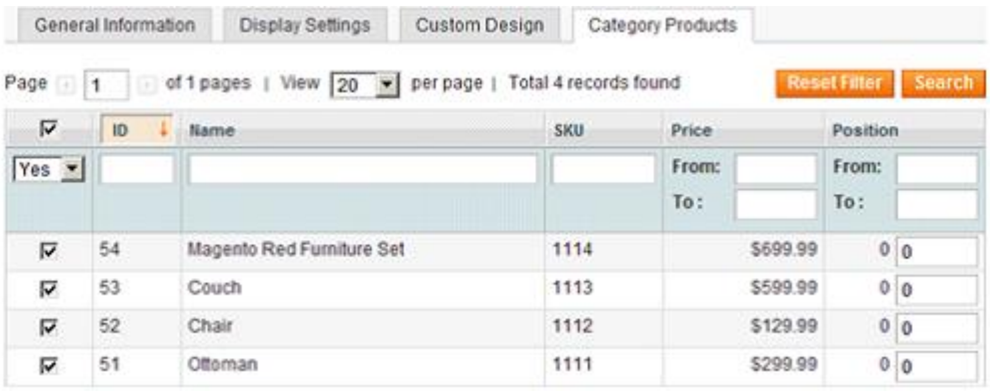
Category is understood as a group of products which have the same characteristics. I'll introduce to you the category tree, the way Magento stores database of categories and how to use the category model in turn.

I- Category tree

Magento designs a category by tree structure. The category tree has a root category (the category without a parent category) and a subcategory (the child category of the parent category).



In Magento, a store associates with a root category. It makes you easily manage categories/products of each store. A category links to products assigned to it and the products of its child category. You can select these products in the tab Category Products in the backend.


General Information | Display Settings | Custom Design | Category Products

Page 1 of 1 pages | View 20 per page | Total 4 records found
Reset Filter Search

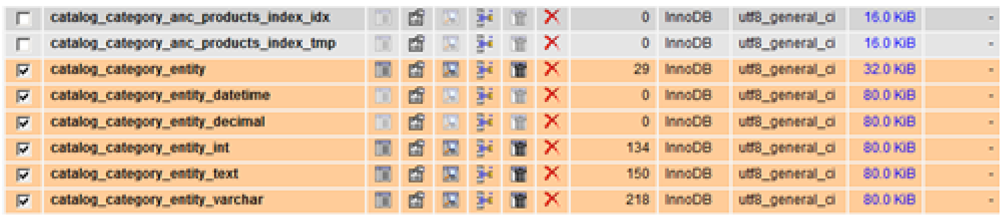
☑	ID	Name	SKU	Price	Position
Yes				From: To:	From: To:
☑	54	Magento Red Furniture Set	1114	$699.99	0
☑	53	Couch	1113	$599.99	0
☑	52	Chair	1112	$129.99	0
☑	51	Ottoman	1111	$299.99	0

To manage the category tree, Magento uses the model*Mage_Catalog_Model_Resource_Eav_Mysql4_Category_Tree* which is extended from*Varien_Data_Tree_Dbp*. This model provides some methods to work with the tree structure such as: move a node, append s child, add a node …

II- Database storage

Magento stores database of categories by two types: EAV and Flat

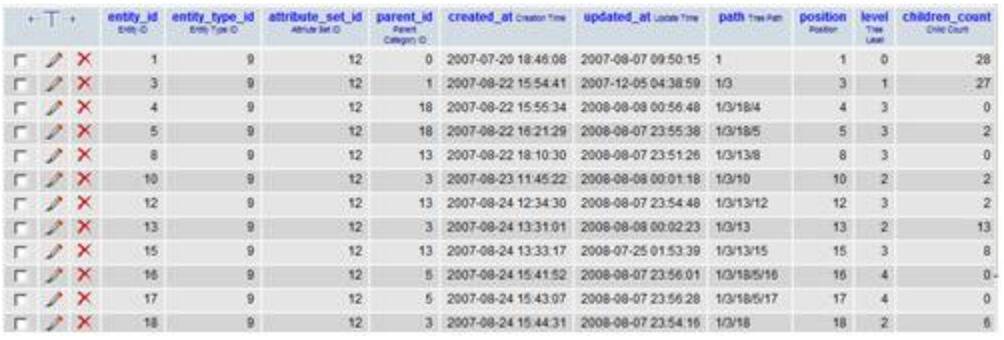
In EAV, the category is stored in some tables:



☐	catalog_category_anc_products_index_idx	0	InnoDB	utf8_general_ci	16.0 KiB	-
☐	catalog_category_anc_products_index_tmp	0	InnoDB	utf8_general_ci	16.0 KiB	-
☑	catalog_category_entity	29	InnoDB	utf8_general_ci	32.0 KiB	-
☑	catalog_category_entity_datetime	0	InnoDB	utf8_general_ci	80.0 KiB	-
☑	catalog_category_entity_decimal	0	InnoDB	utf8_general_ci	80.0 KiB	-
☑	catalog_category_entity_int	134	InnoDB	utf8_general_ci	80.0 KiB	-
☑	catalog_category_entity_text	150	InnoDB	utf8_general_ci	80.0 KiB	-
☑	catalog_category_entity_varchar	218	InnoDB	utf8_general_ci	80.0 KiB	-

The main table is ***catalog_category_entity***. This table has some basic fields:

- parent_id: used to store the parent category. This value is zero (0) if the category is the root category
- path: the path to the category from the root category
- children_count: the number of children category of this category

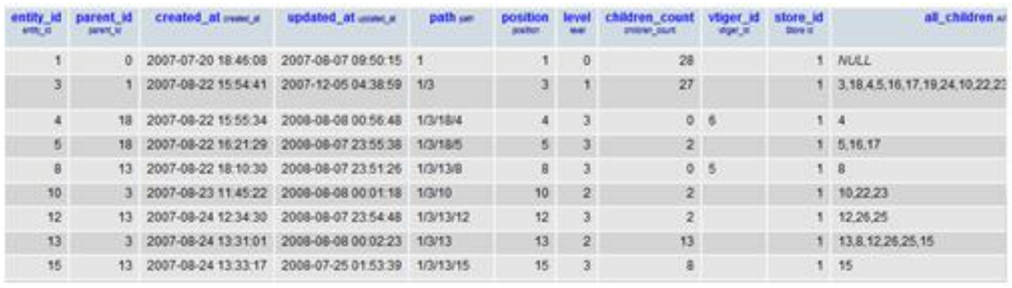


entity_id	entity_type_id	attribute_set_id	parent_id	created_at	updated_at	path	position	level	children_count
1	9	12	0	2007-07-20 18:46:08	2007-08-07 09:50:15	1	1	0	28
3	9	12	1	2007-08-22 15:54:41	2007-12-05 04:38:59	1/3	3	1	27
4	9	12	18	2007-08-22 15:55:34	2008-08-08 00:56:48	1/3/18/4	4	3	0
5	9	12	18	2007-08-22 16:21:29	2008-08-07 23:55:38	1/3/18/5	5	3	2
8	9	12	13	2007-08-22 18:10:30	2008-08-07 23:51:26	1/3/13/8	8	3	0
10	9	12	3	2007-08-23 11:45:22	2008-08-08 00:01:18	1/3/10	10	2	2
12	9	12	13	2007-08-24 12:34:30	2008-08-07 23:54:48	1/3/13/12	12	3	2
13	9	12	3	2007-08-24 13:31:01	2008-08-08 00:02:23	1/3/13	13	2	13
15	9	12	13	2007-08-24 13:33:17	2008-07-25 01:53:39	1/3/13/15	15	3	8
16	9	12	5	2007-08-24 15:41:52	2008-08-07 23:56:01	1/3/18/5/16	16	4	0
17	9	12	5	2007-08-24 15:43:07	2008-08-07 23:56:28	1/3/18/5/17	17	4	0
18	9	12	3	2007-08-24 15:44:31	2008-08-07 23:54:16	1/3/18	18	2	6

When the category is stored in Flat database, a flat

table ***catalog_category_flat_store_<StoreID>*** is created.

Please take a look at the table ***catalog_category_flat_store_1*** below for example:

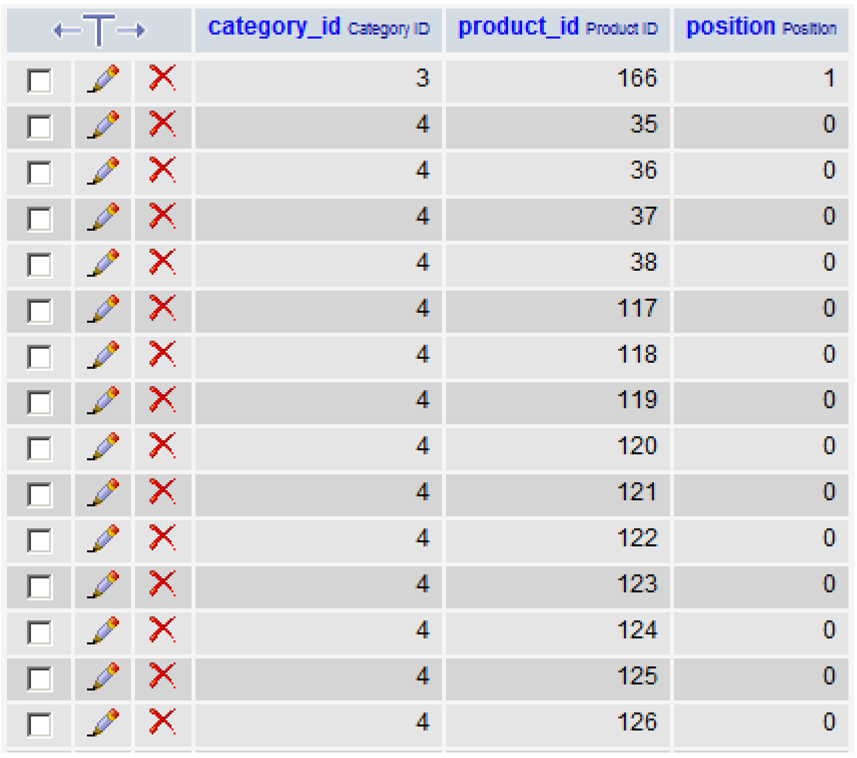


entity_id	parent_id	created_at	updated_at	path	position	level	children_count	vtiger_id	store_id	all_children
1	0	2007-07-20 18:46:08	2007-08-07 09:50:15	1	1	0	28		1	*NULL*
3	1	2007-08-22 15:54:41	2007-12-05 04:38:59	1/3	3	1	27		1	3,18,4,5,16,17,19,24,10,22,23
4	18	2007-08-22 15:55:34	2008-08-08 00:56:48	1/3/18/4	4	3	0	6	1	4
5	18	2007-08-22 16:21:29	2008-08-07 23:55:38	1/3/18/5	5	3	2		1	5,16,17
8	13	2007-08-22 18:10:30	2008-08-07 23:51:26	1/3/13/8	8	3	0	5	1	8
10	3	2007-08-23 11:45:22	2008-08-08 00:01:18	1/3/10	10	2	2		1	10,22,23
12	13	2007-08-24 12:34:30	2008-08-07 23:54:48	1/3/13/12	12	3	2		1	12,26,25
13	3	2007-08-24 13:31:01	2008-08-08 00:02:23	1/3/13	13	2	13		1	13,8,12,26,25,15
15	13	2007-08-24 13:33:17	2008-07-25 01:53:39	1/3/13/15	15	3	8		1	15

When the category is stored in Flat database, a flat

Table ***catalog_category_flat_store_<StoreID>*** is created.

Please take a look at the table ***catalog_category_flat_store_1*** below for example:



category_id Category ID	product_id Product ID	position Position
3	166	1
4	35	0
4	36	0
4	37	0
4	38	0
4	117	0
4	118	0
4	119	0
4	120	0
4	121	0
4	122	0
4	123	0
4	124	0
4	125	0
4	126	0

III- How to use the category model

Magento provides the model and methods helping you work with categories by your code. For instance: you can use it to make the category displayed in the frontend. The default category model is***Mage_Catalog_Model_Category*** including some important methods (you can view more in the source code of this model).

- getParentCategory(): this method returns the parent category of the current category
- getPathInStore(): the path of the current category that is calculated from the root category of the store (not includes the root category id)
- hasChildren(): detects the category to have children or not
- getCategories($parent, $recursionLevel = 0, $sorted=false, $asCollection=false, $toLoad=true): gets categories according to parents with the parameter that you provide
- getChildrenCategories: gets children categories of the current category
- …

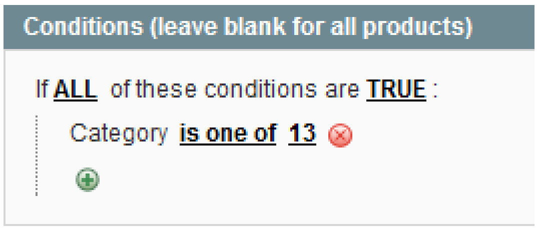
Understanding how to work with categories in Magento is very practical for you to manage your store more effectively on your own initiative.

Part 5: Catalog Rules

After discovering how Magento works with categories, I continued to research on Catalog Rules and found them very interesting. As you may know, Magento has two types of price rules: catalog and shopping cart price rules. While shopping cart price rules are applied in the shopping cart, catalog rules are applied on products before they are added to the cart. They are used when you have a new sales policy for a set of products.

- **Rule model and conditions**

Firstly, conditions are the core of a catalog rule model. They help the system determine products that were discounted. Catalog rules use product conditions which are similar to:



Conditions (leave blank for all products)

If ALL of these conditions are TRUE :

Category is one of 13

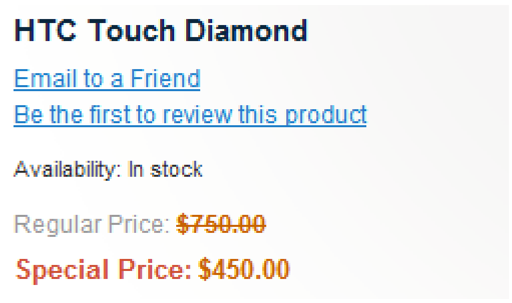
This condition will filter products of category 13 to apply this rule. When you save and apply the rule, the product prices will be re-indexed by the function applyAll() of the rule model (*catalogrule/rule*):

```
/**
* Apply all price rules, invalidate related cache and refresh price index
*
* @return Mage_CatalogRule_Model_Rule
*/
public function applyAll()
{
$this->_getResource()->applyAllRulesForDateRange();
$this->_invalidateCache();
$indexProcess = Mage::getSingleton('index/indexer')-
>getProcessByCode('catalog_product_price');
if ($indexProcess) {
$indexProcess->reindexAll();
}
}
```

When calculating prices for products, catalog rules catch the event *catalog_product_get_final_price* to change the product's prices:

```
<frontend>
<events>
<catalog_product_get_final_price>
<observers>
<catalogrule>
<class>catalogrule/observer</class>
<method>processFrontFinalPrice</method>
</catalogrule>
</observers>
</catalog_product_get_final_price>
</events>
</frontend>
```

The product's price was calculated by the function ***processFrontFinalPrice*** based on catalog rules data. The price is shown in the frontend as below:


HTC Touch Diamond

Email to a Friend

Be the first to review this product

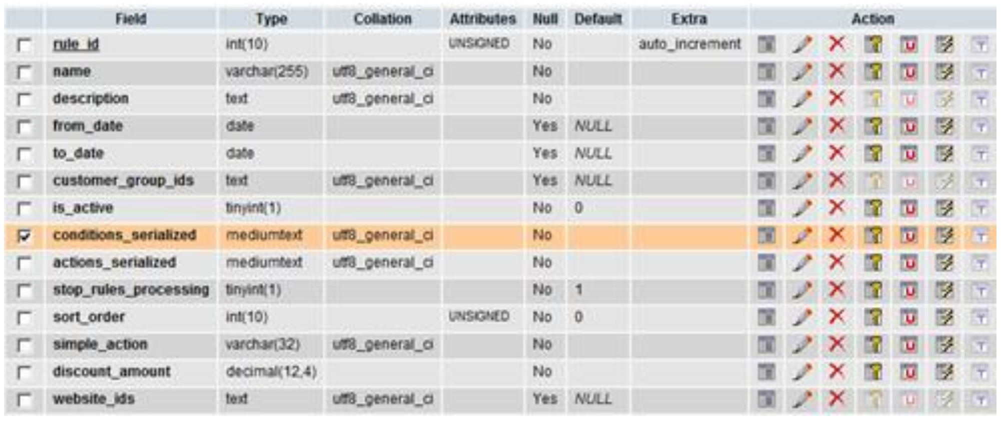
Availability: In stock

Regular Price: ~~$750.00~~

Special Price: $450.00

- **Rules database**

Magento stores catalog price rules in the main table ***catalogrule***:

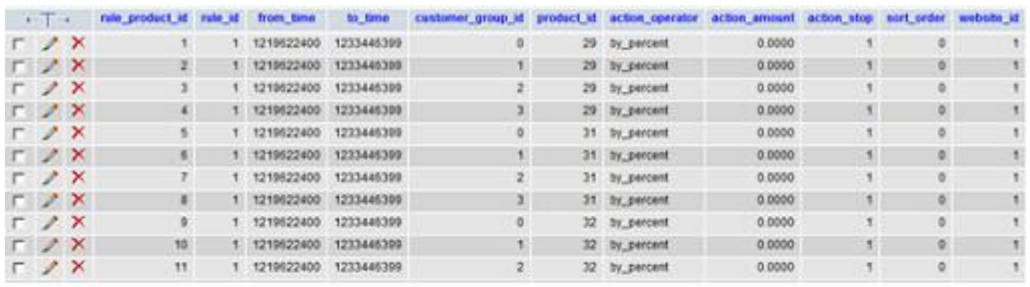


Field	Type	Collation	Attributes	Null	Default	Extra	Action
rule_id	int(10)		UNSIGNED	No		auto_increment	
name	varchar(255)	utf8_general_ci		No			
description	text	utf8_general_ci		No			
from_date	date			Yes	NULL		
to_date	date			Yes	NULL		
customer_group_ids	text	utf8_general_ci		Yes	NULL		
is_active	tinyint(1)			No	0		
conditions_serialized	mediumtext	utf8_general_ci		No			
actions_serialized	mediumtext	utf8_general_ci		No			
stop_rules_processing	tinyint(1)			No	1		
sort_order	int(10)		UNSIGNED	No	0		
simple_action	varchar(32)	utf8_general_ci		No			
discount_amount	decimal(12,4)			No			
website_ids	text	utf8_general_ci		Yes	NULL		

You can see that the field ***conditions_serialized*** is very important in this table. The task of this field is to store the condition for the rule.

