



Drupal Node Overview

Instructor Guide

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EDT502 Final Project

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Program Overview

Overview

Drupal provides an elegantly designed and powerfully implemented mechanism for storing content as extensible, modifiable objects with various properties called nodes. Every major release of Drupal contains many enhancements and new features but the node system, at its core, has seen very little change due to its straightforward and simple design. For this very reason, a strong understanding of how Drupal's node system works is important to understanding Drupal itself, both as a developer and an administrator. It can, however, be difficult to understand just how nodes work. In particular, Drupal administrators and developers tend to have a difficult understanding the ways in which Drupal modules can modify the node structure.

This training is an important step for any potential Drupal developer to quickly get up to speed with what is arguably Drupal's most important feature - its node system. Many potential Drupal developers have used the node system for years either without knowing it, or without fully understanding it. An understanding of the basic features of Drupal's node system, how and when nodes are modified, and being able to identify where and when that modification happens are key objectives to becoming a better Drupal developer. This training helps lay the foundation required for potential Drupal developers to write modules and themes that work with Drupal's node system.

Goal of Instruction

The goal of this program is to provide potential and current Drupal developers, who have experience administering Drupal and some experience with PHP, the necessary foundation of knowledge about the Drupal node system that will allow them to identify cases where nodes are being modified and introduce them to the methods that will allow them to write modules that modify Drupal nodes. Additionally, attendees will be presented with resources that they can use after the training to help reinforce this goal.

Rationale

Drupal's use has grown significantly in the past couple of years as individuals, schools and companies have begun to see its use as a strong platform for content management and application development. This growth is only matched by the lack of development talent for using the platform. This is a major concern for technology managers and coordinators who choose to use Drupal, as they need reassurance that they have staff who can support their platform.

In past, informal experiences with presenting the node system to potential Drupal developer's, it has been found that visual, personable demonstration works best for conveying the underlying ideas of the system. Developers are able to quickly ask questions when they don't understand a concept and clarify what they have learned. The designer of the training has both extensive experience working with Drupal's node system and with presenting its concepts formally and informally to other Drupal developers.

Target Audience

The target population for this particular instance of the training is ASU staff and student Drupal site administrators and developers (either potential or current developers) that have the prerequisites defined in *Attendee Prerequisites*.

Assuming this initial training is successful, the target population will most likely increase to encompass *any* Drupal site administrators and potential or current Drupal developers that have the prerequisites.

Attendee Prerequisites

- Familiarity with administering Drupal and managing content within it
- Basic knowledge of the PHP programming language

Length of Program

The training program for *Drupal Node Overview* should take one hour.

Program Objectives

This workshop for potential and current Drupal developers

1. presents an overview of Drupal's node structure in easy to understand terms;
2. provides attendees with useful tools for inspecting the structure of a node; and
3. gives attendees the knowledge required to identify where and when nodes are modified.

Other content covered

- Attendees will be able to identify other, less critical, attributes of Drupal nodes.

Organization

Number and length of lessons

The program is broken into three topics. All the material can be covered in a single, one hour, session. Each topic should be covered in roughly 15 minutes.

Tests

Included with the materials for the program are both a pretest and posttest. A cue will be given when these should be administered at the designated time in the program.

Materials

The following materials are required for the successful delivery of the training program.

- Instructor manual
- Attendee manuals
- Presenter computer
- Projector
- Attendee log in information slips
- Copies of pretest and posttest (enough for all attendees)
- Copies of participant surveys (enough for all attendees)

Unit Planning

This program of instruction is broken up into three main topics. Each topic is a reflection of an objective of the program and can be treated as a unit of instruction.

Breaking Up Lessons

It should be possible to deliver the entire program of instruction within one hour, so there should not be a great need to divide instruction over several slots of time. However, if it is necessary to do so, you may break up instruction by objective (roughly 15 minutes per objective). The program introduction should be presented with the first objective.

Getting Started

- Prepare the presentation computer by ensuring that the slides open and display correctly and that the website can be opened
- Ensure that you can login to the training website.

