# Plone 3 Techniques

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**Author**: Joel Burton <joel@joelburton.com>

**Covering**: Plone 3.0 or newer

**Info**: Offered through PloneBootcamps: www.plonebootcamps.com

# Contents

# 1 Welcome to Class!

## 1.1 Class

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### 1.1.1 Topics

- Content management changes
  - Workflow
  - Versioning
  - Portlets
  - Control Rules

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### 1.1.2 Topics (2)

- Integrator changes
  - Archetypes
  - Generic Setup

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### 1.1.3 Topics (3)

- Developer changes
  - Intro to Zope 3
  - Views
  - Viewlets
  - Building portlets / content rules
  - PAS

### 1.1.4 What (Mostly) Hasn't Changed

- Archetypes
- "Theming" (CSS)
- Testing
  - Selenium or unit tests
- Deployment
- Relational databases

## 1.2 How Things Work

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### 1.2.1 Advice from Past Students

- 8 hours is a long day
  - Get some rest
  - Drink lots of water
- Work on the exercises
- Make notes in Acrobat reader

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### 1.2.2 Pace of Class

- Starts off gently, gets a bit faster
  - Please feel free to give me feedback
- If you know the answer, let me know!
  - ... if you're lost, tell me that, too

## 1.3 Stereograms

**Stereograms**

- I feel comfortable...
- ... building a Plone 2.5 site
- ... building a Plone 2.5 product
- ... writing medium-complex Python code

# 2 Plone 3 Content Management

## 2.1 Overview

**Overview**

- Click-to-Edit
- New Schematas
- Renaming of Concepts

## 2.2 Click to Edit

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### 2.2.1 Click to Edit

- View screens for content allow click-to-edit
  - Excellent for power-users doing fast edits
  - Sometimes confusing for novice users
    - Easy to trigger unexpected errors
  - Powered by KSS and async JavaScript (AJAX)

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### 2.2.2 Click to Edit Caveats

- Only works with
  - Uncustomized Archetype views
  - "Plone 3-ified" view templates
    - Since practically no one did things to anticipate this
- Not (yet) supported for all AT field types
  - Missing for `float`, `lines`, and others
  - Not supported for add-on field types

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### 2.2.3 Oh, the Humanity!

- Early research shows confusing for end-users
  - May get better as it gets refined
  - Can turn off by turning off `at.kss` in `portal_kss`
    - This loses live validation on edit form, though
    - Refactoring may allow this to be easier in future

## 2.3 New Schematas

### New Schematas

- Edit forms now use AJAX-y schemata tabs
  - Slower to load initial edit form, but must faster to switch!

## 2.4 Renaming

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### 2.4.1 Keywords

- Now called “Categories”
  - May not be as intuitive for users
  - “Categories” can suggest a fixed taxonomy

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### 2.4.2 Smart Folders

- Now called “Collections”
  - May be a very helpful change (“folder” confused people)

## 2.5 Sharing Tab

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### 2.5.1 Sharing Tab

- Radically simplified
  - Still exposes same functionality & reporting
  - No longer shows all roles
    - Only those "appropriate" for sharing (no Manager, Owner, etc)
  - Re-labels roles as capabilities ("Contributor" == "Can add")

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### 2.5.2 Changing Ownership

- Link to change ownership of content item gone
  - Probably unintentional; useful for many sites
  - Feature still works but not exposed in UI:

    `http://path/to/content/ownership_form`

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### 2.5.3 Roles to Share

- **Can view** (`Reader`)
  - Can view (even when private/pending)
- **Can edit** (`Editor`)
  - Can edit (but not delete, etc)
  - Implies viewing

### 2.5.4 Roles to Share II

- **Can add** (`Contributor`)
  - Can add new content below here
  - Does *not* imply viewing or editing
- **Can review** (`Reviewer`)
  - Can publish/reject
  - Does *not* imply viewing or editing
    - Can edit while pending ("clean up")

New roles do not appear on the sharing tab in Plone 3 (unlike earlier versions of Plone). Adding them requires either editing the Plone source tree, or making new ZCML and code in your product. This is controlled in `lib/python/plone/app/workflow`; see the commented-out code in `localroles.py` and `configure.zcml` for examples of adding the "missing" roles of Owner, Manager, and Member.
As "Editor" doesn't normally allow deletion or sharing, you can't make someone a true "collaborator" without sharing the Owner role. You can do this via the ZMI, or by showing the Owner role on the sharing tab.

### 2.5.5 Local Role Pattern

```
/projects          <= Share with COO
  /new-office      <= Share with PM
    /goals
    /plans
    /salaries
      /2007.xls    <= Share to collaborate
```

- Sharing folder shares *everything* within
  - Including subitems

### 2.5.6 Local Role Blacklisting

```
/projects
  /new-office    <= Shared with Marcus
    /goals
    /plans
    /salaries    <= Should be more secret
      /2007.xls
```

- Can turn off "inherit permissions" for `salaries`
  - Marcus doesn't get role here
    - Only his "intrinsic" role of Member

### 2.5.7 Logged-in Users Group

- Virtual group for all logged-in users
  - Everyone is member of
  - Useful for assigning local roles to *every* logged in user
    - eg, giving Reader role to a private folder, so only logged-in-users can see

### 2.5.8 File Fields Searched

- File fields are now searched
  - If we know how to transform them
    - See add-on in `ATContentTypes/docs`
  - Plone's File types are searched
  - Add-on Archetypes with `FileField` fields are searched
- No longer uses TextIndexNG

### 2.5.9 File Fields Search Setup

- Nothing special is needed
  - Changes are all in `FileField` class
- Method is memory inefficient for very large files
  - Mark FileField fields as `searchable=0` to disable

### 2.5.10 Link Monitoring

- Monitors in-Plone linking
  - Deleting or renaming referent provides warning
  - Can monitor and update in Kupu control panel

# 3 Plone 3 Workflows

## 3.1 Overview

**Overview**

- New Workflows
- Placeful Workflow

## 3.2 New Workflows

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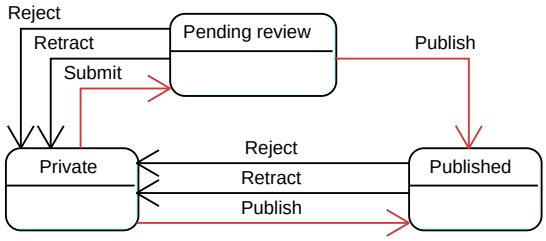
### 3.2.1 Standard Plone Workflow

- Simple Publication Workflow



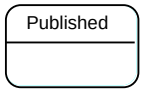

- Owners retract, reviewers reject

---

### 3.2.2 Simple Publication Workflow

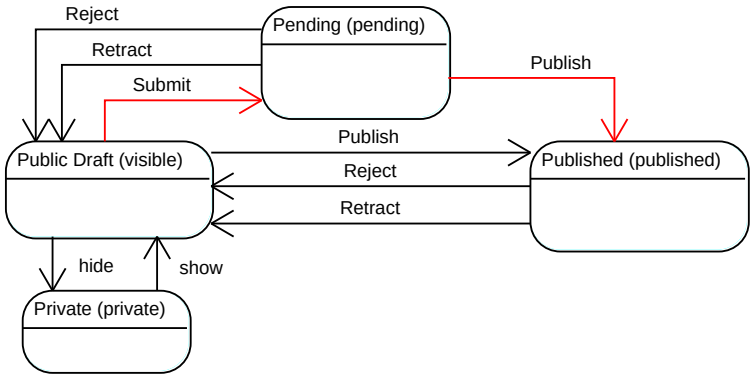
- Things start out as private
  - No more “public draft” (yeah!)
- Owner can edit things when published
  - No more “CNN case”
  - Putting real stuff in workflow transitions

### 3.2.3 One State Workflow




- Single, published state
  - More useful than "no workflow"
    - We can control security
    - Things looking for "published" will find

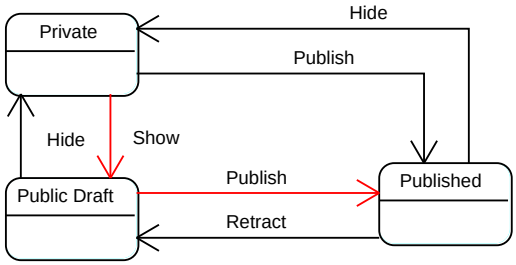
### 3.2.4 Plone Workflow




### 3.2.5 Plone Workflow

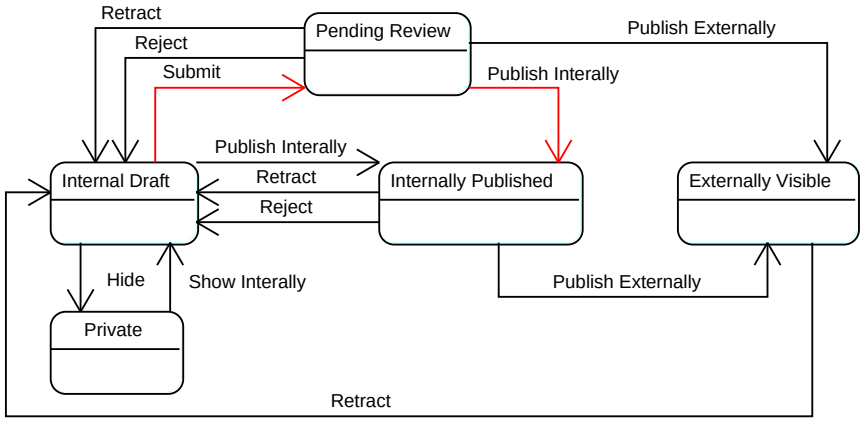
- Almost same as Plone 2 "Plone Workflow"
  - Immediately visible in public draft
  - "CNN case"
    - Owner cannot edit while published
- As useless as ever :)

### 3.2.6 Folder Workflow




- Same as 2.5 “Folder Workflow”
- As useless as ever :)

### 3.2.7 Intranet Workflow

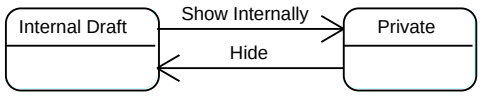



- “Externally visible” is only anon can see

### 3.2.8 Intranet Workflow

- Has "CNN case" (must retract to edit)
- Initial state is internally-viewable
- Generally, 2.5 Plone workflow + internal-only stuff
- Not particularly common case