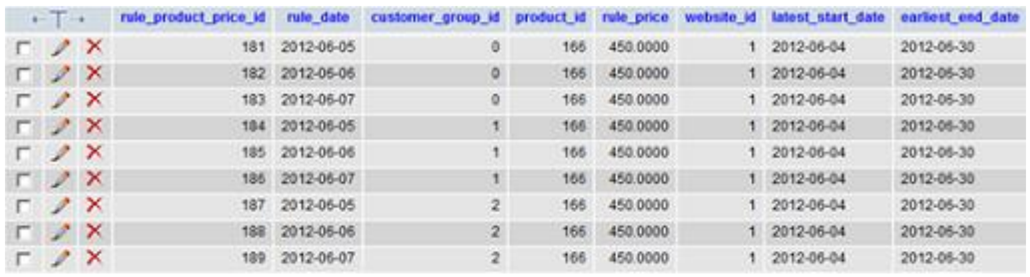
After you apply the rule, Magento will index your price rule and save it to the table ***catalogrule_product***and ***catalogrule_product_price***.

The data in the table ***catalogrule_product*** is used to get rules for a product to calculate its price. The structure of this table is as the followings:



rule_product_id	rule_id	from_time	to_time	customer_group_id	product_id	action_operator	action_amount	action_stop	sort_order	website_id
1	1	1219622400	1233446399	0	29	by_percent	0.0000	1	0	1
2	1	1219622400	1233446399	1	29	by_percent	0.0000	1	0	1
3	1	1219622400	1233446399	2	29	by_percent	0.0000	1	0	1
4	1	1219622400	1233446399	3	29	by_percent	0.0000	1	0	1
5	1	1219622400	1233446399	0	31	by_percent	0.0000	1	0	1
6	1	1219622400	1233446399	1	31	by_percent	0.0000	1	0	1
7	1	1219622400	1233446399	2	31	by_percent	0.0000	1	0	1
8	1	1219622400	1233446399	3	31	by_percent	0.0000	1	0	1
9	1	1219622400	1233446399	0	32	by_percent	0.0000	1	0	1
10	1	1219622400	1233446399	1	32	by_percent	0.0000	1	0	1
11	1	1219622400	1233446399	2	32	by_percent	0.0000	1	0	1

Also, data in the table ***catalogrule_product_price*** is used to get the final price for the product, depending on many rules. It is re-indexed every day by a cron.



rule_product_price_id	rule_date	customer_group_id	product_id	rule_price	website_id	latest_start_date	earliest_end_date
181	2012-06-05	0	166	450.0000	1	2012-06-04	2012-06-30
182	2012-06-06	0	166	450.0000	1	2012-06-04	2012-06-30
183	2012-06-07	0	166	450.0000	1	2012-06-04	2012-06-30
184	2012-06-05	1	166	450.0000	1	2012-06-04	2012-06-30
185	2012-06-06	1	166	450.0000	1	2012-06-04	2012-06-30
186	2012-06-07	1	166	450.0000	1	2012-06-04	2012-06-30
187	2012-06-05	2	166	450.0000	1	2012-06-04	2012-06-30
188	2012-06-06	2	166	450.0000	1	2012-06-04	2012-06-30
189	2012-06-07	2	166	450.0000	1	2012-06-04	2012-06-30

For each product, Magento stores three rows for three days (current day, previous day and the next day). Thus, it helps the system work exactly with many time zones or even when the cron job is missed.

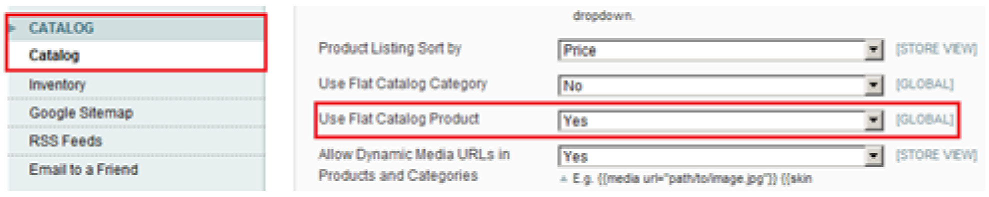
Part 6: Flat catalog product

There are two types of storing a product when loading collection in Magento: EAV and Flat. The Flat has the higher performance than EAV while EAV is more dynamical than Flat. This part will talk about flat catalog product and focus on 3 main following parts:

- Enable flat catalog product
- Add a custom field to flat table
- Save product data to flat table

I- Enable flat catalog product

To use flat catalog product, first you need to enable it. You can login to the admin page and navigate to**System** -> **Configuration** then choose tab **Catalog** -> **Catalog**. In the **Frontend** field set, choose **Yes**for the field **Use Flat Catalog Product**.



Product Listing Sort by	Price	[STORE VIEW]
Use Flat Catalog Category	No	[GLOBAL]
Use Flat Catalog Product	Yes	[GLOBAL]
Allow Dynamic Media URLs in Products and Categories	Yes	[STORE VIEW]

E.g. {{media url="path/to/image.jpg"}} {{skin

II- Add a custom field to flat table

Flat database is used to improve the loading speed of a product collection. However, it's not that all fields of a product are stored in a flat table. Thus you should know how to add a custom attribute to the product stored in the flat table.

• **Step 1**: Add your custom attribute to the list of product's system attributes through config.xml file:

```
<config>
...
<frontend>
<product>
<collection>
<attributes>
```

```
<YOUR_CUSTOM_ATTRIBUTE />

</attributes>

</collection>

</product>

</frontend>

</config>
```

• **Step 2**: Add your custom attribute satisfying one of the followings:

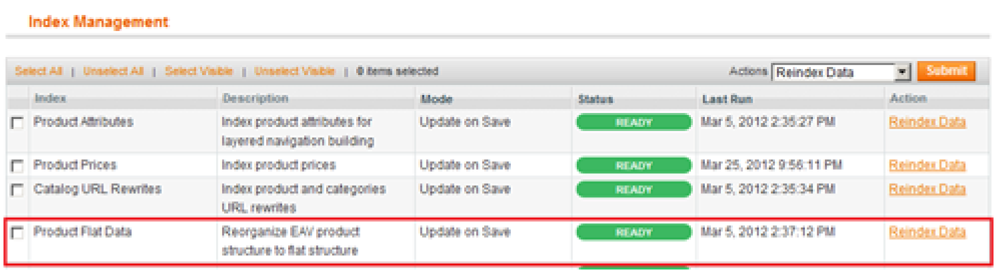
- backend_type = static
- used_in_product_listing = 1
- used_for_sort_by = 1
- is_filterable > 0 (in configure, global/catalog/product/flat
- add_filterable_attributes must be enabled)

• **Step 3**: Use event catalog_product_flat_prepare_columns to add columns to the flat table:

```
Mage::dispatchEvent('catalog_product_flat_prepare_columns', array(

'columns'    => $columnsObject

));
```

III- Save product data to flat table

Flat product data is stored by indexer model. This model runs when you reindex flat data for the product. To reindex flat data, you can login to the backend, go to **System -> Index management** and click on the link **Reindex Data** in the **Product Flat Data row**. Please take a look at the picture below for more details:


Index Management
Select All | Unselect All | Select Visible | Unselect Visible | 0 items selected
Actions Reindex Data
Submit

	Index	Description	Mode	Status	Last Run	Action
☐	Product Attributes	Index product attributes for layered navigation building	Update on Save	READY	Mar 5, 2012 2:35:27 PM	Reindex Data
☐	Product Prices	Index product prices	Update on Save	READY	Mar 25, 2012 9:56:11 PM	Reindex Data
☐	Catalog URL Rewrites	Index product and categories URL rewrites	Update on Save	READY	Mar 5, 2012 2:35:34 PM	Reindex Data
☐	Product Flat Data	Reorganize EAV product structure to flat structure	Update on Save	READY	Mar 5, 2012 2:37:12 PM	Reindex Data

Besides being stored when reindexing, flat data is stored when there's any change in product data by the function ***afterCommitCallback***. This function is called from ***catalog/product*** model and it will call an event to process index data for flat table.

Part 7: Layered Navigation

In this session, I'll write about layered navigation – the very important part of each e-commerce website. The layered navigation helps your customers easily find products with the attribute(s) that they need. 4 main following parts will be covered:

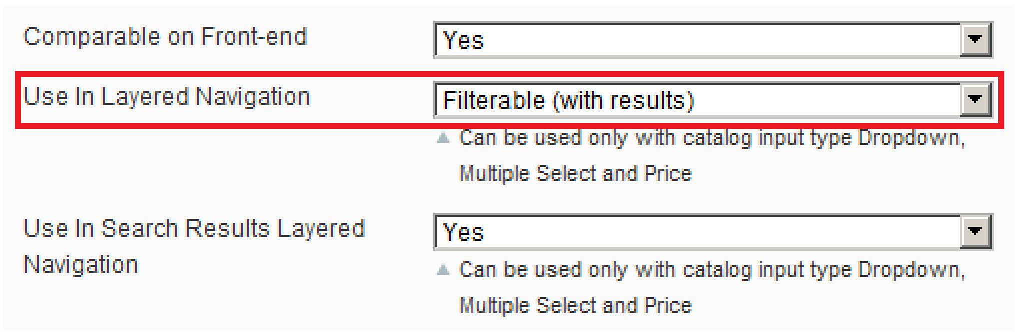
- Add attribute to layered navigation
- Add the custom source to attribute
- Class and database used in layered navigation
- Custom layered navigation

I- Add attribute to layered navigation

To add an attribute to the layered navigation, the attribute needs to satisfy both of the followings:

- Having Dropdown or Multiple Select or Price catalog input type
- Enabled to use in layered navigation

You can easily edit an attribute in the backend then change the attribute shown in layered navigation.



Comparable on Front-end	Yes
Use In Layered Navigation	Filterable (with results) Can be used only with catalog input type Dropdown, Multiple Select and Price
Use In Search Results Layered Navigation	Yes Can be used only with catalog input type Dropdown, Multiple Select and Price

II- Add the custom source to attribute

When you add an attribute by the source code, you can add a custom source to that attribute. For example:

```
$setup = new Mage_Catalog_Model_Resource_Setup('core_setup');

$setup->addAttribute('catalog_product','cover',array(

'group' =>  'General',
'type'  =>  'int',

'input' =>  'select',

'label' =>  'cover',

'source' =>  'test/source_cover',// custom source for attribute

'backend'   =>  '',

'frontend'  =>  '',

'visible'   =>  1,

'user_defined'  =>  1,// enable edit by admin

'is_filterable'  =>  1,// Attribute used in Layered Navigation

'visible_on_front'  =>  1,

'is_configurable'   =>  1,

));
```

Then, you need to write the source model for an attribute as below:

```
<?php

class Magestore_Test_Model_Source_Shopid extends
Mage_Eav_Model_Entity_Attribute_Source_Abstract

{

/**

* Retrieve all cover option

*/

public function getAllOptions($withEmpty = true){

return array(

array(

'value' => 1,

'label' => 'Black'

),

array(

'value' => 2,

'label' => 'White'

),
);
}
}
```

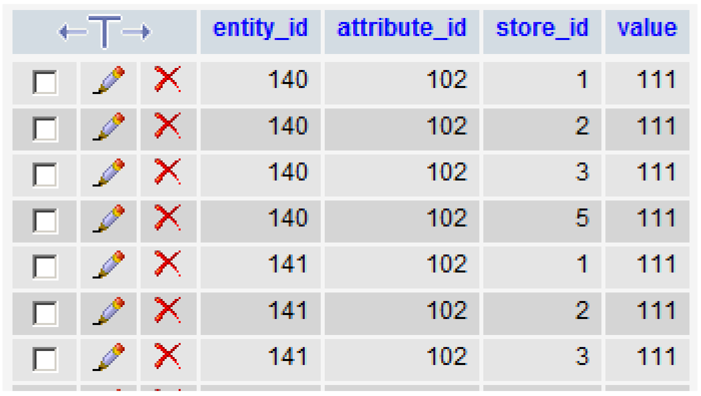
The function getAllOptions is used to get all available options for the attribute. You can customize this function to define options for your attribute.

III- Class and database used in layered navigation

In layered navigation, *Mage_Catalog_Model_Layer* is the important class. It provides product collection for layers, filter collection to be shown in the list… Besides, there are other classes used in layered navigation such as:

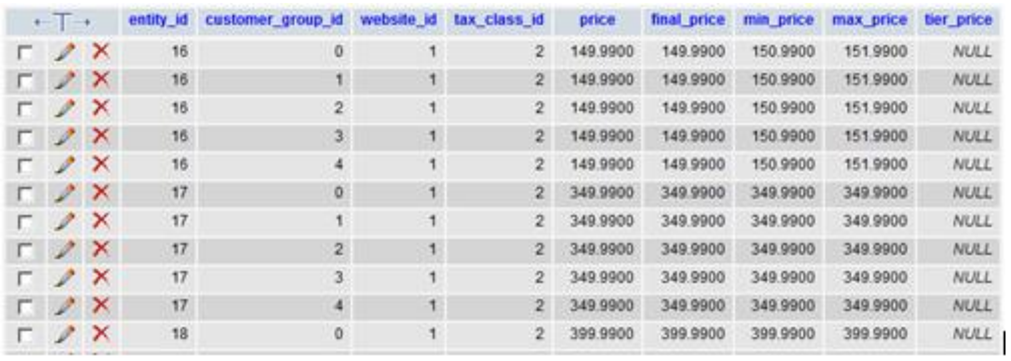
- Mage_Catalog_Model_Layer_State: the state of layered navigation
- Mage_Catalog_Block_Layer_View: the block to show layered navigation in frontend
- …

To improve the performance, Magento uses an index table to filter and count the result for each filter item. The index table for the general attribute is ***catalog/product_index_eav***:



entity_id	attribute_id	store_id	value
140	102	1	111
140	102	2	111
140	102	3	111
140	102	5	111
141	102	1	111
141	102	2	111
141	102	3	111

For price attribute, it is table ***catalog/product_index_price***:



	entity_id	customer_group_id	website_id	tax_class_id	price	final_price	min_price	max_price	tier_price
	16	0	1	2	149.9900	149.9900	150.9900	151.9900	NULL
	16	1	1	2	149.9900	149.9900	150.9900	151.9900	NULL
	16	2	1	2	149.9900	149.9900	150.9900	151.9900	NULL
	16	3	1	2	149.9900	149.9900	150.9900	151.9900	NULL
	16	4	1	2	149.9900	149.9900	150.9900	151.9900	NULL
	17	0	1	2	349.9900	349.9900	349.9900	349.9900	NULL
	17	1	1	2	349.9900	349.9900	349.9900	349.9900	NULL
	17	2	1	2	349.9900	349.9900	349.9900	349.9900	NULL
	17	3	1	2	349.9900	349.9900	349.9900	349.9900	NULL
	17	4	1	2	349.9900	349.9900	349.9900	349.9900	NULL
	18	0	1	2	399.9900	399.9900	399.9900	399.9900	NULL

IV- Custom layered navigation

When you show a custom list of product and want to add the layered navigation to filter your product list, at first, you have to write your own a layer model. For instance:

```
<?php

class Magestore_Test_Model_Layer extends Mage_Catalog_Model_Layer

{

public function getProductCollection(){

// get your custom product collection

return Mage::getResourceModel('catalog/product_collection');

}
```

In this model, you can write your own method getProductCollection to show your custom product list.