Training website log in information

URL: <http://edt502.jeffbeeman.com>

Username: teacher

Password: teacher

Potential Alterations to the Program

It is possible that attendees may not be able to bring computers with them, or that the internet connection for attendees on their own computers may not be accessible. If this is the case, you can alter the training by having attendees come up to the presentation computer to do practice activities. If this is necessary:

- limit the number of attendees who do each set of practice activities,
- talk the other attendees through what the attendee is doing,
- take special care to reiterate important concepts of each section
- watch your time carefully

Part 1: Introduction, Pretest and Getting Started

Materials

Insure that you have the following materials and equipment ready to go before the training begins:

- Presentation computer
- Projector
- Attendee booklet and surveys (one for each attendee)
- Training website
- Attendee computers all have internet access

Note: *Attendees may bring their own computers. In this case, ask them to make sure they have internet access. If most attendees do not have internet access, see Potential Alterations to the Program above.*

- Attendee log in slips

Procedures

Introduce the training program

- Welcome the attendees to the session and hand out the attendee booklet. Allow the attendees some time to flip through the book at their leisure for a couple of minutes, but then ask them to close the books before you begin.
- Tell the attendees they are participating in an overview of Drupal's node system. Explain to them that the term *node*, in Drupal, refers to any piece of content within the site and that nodes can be stories, pages, blog entries, forum topics or any number of other types of content. Point out that each of those pieces of content has common attributes.

Discussion

Ask the attendees the following question to generate discussion:

- **Think about when you've created content in Drupal before. What are some common attributes of the nodes you have created?**

Some good answers would be that they each have **authors**, **titles** and **bodies**.

State the program purpose and objectives

- Inform the attendees that the purpose of this training is to explore Drupal's node system and that understanding how Drupal's node system uses or adds to attributes of nodes can save them hours of development and debugging time when working on modules and themes.
- Tell the attendees that during this training they will learn the important attributes of nodes, find out about a useful tool for discovering all the attributes of nodes, and be introduced to the programmatic methods they can use to alter a node's structure.

Administer the pretest

- Tell the attendees that they will now be taking a pretest to find out what they already know. Explain that they are not expected to know all the answers because they have not been through the training yet and that it's okay if they can't answer some of the questions. Explain that the pretest is used to help the program creators improve the instruction.
- Give each attendee a copy of the pretest.
- Tell the attendees to read the directions and answer the items on their own.
- Help attendees with questions about terminology or directions, but not with answers to the individual items.
- Collect the pretests and tell the attendees that they will be learning the correct answers in the training.
- After the training, score the pretests using the answer key provided in the back of this guide.

Have the attendees log in to the demo website

- Tell the attendees that you will now give them login information for the training demo website and that they should use the information on the paper they receive to log in to the site.
- Hand out the attendee login information slips.

Part 2: Thinking of nodes as objects

This section of the training contains an overview of presenting nodes as objects that have properties and includes a practice activity for attendees to become familiar with the concept. Attendees may not be familiar with the concept of objects that have properties, which is generally a concept that comes from programming. The lesson starts out with a brief comparison, relating nodes to objects, which are then related to automobiles.

Procedures

Introduce the concept of nodes as objects

- Explain to the attendees that Drupal nodes are objects that have properties. A useful comparison is to equate Drupal objects to any physical object in the world, like automobiles. You could explain that automobiles have a type, like sedan, sport utility vehicle, truck or van. They also have a make, like Toyota, Ford, General Motors. They are usually made in a year, such as 2006, and have other properties like exterior color, interior color, engine type and engine size.
- Explain that Drupal nodes, although virtual, are similar to any other physical object and that they have many properties, just like an automobile. Tell the attendees that some of these properties are vital to a node's existence.

Point out key attributes of a node

- On the demo website, click on the *Hello World* post on the front page. Point out the **key attributes** of this node to the attendees by pointing out the:
 - **Node ID:** Explain that this is the unique, numeric identifier of each node, and is also known as *nid*. Point out the node ID by directing the attendees' attention to the URL of the current page. Explain that every node in Drupal can be accessed using a URL following the pattern seen on the website, with the site address plus *node/x*, where *x* is the node ID. Explain to the attendees that the node ID is the most critical attribute of a node, as it is what uniquely identifies it among all the other nodes on the system.
 - **Type:** Explain that while they cannot see it here, you already know that the type of this node is *Story*. Explain that other common types include *Page* and *Forum*. Tell the attendees that you know this is a story because it was created earlier. Explain to them that later in the program they will learn a method to discover this if they don't already know it.
 - **Title:** Direct the attendees' attention to the title of the current page, both at the top of the page content and also in the browser window's title. Explain that this is the brief title of the node.
 - **Created date:** Direct the attendees' attention to the time displayed on the current story node and explain that this is stored in Drupal's database as a Unix time stamp. Explain that this is a time stamp indicating when the node was created.

- **Author:** Explain that this is the ID of the user who created the node, also known as *uid*. Explain that they can discover the *uid* by clicking on the author's username. The resulting page includes the *uid* in the URL of the page (i.e. the site address plus *user/x*, where *x* is the user ID).

