# Endeca® Content Assembler API

## Developer's Guide for Java

# Contents

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## Trademarks

Endeca Content Assembler API Developer's Guide for Java • June 2008

# Preface

The Endeca® Information Access Platform is the foundation for building applications that help people understand complex information, fostering discovery and improving daily decision-making. These applications instantly summarize data and content for users -- even for unanticipated requests. The Guided Summarization experience leads to unexpected insights in millions of everyday decisions, increasing revenue, decreasing costs, and accelerating operations.

The Endeca Information Access Platform is powered by MDEX Engine™ technology, a new class of database designed for exploring information, not managing transactions. The MDEX Engine is supported by:

- The Information Transformation Layer that unites and enriches disparate sources of information while maintaining, augmenting, and even creating structures across the data and content.
- An adaptive application component library that enables the rapid development of information access applications that automatically adapt to changes in the data and content.
- A Web-based management suite that empowers managers to highlight the right information at the right time to end users through adaptive presentation rules and dynamic pages.

These essential capabilities are delivered as an enterprise-class platform, with the scalability, reliability, and security that leading organizations demand.

## About this guide

This guide describes the major tasks involved in developing an Endeca application using the Content Assembler API for Java.

This guide assumes that you have read the *Endeca Getting Started Guide* and that you are familiar with Endeca's terminology and basic concepts.

This guide covers the features of the Content Assembler API for Java. This guide is not a replacement for *Endeca Developer's Guide for Java*.

## Who should use this guide

This guide is intended for developers who are building Endeca applications using the Content Assembler API for Java.

If you are a new user of the Endeca Information Access Platform and you are not familiar with developing Endeca applications, read this guide in conjunction with the *Endeca Developer's Guide for Java* located in `%ENDECA_ROOT%\doc` (in a default installation, that is `C:\Endeca\MDEXEngine\5.1.3\doc`). That guide provides detailed feature descriptions that are not covered in this guide.

If you are an existing user of the Endeca Information Access Platform and you are familiar with developing Endeca applications, this guide should provide enough information to help you build a new application using the Content Assembler API for Java.

Also, see the *Endeca API Reference for the Content Assembler API for Java*. In a default installation, this is located in the `C:\Endeca\ContentAssemblerAPIs\Java\1.0.0\doc\api` directory (on Windows) or the `endeca/ContentAssemblerAPIs/Java/1.0.0/doc/api` directory (on UNIX).

This directory contains reference information for the Content Assembler API classes, which is also available on the Endeca Developer Network (EDeN) at *http://eden.endeca.com*.

## Conventions used in this book

This book uses the following typographical conventions:

Code examples, inline references to code elements, file names, and user input are set in `monospace` font. In the case of long lines of code, or when inline monospace text occurs at the end of a line, the following symbol is used to show that the content continues on to the next line: ¬

When copying and pasting such examples, ensure that any occurrences of the symbol and the corresponding line break are deleted and any remaining space is closed up.

## Contacting Endeca Customer Support

The Endeca Support Center provides registered users with important information regarding Endeca software, implementation questions, product and solution help, training and professional services consultation as well as overall news and updates from Endeca.

You can contact Endeca Standard Customer Support through the online Endeca Support Center *https://support.endeca.com*.

Chapter 1

# Developing Applications with Template-Based Pages

This section provides an overview of working with the Page Builder and the Content Assembler API to create an Endeca application with template-driven dynamic pages.

## Overview of roles

This introduction discusses several roles involved in creating a Web application with template-based pages.

- *Application developers*, who create a set of custom templates as well as a front-end application that can render template-based content.
- *Content administrators*, who are typically site editors responsible for managing the information presented in the Web application. In the case of an eCommerce site, this role may be filled by merchandisers.
- *Managers* who are responsible for approving pages for publication. These managers may have titles such as Editorial Director or Director of Merchandising.
- A *creative team*, which may consist of an art director, Web designer, and graphic artist, or any combination of those roles.

## About the Endeca Page Builder

The Endeca Page Builder is a powerful template-based tool that enables the rapid creation of rich, data-driven pages. The Page Builder is part of the Endeca Workbench suite of tools.

With the Page Builder, content administrators can create dynamic pages based on a set of custom templates, such as landing pages for a particular search term or navigation state. The ability to combine content in a modular fashion within a template framework allows a wide degree of flexibility in crafting pages while maintaining a consistent look-and-feel across an entire site.

For the content administrator, the tool offers a holistic interface to manage the placement and display of content (including rich media, refinements, promotions, or Content Spotlighting) all within the overall context of a page, rather than as isolated content sections. Each dynamic page can be used in any number of locations across a site while presenting content that is contextually relevant to an end user's navigation state. This functionality greatly decreases the time and effort normally associated with the creation and maintenance of custom pages.