After that, you need to write your custom layer view block:

```
<?php

class Magestore_Test_Block_Layer_View extends Mage_Catalog_Block_Layer_View

{

protected function _construct(){

parent::_construct();

Mage::register('current_layer', $this->getLayer());

}



public function getLayer(){
```

```
return Mage::getSingleton('test/layer');

}

...

}
```

There’s one important point that in this block you need to write the methods **getLayer** (to get your custom layer for your layered navigation) and **_construct** (to register your layer with system).

Finally, you may add the layer block to your layout and refresh your page to view the result:

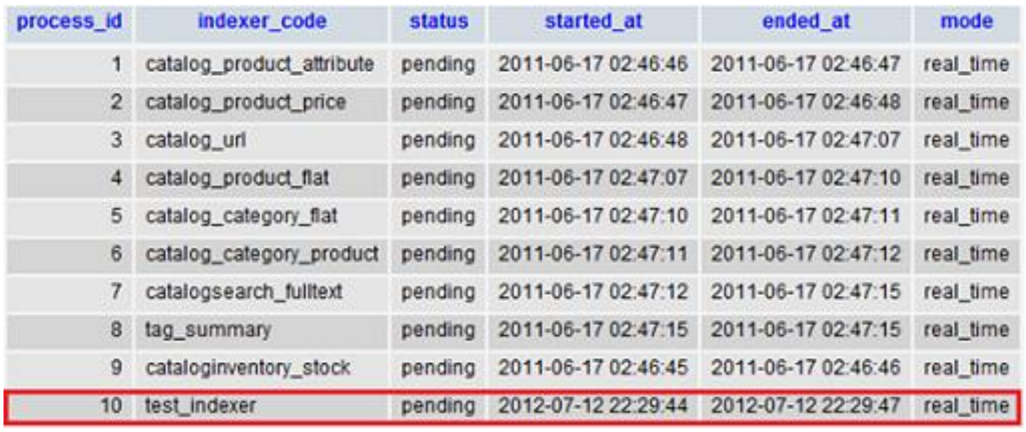
```
<layout>

<test_product_list>

<reference name="left">

<!-- here is your custom layered navigation -->

<block type="test/layer_view" name="customlayer" after="currency"
template="catalog/layer/view.phtml"/>

</reference>

<reference name="content">

<block type="catalog/product_list" name="product_list"
template="catalog/product/list.phtml">

<block type="catalog/product_list_toolbar" name="product_list_toolbar"
template="catalog/product/list/toolbar.phtml">

<block type="page/html_pager" name="product_list_toolbar_pager"/>

</block>

</block>

</reference>

</test_product_list>

...

</layout>
```

Part 8: Custom Index

We know that indexer is used to index EAV database (or other database models) to Flat database. Thus it makes users more easily query database and improve performance. This part will guide you how to add a custom indexer. Three main parts covered are also three main steps that you may follow.

I- Register indexer with Magento system

To register an indexer with your system, you need insert a row to table ***index_process*** as below:



process_id	indexer_code	status	started_at	ended_at	mode
1	catalog_product_attribute	pending	2011-06-17 02:46:46	2011-06-17 02:46:47	real_time
2	catalog_product_price	pending	2011-06-17 02:46:47	2011-06-17 02:46:48	real_time
3	catalog_url	pending	2011-06-17 02:46:48	2011-06-17 02:47:07	real_time
4	catalog_product_flat	pending	2011-06-17 02:47:07	2011-06-17 02:47:10	real_time
5	catalog_category_flat	pending	2011-06-17 02:47:10	2011-06-17 02:47:11	real_time
6	catalog_category_product	pending	2011-06-17 02:47:11	2011-06-17 02:47:12	real_time
7	catalogsearch_fulltext	pending	2011-06-17 02:47:12	2011-06-17 02:47:15	real_time
8	tag_summary	pending	2011-06-17 02:47:15	2011-06-17 02:47:15	real_time
9	cataloginventory_stock	pending	2011-06-17 02:46:45	2011-06-17 02:46:46	real_time
10	test_indexer	pending	2012-07-12 22:29:44	2012-07-12 22:29:47	real_time

Then, add config to indexer to process the index. You can add the following code to ***config.xml*** file:

```
<config>

<global>

<index>

<indexer>

<test_indexer>

<model>test/indexer</model>

<depends>

<catalog_url />

</depends>

</test_indexer>

</indexer>
```

```
</index>

</global>

...

</config>
```

- test_indexer: indexer code of the process
- model: the model to process the index
- depends: require depended indexer to be processed before this indexer (main indexer) processes

II- Write code to process index

After registering indexer with your Magento system, you have to write the indexer model to process your custom index.

```
class Magestore_Test_Model_Indexer extends
Mage_Index_Model_Indexer_Abstract

{

protected $_matchedEntities = array(

'test_entity' => array(

Mage_Index_Model_Event::TYPE_SAVE

)

);


public function getName(){

return Mage::helper('test')->__('Indexer Name');

}


public function getDescription(){

return Mage::helper('test')->__('Indexer Description');

}


protected function _registerEvent(Mage_Index_Model_Event $event){
```

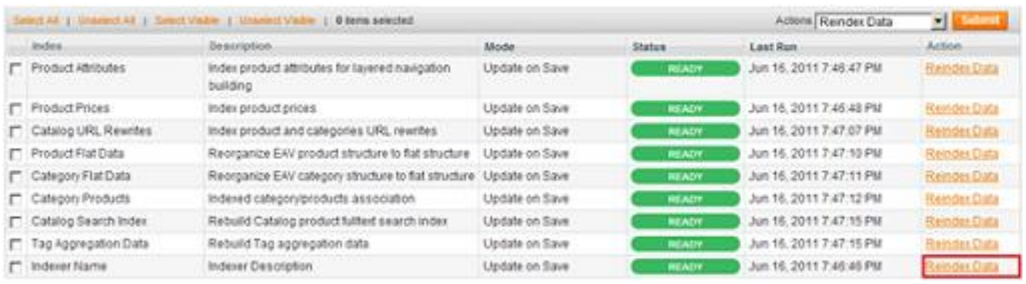
```
// custom register event

return $this;

}


protected function _processEvent(Mage_Index_Model_Event $event){

// process index event

}


public function reindexAll(){

// reindex all data

}

}
```

In this model, you may override these methods:

- getName: get custom indexer name
- getDescription: get custom indexer description
- _registerEvent: custom registered event
- _processEvent: used when processing the index event
- reindexAll: reindex all items of your entity

III- Use the index

You can log in the backend, go to ***System*** > ***Index Management*** and click on ***Reindex Data*** link to process index for your custom index:



Select All | Unselect All | Select Visible | Unselect Visible | 0 items selected
Actions Reindex Data
Submit

	Index	Description	Mode	Status	Last Run	Action
☐	Product Attributes	Index product attributes for layered navigation building	Update on Save	READY	Jun 16, 2011 7:46:47 PM	Reindex Data
☐	Product Prices	Index product prices	Update on Save	READY	Jun 16, 2011 7:46:48 PM	Reindex Data
☐	Catalog URL Rewrites	Index product and categories URL rewrites	Update on Save	READY	Jun 16, 2011 7:47:07 PM	Reindex Data
☐	Product Flat Data	Reorganize EAV product structure to flat structure	Update on Save	READY	Jun 16, 2011 7:47:10 PM	Reindex Data
☐	Category Flat Data	Reorganize EAV category structure to flat structure	Update on Save	READY	Jun 16, 2011 7:47:11 PM	Reindex Data
☐	Category Products	Indexed category/products association	Update on Save	READY	Jun 16, 2011 7:47:12 PM	Reindex Data
☐	Catalog Search Index	Rebuild Catalog product fulltext search index	Update on Save	READY	Jun 16, 2011 7:47:15 PM	Reindex Data
☐	Tag Aggregation Data	Rebuild Tag aggregation data	Update on Save	READY	Jun 16, 2011 7:47:15 PM	Reindex Data
☐	Indexer Name	Indexer Description	Update on Save	READY	Jun 16, 2011 7:46:46 PM	Reindex Data

Or you can catch an event to process your custom index data. For example:

```
public function processTestSave(Varien_Event_Observer $observer){
```

```
$testModel = $observer->getEvent()->getTestEntity();

Mage::getModel('index/indexer')->processEntityAction(

$testModel,

'test_entity',

Mage_Index_Model_Event::TYPE_SAVE

);

}
```

Part 9: Product Option

If you are interested in Magento catalog, you should not skip product option – one of interesting and useful tools in Magento. Product option on one hand helps admin to easily manage products. On the other hand, it enables customers to choose exactly products that they need.

How does Magento process the product option when a product is added to cart and an order is placed? Just read on to find the detailed answer for this question.

- **Add product option to cart**

When product is added to cart, the product type instance (model) will process the buy request data and prepare the option for product.

```
protected function _prepareProduct(Varien_Object $buyRequest, $product,
$processMode)
{
    $product = $this->getProduct($product);
    /* @var Mage_Catalog_Model_Product $product */
    // try to add custom options
    try {
        $options = $this->_prepareOptions($buyRequest, $product,
$processMode);
    } catch (Mage_Core_Exception $e) {
        return $e->getMessage();
    }
    ...
}
```

This function of a product type model runs before the product is added to cart. This function calls _prepareOptions to prepare the product option depended on customer's buy request.

```
protected function _prepareOptions(Varien_Object $buyRequest, $product,
$processMode)
```

```
{
    $transport = new StdClass;
    $transport->options = array();
    foreach ($this->getProduct($product)->getOptions() as $_option) {
        /* @var $_option Mage_Catalog_Model_Product_Option */
        $group = $_option->groupFactory($_option->getType())
            ->setOption($_option)
            ->setProduct($this->getProduct($product))
            ->setRequest($buyRequest)
            ->setProcessMode($processMode)
            ->validateUserValue($buyRequest->getOptions());

        $preparedValue = $group->prepareForCart();
        if ($preparedValue !== null) {
            $transport->options[$_option->getId()] = $preparedValue;
        }
    }

    $eventName = sprintf('catalog_product_type_prepare_%s_options', 
$processMode);
    Mage::dispatchEvent($eventName, array(
        'transport'   => $transport,
        'buy_request' => $buyRequest,
        'product' => $product
    ));
    return $transport->options;
}
```

To change the default process custom option (Foe example: your custom product type), you can rewrite this function or catch the event *catalog_product_type_prepare_%s_options* (%s can be *full* or *lite*depending on the process mode).

- **Convert product custom option from quote to order item**

Magento converts product custom option from quote to order item similarly to converting order, address… It uses the model *sales/convert_quote* to process the convert:

```
public function itemToOrderItem(Mage_Sales_Model_Quote_Item_Abstract $item)

{

    ...

    $options = $item->getProductOrderOptions();

    if (!$options) {

        $options = $item->getProduct()->getTypeInstance(true)-
>getOrderOptions($item->getProduct());

    }

    $orderItem->setProductOptions($options);

    Mage::helper('core')->copyFieldset('sales_convert_quote_item',
'to_order_item', $item, $orderItem);

    ...

}
```

And the custom option is taken from the product type instance by function getOrderOptions.

```
public function getOrderOptions($product = null)

{

    $optionArr = array();

    if ($info = $this->getProduct($product)-
>getCustomOption('info_buyRequest')) {

        $optionArr['info_buyRequest'] = unserialize($info->getValue());

    }



    if ($optionIds = $this->getProduct($product)-
>getCustomOption('option_ids')) {

        foreach (explode(',', $optionIds->getValue()) as $optionId) {
            if ($option = $this->getProduct($product)-
>getOptionById($optionId)) {

                $confItemOption = $this->getProduct($product)-
>getCustomOption('option_'.$option->getId());

                $group = $option->groupFactory($option->getType())
                    ->setOption($option)
                    ->setProduct($this->getProduct())
                    ->setConfigurationItemOption($confItemOption);

                $optionArr['options'][] = array(
                    'label' => $option->getTitle(),
                    'value' => $group-
>getFormattedOptionValue($confItemOption->getValue()),
                    'print_value' => $group-
>getPrintableOptionValue($confItemOption->getValue()),
                    'option_id' => $option->getId(),
                    'option_type' => $option->getType(),
                    'option_value' => $confItemOption->getValue(),
                    'custom_view' => $group->isCustomizedView()
                );
            }
        }
    }

    if ($productTypeConfig = $this->getProduct($product)-
>getCustomOption('product_type')) {
        $optionArr['super_product_config'] = array(
            'product_code'  => $productTypeConfig->getCode(),
            'product_type'  => $productTypeConfig->getValue(),
            'product_id'    => $productTypeConfig->getProductId()
        );

    }


    return $optionArr;

}
```

Thus you can change the product custom option for each product type when storing the order item by changing this function.

TOPIC 8

Part 1: Quote

We have gone through 7 topics of Magento Certificate Preparation Material. We tried to provide you with useful knowledge and information as much as possible. Let's start the eighth topic – Checkout.

Checkout plays an important role on every e-commerce site. It's the core helping customer to buy online products easily. Magento uses quote to store checkout information and calculate subtotal, tax, shipping, grand total… values before creating an order. When customer adds product to cart (or remove product from cart), the data is stored into quote. The quote model includes some important methods:

- assignCustomer: assign customer model object data to the quote
- setBillingAddress/getBillingAddress: set and get billing address for the quote
- setShippingAddress/getShippingAddress: set and get shipping address for the quote
- addItem/removeItem: add and remove item from the quote
- collectTotals: calculate grand total for the quote

The address in the quote has two types: billing address and shipping address. If the quote doesn't have items to be shipped, it only needs billing address. Otherwise, the quote needs both billing address and shipping address. The quote address can be imported from customer address or order address by using methods importCustomerAddress, importOrderAddress.

The quote consists of items which are implements of a product in the shopping cart. Each item associates with a product. Before being added to cart, the product was prepared the necessary information such as quantity, custom option, product type (provided by method prepareForCartAdvanced of product type instance)… Or you can change item's information by the event*sales_quote_product_add_after*.

I don’t show the code here because it is so long. However, you can view the code in details in these classes Mage_Sales_Model_Quote, Mage_Sales_Model_Quote_Item, Mage_Sales_Model_Quote_Address from Magento core.

Part 2: Total models

Our lesson now will help you dive deeper into the world of Magento, showing how to register custom total model with the system as well as method to write your custom total model. As you may know, Magento uses a set of total models to collect the shopping cart total (calculate shipping fee, discount, tax, grand total…). The total model system is dynamical for developer to change or add new custom total model to the shopping cart.

I- Register custom total model with the system

Magento uses configuration to determine total models of system. Thus, to register your custom total model, you need to add configuration (through your module config file: config.xml):

```
<config>
...
<global>
...
<sales>
<quote>
<totals>
<[total_identify]><!-- Identify of the total model -->
<class>[your_extension]/[quote_total_model]</class>
<after>wee,discount,tax,tax_subtotal,grand_total</after>
</[total_identify]>
</totals>
</quote>
<order_invoice>
<totals>
<[total_identify]>
<class>[your_extension]/[invoice_total_model]</class>
</[total_identify]>
```

```
</totals>

</order_invoice>

<order_creditmemo>

<totals>

<[total_identify]>

<class>[your_extension]/[creditmemo_total_model]</class>

</[total_identify]>

</totals>

</order_creditmemo>

</sales>

</global>

</config>
```

As you can see, we register with three types of total models:

- Quote total: used to calculate the custom total before you place order. The sort order of this total is very important because it can depend on other total models.
- Invoice total: used to prepare total for invoice
- Creditmemo total: used to prepare total for refund items.

II- Write your custom total model

A quote total model needs to be extended from the class Mage_Sales_Model_Quote_Address_Total_Abstract and you can write two methods: *collect* and *fetch*for this model.

The method *collect* is used to calculate total for the shopping cart, and the method *fetch* is used to fetch data to display in frontend. Below is an example of a quote total model:

```
<?php

class [Your_Quote_Total_Model] extends
Mage_Sales_Model_Quote_Address_Total_Abstract

{

public function collect(Mage_Sales_Model_Quote_Address $address){
```

```
/* discount 10 dollar for shopping cart */
$baseDiscount = 10;
$discount = Mage::app()->getStore()->convertPrice($baseDiscount);

$address->setCustomDiscount($baseDiscount);

$address->setBaseGrandTotal($address->getBaseGrandTotal() - $baseDiscount);
$address->setGrandTotal($address->getGrandTotal() - $discount);

return $this;
}

public function fetch(Mage_Sales_Model_Quote_Address $address){
$amount = $address->getCustomDiscount();
if ($amount != 0){
$address->addTotal(array(
'code'  => $this->getCode(),
'title' => 'Custom Discount',
'value' => $amount,
));
}
return $this;
}
}
```

The invoice total model is similar to creditmemo total model. This model is only used to calculate the order total, so we only write the method *collect* for this model. For instance:

```
<?php
class [Your_Invoice_Total_Model] extends
Mage_Sales_Model_Order_Invoice_Total_Abstract
```

```
{
public function collect(Mage_Sales_Model_Order_Invoice $invoice){
$baseDiscount = 10;
$discount = Mage::app()->getStore()->convertPrice($baseDiscount);

$invoice->setBaseGrandTotal($invoice->getBaseGrandTotal() - $baseDiscount);
$invoice->setGrandTotal($invoice->getGrandTotal() - $discount);
return $this;
}
}
```

Part 3: Show Custom Total

In this part, I'll guide you how to show your custom total in all areas that you see the order.