Have the attendees practice creating nodes and identifying their key attributes

- Tell the attendees to follow the instructions in their attendee handbooks, *Practice* in the *Thinking of nodes as objects* section.
- Instruct the attendees to pay close attention to the form they are filling out and how the various fields on it relate to the resulting display when then submit the node.
- Tell the attendees to follow the node creation process a couple of times, using different values each time.
- As the attendees work, assist them with any questions or problems they may come across.

Part 3: The devel module

This section of the training contains a brief overview of the devel module and instructs attendees on how it can be used to inspect properties of nodes.

Procedures

Introduce the devel module

- Explain to the attendees that the devel module contains utilities and functions that can help them when developing and debugging issues on their sites and that it is one of the most important tools they have as Drupal developers and administrators.
- Tell the attendees that they will use the devel module to view the key attributes and other “raw” data about the nodes they just created.

Enable the devel module

- Tell the attendees that you will now enable the devel module for use on the demo website.
- Explain to the attendees that if they wish to enable the module on their own site later, they can follow the instructions provided in the attendee booklet.
- Enable the devel module through the standard module installation process. Even though most attendees will be familiar with this process, explain to the attendees the steps you are taking as you go through them.
 1. Go to Administer -> Site Building -> Modules
 2. Check the box next to the Devel module and click “Save the Configuration”
 3. Go to Administer -> User Management -> Access Control
 4. Give Authenticated Users the “access devel information” privilege by checking the box in the corresponding column and clicking “Save permissions.” This will give all users, including the teacher and attendee accounts, access to the devel information.

Demonstrate how to use the devel module

- Explain to the attendees that the devel module can be used to view the raw data structure of a node.
- Demonstrate to the attendees how to access a node’s data structure by navigating to the “Hello World” node and clicking on the “Dev load” tab.
- Explain to the attendees that what they see on the page are the unprocessed, or “raw,” attributes of the node.
- Ask the attendees to point out the key attributes that they learned about earlier.

Note: Attendees might ask about some of the attributes seen on the “Dev load” screen, such as files or taxonomy and what they mean. Explain to the attendees that these attributes are provided by modules, and that they will learn how that happens later in the session.

Practice

- Instruct attendees to visit a few of the nodes they created earlier.
- Tell the attendees to locate the node ID, type, title, created date and author of the nodes.
- Ask the attendees if they can also find the body text and changed dates of the nodes.

Part 4: Modifying the node structure

This section of the training explains how `hook_nodeapi` and `hook_form_alter` can be used together to modify the structure of a node.

Procedures

Explain that modules can modify the node structure

- Explain to the attendees that one of the great strengths of Drupal's node system is that it provides mechanisms for extending and modifying nodes through modules.
- Explain that some modules, like the comment and taxonomy modules, extend nodes by adding data to the node and that Drupal then uses that data to format and display additional information to users.
- As a demonstration of this concept, navigate to the "Dev load" tab of the "Hello World" node and point out the properties related to comments and taxonomy.
- Explain that while the taxonomy attribute is currently empty, if you add terms to the node, they would see them here.
- Explain to the attendees that you will now create a vocabulary (a set of related taxonomy terms) that can be assigned to the nodes that they have been creating.

Create a free-tagging vocabulary for use with Story nodes

Even though most attendees will be familiar with this process, explain to them the steps you are taking as you go through them.

1. Navigate to Administer -> Content Management -> Categories
2. Choose "Add Vocabulary"
3. Enter "Story tags" into the "Vocabulary name" field
4. Check the box next to "Story" under "Types"
5. Check the box next to "Free tagging"
6. Submit the form to create the vocabulary

Note: You may wish to explain to the attendees that they can learn more about taxonomies later by clicking on the "more help" on the categories administration page.

Introduce *hook_form_alter*

- Explain to the attendees that the edit form for story nodes will now be altered to reflect the newly assigned category.
- Go back to the “Hello World” story node and click on “Edit” to go to the edit form for the node.
- Explain to the attendees that the “Story tags” input field has been added to the form through a programmatic method called *hook_form_alter*. Explain to the attendees that there are many Drupal methods that follow a standardized naming convention called “hooks” and that any module can implement them.
- Explain to the attendees that the taxonomy module is using a method called *taxonomy_form_alter*, which is the taxonomy module’s implementation of *hook_form_alter*, to modify the node editing form that they see now by adding the “Story tags” form element.
- Tell the attendees that you will now add some tags to the node to demonstrate that Drupal now accepts the new form element’s input field and associates it with the node.
- Add some terms to the node (i.e. *drupal*, *demo*, *training*).
- Point out the terms on the resulting page.
- Emphasize this point by clicking on the “Dev load” tab of the node and showing the attendees that the terms are now associated with the node programmatically, as well.