## About the Content Assembler API

The Content Assembler API provides a simple interface to access template-driven content for rendering in Web-based applications.

The Content Assembler API enables a Web application to query the MDEX Engine and retrieve the appropriate dynamic content based on a user's navigation state or other triggers. The Content Assembler returns both Endeca query results familiar from the Presentation API or RAD API as well as a content item object that encapulates the page configuration specified by the content administrator. All the content for a page, including the results of any additional queries needed for spotlighting or merchandising, are wrapped in the content item object, simplifying the logic in the front-end application by reducing the need to manage sub-queries in the application layer.

## About cartridges

A cartridge consists of a template and its associated rendering code, separating the structure of dynamic page content from its presentation.

Templates serve as a basis for the dynamic pages that content administrators create in the Page Builder. The templates are XML documents that define the content structure of a dynamic page, or part of a page. A template can be thought of as a content object definition that declares what properties the content contains, and how those properties can be configured in the Page Builder.

Because a template defines the properties in the content objects, you can write code that is tailored to render the content driven by a specific template. For example, one cartridge template may contain properties for a banner image and a link, while another template may be designed to contain several records. The corresponding cartridge code for each of these templates then uses the configured values of these properties to create a banner promotion or a Content Spotlighting section of a page.

By building cartridges and associating specific rendering logic with every template in the application, developers ensure that the application can render any page configuration created in the Page Builder. This enables content administrators to flexibly combine content in a modular manner while maintaining a consistent look-and-feel throughout an entire site.

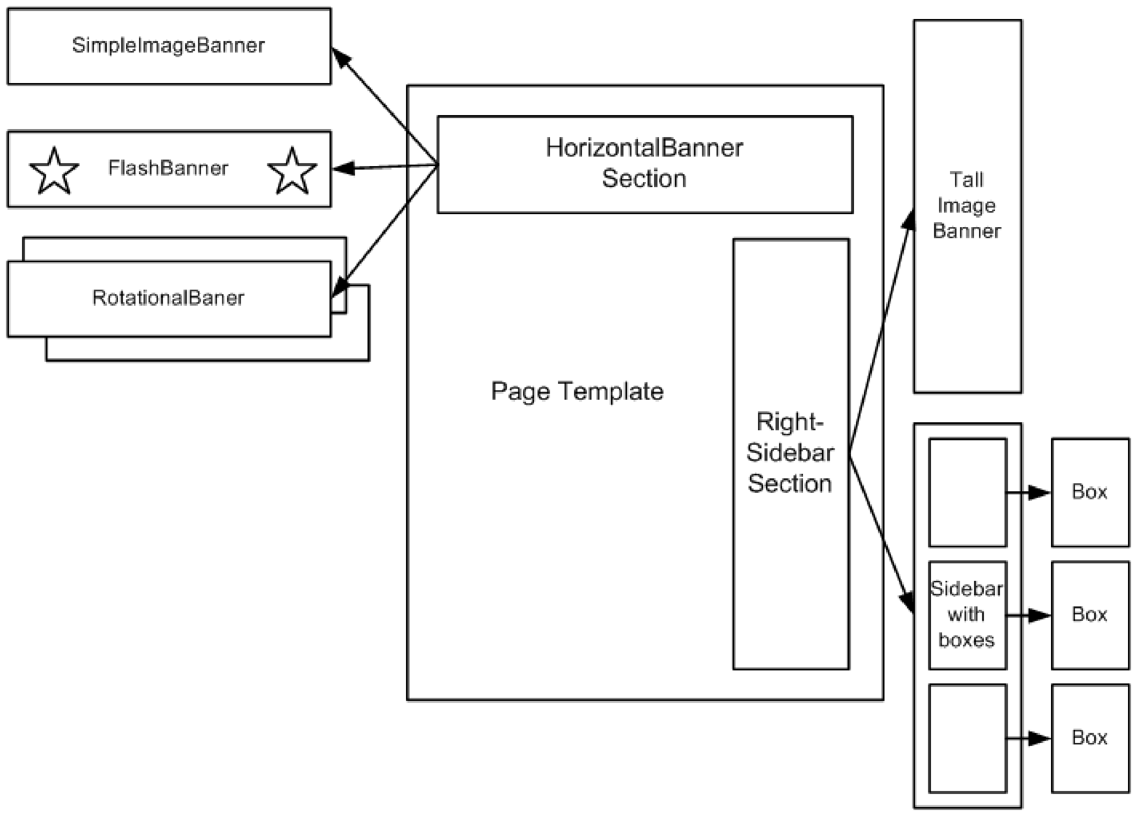
## About templates and the Page Builder

Templates can either define the content structure of an entire page or a section of a page.

*Page templates* drive the content of an entire Web page. They define parts of the page called *sections*.