I- Show custom total in frontend order view page

Frontend shows order view in the Customer account page. After a customer places orders, he can go to My Orders menu to view his orders. Thus, you need to add your total display to this layout page by using the layout handle:

```
<sales_order_view>

<reference name="order_totals">

<block type="[your_custom_order_total_block]" />

</reference>

</sales_order_view>
```

And write your total block as follows:

```
<?php

class [your_custom_order_total_block] extends Mage_Sales_Block_Order_Totals

{

public function initTotals(){

$order = $this->getParentBlock()->getOrder();

if($order->getCustomDiscount() > 0){

$this->getParentBlock()->addTotal(new Varien_Object(array(

'code'  => 'custom_discount',

'value' => $order->getCustomDiscount(),

'base_value'    => $order->getBaseCustomDiscount(),

'label' => 'Custom Discount',

)),'subtotal');

}

}

}
```

In this block, you have to write the ***initTotals*** method to prepare data for total display.

Also, for invoice view page and credit memo view, you can add your custom total display to the frontend page by using the layout handle *sales_order_invoice*, *sales_order_creditmemo*. The blocks for them are similar to the blocks for order.

II- Show custom total in print page

To show custom total in print page, we need to add block to handle layout similarly to displaying it in the view page. The handles you need to add are *sales_order_print*, *sales_order_printinvoice* and*sales_order_printcreditmemo*.

```
<sales_order_print>

<reference name="order_totals">

<block type="[your_custom_order_total_block]" />

</reference>

</sales_order_print>
```

Note that you can re-use the total block of the order page view.

III- Show custom total in the email address

Similar to two parts above, to show custom total in the email address, we only need to add block to layout handles

(*sales_email_order_items*, *sales_email_order_invoice_items*,*sales_email_order_creditmemo_items*).

```
<sales_email_order_items>

<reference name="order_totals">

<block type="[your_custom_order_total_block]" />

</reference>

</sales_email_order_items>
```

IV- Show custom total in backend order view page

To show custom total in backend, you also have to add block to layout handle. However, the handle is in the admin layout and the block is as same as the block in frontend.

```
<adminhtml_sales_order_view>

<reference name="order_totals">

<block type="[your_custom_order_total_block]" />

</reference>

</adminhtml_sales_order_view>
```

For the new invoice page, invoice view page, new creditmemo page, creditmemo page, you can use handles:

adminhtml_sales_order_invoice_new,

adminhtml_sales_order_invoice_view,

adminhtml_sales_order_creditmemo_new,

adminhtml_sales_order_creditmemo_view.

V- Show custom total in PDF (printed from backend)

The way to show your custom total in PDF is different from all parts above. You need to use the configuration (config.xml) to add the custom total pdf model:

```
<global>

...

<pdf>

<totals>

<custom_discount translate="title">

<title>Custom Total</title>

<source_field>custom_discount</source_field>

<model>[custom_total_pdf_model]</model>

<font_size>7</font_size>

<display_zero>0</display_zero>

<sort_order>251</sort_order>

</custom_discount>

</totals>

</pdf>

</global>
```

And write the PDF total model as below:

```
<?php


class [custom_total_pdf_model] extends
Mage_Sales_Model_Order_Pdf_Total_Default

{

public function getTotalsForDisplay(){

$amount = $this->getOrder()->

$fontSize = $this->getFontSize() ? $this->getFontSize() : 7;

if(floatval($amount)){

$amount = $this->getOrder()->formatPriceTxt($amount);

if ($this->getAmountPrefix()){

$discount = $this->getAmountPrefix().$discount;

}

$totals = array(array(

'label' => 'Custom Discount'

'amount' => $amount,

'font_size' => $fontSize,

)

);

return $totals;

}

}

}
```

Hope that you can show your custom total in Magento by yourself after reading.

Part 4: Shopping Cart Rules

Different from catalog cart rules, shopping cart rules define the promotion for customer only when customer checks out product. They can be specified by either coupon code or others. However, have you known how rules are applied in shopping cart? If not, this part will certainly helpful for you.

I- Discount total model

Magento uses a total model to calculate the discount by shopping cart rules and shows it in the cart total. This total is calculated after subtotal and shipping and before grand total.

```
<global>
<sales>
<quote>
<totals>
<discount>
<class>salesrule/quote_discount</class>
<after>subtotal,shipping</after>
<before>grand_total</before>
</discount>
...
</totals>
</quote>
</sales>
</global>
The total is collected:
public function collect(Mage_Sales_Model_Quote_Address $address)
{
parent::collect($address);
$quote = $address->getQuote();
$store = Mage::app()->getStore($quote->getStoreId());
```

```
$this->_calculator->reset($address);


$items = $this->_getAddressItems($address);

if (!count($items)) {

return $this;

}


$eventArgs = array(

'website_id'        => $store->getWebsiteId(),

'customer_group_id' => $quote->getCustomerGroupId(),

'coupon_code'       => $quote->getCouponCode(),

);


$this->_calculator->init($store->getWebsiteId(), $quote-
>getCustomerGroupId(), $quote->getCouponCode());

$this->_calculator->initTotals($items, $address);


$address->setDiscountDescription(array());


foreach ($items as $item) {

if ($item->getNoDiscount()) {

$item->setDiscountAmount(0);

$item->setBaseDiscountAmount(0);

}

else {

/**

* Child item discount we calculate for parent

*/

if ($item->getParentItemId()) {

continue;

}
$eventArgs['item'] = $item;
Mage::dispatchEvent('sales_quote_address_discount_item', $eventArgs);

if ($item->getHasChildren() && $item->isChildrenCalculated()) {
foreach ($item->getChildren() as $child) {
$this->_calculator->process($child);
$eventArgs['item'] = $child;
Mage::dispatchEvent('sales_quote_address_discount_item', $eventArgs);
$this->_aggregateItemDiscount($child);
}
} else {
$this->_calculator->process($item);
$this->_aggregateItemDiscount($item);
}
}
}

/**
* Process shipping amount discount
*/
$address->setShippingDiscountAmount(0);
$address->setBaseShippingDiscountAmount(0);
if ($address->getShippingAmount()) {
$this->_calculator->processShippingAmount($address);
$this->_addAmount(-$address->getShippingDiscountAmount());
$this->_addBaseAmount(-$address->getBaseShippingDiscountAmount());
}

$this->_calculator->prepareDescription($address);
```

```
return $this;
}
```

In this function, as you can see, the event that can work with discount item is sales_quote_address_discount_item.

II- Which rules are applied?

The code for Magento to select and apply rules and is located in the class Mage_SalesRule_Model_Validator. Each item is processed by the *process* method.

```
public function process(Mage_Sales_Model_Quote_Item_Abstract $item)
{
$item->setDiscountAmount(0);
$item->setBaseDiscountAmount(0);
$item->setDiscountPercent(0);
$quote      = $item->getQuote();
$address    = $this->_getAddress($item);

$itemPrice                = $this->_getItemPrice($item);
$baseItemPrice            = $this->_getItemBasePrice($item);
$itemOriginalPrice        = $item->getOriginalPrice();
$baseItemOriginalPrice    = $item->getBaseOriginalPrice();

if ($itemPrice <= 0) {
return $this;
}

$appliedRuleIds = array();
foreach ($this->_getRules() as $rule) {
/* @var $rule Mage_SalesRule_Model_Rule */
if (!$this->_canProcessRule($rule, $address)) {
continue;
}
if (!$rule->getActions()->validate($item)) {
continue;
}

...//calculate and apply discount for item

if ($rule->getStopRulesProcessing()) {
break;
}
}

$item->setAppliedRuleIds(join(',',$appliedRuleIds));
$address->setAppliedRuleIds($this->mergeIds($address->getAppliedRuleIds(),
$appliedRuleIds));
$quote->setAppliedRuleIds($this->mergeIds($quote->getAppliedRuleIds(),
$appliedRuleIds));

return $this;
}
```

Basically, rules are sorted by the priority and Magento applies rule by rule for each item. The rule needs to be validated for the current shopping cart and if that rule prevents further rule from processing, the loop will be broken.

You can go to file *app\code\core\Mage\SalesRule\Model\Validator.php* to view more details of the code.

Part 5: Shipping Methods

In order to help store owner easily ship products to customers after they purchase in Shopping cart site, Magento offers Shipping caculation platform to add more shipping methods. Thus, to complete the checkout process on a store, I think it is also necessary to understand Magento calculate shipping well.

I- Magento calculate shipping rates

Magento calculates Shipping rate through the Insance Model of each shipping method. So, shipping method is checked whether to be active or not. It will estimate the fee by collectRates() of Instance model. You could follow one typicle example with module Mage_Shipping_Model_Carrier_Tablerate. You can see the collectRates() method:

```
/**
* Enter description here...
*
* @param Mage_Shipping_Model_Rate_Request $data
* @return Mage_Shipping_Model_Rate_Result
*/
public function collectRates(Mage_Shipping_Model_Rate_Request $request)
{
if (!$this->getConfigFlag('active')) {
return false;
}

// exclude Virtual products price from Package value if pre-configured
if (!$this->getConfigFlag('include_virtual_price') && $request-
>getAllItems()) {
foreach ($request->getAllItems() as $item) {
if ($item->getParentItem()) {
continue;
}
```

```
if ($item->getHasChildren() && $item->isShipSeparately()) {

foreach ($item->getChildren() as $child) {

if ($child->getProduct()->isVirtual()) {

$request->setPackageValue($request->getPackageValue() - $child-
>getBaseRowTotal());

}

}

} elseif ($item->getProduct()->isVirtual()) {

$request->setPackageValue($request->getPackageValue() - $item-
>getBaseRowTotal());

}

}

}


// Free shipping by qty

$freeQty = 0;

if ($request->getAllItems()) {

foreach ($request->getAllItems() as $item) {

if ($item->getProduct()->isVirtual() || $item->getParentItem()) {

continue;

}


if ($item->getHasChildren() && $item->isShipSeparately()) {

foreach ($item->getChildren() as $child) {

if ($child->getFreeShipping() && !$child->getProduct()->isVirtual()) {

$freeQty += $item->getQty() * ($child->getQty() - (is_numeric($child-
>getFreeShipping()) ? $child->getFreeShipping() : 0));

}

}

} elseif ($item->getFreeShipping()) {
```

```
$freeQty += ($item->getQty() - (is_numeric($item->getFreeShipping()) ?
$item->getFreeShipping() : 0));

}

}

}


if (!$request->getConditionName()) {

$request->setConditionName($this->getConfigData('condition_name') ? $this-
>getConfigData('condition_name') : $this->_default_condition_name);

}


// Package weight and qty free shipping

$oldWeight = $request->getPackageWeight();

$oldQty = $request->getPackageQty();


$request->setPackageWeight($request->getFreeMethodWeight());

$request->setPackageQty($oldQty - $freeQty);


$result = Mage::getModel('shipping/rate_result');

$rate = $this->getRate($request);


$request->setPackageWeight($oldWeight);

$request->setPackageQty($oldQty);


if (!empty($rate) && $rate['price'] >= 0) {

$method = Mage::getModel('shipping/rate_result_method');


$method->setCarrier('tablerate');

$method->setCarrierTitle($this->getConfigData('title'));


$method->setMethod('bestway');
```

```
$method->setMethodTitle($this->getConfigData('name'));


if ($request->getFreeShipping() === true || ($request->getPackageQty() ==
$freeQty)) {
$shippingPrice = 0;
} else {
$shippingPrice = $this->getFinalPriceWithHandlingFee($rate['price']);
}


$method->setPrice($shippingPrice);
$method->setCost($rate['cost']);


$result->append($method);
}


return $result;
}
```

The table rate method calculates shipping rates based on the combination of several conditions. The rate is upon Weight vs. Destination, Price vs. Destination, or # of Items vs. Destination (site admin can configurate for that). The method above gets configuration and rate data from database to calculate.

II- Add custom shipping method rates

To add new shipping method to Magento system, you need to follow 2 steps. At first, you need to add configuration for your method (config.xml):

```
<config>
    ...
    <default>
        <carriers>
            <[CUSTOM_SHIPPING_CODE]>
                <active>1</active>
                <title>Multi Table Rates</title>

                <model>[CUSTOM_MODULE]/carrier_[SHIPPING_MODEL]</model>

                <SA_default_cost>100</SA_default_cost>

                <other_default_cost>250</other_default_cost>

                <shipping_code>[CUSTOM_SHIPPING_CODE]</shipping_code>

                <sallowspecific>0</sallowspecific>

                <specificcountry>US</specificcountry>

                <showmethod>1</showmethod>

                <specificerrmsg>Sorry! We don't support in this
country.</specificerrmsg>

            </[CUSTOM_SHIPPING_CODE]>

        </carriers>

    </default>

</config>
```

And if you want to show configuration for admin to edit, add the file system.xml:

```
<config>

    <sections>

        <carriers>

            <groups>

                <[CUSTOM_SHIPPING_CODE] translate="label"
module="shipping">

                    <label>New Shipping Method!</label>

                    <frontend_type>text</frontend_type>

                    <sort_order>13</sort_order>

                    <show_in_default>1</show_in_default>

                    <show_in_website>1</show_in_website>

                    <show_in_store>1</show_in_store>

                    <fields>

                        <active translate="label">

                            <label>Enabled</label>

                            <frontend_type>select</frontend_type>
```

```
<source_model>adminhtml/system_config_source_yesno</source_model>
                            <sort_order>1</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </active>
                        <title translate="label">
                            <label>Title</label>
                            <frontend_type>text</frontend_type>
                            <sort_order>2</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </title>
                        ...
                        <shipping_title translate="label">
                            <label>Shipping title</label>
                            <frontend_type>text</frontend_type>
                            <sort_order>5</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </shipping_title>
                        <shipping_code translate="label">
                            <label>Shipping code</label>
                            <frontend_type>text</frontend_type>
                            <sort_order>6</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </shipping_code>
                        <sallowspecific translate="label">
                            <label>Ship to applicable countries</label>
                            <frontend_type>select</frontend_type>

<source_model>adminhtml/system_config_source_shipping_allspecificcountries<
/source_model>
                            <sort_order>90</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </sallowspecific>
                        <specificcountry translate="label">
                            <label>Ship to Specific countries</label>
                            <frontend_type>multiselect</frontend_type>

<source_model>adminhtml/system_config_source_country</source_model>
                            <sort_order>91</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </specificcountry>
                        <showmethod translate="label">
                            <label>Show method if not applicable</label>
                            <frontend_type>select</frontend_type>

<source_model>adminhtml/system_config_source_yesno</source_model>
                            <sort_order>92</sort_order>
                            <show_in_default>1</show_in_default>
                            <show_in_website>1</show_in_website>
                            <show_in_store>1</show_in_store>
                        </showmethod>

                        <specificerrmsg translate="label">

                            <label>Show method if not applicable</label>

                            <frontend_type>textarea</frontend_type>

                            <sort_order>99</sort_order>

                            <show_in_default>1</show_in_default>

                            <show_in_website>1</show_in_website>

                            <show_in_store>1</show_in_store>

                        </specificerrmsg>

                    </fields>

                </shippingmodule>

            </[CUSTOM_SHIPPING_CODE]>

        </carriers>

    </sections>

</config>
```

Secondly, you need to write the model carrier for your shipping method. In this model, please write two methods (collectRates and getAllowedMethods):

```
class [FULL_CUSTOM_MODULE]_Model_Carrier_[SHIPPING_MODEL]

extends Mage_Shipping_Model_Carrier_Abstract

implements Mage_Shipping_Model_Carrier_Interface

{

protected $_code = '[CUSTOM_SHIPPING_CODE]';


public function collectRates(Mage_Shipping_Model_Rate_Request $request) {

if (!$this->getConfigFlag('active')) {

return false;

}


$result = Mage::getModel('shipping/rate_result');
$method = Mage::getModel('shipping/rate_result_method');


$method->setCarrier('freeshipping');

$method->setCarrierTitle($this->getConfigData('title'));


$method->setMethod('freeshipping');

$method->setMethodTitle($this->getConfigData('name'));


/** Custom shipping method rate calculation and set for method */

$method->setPrice('1.00');

$method->setCost('1.00');


$result->append($method);

return $result;

}


public function getAllowedMethods() {

return array('[CUSTOM_SHIPPING_CODE]'=>$this->getConfigData('name'));

}

}
```

Part 6: Payment Methods

Once customer details are filled in and the chosen shipping method, the payment method forms will be shown for customer to select. After a customer selects a payment method, the checkout will progress through the payment method's function. It can be the request via an API, authorization or offline payment. This part will introduce how to add a custom payment method for Magento.