Introduce *hook_nodeapi*

- Explain to the attendees that while the taxonomy module’s implementation of *hook_form_alter* added the “Story tags” form element to the node edit form, its *only* purpose is to modify the form. Tell the attendees that Drupal provides another hook, called *hook_nodeapi*, for saving, loading and viewing the data that users enter in the modified form.
- Explain that *hook_nodeapi* provides many “operations” that can be called in the process of creating, updating and viewing nodes as well as in other contexts, such as generating an RSS feed or populating Drupal’s search index.
- As an example, explain that when you updated the node, the “update” operation, or “op” of *taxonomy_nodeapi* was called. It was given the full node, including the term data that was added through *taxonomy_form_alter*. Explain that the taxonomy module took that data and saved it into its own database tables.
- To further illustrate this, go to http://api.drupal.org/api/function/taxonomy_nodeapi/5 and point out the “update” operation of the *taxonomy_nodeapi* function.

Practice

- Instruct the attendees to go to the *Modifying the node structure* practice section of their attendee handbooks and to go through the steps there a few times.
- As the attendees work, assist them with any questions they may have about how the *hook_form_alter* and *hook_nodeapi* function.

Part 5: Posttest and Wrap-up

Procedures

Summarize the material covered

- Tell the attendees that they are going to wrap up the session with a brief review of the concepts covered.
- Ask what the key attributes of nodes are. Guide the attendees toward an answer that includes **node ID**, **title**, **created date**, **type**, and **author ID**.
- Ask what tool can be used to discover all attributes of a node. Ask the attendees to explain how this tool is used.
 - **Answer:** The devel module; and, the attributes of nodes can be viewed by clicking on the “Dev load” tab of any node.
- Ask attendees to name the two programmatic methods used to modify a node’s structure.
 - **Answer:** *hook_form_alter* and *hook_nodeapi*

Administer the posttest

- Give each attendee a copy of the posttest. Tell the attendees that the posttest will give them a chance to review the material and see how much they learned, as well as help the program designers to improve the course by gathering data about where instruction could be improved.
- Have the attendees write their name on the test and go over the instructions with them before they begin.
- Collect the tests when the attendees are finished.
- Go over the correct answers with the attendees using the answer key at the back of this program guide.

Resource reminders and wrap-up

- Tell the attendees that they have several useful guides in their attendee handbooks and remind them to hang on to them. Remind them of the links and charts in the back of the guide, as well.
- Ask for any final questions, and tell the attendees that the session is completed.

Test Answer Keys

Pretest

5 points each

1. c
2. d
3. a
4. b
5. d
6. type
7. devel
8. hook_nodeapi

Posttest

5 points each

Model answers:

1. *Node ID*, or *nid*, is the unique numeric identifier of each node. *Type* defines the kind of node, such as story, page or forum. *Title* is the brief title of the node. *Created date*, or *created*, is a time stamp indicating when the node was created. *Author*, or *uid*, is stored as the user ID of the author of the node.
2. The devel module
3. Dev load
4. `hook_form_alter` is used to modify Drupal forms, like the node editing form.
5. `hook_nodeapi` is used to work with node data as nodes as created, updated, deleted and during other node “operations.”

Attendee Login Slips

URL: http://edt502.jeffbeeman.com Username: student1 Password: student1	URL: http://edt502.jeffbeeman.com Username: student2 Password: student2	URL: http://edt502.jeffbeeman.com Username: student3 Password: student3
URL: http://edt502.jeffbeeman.com Username: student4 Password: student4	URL: http://edt502.jeffbeeman.com Username: student5 Password: student5	URL: http://edt502.jeffbeeman.com Username: student6 Password: student6
URL: http://edt502.jeffbeeman.com Username: student7 Password: student7	URL: http://edt502.jeffbeeman.com Username: student8 Password: student8	URL: http://edt502.jeffbeeman.com Username: student9 Password: student9
URL: http://edt502.jeffbeeman.com Username: student10 Password: student10	URL: http://edt502.jeffbeeman.com Username: student11 Password: student11	URL: http://edt502.jeffbeeman.com Username: student12 Password: student12
URL: http://edt502.jeffbeeman.com Username: student13 Password: student13	URL: http://edt502.jeffbeeman.com Username: student14 Password: student14	URL: http://edt502.jeffbeeman.com Username: student15 Password: student15
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