### 3.2.9 Intranet Folder Workflow




- For folders in Intranet workflow
  - Just private and internal states
- Often better: use Intranet Workflow

## 3.3 Workflow Changes

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### 3.3.1 Files & Images

- Files & Images don't ship with assigned workflow
  - Fixes common case of forgetting to publish
    - Leading to "broken" links/images
- Can easily assign to a workflow
  - Usually better to assign single-state workflow

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### 3.3.2 Default Pages

- Default page workflow is different from folder workflow
  - Constant confusion
- Plone 3 tries to keep in sync
  - When default page undergoes workflow, same transition attempted on folder
    - Name must match
  - Transitioning folder does not transition page

## 3.4 Placeful Workflow

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### 3.4.1 About Placeful Workflow

- Different workflow behavior in different areas of site
- Useful for "Private" folders
- New in Plone 2.5; product can be used with 2.1

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### 3.4.2 Using Placeful Workflow

- First, create new workflow definitions, if needed
  - eg, private_plone_workflow
- Next, create a new "workflow policy"
  - Site Setup -> Placeful Workflow

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### 3.4.3 Establishing Placeful Workflow

- Go to folder on site
- Choose new workflow policy under workflow menu

### 3.4.4 Advantages of Placeful Workflow

- Can feel “natural” -- uses same content types, etc.
  - But these might have been different content types anyway
  - Useful for changing semantics of entire *tree*
    - Harder to do with standard workflow

## 3.5 Customizing Workflows

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### 3.5.1 Customizing Workflows

- Can still do in ZMI
  - Or in UML
  - Or in Generic Setup XML
- Often best: design in ZMI, export to GS

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### 3.5.2 Transition Action

- **Display in Actions Box URL**
  - In Plone 2, not used
    - Couldn't be blank
    - Convention was /

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### 3.5.3 Transition Action (2)

- **Display in Actions Box URL**
  - In Plone 3, use:

    ```
    %(content_url)s/content_status_modify?workflow_action=
    ```

    - Put transition name at end
  - Could go to specialized form
    - To gather more information about transition

# 4 Versioning

## 4.1 Overview

**Overview**

- Versioning
- Purging
- Staging

## 4.2 Versioning

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### 4.2.1 Versioning

- `CMFEditions` is now included in core product
  - As items get edited, each version is saved
  - Can add "Change Note" explaining changes
  - `History` tab shows history
    - Overlap in term "history" with workflow history in byline

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### 4.2.2 Features

- Previewing previous versions
- Reverting to previous versions
- Comparing ("diff") to previous versions

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### 4.2.3 Versioned Types

- Control of types-to-version on type-by-type basis
  - Controlled in new "types" control panel

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### 4.2.4 Purging

- Normally, all old copies are kept
  - After all packing
  - Increases size of database
    - Though minimal impact on performance
- `portal_purgepolicy` controls this

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### 4.2.5 Staging

- Lightweight, in-site staging
  - Using `iterate` (“Working Copy”)
  - Removes most need for separate sites for staging
- Included in Plone 3, but not installed

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### 4.2.6 Using Iterate

- “Check out” under content menu
  - Copies content item
    - New copy begins at initial workflow state
    - Can be edited and workflowed
    - Original copy cannot be edited or workflowed

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### 4.2.7 Using Iterate II

- "Check in" under content menu
  - Moves new copy to replace original
    - But stays in state of original (ie, homepage stays published)
    - History of items are merged

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### 4.2.8 Using Iterate III

- "Cancel checkout" under content menu
  - Delete copies and unlocks original

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### 4.2.9 Iterate Missing Features

- Doesn't stage/version dependencies
  - ie, Images display in content don't change/iterate
  - No branches/tags/etc
    - Users would likely find these insanely confusing

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### 4.2.10 Iterate Security

- Two permissions control check-in/out
  - `iterate: Check in content`
  - `iterate: Check out content`
- Can add to be controlled in workflow
  - So items must be in certain state to be checked-in, etc.

## 4.3 Plone 3 Practices

**Plone 3 Practices**

- CMFEditions is definitely solid
  - Which is good, given that it's now installed by default :)
  - Works great under 2.5!
- iterate is much newer
  - Has Plone 3 dependencies except in antique branches

# 5 Plone 3 Portlets

## 5.1 Adding Portlets

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### 5.1.1 Adding Portlets

- Can add portlets to root of site
  - `Manage portlets` link at the root
  - Different portlets request different config

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### 5.1.2 Type-Specific Portlets

- Can manage using "Types" control panel
  - eg, mission statement portlet appears only on press releases

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### 5.1.3 Group-Specific Portlets

- Can manage using User/Group admin in Control Panel
  - eg, policies portlet appears only for members of Staff

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### 5.1.4 Blocking Portlets

- Allows you to have different behavior in different places
  - `Block`: Don't show what would normally appear
  - `Always Show`: Show what would appear if nothing were blocked

### 5.1.5 Useful Add-On Portlets

- `plone.portlet.static`
  - Make a simple static "message" portlet
    - eg, "office address"
- `plone.portlet.collection`
  - Make a portlet out of any Collection

## 5.2 Dashboard

**Dashboard**

- Users can add portlets here
  - Any portlet type can be added
  - Specific to users
    - Though could be used via code with groups/teams/etc

# 6 Content Rules

## 6.1 Overview

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### 6.1.1 Overview

- Powerful, flexible system for performing actions when something happens
  - Sending mail on publish
  - Moving content on submission
  - Logging all edits

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### 6.1.2 Adding a Rule

- Title
- Description
- Event (will clarify with conditions)
- Enabled
  - Simple place to turn off w/o hunting down
- Stop Further Rules
  - If this happens, don't look further

### 6.1.3 Conditions

- Content Type
- File Extension
- Workflow State
- User group or role
- All must apply

### 6.1.4 Actions

- Log to file
- Notify (web status message)
- Copy/Move/Delete
- Transition
- Send Mail

## 6.2 Limtations

**Limitations**

- All conditions must apply
  - No arbitrary scripted conditions
  - Could fix by adding a TALES expression condition
- Email sending is limited in variable replacements
  - Could fix by writing new, better action
  - Or can use a traditional workflow script to send email

# 7 Plone 3 Skinning

## 7.1 Overview

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### 7.1.1 Overview

- Templates can still live in custom folder
  - Or on-disk skin folder
- Zope3-wired templates are stored elsewhere
  - Also either on-disk or in-ZODB

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### 7.1.2 Zope3 Templates

- Portlets
- Viewlets
  - Page components
    - Search box, logo, footer, etc.
- Most “new” templates

## 7.2 Customerize

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### 7.2.1 Customerize

- `portal_view_customizations`
  - Lists all templated-based Zope3 views

  Does not list ones that requires class, as these must be customized on disk.

  - Can examine to find where they're stored
    - Useful for on-disk developers
  - Can be very slow to load on Windows

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### 7.2.2 Customerize (2)

- `portal_view_customizations`
  - Can customize TTW
    - Similiar to "custom folder" for Zope3 templates
    - Cannot customize into different "skin paths"
- Some things can only be customized on disk
  - Changes not captured by GS snapshots (!!)

# 8 Plone 3 Archetypes

## 8.1 Overview

**Overview**

- Archetypes
- Different permissions
- Skinning

## 8.2 Archetypes

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### 8.2.1 Archetypes

- Not going anywhere soon :)
  - Though underpinning are changing, slowly
- Still the commonly-accepted way to create content types
  - UML is still the easiest & often best way

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### 8.2.2 Converting UML

- Need very recent copy of ArchGenXML
- TTW converter at http://uml3.joelburton.com

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### 8.2.3 Permissions

- For existing products
  - Permission names have moved
  - See newly-generated product for comparison

### 8.2.4 Skinning

- Can output view widget for field
  - As opposed to using accessor directly
- Will allow inline editing in Plone 3
  - And other advantages of widget
    - LinkField might show URL as link

### 8.2.5 base_view Example

- `yourtype_view.pt`:

```
<div metal:define-macro="body">
  <div metal:use-macro="python:
      context.widget('myfield')" />
</div>
```

# 9 GenericSetup

## 9.1 Introduction

**Overview**

- About Generic Setup
- Snapshots
- Creating a New Policy
- Duplication Customization Policies

## 9.2 Generic Setup

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### 9.2.1 About Generic Setup

- New style setup tool for Plone
- Plone uses it for its own setup
  - Products can use it for installation
  - You can use it to capture ZMI changes

---

### 9.2.2 Profiles

- Base Profile
  - Initial setup of site
  - Standard Plone is at `CMFPlone/profiles/default`
  - Can switch to different one later
  - Similiar to Plone 2's "Customization Policies"

---

### 9.2.3 Extension Profiles

- Either overrides or adds to base profile
  - What most products will use

---

### 9.2.4 Snapshots

- Can capture state of site
  - Tool settings and content
  - **Not everything** captured
    - Only standard and updated tools

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### 9.2.5 Snapshots (2)

- Stores results as XML files in ZMI
- Can compare states
  - Useful to see "what's changed"
- Creating snapshots seems to hang sometimes

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### 9.2.6 Export

- Creates snapshot of just one step
- Useful for creating a "site configuration" that captures the configurations of many products
  - eg, capture workflow settings

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### 9.2.7 Factoring What You Need

- Can capture changes either with export or snapshot
  - Trim set of files down
  - Trim files themselves to "what you need"

### 9.2.8 Sample Properties.xml

- `properties.xml`:

```
<?xml version="1.0">
<site>
  <property name="title">Your Site</property>
  <property name="description">Your Description</property>
</site>
```

### 9.2.9 Sample Workflows.xml

- `workflows.xml`:

```
<?xml version="1.0"?>
<object name="portal_workflow"
    meta_type="Plone Workflow Tool">
<object name="foo_workflow" meta_type="Workflow"/>
 <bindings>
  <type type_id="Folder">
   <bound-workflow workflow_id="foo_workflow"/>
  </type>
 </bindings>
</object>
```