I- Declare custom payment method by configuration

To add your custom payment method, you need to declare with Magento's system. Thus you can add the code below to your module configuration (config.xml).

```
<config>
   ...
    <default>
        <payment>
            <[custom_payment]>
                <active>1</active>
                <model>[custom_module]/method_[payment_model]</model>
                <order_status>pending</order_status>
                <title>Custom Payment Method</title>
                <allowspecific>0</allowspecific>
                ...
            </[custom_payment]>
         </payment>
    </default>
</config>
```

In this configuration, you see the tag model, this is the configuration of the payment adaptor model.

II- Write adaptor model for custom payment method

Firstly, you have to write your custom model corresponding to the configuration above. This model needs to be extended from class ***Mage_Payment_Model_Method_Abstract***. This model class is similar to the following:

```
class [Custom_Module]_Model_Method_[Payment_Model] extends
Mage_Payment_Model_Method_Abstract

{

    /** form block and info block for custom payment method */

    protected $_formBlockType = '[custom_module/form_block]';

    protected $_infoBlockType = '[custom_module/info_block]';


    /** Payment method features */

    protected $_isGateway                   = true;

    protected $_canOrder                    = false;

    protected $_canAuthorize                = false;

    protected $_canCapture                  = true;

    protected $_canCapturePartial           = false;

    protected $_canRefund                   = true;

    ...


    public function authorize(Varien_Object $payment, $amount) {

        // authorize payment

    }


    public function capture(Varien_Object $payment, $amount) {

        // capture payment

    }


    public function order(Varien_Object $payment) {
        // void payment
    }

    public function refund(Varien_Object $payment, $amount) {
        // refund payment
    }
    ...
}
```

Above are some basic methods that the system calls when the order is processed. Thus they are key functions of a payment method. If payment method uses a gateway, some function can send request to the gateway to collect information for processing order.

III- Store payment's information

Payment model is the abstract of an instance payment method and it works with database. Payment model can be Mage_Sales_Model_Order_Payment or Mage_Sales_Model_Quote_Payment depending on checkout stage. And the database is stored corresponding with tables ***sales_flat_order_payment***and ***sales_flat_quote_payment***. However, Quote_Payment doesn't have any method to process the order. You can view more details in the Magento's source code and database.

TOPIC 9

Part 1: Create order in Admin

From Magento 1.4, administrators can create order for customers in the back-end. It helps admin easily manage his store activity when customer doesn't place order on the website. This part will guide you how to create order in admin panel step by step and also mention the way to calculate price when an order is created from admin as well as order state and order status.

I- Steps to create order in admin panel

- To create a new order in admin, you can follow some steps below:
- Select ***Sales*** > ***Orders*** menu
- Click on the ***Create New Order*** button, a customer select page will be shown
- You can select Customer or Create new Customer for the order. A store select page will be shown
- Select store where order is placed. Then the page to create order will be displayed. In this page, you need to select product, fulfill customer information (email, address…), select payment method and shipping method.
- After that, click on the ***Submit Order*** button to complete creating an order.

II- Calculating price when an order is created from admin

When you select a product to add to order in backend, you need to choose options (if have) for that product. That's information to post on sever when you click on ***Add Selected Product(s) to Order***button. The product is added to Order as below:

```
//
app\code\core\Mage\Adminhtml\controllers\Sales\Order\CreateController.php

// _processActionData method

/**

 * Adding products to quote from special grid
 */
if ($this->getRequest()->has('item') && !$this->getRequest()-
>getPost('update_items') && !($action == 'save')) {
    $items = $this->getRequest()->getPost('item');
    $items = $this->_processFiles($items);
    $this->_getOrderCreateModel()->addProducts($items);
}
```

And when the quote of that order is collected, subtotal is collected first and it calculates the product price:

```
// app\code\core\Mage\Sales\Model\Quote\Address\Total\Subtotal.php
// _initItem method

} else if (!$quoteItem->getParentItem()) {
    $finalPrice = $product->getFinalPrice($quoteItem->getQty());
    $item->setPrice($finalPrice)
        ->setBaseOriginalPrice($finalPrice);
    $item->calcRowTotal();
    $this->_addAmount($item->getRowTotal());
    $this->_addBaseAmount($item->getBaseRowTotal());
    $address->setTotalQty($address->getTotalQty() + $item->getQty());
}
```

In the admin panel, you can change the product price when creating order by ***Custom Price*** option. When product item calculates the row total, it was get for the product price:

```
// app\code\core\Mage\Sales\Model\Quote\Item\Abstract.php

public function calcRowTotal()
{
    $qty        = $this->getTotalQty();
    $total      = $this->getCalculationPrice()*$qty;
    $baseTotal  = $this->getBaseCalculationPrice()*$qty;


    $this->setRowTotal($this->getStore()->roundPrice($total));

    $this->setBaseRowTotal($this->getStore()->roundPrice($baseTotal));

    return $this;

}

/**

 * Get item price used for quote calculation process.

 * This method get custom price (if ut defined) or original product final
price

 *

 * @return float

 */

public function getCalculationPrice()

{

    $price = $this->_getData('calculation_price');

    if (is_null($price)) {

        if ($this->hasOriginalCustomPrice()) {

            $price = $this->getOriginalCustomPrice();

        } else {

            $price = $this->getConvertedPrice();

        }

        $this->setData('calculation_price', $price);

    }

    return $price;

}
```

III- Order state and order status

Order in Magento has both states and status for the process. Each state may have one or several statuses and a status can just have one state. By default, states are invisible in Magento frontend and backend, but status is visible. You can view the Magento order's statuses and states in the Sales module configuration:

```
<global>
    ...
    <sales>
        ...
        <order>
            <statuses>
                <pending translate="label"><label>Pending</label></pending>
                ...
                <fraud translate="label"><label>Suspected
Fraud</label></fraud>
                <payment_review translate="label"><label>Payment
Review</label></payment_review>
            </statuses>
            <states>
                <new translate="label">
                    <label>New</label>
                    <statuses>
                        <pending default="1"/>
                    </statuses>
                    <visible_on_front>1</visible_on_front>
                </new>
                ...
                <payment_review translate="label">
                    <label>Payment Review</label>
                    <statuses>
                        <payment_review default="1"/>
                        <fraud/>
                    </statuses>
                    <visible_on_front>1</visible_on_front>
                </payment_review>
            </states>
        </order>
    </sales>
</global>
```

And you can add custom status and state to the order by adding configuration following the paths***global/sales/order/states*** and ***global/sales/order/statuses***. It may be useful for your custom order process.

Part 2: Invoice

An invoice is created when a customer pays for his order. If the order uses an online payment method, the invoice will be created automatically. If not, invoices are manually created by the administrator in back-end.

I- Invoice Model

Invoice model (Mage_Sales_Model_Order_Invoice) works with invoice data. Magento allows creating many invoices for an order. With each invoice, you can pay for some items of your order. You can get invoiced items by method ***getAllItems***():

```
public function getAllItems()

{

$items = array();

foreach ($this->getItemsCollection() as $item) {

if (!$item->isDeleted()) {

$items[] =  $item;

}

}

return $items;

}
```

In the topic 8, I mentioned invoice total. It's collected by the method ***collectTotals***() in this model:

```
/**

* Invoice totals collecting

*

* @return Mage_Sales_Model_Order_Invoice

*/

public function collectTotals()

{

foreach ($this->getConfig()->getTotalModels() as $model) {

$model->collect($this);
}
return $this;
}
```

Specially, invoice model has two important methods which are **Capture** and **Pay**. Method **Pay** affects the order; it'll pay for the invoice's order.

```
/**
     * Pay invoice
     *
     * @return Mage_Sales_Model_Order_Invoice
     */
    public function pay()
    {
        if ($this->_wasPayCalled) {
            return $this;
        }
        $this->_wasPayCalled = true;
        $invoiceState = self::STATE_PAID;
        if ($this->getOrder()->getPayment()->hasForcedState()) {
            $invoiceState = $this->getOrder()->getPayment()-
>getForcedState();
        }

        $this->setState($invoiceState);

        $this->getOrder()->getPayment()->pay($this);
        $this->getOrder()->setTotalPaid(
            $this->getOrder()->getTotalPaid()+$this->getGrandTotal()
        );
        $this->getOrder()->setBaseTotalPaid(
            $this->getOrder()->getBaseTotalPaid()+$this-
>getBaseGrandTotal()
```

```
        );

        Mage::dispatchEvent('sales_order_invoice_pay', array($this-
>_eventObject=>$this));

        return $this;

    }
```

Method Capture includes triggering the payment method to capture and pay for the order:

```
/**

* Capture invoice

*

* @return Mage_Sales_Model_Order_Invoice

*/

public function capture()

{

$this->getOrder()->getPayment()->capture($this);

if ($this->getIsPaid()) {

$this->pay();

}

return $this;

}
```

You can find more methods of this model in file:

app\code\core\Mage\Sales\Model\Order\Invoice.php

II- Create an invoice for online capture payment

When you create an invoice in the back-end manual, the payment will be captured offline and the invoice is created. But if your customer uses an online payment to pay for his order, how and when an invoice is created?

I will take the payment method Paypal as an example. When a customer pays for his order by PayPal, his order information is sent to the Paypal gateway. When his payment in PayPal is completed, PayPal will call back to a link address. In Magento, it’s linked to the Paypal/Ipn Controller. In this controller, the payment is processed and the invoice is created as follows:

```
/**
     * Instantiate IPN model and pass IPN request to it
     */
    public function indexAction()
    {
        if (!$this->getRequest()->isPost()) {
            return;
        }
        try {
            $data = $this->getRequest()->getPost();
            Mage::getModel('paypal/ipn')->processIpnRequest($data, new
Varien_Http_Adapter_Curl());
        } catch (Exception $e) {
            Mage::logException($e);
        }
    }
```

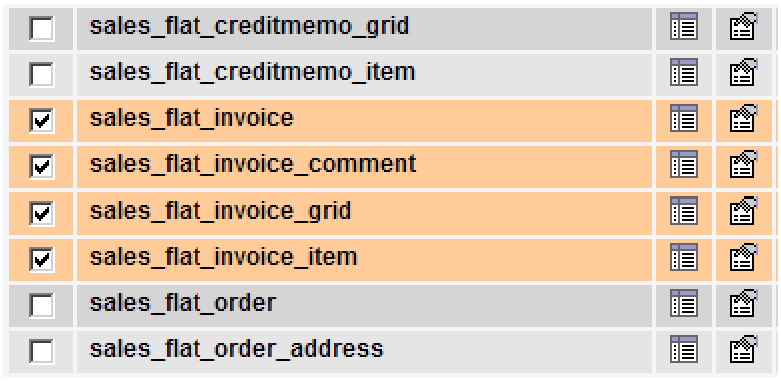
You can view the code to create the invoice in model ***paypal/ipn***:

```
    protected function _registerPaymentCapture()
    {
        if ($this->getRequestData('transaction_entity') == 'auth') {
            return;
        }
        $this->_importPaymentInformation();
        $payment = $this->_order->getPayment();
        $payment->setTransactionId($this->getRequestData('txn_id'))
            ->setPreparedMessage($this->_createIpnComment(''))
            ->setParentTransactionId($this-
>getRequestData('parent_txn_id'))
```

```
            ->setShouldCloseParentTransaction('Completed' === $this-
>getRequestData('auth_status'))

            ->setIsTransactionClosed(0)

            ->registerCaptureNotification($this-
>getRequestData('mc_gross'));

        $this->_order->save();


        // notify customer

        if ($invoice = $payment->getCreatedInvoice() && !$this->_order-
>getEmailSent()) {

            $comment = $this->_order->sendNewOrderEmail()-
>addStatusHistoryComment(

                    Mage::helper('paypal')->__('Notified customer about
invoice #%s.', $invoice->getIncrementId())

                )

                ->setIsCustomerNotified(true)

                ->save();

        }

    }
```

III- Store invoice information

Magento stores invoice information in 4 following tables:



☐	sales_flat_creditmemo_grid
☐	sales_flat_creditmemo_item
✓	sales_flat_invoice
✓	sales_flat_invoice_comment
✓	sales_flat_invoice_grid
✓	sales_flat_invoice_item
☐	sales_flat_order
☐	sales_flat_order_address

Table ***sales_flat_invoice*** stores main information of invoices.

Table ***sales_flat_invoice_comment*** stores comments on an invoice.

Table ***sales_flat_invoice_item*** stores the list of items of invoice.

Specially, table ***sales_flat_invoice_grid*** stores some information of invoices to increase load speed when showing a grid invoice.

Part 3: Shipment

Coming back to our topic: Sales and Customer. In this part, I'll talk about the shipment, the next step of sale process.

I- Shipment Model

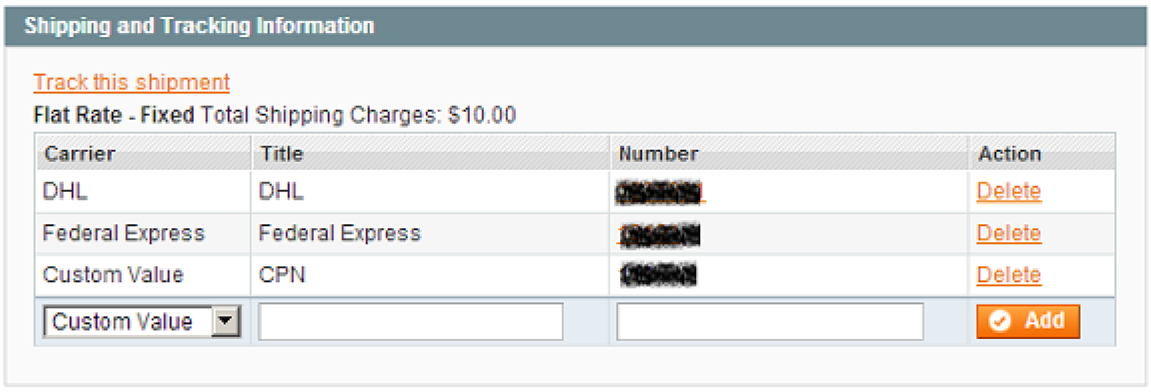
Shipment model (Mage_Sales_Model_Order_Shipment) works with shipment data. Magento allows you to create many shipments for an order with items which can ship separately. With each shipment, you can get shipment items by method **getAllItems()**:

```
public function getItemsCollection()

{

if (empty($this->_items)) {

$this->_items =
Mage::getResourceModel('sales/order_shipment_item_collection')

->setShipmentFilter($this->getId());


if ($this->getId()) {

foreach ($this->_items as $item) {

$item->setShipment($this);

}

}

}

return $this->_items;

}


public function getAllItems()

{

$items = array();

foreach ($this->getItemsCollection() as $item) {

if (!$item->isDeleted()) {

$items[] =  $item;
}
}
return $items;
}
```

Besides, shipment has another important method, which is getAllTracks(). It returns all track information of shipment:

```
public function getAllTracks()
{
$tracks = array();
foreach ($this->getTracksCollection() as $track) {
if (!$track->isDeleted()) {
$tracks[] =  $track;
}
}
return $tracks;
}
```

Specifically, track information has carrier name, title, and track number. This information allows you to track package shipment.