Sections can be thought of as slots that can be filled with content such as a banner image, Content Spotlighting, or search results). Typically, they represent a physical area on the page, but can also represent content that is not visible (for example, meta keywords used for search engine optimization). They can also represent content that may be rendered in a number of ways (for example, a page element that may display in the left or right column of a page depending on context).

The content in sections is also driven by templates known as *cartridge templates*. The following diagram shows a page template that includes two sections, and the cartridge templates that can be applied to each section.



A template defines what kinds of cartridges can be used in each of its sections. In this example, the SimpleImageBanner, FlashBanner, and RotationalBanner cartridges can be inserted in any section of type HorizontalBanner. A page template may include multiple sections of the same type. The same type of section can also be used in multiple templates. Cartridge templates can in turn define sections within them.

Content administrators configure dynamic pages in the Page Builder by selecting cartridges to insert into sections and then populating the cartridges with content. The interface for populating cartridges in the Page Builder is driven by the template definition. Some cartridges may be prepopulated by the application developer with information that the application can use to render predefined content, without the need for additional configuration by the content administrator. Such prepopulated cartridges can still present contextually relevant content through the use of Endeca query refinements.

## About content items and the Content Assembler API

When a content administrator creates pages in the Page Builder, the resulting configurations are saved as XML documents in the MDEX Engine.

If a template is seen as a content object definition, then these page configurations represent instances of the content objects that have specific values for the properties defined in the template.

The Content Assembler retrieves these page configurations, evaluates the XML and returns content item objects based on the configuration and any additional queries that need to be made. For example, if the template defines a record list property and a content administrator specifies a navigation query to populate that property, the assembler executes that query to return specific records in the content item object.

Each template corresponds to a single content item object. In other words, the entire page is returned by the Content Assembler API as a single root content item, and each cartridge within the page is returned as a nested content item property within the parent content item.

## A typical workflow for creating a template-based application

Applications built with template-based pages present dynamic content with a consistent look and feel, while the Page Builder enables updates to that content with relatively little maintenance.

The process of developing the application generally begins with the creative team. This team develops mockups of the page layouts that are used throughout the application, as well as any custom images or rich media that the design requires. Although there may be several variations, the set of layouts for a site typically follow a common high-level structure that results in a unified appearance across an entire site. For example, certain elements (such as a logo or banner) may always be present in the same location, or the proportions or relative position of various areas of the page may remain constant even if the content within those areas changes.

The application developer then creates cartridges based on the layouts from the creative team. This involves writing templates that describe the overall content structure of a page, including page sections that can be filled by certain cartridges. Typically, an application has only a few top-level page templates that define the overall page layouts that are used in the site, and many cartridge templates that drive the behavior of specific parts of a page. For each template, the developer writes code for the front-end application that can render the content items based on that template. Because templates define the kinds of content that are allowed in a page, an application that is aware of the templates being used within the site can include very specific rendering logic for pages based on those templates.

The developer uploads the templates to the Page Builder, and specifies an application that uses the cartridge code as the preview application in Endeca Workbench.

A content administrator can then use the Page Builder to create and configure dynamic pages. The content administrator can control the conditions under which a page should display by applying triggers based on navigation state, search terms, date ranges, or user profiles. Configuring a page in the Page Builder consists of associating it with a particular trigger or set of triggers, and designating the content to display by inserting and configuring cartridges in each section. Cartridges can contain content that is either static or dynamically populated based on queries to the MDEX Engine.