### 9.2.10 Import

- Apply/re-apply profile steps
  - All Extension profiles and snapshots are listed
- Be careful about “dependencies” box
  - Can re-apply existing policies and overwrite your changes

### 9.2.11 Using with Products

- Create policy
  - Convention: `default` in folder `profiles`
  - Register with ZCML
- Code-generators (ArchGenXML and DIYPloneStyle) do for you

### 9.2.12 GS and ZCML

```
<configure
    xmlns="http://namespaces.zope.org/zope"
    xmlns:genericsetup=
      "http://namespaces.zope.org/genericsetup">

  <genericsetup:registerProfile
      name="myprod"
      title="Myprod Extension"
      directory="profiles/default"
      description="Extension profile myprod."
      provides="Products.GenericSetup.interfaces.EXTENSION"
      />

</configure>
```

### 9.2.13 GS and QuickInstaller

- Plone 3 introduces "GS-aware" Quick Installer
- An explicit Install.py takes precedence, though
  - May need to pull in GS manually, then, in Install.py:

```
def install(self, reinstall=False):
    id = "ourproduct:default"
    portal_setup = getToolByName(self, 'portal_setup')
    portal_setup.runAllImportStepsFromProfile(
        'profile-%s' % extension_id,
        purge_old=False)
```

### 9.2.14 Getting GS w/o ZCML

- In product `init.py`:

```
from Products.GenericSetup import EXTENSION, profile_registry

def initialize(context):
    profile_registry.registerProfile(
        'profile-id',
        'Profile Title',
        'Profile Description',
        'path-to-profile',
        'ProductName',
        EXTENSION,
    )
```

### 9.2.15 GS and Python Code

- Can have generic setup run any Python code

### 9.2.16 GS and Python Code II

- add to import_steps.xml:

```
<import-step id="foopolicy"
  version="1.0"
  handler="Products.Foo.myPolicy.myPolicy"
  title="My Policies">
  My special things
</import-step>
```

### 9.2.17 GS and Python Code III

- myPolicy.py:

```
def mypolicy(context):
    site = context.getSite()
    site.invokeFactory(
        'Document',
        'foo',
        title='Foo Document')
```

## 9.3 Exercises

### 9.3.1 Exercises

1. Create a simple product with just a GenericSetup profile. In the profile, clone the News Item content type into a Press Release type.

---

### 9.3.2 Exercises Answers #1

1. Create a simple product...

- Create GSPlay folder in `Products`
- `__init__.py`:

```
# Make this into a package
```

- `configure.zcml`:

```
<configure
  xmlns="http://namespaces.zope.org/zope">

  <include file="profiles.zcml" />

</configure>
```

---

### 9.3.3 Exercises Answers #2

- `profiles.zcml`:

```
<configure
    xmlns="http://namespaces.zope.org/zope"
    xmlns:genericsetup=
      "http://namespaces.zope.org/genericsetup">

  <genericsetup:registerProfile
      name="default"
      title="GSPlay Extension"
      directory="profiles/default"
      description="Extension profile for GSPlay."
      provides="Products.GenericSetup.interfaces.EXTENSION"
      />

</configure>
```

---

### 9.3.4 Exercises Answers #3

- Export "Types Tool" step from `portal_setup`
- Trim to `profiles/default/types.xml`:

```
<?xml version="1.0"?>
<object name="portal_types" meta_type="Plone Types Tool">
 <object name="PressRelease"
    meta_type="Factory-based Type Information with dynamic views"/>
</object>
```

---

### 9.3.5 Exercises Answers #4

- Delete all types from `types/` except `News_Item.xml`
- Rename to `PressRelease.xml`
- Change properties (title, description, etc.)

# 10 Buildout Basics

## 10.1 Overview

**Overview**

- What is buildout?
  - Who is it for?
- Basic usage

## 10.2 Buildout

---

### 10.2.1 Buildout

- System for installing and configuring Plone
  - And add-on products
  - And, possibly, Zope and Python
  - In a scripted, reproducible way

---

### 10.2.2 Who Is It For?

- Developers
- Experienced, advanced integrators
  - Multiple rollouts of same setup
  - Complex interdepencies of products
  - Desire to get lost in poor docs and bleeding edge :)

---

### 10.2.3 Idea

- A single config file, `buildout.cfg`
  - This downloads/generates/configs all components
  - You don't/can't touch most things below it
- Very reproducible--just copy `buildout.cfg` to other box

---

### 10.2.4 Getting Started

- Martin's book

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### 10.2.5 Eggs

- Pure Python idea, not a Zope/Plone thing
  - A package with installation scripts & metadata
  - Can be a directory
  - Can be a zipfile of a directory
    - And can be used without unzipping

---

### 10.2.6 Eggs 2

- Many Plone products distributed as "eggs"
  - Can still unzip code in `lib/python`, as normal
  - Or run their `setup.py`
- Most Plone products in eggs can't be used as zip file
  - But this will change

---

### 10.2.7 Challenges

- *Very* command-line oriented
  - Complex on Windows
- Option location & spelling is different than in traditional `zope.conf`, `zeo.conf`, etc.
- Errors can be opaque

---

### 10.2.8 But ...

- The developers love it!
  - So it will get better
- At the point you need it, you can learn the details

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### 10.2.9 Does this Replace My Installer?

- No. Yes. Maybe.
  - Installers are much easier!
    - Easy is good
  - More likely, installers will be a "front end" for buildout
    - Start easy, can edit `buildout.cfg` when you need to

---

### 10.2.10 Eggs without Buildout

- Some new-style products (unzipped):

```
plone.portlets.joel/
  __init__.py
  plone/
    __init__.py
    portlets/
      __init__.py
      joel/
        __init__.py
        foo.py
        bar.py
        browser/
```

---

### 10.2.11 Eggs without Buildout 2

- Can't just unzip this, as there already *is* a `plone` package
  - And may even be a `portlets` package inside of it!
- The goal is you can put this in top-level, next to `plone.portlets.bob`, and they'd both work
- The `__init__.py` files in top-level, in `plone/`, and in `portlets/` contain magic name-mangling stuff

---

### 10.2.12 Eggs without Buildout 3

- Copy `joel/` folder and put in existing `plone/portlets` dir
  - If you don't have `plone`, but not `plone/portlets`:
    - Copy `portlets/` into `plone`
    - **Empty** the `portlets/__init__.py` file but keep the file
      - That removes the weird name-mangling stuff

# 11 Plone 3 and Python

## 11.1 Overview

**Overview**

- Classes
- Decorators
- Unicode strings

## 11.2 Classes

---

### 11.2.1 Classes

- No changes, but more need
  - Portlets are classes
  - "Views" (templates) can use classes
  - Utilities and adapters are classes
  - ... and more!

---

### 11.2.2 Classes 2

- Nothing new. Just review!

```
class Dog(Animal):
  """Our canine friend"""

  color = "spotted"

  def __init__(self, color, name):
    ...

  def rescue(self, severity=5):
    """Go, Lassie, Go!"""
    ...
```

---

### 11.2.3 Classes 3

- Make sure you understand `init` and `super`
  - Python in a Nutshell has excellent chapter on OO

---

### 11.2.4 Decorators

- A "decorated function" is a function with a wrapper around it
  - Can be used for interesting meta-programming

---

### 11.2.5 Decorator Example

- eg, every time a function is called, log it:

```
@somelogger
def myMethod(a, b, c)
  ...
```

- Exact same thing as:

```
def myMethod(a, b, c):
  ...
myMethod = somelogger(myMethod)
```

---

### 11.2.6 Decorators

- Used in z3-technology to "mark" functions/methods
  - "This is an adapter"
  - "This is a view"
  - "This is protected in some way"

### 11.2.7 Unicode

- Unicode = strings can be more than 8-bit
  - Required for many non-English characters
- `"Dog"` is string; `u"Dog"` is unicode
  - Also 'Cat'/u'Cat' and """Long"""/u"""Long"""
  - They're **not** the same
  - z3 stuff fail w/strings if expecting unicode

# 12 Interfaces and ZCML

## 12.1 Overview

**Overview**

- Interfaces
- Marker interfaces
- ZCML

## 12.2 What Is Zope 3

---

### 12.2.1 Benefits of Zope 3

- "Pure Python" feel
- More declarative; less "magical"
- Comprehensive suite of tests
- Good for writing applications that have "components"

---

### 12.2.2 Downsides of Zope 3

- Another technology to learn!
  - And not one aiming for beginners
- No TTW configuration for many things

## 12.3 Interfaces

---

### 12.3.1 Interfaces

- The "public" face of a class
  - Explains what the class does
  - But not how it does it
- Useful for documentation
  - And for interoperability with other programmers

---

### 12.3.2 Student

```
class Student:
  """Student of a bootcamp."""

  def _isBirthday(self):
    # ... code goes here ...

  def isClassFree(self):
    """Does this student get a free class?

    They get a free class on their birthday.
    """
    # ... code goes here ...
```

### 12.3.3 Student Interface

- interfaces.py:

```
from zope.interface import Interface

class IStudent(Interface):
  """Student of bootcamp."""

  def isClassFree():
    """Does this student get a free class?"""
```

### 12.3.4 Student Implementation

- student.py:

```
from zope.interface import implements

class Student:
  implements(IStudent)

  def _isBirthday(self):
    # ... code goes here ...

  def isClassFree(self):
    # Give them a class on their birhday
    # ... code goes here ...
```

### 12.3.5 Advantages of Interfaces

- Obvious how interact with object
  - What is public vs. not
- Don't have to page through code to read docstrings
- The interface can be used by others
  - Who want to implement a *different* kind of student
  - But still have the same API

### 12.3.6 Disadvantages of Interfaces

- More typing
- Two places to read
- May be overkill for simple, obvious objects with small teams

## 12.4 Marker Interfaces

---

### 12.4.1 "Marker Interfaces"

- An interface that "means" something
  - But doesn't suggest any implementation

---

### 12.4.2 Zope 2-Style Markers

- student.py:

```
class Student:
  _canAppearInBlog = True

  ...
```

- Z2 uses attributes to "signal" various things
  - eg `hasattr(self, '_canAppearInBlog')`