Shipping and Tracking Information

Track this shipment

Flat Rate - Fixed Total Shipping Charges: $10.00

Carrier	Title	Number	Action
DHL	DHL	[redacted]	Delete
Federal Express	Federal Express	[redacted]	Delete
Custom Value	CPN	[redacted]	Delete
Custom Value			Add

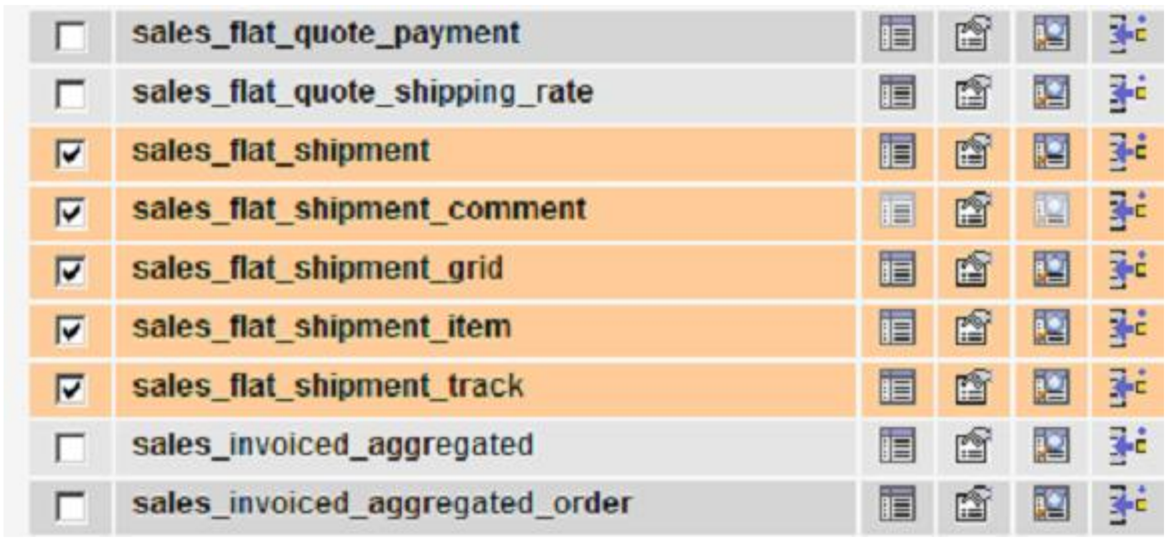
Shipping carriers has API (such as DHL, Federal Express…), allowing you to track shipment online. With track number, you will get the details of package shipment as shipping date, service, weight, length… You can find code to get tracking detail in file app\code\core\Mage\Sales\Model\Order\Shipment\Track.php:

```
/**
```

```
* Retrieve detail for shipment track

*

* @return string

*/

public function getNumberDetail()

{

$carrierInstance = Mage::getSingleton('shipping/config')-
>getCarrierInstance($this->getCarrierCode());

if (!$carrierInstance) {

$custom['title'] = $this->getTitle();

$custom['number'] = $this->getNumber();

return $custom;

} else {

$carrierInstance->setStore($this->getStore());

}


if (!$trackingInfo = $carrierInstance->getTrackingInfo($this->getNumber()))
{

return Mage::helper('sales')->__('No detail for number "%s"', $this-
>getNumber());

}


return $trackingInfo;

}
```

II- Store Shipping Information

Magento stores shipping and tracking information in five tables as below:



☐	sales_flat_quote_payment				
☐	sales_flat_quote_shipping_rate				
✓	sales_flat_shipment				
✓	sales_flat_shipment_comment				
✓	sales_flat_shipment_grid				
✓	sales_flat_shipment_item				
✓	sales_flat_shipment_track				
☐	sales_invoiced_aggregated				
☐	sales_invoiced_aggregated_order				

Table **sales_flat_shipment** stores main information of shipment.

Table **sales_flat_shipment_comment** stores comments for a shipment.

Table **sales_flat_shipment_item** stores list of items of shipment.

Table **sales_flat_shipment_grid** stores some information of shipment to increase loading speed when showing a grid invoice.

Table **sales_flat_shipment_track** stores tracking information for a shipment.

That's all about shipment. Many people think it's so sophisticated to practice; in fact, it's not difficult to understand. I hope that all information in this part will help you with your jobs.

Part 4: Refund

A refund usually refers to the reimbursement of funds to a customer for a product or service provided. Magento framework will create a Credit Memo for the returned orders.

I- Overview

Refund, in somehow, is a reverse process of the payment process. Magento uses the mode **Mage_Sales_Model_Order_Creditmemo** to work with the data of the refund.

Similar with the "Invoice" part in Topic 9 – Part 2, Creditmemo's model also has some methods: **getAllItems**() to collect all refunded items, **collectTotals**() to calculating credit memo total. And an important method of this model is **refund**():

```
public function refund()

{

    $this->setState(self::STATE_REFUNDED);

    $orderRefund = Mage::app()->getStore()->roundPrice(

        $this->getOrder()->getTotalRefunded()+$this->getGrandTotal()

    );

    $baseOrderRefund = Mage::app()->getStore()->roundPrice(

        $this->getOrder()->getBaseTotalRefunded()+$this-
>getBaseGrandTotal()

    );


    if ($baseOrderRefund > Mage::app()->getStore()->roundPrice($this-
>getOrder()->getBaseTotalPaid())) {


        $baseAvailableRefund = $this->getOrder()->getBaseTotalPaid()-
$this->getOrder()->getBaseTotalRefunded();


        Mage::throwException(
            Mage::helper('sales')->__('Maximum amount available to refund
is %s',
                $this->getOrder()->formatBasePrice($baseAvailableRefund)
            )
        );
    }
    $order = $this->getOrder();
    ...

    if ($this->getInvoice()) {
        $this->getInvoice()->setIsUsedForRefund(true);
        $this->getInvoice()->setBaseTotalRefunded(
            $this->getInvoice()->getBaseTotalRefunded() + $this-
>getBaseGrandTotal()
        );
        $this->setInvoiceId($this->getInvoice()->getId());
    }

    if (!$this->getPaymentRefundDisallowed()) {
        $order->getPayment()->refund($this);
    }

    Mage::dispatchEvent('sales_order_creditmemo_refund', array($this-
>_eventObject=>$this));
    return $this;
}
```

Refund can be conducted online or offline. Similar to the invoice creation, creditmemo in Magento is also created automatically when the system makes refunds for an order through a pay gate (e.g. PayPal).

The table for storing refund data is similar to that of invoice, which includes: sales_flat_creditmemo, sales_flat_creditmemo_comment, sales_flat_creditmemo_grid, sales_flat_creditmemo_item.

II- Creditmemo collect total

The calculation of the totality of creditmemo (Subtotal, discount, tax…) is also similar to that of an invoice.

However, the calculation of shipping fee and grand totality of creditmemo is a little bit different. When a refund is conducted offline, the shipping fee is calculated based on the data that admins import and collected for this credit memo. Moreover, the two other boxes (Adjustment Refund and Adjustmend Fee) are added to enable the changing the values of grand totality ad credit memo. The code of collecting creditmemo's grand totality is as follows:

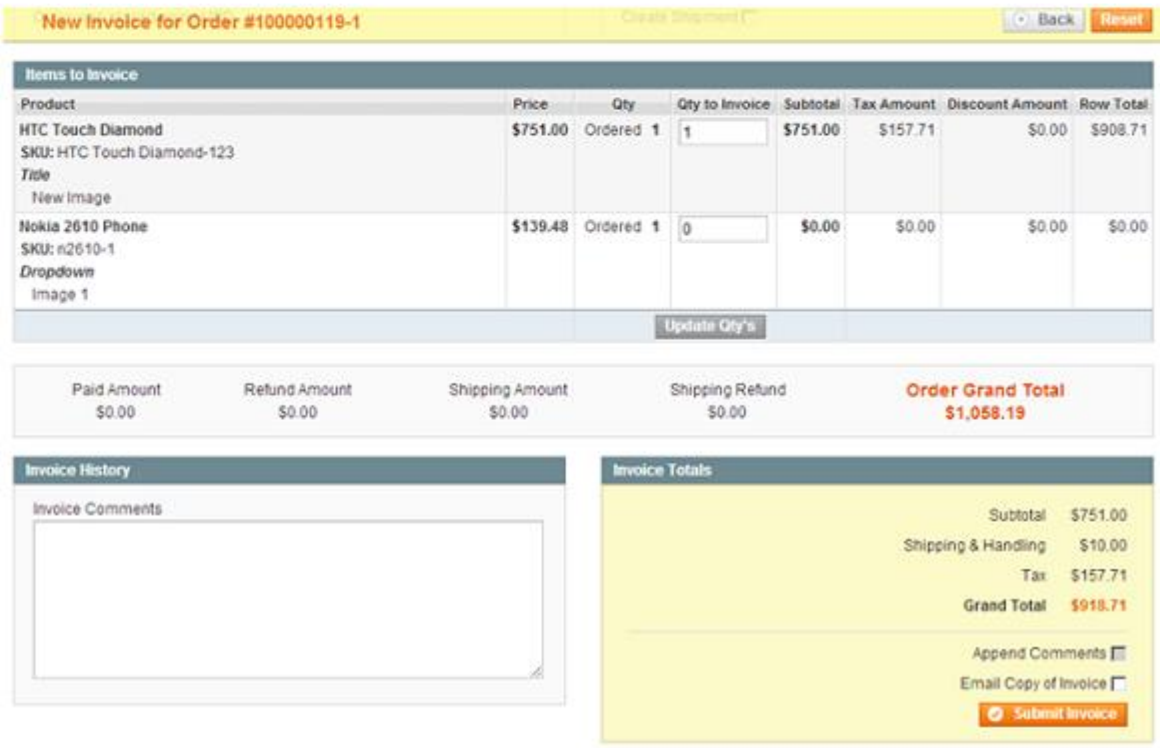
```
class Mage_Sales_Model_Order_Creditmemo_Total_Grand extends
Mage_Sales_Model_Order_Creditmemo_Total_Abstract
{
    public function collect(Mage_Sales_Model_Order_Creditmemo $creditmemo)
    {
        $grandTotal     = $creditmemo->getGrandTotal();
        $baseGrandTotal = $creditmemo->getBaseGrandTotal();

        $grandTotal+= $creditmemo->getAdjustmentPositive();
        $baseGrandTotal+= $creditmemo->getBaseAdjustmentPositive();

        $grandTotal-= $creditmemo->getAdjustmentNegative();
        $baseGrandTotal-= $creditmemo->getBaseAdjustmentNegative();

        $creditmemo->setGrandTotal($grandTotal);
        $creditmemo->setBaseGrandTotal($baseGrandTotal);
        $creditmemo->setAdjustment($creditmemo->getAdjustmentPositive()-
$creditmemo->getAdjustmentNegative());

        $creditmemo->setBaseAdjustment($creditmemo-
>getBaseAdjustmentPositive()-$creditmemo->getBaseAdjustmentNegative());


        return $this;

    }

}
```

Part 5: Partial Operations

Partial operation allows processing each part of order, and helps this process become more flexible. Magento supports three partial operations: partial invoice, partial shipping and partial refund. Three operations are similar, so I will guide you through partial invoice in this lesson and you can apply on the two remaining operations.

I- Create a Partial Invoice

After making an order, you can create its invoice in backend. In the new invoice page, you need to select the quantity of item to invoice.



New Invoice for Order #100000119-1

Items to Invoice

Product	Price	Qty	Qty to Invoice	Subtotal	Tax Amount	Discount Amount	Row Total
HTC Touch Diamond SKU: HTC Touch Diamond-123 *Title* New Image	$751.00	Ordered 1	1	$751.00	$157.71	$0.00	$908.71
Nokia 2610 Phone SKU: n2610-1 *Dropdown* Image 1	$139.48	Ordered 1	0	$0.00	$0.00	$0.00	$0.00

Paid Amount	Refund Amount	Shipping Amount	Shipping Refund	Order Grand Total
$0.00	$0.00	$0.00	$0.00	$1,058.19

Invoice History

Invoice Comments

Invoice Totals

Subtotal	$751.00
Shipping & Handling	$10.00
Tax	$157.71
Grand Total	$918.71

Append Comments ☐

Email Copy of Invoice ☐

Choosing "submit invoice" to create a partial invoice for that order. Another method is using the following code:

```
$order;// Your order to create Invoice

if($order->canInvoice()){

$invoiceQtys=array(

// ItemID =>QtyOf Item to Invoice

);
$invoice= Mage::getModel('sales/service_order',$order)-
>prepareInvoice($invoiceQtys);

$invoice->register();

$invoice->getOrder()->setIsInProcess(true);

Mage::getModel('core/resource_transaction')

->addObject($invoice)

->addObject($invoice->getOrder())

->save();

}
```

II- Dummy Item

Dummy item is the item that does not involve in the calculation when you create an invoice (or refund, shipment). For example, you buy a bundle product and the price was calculated based on its components. That bundle product is a dummy item when you invoice or refund. Detail of method to check if an item is dummy:

```
/**

* This is Dummy item or not

* if $shipment is true then we checking this for shipping situation if not

* then we checking this for calculation

*

* @parambool $shipment

* @return bool

*/

publicfunctionisDummy($shipment=false){

if($shipment){

if($this->getHasChildren()&&$this->isShipSeparately()){

returntrue;

}

if($this->getHasChildren()&&!$this->isShipSeparately()){

returnfalse;

}
if($this->getParentItem()&&$this->isShipSeparately()){

returnfalse;

}

if($this->getParentItem()&&!$this->isShipSeparately()){

returntrue;

}

}else{

if($this->getHasChildren()&&$this->isChildrenCalculated()){

returntrue;

}

if($this->getHasChildren()&&!$this->isChildrenCalculated()){

returnfalse;

}

if($this->getParentItem()&&$this->isChildrenCalculated()){

returnfalse;

}

if($this->getParentItem()&&!$this->isChildrenCalculated()){

returntrue;

}

}

returnfalse;

}
```

III- Last Item

Because of some problems when calculate the total of invoice, Magento processes to separate between a normal item and the last item. It is very important when you create a Partial Invoice. For instant, the model to calculate discount for an invoice:

```
/**

* Resolve rounding problems

*/

if($item->isLast()){
```

```
$discount=$orderItemDiscount-$orderItem->getDiscountInvoiced();

$baseDiscount=$baseOrderItemDiscount-$orderItem->getBaseDiscountInvoiced();

}

else{

$discount=$orderItemDiscount*$item->getQty()/$orderItemQty;

$baseDiscount=$baseOrderItemDiscount*$item->getQty()/$orderItemQty;</p>

$discount=$invoice->getStore()->roundPrice($discount);

$baseDiscount=$invoice->getStore()->roundPrice($baseDiscount);

}
```

And the method, which checks if the current item is the last, depends on the quantity of current items and the available items of order allowed to invoice:

```
/**

* Checking if the item is last

*

* @return bool

*/

publicfunctionisLast()

{

if((string)(float)$this->getQty()==(string)(float)$this->getOrderItem()->getQtyToInvoice()){

returntrue;

}

returnfalse;

}
```

Part 6: Cancel Operations

This lesson refers to cancelation, which is an important operation since everyone can make a mistake sometime, right? It allows admin to cancel a wrong action while processing the order.

I- Order entities support cancel

Not all of order's entities in Magento support cancelling operations (the shipment for example), and the cancelling operation is not always available.

The order allows to cancel but it checkscans cancelled order by using method***canCancel()***in the order model:

```
/**

* Retrieve order cancel availability

*

* @return bool

*/

publicfunctioncanCancel()

{

if($this->canUnhold()){// $this->isPaymentReview()

returnfalse;

}


$allInvoiced=true;

foreach($this->getAllItems()as$item){

if($item->getQtyToInvoice()){

$allInvoiced=false;

break;

}

}

if($allInvoiced){

returnfalse;
}


$state=$this->getState();

if($this->isCanceled()||$state=== self::STATE_COMPLETE ||$state===
self::STATE_CLOSED){

returnfalse;

}


if($this->getActionFlag(self::ACTION_FLAG_CANCEL)===false){

returnfalse;

}


returntrue;

}
```

When an order is called off, it cancels the order’s payment and item, and sets data of cancelation in order model. Magento dispatchs an event after the cancellation.

```
/**

     * Cancel order

     *

     * @return Mage_Sales_Model_Order

     */

publicfunction cancel()

{

if($this->canCancel()){

$this->getPayment()->cancel();

$this->registerCancellation();


            Mage::dispatchEvent('order_cancel_after',array('order'=>$this))
;

}
return$this;

}
```

The ordered item allows cancelation if that item did not cancel:

```
/**

* Cancel order item

*

* @return Mage_Sales_Model_Order_Item

*/

publicfunction cancel()

{

if($this->getStatusId()!== self::STATUS_CANCELED){

Mage::dispatchEvent('sales_order_item_cancel',array('item'=>$this));

$this->setQtyCanceled($this->getQtyToCancel());

$this->setTaxCanceled($this->getTaxCanceled()+$this-
>getBaseTaxAmount()*$this->getQtyCanceled()/$this->getQtyOrdered());

$this->setHiddenTaxCanceled($this->getHiddenTaxCanceled()+$this-
>getHiddenTaxAmount()*$this->getQtyCanceled()/$this->getQtyOrdered());

}

return$this;

}
```

Similar to order, the invoice and invoice items, the credit memo and credit memo items allow cancelation, too. However, you can't cancel an invoice or a credit memo in backend, these operations are used for the online payment.