---

### 12.4.3 Zope 3-Style Markers

- interfaces.py:

```
from zope.interface import Interface

class IBloggable(Interface):
  """Object can appear in blog."""
```

### 12.4.4 Zope 3-Style Markers II

- student.py:

```
from interfaces import IBloggable
from zope.interfaces import implements

class Student:
  implements(IBloggable)
```

## 12.5 ZCML

---

### 12.5.1 ZCML Intro

- ZCML = XML dialect for Zope3 configuration
  - Mark class as implementing interfaces
  - Can be stored in top-level `configure.zcml` file

---

### 12.5.2 Example ZCML

- `configure.zcml`:

```
<configure
  xmlns="http://namespaces.zope.org/zope"
>
  ...
</configure>
```

---

### 12.5.3 Example ZCML: Five

- May require `xmlns` attributes for extensions (`five`, `browser`, etc)
- `configure.zcml`:

```
<configure
    xmlns="http://namespaces.zope.org/zope"
    xmlns:five="http://namespaces.zope.org/five"
    >

</configure>
```

### 12.5.4 Marking Class with Iface

```
<five:implements
    interface=".interfaces.IBloggable"
    class=".content.student.Student" />
```

### 12.5.5 Finding Things in ZCML

- "." refers to current package:
  - `.interfaces.IBloggable`
- Or give full Python package:
  - `PIL.ImageImage`
- Or look in Zope/Plone products:
  - `Products.CMFPlone.interfaces`

### 12.5.6 Marker Interface TTW

- "Interfaces" tab lists interfaces
  - Can mark on for a class
- Nothing critical there yet
  - But addon products may add
  - And so might future Plones

## 12.6 Plone 3 Practices

---

### 12.6.1 Hiding From Breadcrumbs

- One object?
  - Can mark in ZMI with interfaces tab
- Your code?
  - Can add to class:

```
class Student:
  implements(IHideFromBreadcrumbs)
```

---

### 12.6.2 Hiding From Breadcrumbs II

- General, best practice
  - Mark class in ZCML
  - Doesn't mix code and configuration

## 12.7 ZCML Organization

---

### 12.7.1 ZCML Organization

- Can split up ZCML into multiple files
  - Only `configure.zcml` is examined
  - It can include other files:

```
<include file="..." [package="..."] />
```

---

### 12.7.2 ZCML Organization II

- `configure.zcml`:

```
<include file="implements.zcml" />
```

- Note this is a full filepath, not Py package
  - eg, no leading period

---

### 12.7.3 ZCML Organization III

- `configure.zcml`:

```
<include package=".browser" />
```

  - Reads `configure.zcml` from `browser/`

## 12.8 Exercises

### 12.8.1 Exercises

1. Hide all normal Plone Folders from the breadcrumbs/navigation.
    - These are things that all of class `ATFolder`, found in ATContentTypes
    - The interface for hide-from-breadcrumbs is in `CMFPlone.interfaces.breadcrumbs`

---

### 12.8.2 Exercises Answers #1

1. Hide all normal Plone Folders from the breadcrumbs/navigation.

- `configure.zcml`:

```
<five:implements
  class="Products.ATContentTypes.content.folder.ATFolder"
  interface="Products.CMFPlone.interfaces.breadcrumbs.IHideFromBreadcrumbs"
  />
```

# 13 Utilities and Adapters

## 13.1 Overview

**Overview**

- Utilities
- Named Utilities
- ZCML Overriding
- Adapters

## 13.2 Utilities

---

### 13.2.1 Utilities

- Single tools
  - Similar to in-ZODB CMF tools
  - Can be replaced/extended in other products

---

### 13.2.2 Making a Utility

- Define an interface for it:

```
class ICapitalizer(Interface):
  """Capitalize phrases."""

  def __call__(msg):
     """Return the capitalized phrase."""
```

---

### 13.2.3 Making a Utility II

- Create a utility class:

```
class SimpleCapitalier(object):
  implements(ICapitalizer)

  def __call__(self, msg):
    return msg.upper()
```

### 13.2.4 Making a Utility III

- Register the utility (in ZCML):

```
<utility factory=".capitalizer.SimpleCapitalizer" />
```

- You can also add a `provides` attribute for which interface it implements

  This is only needed if more than one is possible, or if none are specified in class.

### 13.2.5 Using Utilities

- Get the current implementation:

```
from zope.component import getUtility
cap = getUtility(ICapitalizer)
cap("this is lower")
```

## 13.3 Named Utilities

---

### 13.3.1 Named Utilities

- A utility that has a name
  - Can have more than one with different names
  - Can look up by ( name + interface)
- Often used for "registries"
  - Transformations, conversions, etc.

---

### 13.3.2 Making a Named Utility

- Still make an interface and class
- Register:

```
<utility
     factory=".capitalizer.SimpleCapitalizer"
     name="english"
     />
```

---

### 13.3.3 Using a Named Utility

```
from zope.component import getUtility
cap = getUtility(ICapitalizer, name="english")
cap("this is lower")
```

## 13.4 Overriding ZCML

---

### 13.4.1 Conflicting ZCML

- ZCML declarations cannot conflict
  - eg, registering two classes as same non-named utility
- An error during startup will occur

---

### 13.4.2 Overriding ZCML

- To override ZCML, put in `overrides.zcml` file in your product
  - This file is looked for automatically
  - It overrides the normal layer of `configure.zcml`

## 13.5 Products Versus Packages

---

### 13.5.1 Products? Packages?

- Zope 2 "products" are Python packages
  - But not in normal PYTHONPATH
    - Magic required to find
- Zope 3-style pure packages are in PYTHONPATH
  - A normal package *might* be useful outside of Zope/Plone
    - But most still have lots of Zope/Plone deps

---

### 13.5.2 Products? Packages? II

- Products are scanned automatically
  - For `configure.zcml`
  - And `__init__.py`
- Packages are not
  - Must add a "slug" to notice `configure.zcml`

---

### 13.5.3 ZCML Slugs

- A .zcml file, typically just including zcml for a package
  - Stored in `etc/package-includes`
- Conventionally, named `[product]-configure.zcml`
  - Or `[product]-overrides/zcml`

### 13.5.4 Sample ZCML Slug

- `myproduct-configure.zcml`:

```
<include package="myproduct" />
```

## 13.6 Adapters

---

### 13.6.1 Adapters

- Method of "adding methods" to classes
  - Similar to subclassing, but more flexible

---

### 13.6.2 Subclassing

- `zoo.py`

```
class Mammal:
  ...

class Dog(Mammal):
  ...

class Person(Mammal):
  ...
```

---

### 13.6.3 Subclassing Problems

- Difficult to manage in large systems
  - Typical Plone object has 15+ subclasses!
- Adding new functionality is tricky
  - Since existing objects don't include that subclass

---

### 13.6.4 Adapter Benefit

- New object "adapts to" interface
  - Creates a temporary object with additional, discovered functionality

---

### 13.6.5 Adapter Example

- `interfaces.py`:

```
class INoise(Interface):
  def makeNoise():
    """Make right kind of noise for this animal."""
```

---

### 13.6.6 Adapter Example

- `interfaces.py`:

```
class IDog(Interface):
  """Canines"""
```

- `dog.py`:

```
class Dog:
  implements(IDog)
```

---

### 13.6.7 Adapter Example

- `bark.py`:

```
class Bark:
  implements(INoise)

  def makeNoise(self): return "woof!"
```

### 13.6.8 Adapter Example

- Once we do the "wiring", we can "adapt" bark.py to dog.py

```
>>> from interface import INoise
>>> mydog = Dog()
>>> INoise(mydog).makeNoise()
```

- This finds the "right" INoise adaption for Dogs
  - Since Dogs implement the IDog interface

### 13.6.9 Example ZCML

- Adapt bark as INoise for dog:

```
<adapter
    for=".interfaces.IDog"
    provides=".interfaces.INoise"
    factory=".bark.Bark" />
```

### 13.6.10 Plone 3 Techniques

- Adapters used to add logic onto classes
  - Might not have to create separate content types
  - Experimental products allow new AT fields
- One day, all content types may be one class

## 13.7 Exercises

### 13.7.1 Exercises

1. Create a package, `languagetools`, that contains and registers the capitalization utility from this chapter.
   - Register it as a global, unnamed utility
   - Write an external method (or unit test) that finds this utility and tests it.

---

### 13.7.2 Exercises Answers #1

1. Create a product, `languagetools`, that contains and registers the capitalization utility from this chapter.

- Create `languagetools` in `lib/python`
- Add an empty `__init__.py` to it
- Create the slug in `etc/package-includes/languagetools-configure.zcml`:

```
<include package="languagetools" />
```

---

### 13.7.3 3xercise Answers #2

1. Create a product, `languagetools` ...

- Add `interfaces.zcml`:

```
class ICapitalizer(Interface):
  """Capitalize phrases."""

  def __call__(msg):
     """Return the capitalized phrase."""
```

---

### 13.7.4 Exercise Answers #3

1. Create a product, `languagetools` ...

- Add `capitalizer.zcml`:

```
class SimpleCapitalier(object):
  implements(ICapitalizer)

  def __call__(self, msg):
    return msg.upper()
```

---

### 13.7.5 Exercise Answers #4

1. Create a product, `languagetools` ...

- `configure.zcml`:

```
<configure
  xmlns="http://zope.namepsaces.org/zope">
  <utility factory=".capitalizer.SimpleCapitalizer" />
</configure>
```

---

### 13.7.6 Exercise Answers #4

1. Create a product, `languagetools` ...

- `$INSTANCE_HOME/Extensions/testUtility`:

```
from zope.component import getUtility

def testUtility(self):
  """Test utility"""
  cap = getUtility(ICapitalizer)
  return cap("this is lower")
```

- Register external method with module='testUtility' and function='testUtility'

# 14 Views and View Classes

## 14.1 Overview

**Overview**

- "Views"
- View Classes

## 14.2 Views

---

### 14.2.1 Views

- "View" is a horribly overloaded word in Zope/Plone
  - These are "on-disk, ZCML-wired Page Templates"
  - Get to choose where they can be used
    - Rather than a "global namespace"