II- Void and cancel

Void operation is used for online payment methods. It will cancel the invoice and callback to online payment to void it. But not like the cancelation, the invoiced quantity will no longer be able to be invoiced again. You can see the ***void()*** method in the Invoice model:

```
/**

* Void invoice
```

```
*
* @return Mage_Sales_Model_Order_Invoice
*/
publicfunction void()
{
$this->getOrder()->getPayment()->void($this);
$this->cancel();
return$this;
}
```

And the ***_void()*** method in Payment model:

```
/**
* Authorize payment either online or offline (process auth notification)
* Updates transactions hierarchy, if required
* Prevents transaction double processing
* Updates payment totals, updates order status and adds proper comments
*
* @parambool $isOnline
* @param float $amount
* @return Mage_Sales_Model_Order_Payment
*/
protectedfunction _authorize($isOnline,$amount)
{
// update totals
$amount=$this->_formatAmount($amount,true);
$this->setBaseAmountAuthorized($amount);

// do authorization
$order=$this->getOrder();
$state=Mage_Sales_Model_Order::STATE_PROCESSING;
$status=true;
```

```
if($isOnline){

// invoke authorization on gateway

$this->getMethodInstance()->setStore($order->getStoreId())-
>authorize($this,$amount);

}else{

$message= Mage::helper('sales')->__(

'Registered notification about authorized amount of %s.',

$this->_formatPrice($amount)

);

}


// similar logic of "payment review" order as in capturing

if($this->getIsTransactionPending()){

$message= Mage::helper('sales')->__('Authorizing amount of %s is pending
approval on gateway.',$this->_formatPrice($amount));

$state=Mage_Sales_Model_Order::STATE_PAYMENT_REVIEW;

if($this->getIsFraudDetected()){

$status=Mage_Sales_Model_Order::STATUS_FRAUD;

}

}else{

$message= Mage::helper('sales')->__('Authorized amount of %s.',$this-
>_formatPrice($amount));

}


// update transactions, order state and add comments

$transaction=$this-
>_addTransaction(Mage_Sales_Model_Order_Payment_Transaction::TYPE_AUTH);

if($order->isNominal()){

$message=$this->_prependMessage(Mage::helper('sales')->__('Nominal order
registered.'));

}else{

$message=$this->_prependMessage($message);
$message=$this->_appendTransactionToMessage($transaction,$message);

}

$order->setState($state,$status,$message);


return$this;

}
```

III- Tax and discount processing

While cancelling, the data was calculated and stored in database.

Order cancelation calculates and stores canceled tax and canceled discount:

```
$this->setSubtotalCanceled($this->getSubtotal()-$this-
>getSubtotalInvoiced());

$this->setBaseSubtotalCanceled($this->getBaseSubtotal()-$this-
>getBaseSubtotalInvoiced());


$this->setTaxCanceled($this->getTaxAmount()-$this->getTaxInvoiced());

$this->setBaseTaxCanceled($this->getBaseTaxAmount()-$this-
>getBaseTaxInvoiced());


$this->setShippingCanceled($this->getShippingAmount()-$this-
>getShippingInvoiced());

$this->setBaseShippingCanceled($this->getBaseShippingAmount()-$this-
>getBaseShippingInvoiced());


$this->setDiscountCanceled(abs($this->getDiscountAmount())-$this-
>getDiscountInvoiced());

$this->setBaseDiscountCanceled(abs($this->getBaseDiscountAmount())-$this-
>getBaseDiscountInvoiced());
```

The tax canceled equals the tax of order subtract the tax invoiced. Discount canceled equals the discount of order subtract the discount invoiced. Invoice and credit memo canceled will calculate and update tax, discount for order. See the invoice canceled code:

```
/**
```

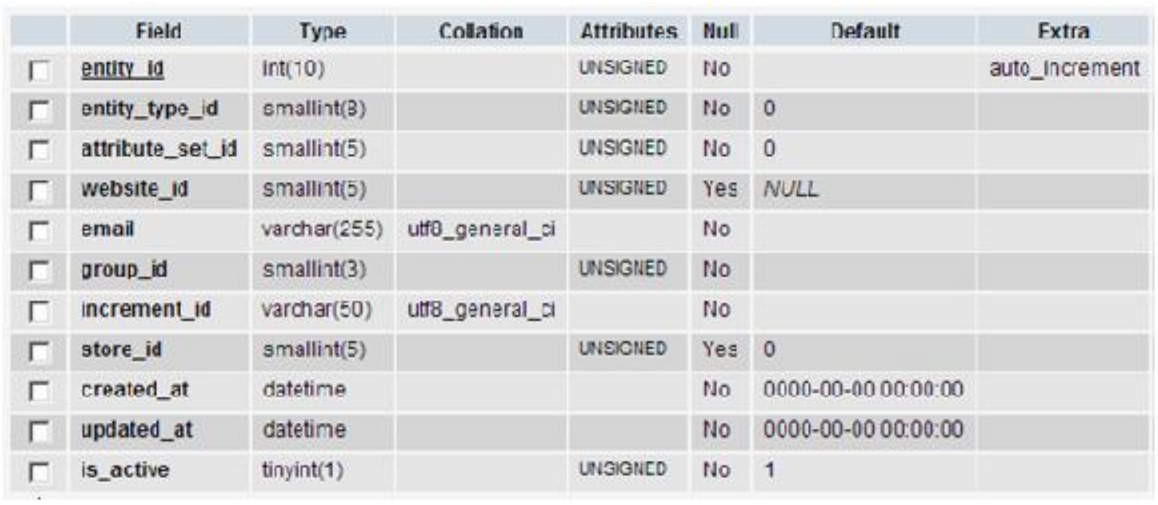
```
     * Cancel invoice action
     *
     * @return Mage_Sales_Model_Order_Invoice
     */
publicfunction cancel()
{
$order=$this->getOrder();
$order->getPayment()->cancelInvoice($this);
foreach($this->getAllItems()as$item){
$item->cancel();
}

/**
         * Unregister order totals only for invoices in state PAID
         */
$order->setTotalInvoiced($order->getTotalInvoiced()-$this-
>getGrandTotal());
$order->setBaseTotalInvoiced($order->getBaseTotalInvoiced()-$this-
>getBaseGrandTotal());

$order->setSubtotalInvoiced($order->getSubtotalInvoiced()-$this-
>getSubtotal());
$order->setBaseSubtotalInvoiced($order->getBaseSubtotalInvoiced()-$this-
>getBaseSubtotal());

$order->setTaxInvoiced($order->getTaxInvoiced()-$this->getTaxAmount());
$order->setBaseTaxInvoiced($order->getBaseTaxInvoiced()-$this-
>getBaseTaxAmount());

$order->setHiddenTaxInvoiced($order->getHiddenTaxInvoiced()-$this-
>getHiddenTaxAmount());
$order->setBaseHiddenTaxInvoiced($order->getBaseHiddenTaxInvoiced()-$this->getBaseHiddenTaxAmount());


$order->setShippingTaxInvoiced($order->getShippingTaxInvoiced()-$this->getShippingTaxAmount());

$order->setBaseShippingTaxInvoiced($order->getBaseShippingTaxInvoiced()-$this->getBaseShippingTaxAmount());


$order->setShippingInvoiced($order->getShippingInvoiced()-$this->getShippingAmount());

$order->setBaseShippingInvoiced($order->getBaseShippingInvoiced()-$this->getBaseShippingAmount());


$order->setDiscountInvoiced($order->getDiscountInvoiced()-$this->getDiscountAmount());

$order->setBaseDiscountInvoiced($order->getBaseDiscountInvoiced()-$this->getBaseDiscountAmount());

$order->setBaseTotalInvoicedCost($order->getBaseTotalInvoicedCost()-$this->getBaseCost());


if($this->getState()== self::STATE_PAID){

$this->getOrder()->setTotalPaid($this->getOrder()->getTotalPaid()-$this->getGrandTotal());

$this->getOrder()->setBaseTotalPaid($this->getOrder()->getBaseTotalPaid()-$this->getBaseGrandTotal());

}

$this->setState(self::STATE_CANCELED);

$this->getOrder()->setState(Mage_Sales_Model_Order::STATE_PROCESSING,true);

        Mage::dispatchEvent('sales_order_invoice_cancel',array($this->_eventObject=>$this));

return$this;

}
```

Part 7: Customer Management

Before we proceed further, let me ask you a very simple question: “What is the basic difference between a successful and an unsuccessful business?” A business is successful only when its products and services have enough buyers in the market. Yes, there are several other parameters also but customers play a crucial role in deciding the success and failure of an organization. And with such a large number of customer in your system, how can you handle them? Magento helps manage customer easily and conveniently.

I- Customer Entity

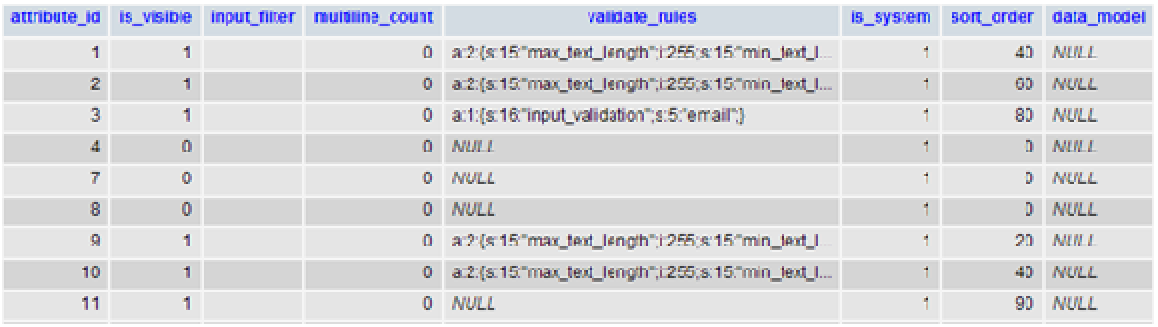
Similar to product, Magento uses EAV model to keep customer’s information. The main table to store customer data is ***customer_entity***.



	Field	Type	Collation	Attributes	Null	Default	Extra
☐	entity_id	int(10)		UNSIGNED	No		auto_increment
☐	entity_type_id	smallint(8)		UNSIGNED	No	0	
☐	attribute_set_id	smallint(5)		UNSIGNED	No	0	
☐	website_id	smallint(5)		UNSIGNED	Yes	*NULL*	
☐	email	varchar(255)	utf8_general_ci		No		
☐	group_id	smallint(3)		UNSIGNED	No		
☐	increment_id	varchar(50)	utf8_general_ci		No		
☐	store_id	smallint(5)		UNSIGNED	Yes	0	
☐	created_at	datetime			No	0000-00-00 00:00:00	
☐	updated_at	datetime			No	0000-00-00 00:00:00	
☐	is_active	tinyint(1)		UNSIGNED	No	1	

Customer_entity

Besides EAV tables, customer’s attributes have an additional table (***customer_eav_attribute***), you can add validate required to an attribute:



attribute_id	is_visible	input_filter	multiline_count	validate_rules	is_system	sort_order	data_model
1	1		0	a:2:{s:15:"max_text_length";i:255;s:15:"min_text_l...	1	40	*NULL*
2	1		0	a:2:{s:15:"max_text_length";i:255;s:15:"min_text_l...	1	60	*NULL*
3	1		0	a:1:{s:16:"input_validation";s:5:"email";}	1	80	*NULL*
4	0		0	*NULL*	1	0	*NULL*
7	0		0	*NULL*	1	0	*NULL*
8	0		0	*NULL*	1	0	*NULL*
9	1		0	a:2:{s:15:"max_text_length";i:255;s:15:"min_text_l...	1	20	*NULL*
10	1		0	a:2:{s:15:"max_text_length";i:255;s:15:"min_text_l...	1	40	*NULL*
11	1		0	*NULL*	1	90	*NULL*

Customer_eav_attribute

If you want to add attributes in customer's data, you can use the customer setup class (***Mage_Customer_Model_Entity_Setup***):

```
$setup=new Mage_Customer_Model_Entity_Setup();

$setup->addAttribute('customer','national_id',array(

'group'=>'General',

'type'=>'varchar',

'input'=>'text',

'label'=>'National Identification',

'visible'=>1,

'required'=>0,

'visible_on_front'=>1,

'sort_order'=>120

));
```

In addition, if you want to show your custom attribute on edit form in backend, you need to add attribute to customer form attribute:

```
$setup->getConnection()->insertMultiple($setup-
>getTable('customer/form_attribute'),array(

array(

'form_code'=>'adminhtml_customer',

'attribute_id'=>$setup->getAttributeId('customer','national_id')

)

));
```

II- Magento Customer Address

Magento designs multiple addresses option for one customer. In checkout process, customer address is converted to billing address and shipping address. The billing address is often used to calculate the tax for order, the shipping address is always used to calculate the shipping fee. Magento configures fields that convert from customer address to order address in config.xml file:

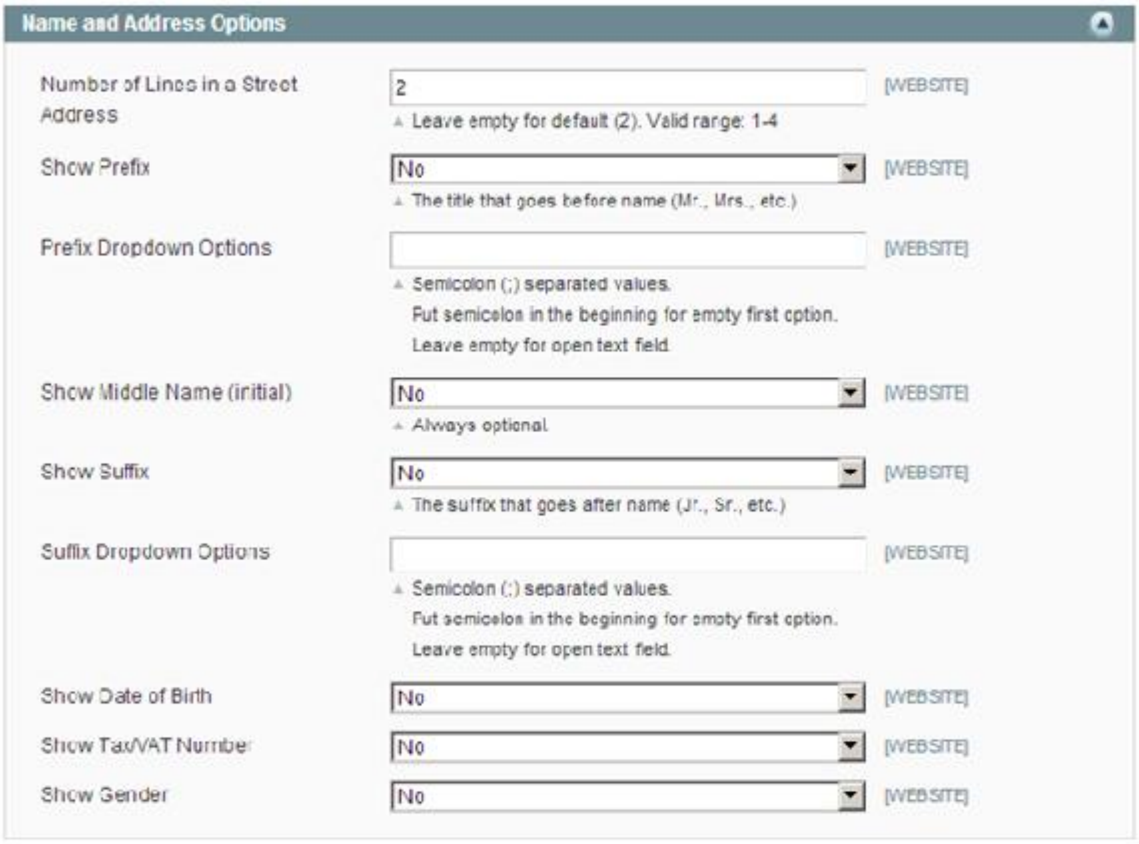
```
<config>
```

```
    ...
    <global>
        <fieldsets>
            ...
            <customer_address>

<id><to_quote_address>customer_address_id</to_quote_address></id>

<parent_id><to_quote_address>customer_id</to_quote_address></parent_id>
                <prefix><to_quote_address>*</to_quote_address></prefix>

<firstname><to_quote_address>*</to_quote_address></firstname>

<middlename><to_quote_address>*</to_quote_address></middlename>
                <lastname><to_quote_address>*</to_quote_address></lastname>
                <suffix><to_quote_address>*</to_quote_address></suffix>
                <!--<email><to_quote_address>*</to_quote_address></email>--
>
                <company><to_quote_address>*</to_quote_address></company>

<street_full><to_quote_address>street</to_quote_address></street_full>
                <city><to_quote_address>*</to_quote_address></city>
                <region><to_quote_address>*</to_quote_address></region>

<region_id><to_quote_address>*</to_quote_address></region_id>
                <postcode><to_quote_address>*</to_quote_address></postcode>

<country_id><to_quote_address>*</to_quote_address></country_id>

<telephone><to_quote_address>*</to_quote_address></telephone>
                <fax><to_quote_address>*</to_quote_address></fax>
            </customer_address>
        </fieldsets>
    </global>

</config>
```

Please note that EAV Model stores customer address. Therefore, adding attributes in it is similar to customer entity, which entity type is ***customer_address***.