---

### 14.2.2 Sample View

- `configure.zcml`:

```
<browser:page
  for="*"
  name="mypage.html"
  template="mytemplate.pt"
  permission="zope2.View"
  />
```

- Traversing to `mypage.html` on *anything* shows `mytemplate.pt`

### 14.2.3 Sample View II

- Requires "browser" namespace:

```
<configure
    xmlns="http://namespaces.zope.org/zope"
    xmlns:browser="http://namespaces.zope.org/browser"
    >
  <browser:page
    for="*"
    name="mypage.html"
    template="mytemplate.pt"
    permission="zope2.View"
    />
</configure>
```

### 14.2.4 Sample View III

- Not much advantage so far
  - Could be in CMF on-disk skin folder
  - But can tie to certain interfaces

### 14.2.5 Sample View IV

```
<browser:page
  for=".interface.IMyNewType
  name="mypage.html"
  template="mytemplate.pt"
  permission="zope2.View"
  />
```

- Now, only works for things implementing IMyNewType
  - Doesn't "pollute" global namespace

## 14.3 Permissions

---

### 14.3.1 Permissions

- Same permissions are being used
  - But with new, "package-style" names
  - `View` => `zope2.View`
    - Convention: Remove spaces, jam together
    - Prefix with product (`cmf.ModifyPortalContent`)
      - See common in `Products/Five/permissions.zcml`

---

### 14.3.2 New Permissions

- Can add permissions as:

```
<permissionid="zope2.View"
  title="View"
  />
```

---

### 14.3.3 Significant Security Change

- ZCML wired PageTemplate views are *trusted*
  - They can do things currently logged-in users cannot
  - **Very significant** security change
    - You must trust people who write these!

---

### 14.3.4 The Goggles

- In Zope3 + Plone3, often see URLs like:

```
http://site/@@mypage.html
```

- `@@` tells Zope it's a view
  - Not required, `/mypage.html` would work, too
  - But disambiguates if "mypage.html" were a content object in ZODB
    - Or method / something else acquired

---

### 14.3.5 View Classes

- Provides a Python class that can be associated with PageTemplates
  - Can be used to handle complex logic, etc.

---

### 14.3.6 Zope2-style "View Class"

- area.py PythonScript:

```
##parameters=room
from math import pi
radius = room.getRadius()
return pi * radius * radius
```

---

### 14.3.7 Zope2-style "View Class"

- room_info.pt:

```
<span tal:replace="python: context.area(context)">
  [room area]
</span>
```

---

### 14.3.8 Zope2-style Overview

- Easy to do & understand
- Loose wiring ("coupling") between template + code
- Not easy to change area calculation for one type of content

---

### 14.3.9 Zope3-style View Class

- area.py:

```
from math import pi
from Products.Five import BrowserView

class RoomView(BrowserView):
  def getArea(self):
    radius = self.context.getRadius()
    return pi * radius * radius
```

---

### 14.3.10 Zope3-style View Class

- The ZCML:

```
<browser:page
    for=".interfaces.IRoom"
    name="area"
    class=".area.RoomView"
    permission="zope2.View"
    />
```

### 14.3.11 Using Zope3 View Class

- room_info.pt:

```
<span tal:define="viewc context/@@area"
      tal:replace="python: viewc.getArea(context)">
  [room area]
</span>
```

- `@@` are optional, but clarifying

### 14.3.12 Binding Class and View Together

- In ZCML, can connect the template and the class:

```
<browser:page
    for=".interfaces.IRoom"
    name="room_info"
    class=".area.RoomView"
    template="room_info.pt"
    permission="zope2.View"
    />
```

- In template, just refer to `view/getArea`

### 14.3.13 Binding Class and View Together II

- Simplifying
  - Requires page template being ZCML-wired

## 14.4 Plone 3 Practices

---

### 14.4.1 "Browser" Package

- Views and view classes often go into `browser/` package of product
  - Browser-specific ZCML into `browser/configure.zcml`
  - Don't forget to include this in main `configure.zcml`
  - Don't forget to make a package (`__init__.py`)

---

### 14.4.2 "Templates" Directory

- Where there are more than a few page templates, these go in `templates` directory of browser package

# 15 Viewlets

## 15.1 Overview

**Overview**

- Viewlets
- Re-arranging and hiding
- Viewlet managers
- Layers

## 15.2 Viewlets

---

### 15.2.1 Viewlets

- Small, self-contained visual item
  - Search box
  - Logo
- Portlets are a special kind of viewlet

---

### 15.2.2 Re-Arranging Viewlets

- `/manage-viewlets`
  - Re-arrange within manager
  - Hide
- Changes persist in ZMI
  - Can be captured by GS snapshot

---

### 15.2.3 A Viewlet

- `sponsor.pt`:

```
<p>
  Plone is brought to you by the letter P
  and the numbers 4, 5, and 6.
</p>
```

- Nothing very special about it :)

### 15.2.4 Viewlet ZCML Registration

- configure.zcml:

```
<browser:viewlet
  name="yourproduct.sponsorship"
  for="*"
  manager=
"plone.app.layout.viewlets.interfaces.IPortalFooter"
  template="sponsor.pt"
  permission="zope.Public"
  />
```

### 15.2.5 A Viewlet with Logic

- webmaster.pt:

```
<p>Our webmaster is at
  <i tal:replace="view/webmaster_email">[email]</i>
</p>
```

### 15.2.6 Viewlet Class

- webmaster.py:

```
class WebmasterViewlet(ViewletBase):

  render = ViewPageTemplateFile('webmaster.pt')

  def update(self):
    super(WebmasterViewlet, self).update(self)
    portal = self.portal_state.portal()
    self.webmaster_email = portal.email_from_address
```

### 15.2.7 Viewlet ZCML Registration

- `configure.zcml`:

```
<browser:viewlet
  name="yourproduct.webmaster"
  for="*"
  manager=
"plone.app.layout.viewlets.interfaces.IPortalFooter"
  class=".webmaster.WebmasterViewlet"
  permission="zope.Public"
  />
```

## 15.3 Re-Arranging and Hiding

---

### 15.3.1 Rearranging and Hiding

- Done in GS profile, not in ZCML
  - Weird mix of GS and ZCML in viewlets

---

### 15.3.2 Specifying Viewlet Order

- `profiles/default/viewlets.xml`:

```
<object>
  <order manager="plone.portalfooter"
       skinname="YourSkinPath">
    <viewlet name="webmaster.sponsorship" />
    <viewlet name="webmaster.webmaster" />
  </order>
</object>
```

---

### 15.3.3 Removing Viewlets

- Leaving out of `viewlets.xml` doesn't hide
  - They just appear at the bottom of that manager
- Hide using a `<hidden />` directive

### 15.3.4 Hiding Viewlets

- `profiles/default/viewlets.xml`:

```
<object>
  <hidden manager="plone.portalfooter"
      skinname="YourSkinPath">
    <viewlet name="plone.footer" />
    <viewlet name="plone.colophon" />
  </order>
</object>
```

### 15.3.5 Inserting in Order

- `profiles/default/viewlets.xml`:

```
<object>
  <order manager="plone.portalfooter"
      skinname="YourSkinPath"
      based-on="Plone Default">
    <viewlet name="myproduct.webmaster"
      insert-after="plone.footer" />
  </order>
</object>
```

- Can also `insert-before`

### 15.3.6 Viewlet Managers

- Container for viewlets
  - Plone ships with several (`plone.portaltop`, `plone.portalfooter`, etc)
  - Can create your own
    - They're just an interface

---

### 15.3.7 New Viewlet Manager

- `interfaces.py`:

```
from zope.viewlet.interfaces import IViewletManager

class IPortalHelp(IViewletManager):
  """Viewlet manager for help stuff at bottom."""
```

---

### 15.3.8 Adding Viewlets to Manager

- Same as before, but with new `manager` line.
- `configure.zcml`:

```
<browser:viewlet
  name="webmaster.sponsorship"
  for="*"
  manager=".interfaces.IPortalHelp"
  class=".webmaster.WebmasterViewlet"
  permission="zope.Public"
  />
```

## 15.4 Layers

---

### 15.4.1 Layers

- Analagous to CMF "skin paths"
  - New skin products can create one
    - DIYPloneStyle does this for you
- To ensure an item only appears in your theme

---

### 15.4.2 Making a Layer

- Normally, done for you by DIYPloneStyle:

```
<interface
  interface=".interfaces.IThemeSpecific"
  type="zope.publisher.interfaces.browser.IBrowserSkinType"
  name="mytheme"
  />
```

---

### 15.4.3 Binding Viewlets to Theme

- `configure.zcml`:

```
<browser:viewlet
  name="webmaster.sponsorship"
  for="*"
  manager=".interfaces.IPortalHelp"
  class=".webmaster.WebmasterViewlet"
  permission="zope.Public"
  layer=".interfaces.IThemeSpecific"
  />
```

- Note we bind to *interface*, not *name*!

# 16 Plone 3 Portlets

## 16.1 Overview

**Overview**

- Classic Portlets
- New-Style Portlets

## 16.2 Classic Portlets

---

### 16.2.1 Classic Portlets

- Straightforward, template-based
  - Much easier to write
  - Slightly faster
  - Use use scripts/view classes for logic
  - Can use dynamic placement of new system
  - Can't have "configuration-while-adding" of new portlets

---

### 16.2.2 Sample Classic Portlet

- `portlet_mission.pt`:

```
<dl class="portlet" metal:define-macro="portlet">
  <dt class="portletHeader">Mission Statement</dt>
  <dd class="portletItem even">Our first goal...</dd>
  <dd class="portletItem odd">Our second goal...</dd>
  <dd class="portletFooter">More...</dd>
</dl>
```

- Register with template `portlet_mission` and macro `portlet`

## 16.3 New-Style Portlets

---

### 16.3.1 New-Style Portlet

- Three Python classes
  - Interface of portlet data requirements
  - Assignment
    - Controls where/when it can appear
  - Renderer
    - Handles how it appears

---

### 16.3.2 New Mission Portlet

- `mission.py`:

```
from plone.portlets.interfaces import IPortletDataProvider

class IMissionPortlet(IPortletDataProvider):

    statement = schema.Text(title=u"Mission Statement",
        description=u"Enter your mission statement",
        required=True)
```

- Schema here is Zope 3's formlib

### 16.3.3 New Mission Portlet II

- `mission.py` (cont'd):

```
from plone.app.portlets.portlets import base

class Assignment(base.Assignment):
    implements(IMissionPortlet)

    title = u"Mission Statement"

    def __init__(self, statement):
        self.statement = statement
```

### 16.3.4 New Mission Portlet III

- `mission.py` (cont'd):

```
class Renderer(base.Renderer):
    _template = ViewPageTemplateFile('mission.pt')

    def render(self):
        return self._template()
    def statement(self):
        return self.data.statement
    def title(self):
        return self.data.title
```

- Most similiar to "view class" for portlet

### 16.3.5 New Mission Portlet IV

- Need mostly-boilerplate add/edit classes
- `mission.py` (cont'd):

```
from plone.app.portlets.portlets import base

class AddForm(base.AddForm):
    form_fields = form.Fields(IMissionPortlet)
    label = u"Add Mission Portlet"
    description = u"Displays mission statements."

    def create(self, data):
        return Assignment(statement=data.get('statement',''))
```

### 16.3.6 New Mission Portlet V

- (cont'd):

```
class EditForm(base.EditForm):
    form_fields = form.Fields(IMissionPortlet)
    label = u"Edit Mission Portlet"
    description = u"Displays mission statements."
```

### 16.3.7 New Mission Portlet VI

- Need ZCML registration in `configure.zcml`:

```
<configure xmlns:plone="http://namespaces.plone.org/plone">
  <plone:portlet
    name="portlets.Mission"
    interface=".mission.IMissionPortlet"
    assignment=".mission.Assignment"
    renderer=".mission.Renderer"
    addview=".mission.AddForm"
    editview=".mission.EditForm"
    />
</configure>
```

### 16.3.8 New Mission Portlet VII

- `portlet.pt`:

```
<dl class="portlet">
  <dt class="portletHeader"
      tal:content="view/title">[title]</dt>
  <dd class="portletItem"
      tal:content="view/statement">[statement]</dd>
</dl>
```

- Doesn't require any `<metal>` statements
- Notice use of renderer as view class

### 16.3.9 New Mission Portlet VIII

- Requires GS install, `profiles/default/portlets.xml`:

```
<?xml version="1.0"?>
<portlets>
 <portlet
   addview="portlets.Mission"
   title="Mission Portlet"
   description="A portlet showing mission."
   />
</portlets>
```

### 16.3.10 Classic or New Style

- Clearly, new style have more conceptual overhead/typing
  - But lots of flexibility in assignment class
    - In cases of complex logic in placement
    - Keeps "should-it-show" logic out of template itself

### 16.3.11 Classic or New Style II

- Alternate strategy for our mission portlet
  - Sitewide tool where mission statement is kept, shown in classic portlet
    - Using AGX's <<tool>> stereotype

### 16.3.12 Classic or New Style III

- Best strategy in many cases:
  - Use `plone.portlet.static` and `plone.portlet.collection`
  - New-style portlets for simple messages or Collection results

# 17 Formlib Intro

## 17.1 Overview

---

### 17.1.1 Overview

- Zope3 form generation
  - Can be used to make freestanding forms
    - Though PloneFormGen is often much nicer
  - Used for modeling data required by portlets, etc.

---

### 17.1.2 Concepts

- An interface defines the data requirements
- An implementation class defines how it works

## 17.2 Example

---

### 17.2.1 Example 1

- `myform.py`:

```
from zope.interface import Interface
from zope import schema

class IMyForm(Interface):
    """Define our fields"""

    name = schema.TextLine(title=u"Name",
        required=True)
    subject = schema.Text(title=u"Subject")
```

---

### 17.2.2 Implementation Class

- Uses fields defined in interface
- Has action methods
  - Decorator makes them into buttons

---

### 17.2.3 Example 2

- `myform.py`:

```
from zope.formlib import form
from Products.Five.formlib import formbase

class MyForm(formbase.PageForm):
    form_fields = form.FormFields(IMyForm)
    label = u"Fill out My Form!"

    @form.action(u"Send")
    def action_send(self, action, data):
        """Do something with data"""
        raise "You said", data
```

---

### 17.2.4 Registering with ZCML

- Gets registered as a normal view
  - The "form" magic comes from the base class

---

### 17.2.5 Example 3

- `configure.zcml`:

```
<browser:page
    for="*"
    name="myform"
    class=".myform.MyForm"
    permission="zope2.View"
    />
```

---

### 17.2.6 Common Field Types: String

- `ITextLine`
  - Like AT's "String"; no newlines
- `IText`
  - Like AT's "Text"; allows newlines
- `IASCIILine`, `IASCII`
  - Only low-bit ASCII; otherwise, see above

---

### 17.2.7 Common Field Types: Numbers

- `IInt`
- `IFloat`

---

### 17.2.8 Common Field Types: Dates

- `IDatetime`
- `IDate`

---

### 17.2.9 Common Field Types: Other

- `IBool`
  - Yes/No choice
- `IURI`
  - Absolute URL
- `ICollection`
  - Like “lines” field
  - Unrelated to “Plone 3 collections” (ie, Smart Folders)

---

### 17.2.10 Common Field Paramters

- `title`
- `description`
- `required`
- `readonly`
- `default`

## 17.3 Road Ahead

### Road Ahead

- Excellent examples on how to use in Philip's book

# 18 KSS Intro

## 18.1 Overview

---

### 18.1.1 Overview

- KSS Overview
- Simple Client-Side Actions
- Server-Side Actions

---

### 18.1.2 What is KSS?

- "Kinetic Style Sheets"
  - Power of JS, syntax of CSS
  - Allows you to declare behavior
  - Includes AJAX library
- Very powerful, very cool!

## 18.2 Client-Side

---

### 18.2.1 Calculator Form

- calc.pt:

```
<html metal:use-macro="context/main_template/macros/master">
<div metal:fill-slot="main">

<form>
  2 x <input type="text" id="numfield" /> =
  <b id="result">?</b>
</form>

</div>
</html>
```

- Nothing unusual or KSS-specific

---

### 18.2.2 KSS

- calc.kss:

```
#result:click {
  action-client: alert;
  alert-message: "Hello";
}
```

---

### 18.2.3 KSS Syntax

- `calc.kss`:

```
#result:click {   CSS identifier + event
  action-client: alert;   Action
  alert-message: "Hello"; Parameters
}
```

---

### 18.2.4 KSS 2

- `calc.kss`:

```
#result:click {
  action-client: alert;
  alert-message: formVar('numfield');
}
```

- `formVar` is a "parameter provider" (helper function)

## 18.3 Server-Side

---

### 18.3.1 KSS

- `play.kss`:

```
#num:change {
  action-server: kssCalc;
  kssCalc-num: currentFormVar('numfield');
}
```

- Calls script "kssCalc"
  - Can be view, PythonScript, ExternalMethod, whatever
  - Passes form field `numfield` as `num`

---

### 18.3.2 Script

- `kssCalc.py` (PythonScript):

```
request = context.REQUEST
answer = str(2 * int(num))          # get answer

from kss.core.ttwapi import ( startKSSCommands,
    getKSSCommandSet, renderKSSCommands )

startKSSCommands(context, request)  # boilerplate

core = getKSSCommandSet('core')
core.replaceInnerHTML('#result', answer)

return renderKSSCommands()          # boilerplate
```

### 18.3.3 Alternate Script

- As on-disk class, `calculator.py`:

```
from kss.core import kssaction
from plone.app.plonekssview import PloneKSSView

class Calculator(PloneKSSView):
  @kssaction
  def calculate(self, num):
    answer = str(2 * int(num))          # get answer
    core = self.getCommandSet('core')
    core.replaceInnerHTML('#result', answer)
```

- Start KSS & rendering done via decorator

### 18.3.4 Alternate Script 2

- Add new class as view:

```
<browser:page
  for="*"
  name="kssCalc"
  class=".calculator.Calculator"
  attribute="calculate"
  permission="zope2.View"
  />
```

- This is now bound as "kssCalc", and works as earlier

## 18.4 KSS Cheat Sheet

---

### 18.4.1 Actions: Changing HTML

- `replaceInnerHTML`: Replace all children of the given node with the given content.
  - `html`: the html to insert
- `insertHTMLAfter`: Add HTML after given node.
  - `html`: the html to insert
- `deleteNode`: Delete the node.

---

### 18.4.2 Actions: Attributes

- `setAttribute`: Sets a given HTML attribute of the node.
  - `name`: the attribute name.
  - `value`: the attribute value to set
- `setStyle`: Sets a given style element on the node.
  - `name`: the name of the style element.
  - `value`: the style element value to set

---

### 18.4.3 Actions: CSS Classes

- `addClass`: Add a class to the classes of the node.
  - `value`: the name of the class
- `removeClass`: Remove a class from the classes of the node.
  - `value`: the name of the class
- `toggleClass`: Toggle class on node.
  - `value`: the name of the class

---

### 18.4.4 Actions: Form Elements

- `focus`: Focus the given node that is a form input.

---

### 18.4.5 Actions: Debugging

- `error`: Throws an exception, when executed.
- `log`: Logs an informational message.
  - `message`
- `alert`: Javascript alert box.
  - `message`

---

### 18.4.6 Parameter Providers: Forms

- `formVar(formname, varname)`
  - Produces the value of a given variable within a given form.
- `currentFormVar(varname)`
  - Produces the value of a given variable within the current form.

---

### 18.4.7 Parameter Providers: Content

- `nodeAttr(attrname)`
  - Produces the value of a given html attribute of the selected node.
- `nodeContent()`
  - Produces the textual content of the node. Newlines are converted to spaces.

---

### 18.4.8 Command Sets: Core

- Commands are things used by scripts
- `core` command set are the same as the "actions"
  - `setAttribute`, `addClass`, etc.
  - except when called from code, first parameter is identifier
    - `core.setAttribute('#myitem', 'size', '30')`

---

### 18.4.9 Commands Sets: Zope + Plone

- Additional command sets for Zope and Plone specific stuff
  - Refreshing a viewlet
  - Refreshing a portlet
  - ... and more!