III- Configure validation customer information

To change the validation of customer information, you can go to ***System > Configuration > Customer Configuration*** and find the field set ***Name and Address Options***:



Name and Address Options

Number of Lines in a Street Address	2 Leave empty for default (2). Valid range: 1-4	[WEBSITE]
Show Prefix	No The title that goes before name (Mr., Mrs., etc.)	[WEBSITE]
Prefix Dropdown Options	 Semicolon (;) separated values. Put semicolon in the beginning for empty first option. Leave empty for open text field.	[WEBSITE]
Show Middle Name (initial)	No Always optional.	[WEBSITE]
Show Suffix	No The suffix that goes after name (Jr., Sr., etc.)	[WEBSITE]
Suffix Dropdown Options	 Semicolon (;) separated values. Put semicolon in the beginning for empty first option. Leave empty for open text field.	[WEBSITE]
Show Date of Birth	No	[WEBSITE]
Show Tax/VAT Number	No	[WEBSITE]
Show Gender	No	[WEBSITE]

Name and Address Options

When you save the configuration, the customer attribute is saved too. You can find the code to save it on class***Mage_Adminhtml_Model_System_Config_Backend_Customer_Show_Customer*** and method***_afterSave()***:

```
protectedfunction _afterSave()

{
```

```
$result=parent::_afterSave();


$valueConfig=array(

''=>array('is_required'=>0,'is_visible'=>0),

'opt'=>array('is_required'=>0,'is_visible'=>1),

'1'=>array('is_required'=>0,'is_visible'=>1),

'req'=>array('is_required'=>1,'is_visible'=>1),

);


$value=$this->getValue();

if(isset($valueConfig[$value])){

$data=$valueConfig[$value];

}else{

$data=$valueConfig[''];

}


if($this->getScope()=='websites'){

$website= Mage::app()->getWebsite($this->getWebsiteCode());

$dataFieldPrefix='scope_';

}else{

$website=null;

$dataFieldPrefix='';

}


foreach($this->_getAttributeObjects()as$attributeObject){

if($website){

$attributeObject->setWebsite($website);

$attributeObject->load($attributeObject->getId());

}

$attributeObject-
>setData($dataFieldPrefix.'is_required',$data['is_required']);
$attributeObject-
>setData($dataFieldPrefix.'is_visible',$data['is_visible']);

$attributeObject->save();

}


return$result;

}
```

Therefore, you can add configuration to your custom attribute with the backend model (tag ***backend_model***) as the following instruction:

adminhtml/system_config_backend_customer_show_customer.

The configuration will be automatically applied to your custom attribute that you added.

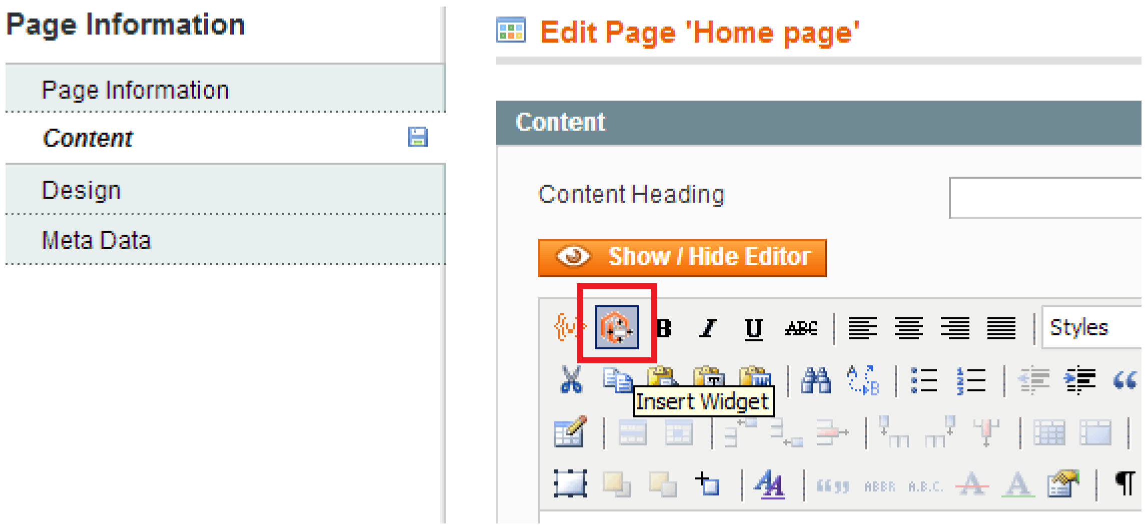
TOPIC 10

Part 1: Widgets

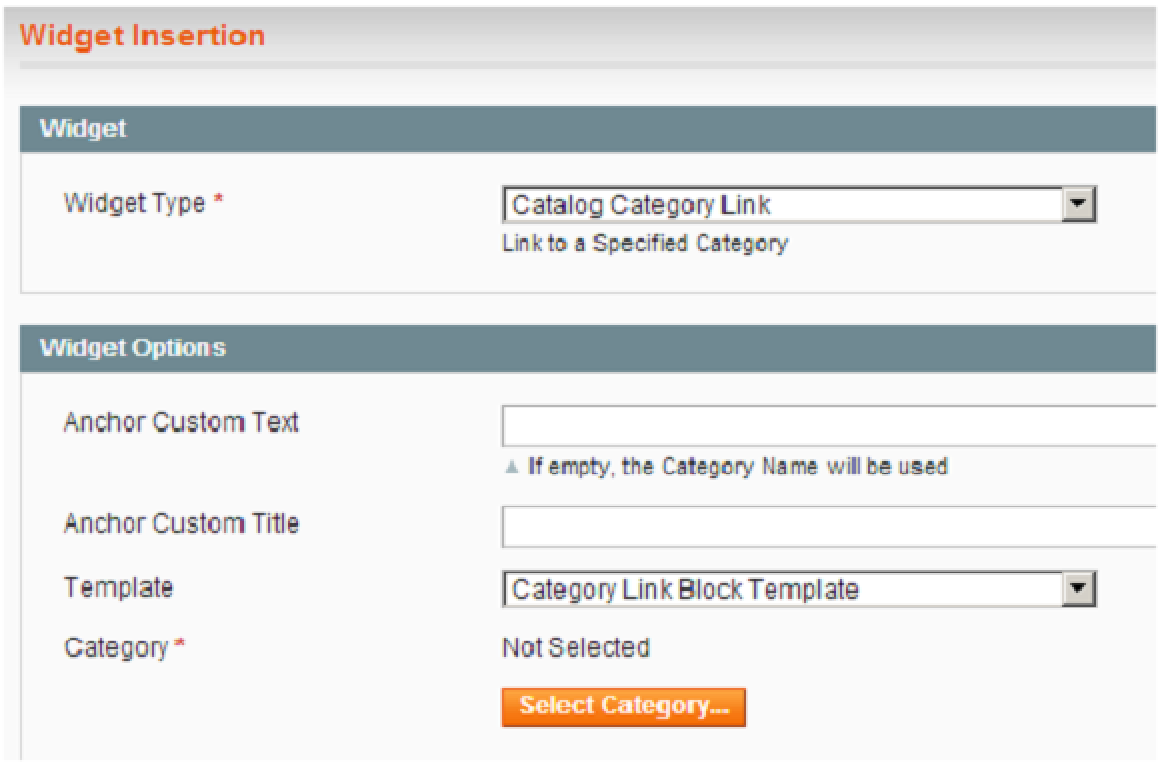
Let's start with **Topic 10 – Advanced Features** and the first part will be about **widgets**. Magento provides widgets so that admins can conveniently add dynamic content to a page without technical knowledge.

I- Create frontend widget

Admins can create a widget for a CMS page on WYSIWYG editor.



Admins need to select widget type and specify parameters for that widget.


Widget Insertion

Widget

Widget Type * Catalog Category Link
Link to a Specified Category

Widget Options

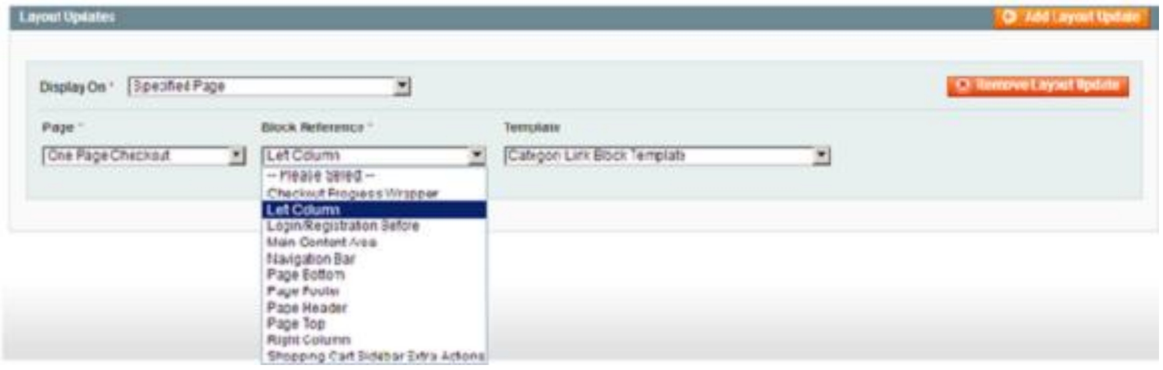
Anchor Custom Text
If empty, the Category Name will be used

Anchor Custom Title

Template Category Link Block Template

Category * Not Selected

Another way is that admins can create a widget for any magento page by going to the menu ***CMS –> Widgets***and adding new widget instance. On the edit form, admins need to select the **layout updates** to choose a specific page and position for the widget.


Layout Updates

Display On * Specified Page

Page * One Page Checkout
Block Reference * Left Column
Template Category Link Block Template

II- Widget for custom module

Magento allows developers to add a custom widget type easily.

Firstly, you need to declare your custom widget type in the ***widget.xml*** file on ***etc*** folder.

```
<?xml version="1.0"?>

<widgets>
```

```
<custom_widget type="widgets/widgets" translate="name description"
module="widgets">

<name>Custom Widget</name>

<description>Custom Module Widget</description>

<is_email_compatible>1</is_email_compatible>

<parameters>

<template>

<required>1</required>

<visible>1</visible>

<label>Template</label>

<type>select</type>

<value>widgets/widgets.phtml</value>

</template>

</parameters>

</custom_widget>

</widgets>
```

Then, you need to create the block **class** for that widget type. This block needs **implements** from Mage_Widget_Block_Interface.

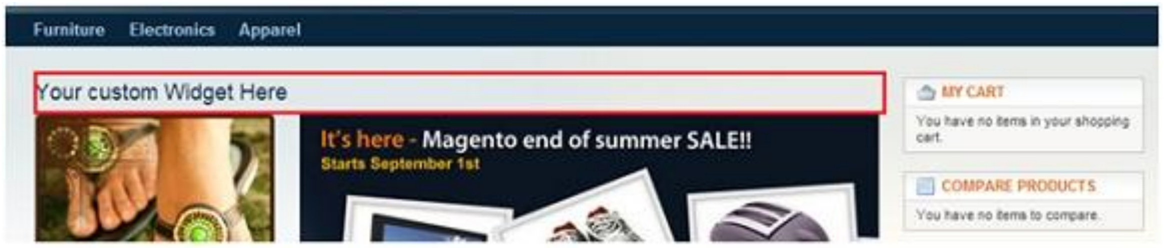
```
<?php

class Magestore_Widgets_Block_Widgets

    extends Mage_Catalog_Block_Product_Abstract

    implements Mage_Widget_Block_Interface

{

    // content of your custom block

}
```

The next step is to create a template file:

```
<?php

/**

* Custom Widget template

*/
```

```
?>
<h2>
<?php echo $this->__('Your custom Widget Here') ?>
</h2>
```

Finally, you go to admin panel and create a **widget instance** for your custom widget. This widget instance will update the layout and show your custom widget on frontend:


Furniture
Electronics
Apparel
Your custom Widget Here
It's here - Magento end of summer SALE!!
Starts September 1st
MY CART
You have no items in your shopping cart.
COMPARE PRODUCTS
You have no items to compare.

Magestore really hopes that you can find this part useful in assisting you to develop widget for your custom module. Goodbye and see you again soon!

Part 2: API

You may probably know that API is one of the most important things to developers and Magento provides API functions to allow developers to work with Magento from a third party system.

I- Magento Core API

On version 1.5, Magento API supports two API protocols: SOAP and XML-RPC, of which SOAP is the default.

To connect with Magento SOAP web services, you can use these links for your SOAP clients:

```
http://magentosite/index.php/api/soap/?wsdl

http://magentosite/index.php/api/?wsdl
```

This is an example of SOAP client code written in PHP:

```
$client = new
SoapClient('http://magentosite/index.php/api/soap/?wsdl');


// get sessionId before call Magento Core API function

$sessionId = $client->login('apiUser', 'apiKey');


$result = $client->call($sessionId, 'order.list');

$result = $client->call($sessionId, '.', 'arg1');

$result = $client->call($sessionId, '.', array('arg1', 'arg2',
'arg3'));

$result = $client->multiCall($sessionId, array(

array('.'),

array('.', 'arg1'),

array('.', array('arg1', 'arg2'))

));


// If you don't need the session anymore
```

```
$client->endSession($sessionId);
```

To connect with Magento XML-RPC wen services, you need to use this link for your XML-RPC client:

http://magentosite/index.php/api/xmlrpc/

Please look at an example code using XML-RPC client:

```
$client = new
Zend_XmlRpc_Client('http://magentosite/index.php/api/xmlrpc/');


// get sessionId before call Magento Core API function
$sessionId = $client->call('login', array('username' => 'apiUser',
'password' => 'apiKey'));


$result = $client->call('call', array($sessionId, '.'));
$result = $client->call('call', array($sessionId, '.', 'arg1'));
$result = $client->call('call', array($sessionId, '.', array('arg1',
'arg2', 'arg3')));
$result = $client->call('multiCall', array($sessionId, array(
array('.'),
array('.', 'arg1'),
array('.', array('arg1', 'arg2'))
)));


// If you don't need the session anymore
$client->call('endSession', array($sessionId));
```

Magento Core API allows you to manage customers, categories, products, sales, checkout process, countries and regions. For the full list of core API methods, we can visit http://www.magentocommerce.com/wiki/doc/webservices-api/api. In that part, I have an example using Magento API method ***customer.info***, this code below:

```
$client = new Zend_XmlRpc_Client('http://magentohost/api/xmlrpc/');
```

```
// get sessionId before call Magento Core API function
$sessionId = $client->call('login', array('username' => 'apiUser',
'password' => 'apiKey'));

$result = $client->call('call', array($sessionId, 'customer.info',
'1'));

print_r($result);

// If you don't need the session anymore
$client->call('endSession', array($sessionId));
```

And then, the result will be:

```
Array
(
[customer_id] => 1
[created_at] => 2007-08-30 23:23:13
[updated_at] => 2008-08-08 12:28:24
[increment_id] => 000000001
[store_id] => 1
[website_id] => 1
[firstname] => John
[lastname] => Doe
[email] => john.doe@example.com
[password_hash] => 2049484a4020ed15d0e4238db22977d5:eg
[default_billing] => 274
[default_shipping] => 274
[created_in] =>
[group_id] => 1
[prefix] =>
[middlename] =>

[suffix] =>

[dob] =>

[taxvat] =>

[confirmation] =>

[gender] =>

)
```

II- Create your own API

You may know how to use Magento API, but when you develop a Magento module, you may do not know how to add your custom API method for working on Magento. This topic will help you to implement that.

First of all, you need to declare your API method with sys tem by adding code in the file ***api.xml*** on ***etc*** folder of your module. This file has similar code to:

```
<?xml version="1.0"?>

<config>

    <api>

        <resources>

            <[custom_resource] translate="title"
module="[custom_module]">

                <title>[Your custom title]</title>

                <acl>[custom_resource]</acl>

                <model>[custom_module]/[your_model]</model>

                <methods>

                    <[method] translate="title"
module="[custom_module]">

                        <title>[Your custom method title]</title>

                        <method>[method]</method>

                        <acl>[custom_resource]/[method]</acl>

                    </[method]>

                </methods>
                <faults module="[custom_module]">
                    <!-- Example a fault response -->
                    <data_invalid>
                        <code>100</code>
                        <message>Invalid data. View details in error
message</message>
                    </data_invalid>
                </faults>
            </[custom_resource]>
        </resources>
        <acl>
            <resources>
                <[custom_resource] translate="title"
module="[custom_module]">
                    <title>[Your custom title]</title>
                    <sort_order>2000</sort_order>
                    <[method] translate="title"
module="[custom_module]">
                        <title>[Your custom method title]</title>
                    </[method]>
                </[custom_resource]>
            </resources>
        </acl>
    </api>
</config>
```

Then, you need to declare your module model in ***config.xml*** file and write your model as an adapter for API method above:

```
<?php

class [Your_Module]_Model_[your_model] extends
Mage_Api_Model_Resource_Abstract
```

```
{
    public function [method]() {
        // put adapter code here
        try {
            ...
        } catch (Exception $e) {
            // fault with the code tag data_invalid
            $this->_fault('data_invalid', $e->getMessage());
        }
    }
}
```

---THE END---