---

### 18.4.10 Debugging KSS

- Use Firebug!
  - Turn on `portal_javascript` debugging
  - Messages come out to Firebug console
- Try your scripts from URL directly

# 19 Pluggable Auth Service

## 19.1 Concepts

---

### 19.1.1 Plone PAS

- "Pluggable Authentication System"
  - Allows replacement of any part of security system
  - ie, can write new role-checking-system or user-storage
- In Plone 2.5+

---

### 19.1.2 PAS Concepts

- **Challenge:** "who are you?"
- **Credentials:** "I am Joel"
- **Authentication:** "Yes, you are"
- **Group assignment:** "You're part of ..."
- **Role assignment:** "You act like..."
- **Enumeration:** listing of users
- **User adding/Editing of users**

### 19.1.3 PAS Plugins

- Examples
  - Users/groups/roles from SQL: SQLPASPlugin
  - LDAP: PAS LDAP Docs
  - Role for in-network people: AutoRole
  - Can't login twice at same time: NoDuplicateLogin
- Many others: Authentication Add-Ons

## 19.2 Only In-Network

---

### 19.2.1 Only In-Network Concept

- Only people from localhost can log in
  - Polite: hide "login_form" link
  - Polite: don't issue challenge
  - Real: refuse to authenticate

---

### 19.2.2 In-Network Script

- zope-root/inNetwork.py:

```
request = context.REQUEST

return request['REMOTE_ADDR']=='127.0.0.1'
```

---

### 19.2.3 Hide Login Form

- Change `portal_membership` condition:

```
python:object.inNetwork() and member is None
```

---

### 19.2.4 Script PAS Plugins

- Can write PAS plugins as PythonScripts
  - Add `Scriptable Plugin` called `only_inside`
  - Name is unimportant

---

### 19.2.5 Learning the API

- Find interfaces in

  ```
  Products/PluggableAuthService/interfaces
  ```

- Signature in `plugins.py`:

  ```
  def challenge( request, response ):
    """ ...
    Returns True if it fired, False otherwise.
  ```

---

### 19.2.6 Refuse to Challenge

- `only_inside/challenge`:

  ```
  ##parameters=request,response
  if not context.inNetwork():
    return True
  ```

---

### 19.2.7 Making it Work

- `only_inside` Interfaces tab
  - Add `Challenge` interface
- Activate
  - Turns on
  - Then move to first

---

### 19.2.8 Refusing to Authenticate

- `only_inside/authenticateCredentials`:

```
if not context.inNetwork():
  raise "OutsideOfNetwork", \
    "Out-of-network users cannot log in."
```

---

### 19.2.9 Making it Work

- `only_inside` Interfaces tab
  - Add `Authenticate` interface
- Activate
  - Turns on
  - Then move to first

---

### 19.2.10 Testing it Out

- No login button
- Won't challenge for needs-login

```
http://site/change_ownership?userid=foo
```

- Will refuse offered credentials

```
http://site?__ac_name=admin&__ac_password=admin
```

## 19.3 Free Role

---

### 19.3.1 Free Role Concept

- Give additional role to logged-in members
  - But only from localhost

---

### 19.3.2 New Plugin

- Add `Scriptable Plugin` called `free_role`
- `free_role/getRolesForPrincipal`:

```
if context.inNetwork():
  return ['Manager']
```

- Add interface for `Roles` and activate
  - Order of activation not important

## 19.4 On-Disk Plugins

---

### 19.4.1 On-Disk Plugins

- Can write plugins on disk as a product
  - Can also export ZMI scriptable plugins

---

### 19.4.2 On-Disk Plugins Details

- Just wrapper for add-forms and class
  - Subclasses `BasePlugin`
  - Use `classImplements` to implement interface
  - Actual method is the same
- NoGoChallenger is nice and simple
- http://svn.plone.org/svn/collective/PASPlugins/NoGoChallenger/trunk/

## 19.5 Exercises

### 19.5.1 Exercises

1. Write a new plugin. If the user is coming from inside our network, this should ignore whatever username and password is provided for authentication, and log the user in as "admin".

   - What part of the process is this?
   - How could we make this happen only if we can't find the user?

---

### 19.5.2 Excercise Answers

1. Plugin `simple_pass/authenticateCredentials`:

   ```
   ##parameters=credentials
   if context.inNetwork():
     return ('admin','admin')
   ```

   - Register and activate for authenticate

# 20 Plone 3 Fixes

## 20.1 CM Fixes

---

### 20.1.1 Turn Off Inline Editing

- In `portal_kss`, turn off `at.kss`
  - This loses live validation on edit form, though
  - Refactoring may allow this to be easier in future

---

### 20.1.2 Multipage Wizards

- AJAX schematas are pretty and fast
  - But don't reload fieldset during switches
  - One schemata can't rely on another

---

### 20.1.3 Multipage Wizard Fix

- Marker interface `IMultiPageSchema` can be added to content class:

```
<five:implements
  class="Products.ATContentTypes.content.folder.ATFolder"
  interface=
"Products.Archetypes.interfaces.IMultiPageSchema" />
```

## 20.2 Security Fixes

---

### 20.2.1 Adding Roles to Sharing

- Require on-disk Python class & ZCML registration
- See examples in `plone/app/workflow/localroles.py` and `plone/app/workflow/configure.zcml`
  - `Member`, `Manager`, and `Owner` are just commented out

---

### 20.2.2 Adding Roles to Sharing

- `localroles.py`:

```
from plone.app.workflow.interfaces import ISharingPageRole
from zope.interface import implements

class ModeratorRole(object):
    implements(ISharingPageRole)

    title = "Can moderate"
    required_permission = None
    # Or can name permission required to assign -- nice!
```

---

### 20.2.3 Adding Roles to Sharing II

- `configure.zcml`:

```
<utility
    name="Moderator"
    factory=".localroles.ModeratorRole"
    />
```

- These don't add role itself, just to sharing
  - Still should add in GS or via ZMI

---

### 20.2.4 Old-Style Messages

```
request.redirect('/foo?portal_status_message=Hello')
```

- No way to have more than one status message
- Ugly URLs
  - People may bookmark and be confused
- Not everything can appear in URL
- Still works, though!

---

### 20.2.5 New-Style Messages

```
from Products.statusmessages.interfaces import IStatusMessage
IStatusMessage(request).addStatusMessage(message, type=type)
```

- Typical type `info`

# 21 Building Content Rules

## 21.1 Overview

**Overview**

- Rules
- Actions

## 21.2 Building an Action

---

### 21.2.1 Action Overview

- Similar to building a new portlet
  - Interface for data model
  - Action for the ping logic
  - Executor for the action
    - Action and Executor could be same class

---

### 21.2.2 Interface

- `ping.py`:

```
class IPingAction(Interface):
    """Definition of the config for ping"""

    url = schema.TextLine(title=u"URL",
                          description=u"URL to ping",
                          required=True)
```

### 21.2.3 Action

- ping.py (cont'd):

```
class PingAction(SimpleItem):
    """The implementation of the action defined before"""
    implements(IPingAction, IRuleElementData)

    url = ''

    element = 'plone.actions.Ping'

    @property
    def summary(self):
        return "Ping %s" % self.url
```

### 21.2.4 Executor

- ping.py (cont'd):

```
class PingActionExecutor(object):
    """The executor for this action."""
    implements(IExecutable)
    adapts(Interface, IPingAction, Interface)

    def __init__(self, context, element, event):
        self.context = context
        self.element = element
        self.event = event
    def __call__(self):
        url = self.element.url
        return True
```

### 21.2.5 Add Form

- `ping.py` (cont'd):

```
class PingAddForm(AddForm):
    """ An add form for the ping action """

    form_fields = form.FormFields(IPingAction)
    label = u"Add Ping Action"
    description = u"A ping action pings by getting URL."
    form_name = u"Configure element"

    def create(self, data):
        a = PingAction()
        form.applyChanges(a, self.form_fields, data)
        return a
```

### 21.2.6 Edit Form

- `ping.py` (cont'd):

```
class PingEditForm(EditForm):
    """ An edit form for the ping action """

    form_fields = form.FormFields(IPingAction)
    label = u"Edit Ping Action"
    description = u"A ping action pings by getting URL."
    form_name = u"Configure element"
```

### 21.2.7 ZCML Wiring

- First, register adapter in `configure.zcml`:

```
<adapter factory=".ping.PingActionExecutor" />
```

### 21.2.8 ZCML Wiring II

- Then, wire add/edit pages in `configure.zcml`:

```
<browser:page
  for="plone.app.contentrules.browser.interfaces. \
       IRuleActionAdding"
  name="plone.actions.Ping"
  class=".ping.PingAddForm"
  permission="cmf.ManagePortal" />

<browser:page
  for=".ping.IPingAction"
  name="edit"
  class=".ping.PingEditForm"
  permission="cmf.ManagePortal" />
```

### 21.2.9 ZCML Wiring III

- Last, register the action itself:

```
<plone:ruleAction
    name="plone.actions.Ping"
    title="Ping"
    description="Ping a particular server"
    for="*"
    event="*"
    addview="plone.actions.Ping"
    editview="edit"
    />
```

# 22 Internationalization

## 22.1 Concepts

### Overview

- i18n of templates
  - What developers do
  - What translators do
- i18n of content

## 22.2 Template i18n

---

### 22.2.1 Template i18n

- Plone ships 50+ languages
  - Some perfect, some good start
  - Includes R-to-L support

---

### 22.2.2 Your Template

```
<p>Welcome to Plone.</p>

<img src="plone.gif"
    alt="Plone Icon" />

<p>There have been over
  <span tal:content="context/download">
  100,000</span> downloads of Plone.
</p>

<p>Visit <a href="about">About Plone</a>
  for more info.
</p>
```

### 22.2.3 Your Template: Need to Do

```
<p>Welcome to Plone.</p> translate

<img src="plone.gif"
    alt="Plone Icon" /> translate alt text

<p>There have been over
  <span tal:content="context/download">
  100,000</span> downloads of Plone.
</p> translate, move # as needed

<p>Visit <a href="about">About Plone</a>
  for more info. translate, keep link, move
</p>
```

### 22.2.4 Case 1: "Welcome to Plone"

```
<p>Welcome to Plone.</p> translate
```

- `i18n:translate` marks as needing translation

  ```
  <p i18n:translate="">Welcome to Plone.</p>
  ```

  - This uses "Welcome to Plone" as string-to-translate

### 22.2.5 Case 1: "Welcome..." (2)

- Some words have mulitple meanings, eg "set"
  - A collection of things
  - To establish a choice

  ```
  <p i18n:translate="">Set</p>
  ```

- Unclear which we mean

---

### 22.2.6 Case 1: "Welcome..." (3)

- Can pick a "message id" (msgid)

```
<p i18n:translate="set-a-setting">Set</p>
```

- Translators now know what meaning to use

---

### 22.2.7 Case 2: Alt Text of Image

```
<img src="plone.gif"
    alt="Plone Icon" /> translate
```

- `i18n:attributes`:

```
<img src="plone.gif"
    alt="Plone Icon" i18n:attributes="alt" />
```

  - Marks "alt" as needing translation

---

### 22.2.8 Case 2: Alt Text (2)

- Example with two attributes:

```
<img src="plone.gif"
    alt="Plone Icon"
    title="Plone Icon Title"
/>
```

- Mark both as needing translation:

```
<img src="plone.gif"
    alt="Plone Icon"
    title="Plone Icon Title"
    i18n:attributes="alt; title">
```

---

### 22.2.9 Case 2: Alt Text (2)

- Can use msgids:

```
<img src="plone.gif"
    alt="Plone Icon"
    title="Plone Icon Title"
    i18n:attributes="alt plone-icon;
        title plone-icon-title">
```

---

### 22.2.10 Case 3: Dynamic Content

```
<p>There have been over
  <span tal:content="context/download">
  100,000</span> downloads of Plone.
</p> translate, move # as needed
```

- Need to translate sentence
  - # itself isn't translated

---

### 22.2.11 Case 3: Dynamic Content (2)

- But needs to go in the right place
  - Won't be the same in every language
    - "There have been over 10,000 downloads"
    - "There have over 10,000 downloads been"
    - "Over 10,000 have been downloads"

---

### 22.2.12 Case 3: Dynamic Content (3)

- Want translators to see:

```
There have been ${count} downloads of Plone
```

- `i18n:name` to name the special part:

```
<p i18n:translate="">There have been over
  <span tal:content="here/download_count"
   i18n:name="count">100,000</span>
  downloads of Plone.
</p>
```

  - Whole thing is marked with `i18n:translate`

---

### 22.2.13 Case 3: Dynamic Content (4)

- `i18n:name` isn't related to how things work:

```
<span tal:content="here/download_count"
 i18n:name="count">100,000</span>
```

  - `download_count` is real method
  - `count` is name for translators

- Must be unique only in `i18n:translate` tag
  - Other things can be called `count`

### 22.2.14 Case 4: Combining Ideas

```
<p>Visit <a href="about">About Plone</a>
  for more info. translate, keep link, move
</p>
```

- `About Plone` must be movable and translated:

```
<p i18n:translate="">Please visit
  <span i18n:name="about-plone">
    <a href="about" i18n:translate="">
      About Plone</a>
  </span> for more info.</p>
```

### 22.2.15 i18n Domain

- `i18n:domain` defines "domain" for translations
  - Different apps might translate differently
  - Use your app or company name

### 22.2.16 Complete Template

```
<html i18n:domain="myprod"><body>
<p i18n:translate="">Welcome to Plone.</p>
<img src="plone.gif"
    alt="Plone Icon" i18n:attributes="alt" />
<p i18n:translate="">There have been over
  <span tal:content="here/download_count"
   i18n:name="count">100,000</span>
  downloads of Plone.</p>
<p i18n:translate="">Please visit
  <span i18n:name="about-plone">
    <a href="about" i18n:translate="">About Plone</a>
  </span> for more info.</p>
</body></html>
```

## 22.3 Translating

---

### 22.3.1 Creating Template

```
i18ndude rebuild-pot
  --pot myprod.pot   output file location
  --create myprod    # your domain
  *.pt               path to templates
```

---

### 22.3.2 POT File

- myprod.pot

```
"Language-Code: en"
"Language-Name: English"
"Domain: myprod"

#. Default: "About Plone"
#: myzpt.pt
msgid "About Plone"
msgstr ""

#. Default: "Please visit ${about-plone} for more info."
#: myzpt.pt
msgid "Please visit ${about-plone} for more info."
msgstr ""

#. Default: "Plone Icon"
#: myzpt.pt
msgid "Plone Icon"
msgstr ""
```

### 22.3.3 POTs and POs

- POT is the **template**
- PO is copied from that
  - And changed for a language
  - One PO per language you want

### 22.3.4 PO File Translate

- `myprod-pl.po`

```
"Language-Code: pl"
"Language-Name: Pig Latin"
"Domain: myprod"

#. Default: "About Plone"
#: myzpt.pt
msgid "About Plone"
msgstr "Aboutay Lonepay"

#. Default: "Please visit ${about-plone} for more info."
#: myzpt.pt
msgid "Please visit ${about-plone} for more info."
msgstr "Leasepay isitvay ${about-plone} orfay ormay infoay."

#. Default: "Plone Icon"
#: myzpt.pt
msgid "Plone Icon"
msgstr "Lonepay Iconay"
```

### 22.3.5 Help for Translators

- We're using standard machinery
  - So use existing editors, checkers, etc
- `i18ndude` has features to find
  - Missing `i18n:translates`
  - Text that isn't translated

## 22.4 Translating Scripts

### Translating Scripts

- In your product, create a “MessageFactory”:

```
from zope.i18nmessageid import MessageFactory
MyProdMessageFactory = MessageFactory('MyProduct')
```

- In scripts, import (by convention, as _):

```
from MyProduct import MyProdMessageFactory as _

print _(u"This can be translated.")
```

## 22.5 Translating Content

---

### 22.5.1 Translating Content

- We don't do automatically
  - Machine generated translation can be poor
- We give you tools to help humans
  - `LinguaPlone` is the most popular

---

### 22.5.2 LinguaPlone

- Choose languages your site will use
  - Site Setup -> Language Tool
- For a piece of content, can manage translations
- Can translate to each language

---

### 22.5.3 LinguaPlone Options

- How does it figure out "your" language
  - Cookies, forms, browsers, etc
- Does it use flags? Or names?
  - Flags are pretty but tricky
    - What to show for English?
      - US?
      - Britain?
      - India?

### 22.5.4 Language-Independent

- Some fields never will be translated
  - People's names
  - Birth dates
  - Phone numbers
- Tagged value: `languageIndependent`

# 23 Unit Tests

## 23.1 Overview

**Overview**

- Running unit tests
- Writing unit tests
- Test frameworks

## 23.2 Running Unit Tests

### Running

```
zopectl test -m Products.ProductName
```

- `-D` option for postmortem

## 23.3 Writing Unit Tests

---

### 23.3.1 Setup

- Must have `PloneTestCase`
  - Included with Plone 2.5+
- Create `tests` package
  - (Don't forget `__init__.py`!)

---

### 23.3.2 Base Class

- `tests/base.py`

```
from Testing import ZopeTestCase
from Products.PloneTestCase.PloneTestCase import \
    PloneTestCase, setupPloneSite

ZopeTestCase.installProduct('MyProduct')

setupPloneSite(products=('MyProduct',))

class MyProductTestCase(PloneTestCase):
  "Base class for your product's tests"
```

### 23.3.3 Sample Test

- tests/test_setup.py:

```
from base import MyProductTestCase

class TestProductInstall(MyProductTestCase):

  def testTypesInstalled(self):
    for t in ['Foo']:
      self.failUnless(t in
        self.portal.portal_types.objectIds(),
        '%s content type not installed' % t)
```

### 23.3.4 Test Suite

- tests/test_setup.py:

```
def test_suite():
    from unittest import TestSuite, makeSuite
    suite = TestSuite()
    suite.addTest(makeSuite(TestProductInstall))
    return suite
```

### 23.3.5 Scaffolding

- ZODB is aborted after each test
  - So cleanup is done for us
- Need to be done before tests?
  - `afterSetUp`
- Extra cleanup needed?
  - `beforeTearDown`

---

### 23.3.6 Test Functions

- `failUnless(expr[, msg])`
  - Ensure expr is true
- `assertEqual(expr1, expr2[, msg])`
  - Ensure expr1 is equal to expr2
- `fail([msg])`
  - Fail
  - Useful in condition

---

### 23.3.7 Helper Attributes

- `self.portal`
  - Your portal
- `self.folder`
  - Member folder for "you"

---

### 23.3.8 Helper Methods

- `self.logout()`
- `self.login([username])`
- `self.setRoles(roles)`
  - Pass in list of roles for you
- `self.setPermissions(perms)`
  - Pass in list of perms for you

## 23.4 DocTests

---

### 23.4.1 About DocTests

- Tests embedded into documentation files
  - Natural way of explaining + testing
- Tests in top-level as "foo.txt"

---

### 23.4.2 Sample DocTest

- `test.txt`:

```
Let's test some basic math:

  >>> 1 + 1
  2

This won't work:

  >>> 1 + 1
  3
```

### 23.4.3 DocTest

- tests/test_doctests.py:

```
import os, sys
import doctest
import unittest
from base import MyProductTestCase
from Testing.ZopeTestCase import FunctionalDocFileSuite

OPTIONFLAGS = ( doctest.REPORT_ONLY_FIRST_FAILURE |
                doctest.ELLIPSIS |
                doctest.NORMALIZE_WHITESPACE)
```

### 23.4.4 DocTest (2)

- tests/test_doctests.py:

```
def test_suite():
  filenames = ['test.txt']
  return unittest.TestSuite(
    [ FunctionalDocFileSuite(
        os.path.basename(filename),
        optionflags=OPTIONFLAGS,
        package='Products.Tester',
        test_class=MyProductTestCase)
      for filename in filenames ]
      )
```

### 23.4.5 DocTest Tips

- Still have
  - afterSetUp and beforeTearDown
  - access to self and helper methods

## 23.5 Road Ahead

### Road Ahead

- In-code doctests
- `zope.testbrowser` and `zope.testrecorder`