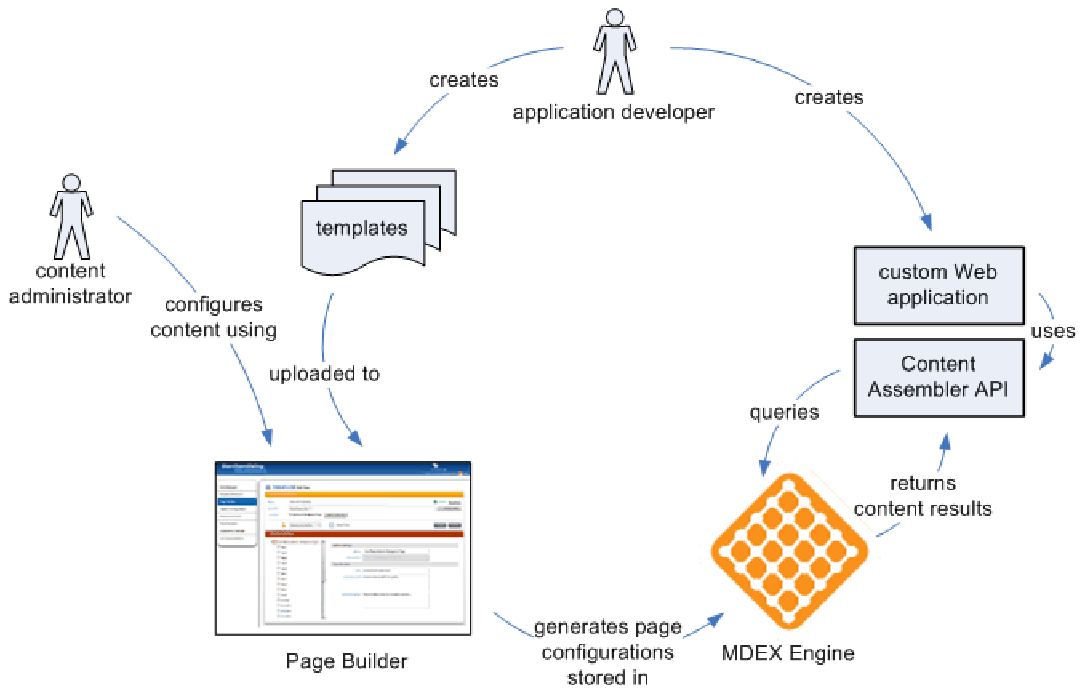
The Page Builder allows the content administrator to save progress incrementally and also to preview dynamic pages to make sure that the application renders the content as desired.

Once a page configuration is complete, the content administrator can request that a manager activate the page. Once the manager activates the page in the Page Builder, it is published and accessible to the end users of the Web site. The workflow model within the Page Builder also allows content administrators to make dramatic changes to pages in the tool and request re-activation from their manager without the need for any changes in the application code.

## Page Builder and Content Assembler API architecture

The Page Builder and the Content Assembler API combine to enable the creation and display of dynamic pages.

This diagram shows the life cycle of a dynamic page that is created using the Page Builder and rendered by an application built with the Content Assembler API:



The application developer creates cartridges based on designs from the creative team and incorporates the cartridge code into a Web application.

Based on the templates that have been uploaded to the Page Builder, the content administrator configures specific pages and sets them to display based on a set of criteria such as navigation state, user profile, and date range. The Page Builder outputs these page configurations as XML documents that are stored in the MDEX Engine.

As users search or navigate within the site, the application queries the MDEX Engine using the Content Assembler API, retrieves the dynamic page content that applies at the appropriate navigation state, and renders the content.

Chapter 2

# Working with Templates for Dynamic Pages

This section describes the process of creating templates that are used to drive dynamic pages.

## Template prerequisites

The Page Builder leverages functionality from dynamic business rules such as triggers, priority, and workflow to manage dynamic pages. Because dynamic pages are stored as dynamic business rules in the MDEX Engine, some of the same supporting configuration is required for pages as for rules.

Before you create templates for use in the Page Builder, you must have the following in place for the dynamic pages in your application:

- One or more rule groups (the "default" rule group is automatically created)
- One or more rule zones
- A rule style

You specify the zone and style for a page in the top-level page templates that you create.

### About dynamic pages and rule groups

Dynamic pages use the same group mechanism as dynamic business rules.

You can use one rule group for all your dynamic pages, or you can use multiple groups to organize the pages in your application, for example, into an Electronics group and a Jewelry group. Multiple groups also allow you to manage permissions independently for each rule group.

If you are using both traditional dynamic business rules and dynamic pages in your application, create rule groups for use with dynamic pages that are distinct from those used for dynamic business rules. For example, if you group your rules and pages by category, you can have separate rule groups for "Sports rules" and "Sports pages." For details about creating rule groups, see the *Endeca Developer Studio Help*.

The Group List pages of both the Rule Manager and the Page Builder display all groups that a user has permission to view, regardless of whether they are used for dynamic business rules or dynamic pages. Within a rule group, only rules that represent dynamic pages display in the Page Builder. Both dynamic business rules and dynamic pages display in the Rule Manager, but dynamic pages are read-only in the Rule Manager for all users regardless of rule group permissions. Users who have the pages role should have permissions to access groups that you have set up for use with dynamic pages, and users with the rules role should have permissions for groups that are used only for dynamic business rules.

Workflow, resource locks, and priority for groups with dynamic pages function exactly as they do for dynamic business rules. For more information about rule groups, see "Grouping rules" in the *Endeca Developer's Guide*.

## About using zones with dynamic pages

Zones enable the display of dynamic pages in the application. While a single zone can be sufficient, multiple zones allow finer-grained control over the display of dynamic pages.

Unlike dynamic business rules, which generally control only one aspect of a page that is divided up into zones, dynamic pages drive the presentation of the page as a whole. In the context of dynamic pages, *sections* represent the parts of a page and *zones* allow you to provide different perspectives on the same page. Two common use cases for using multiple zones are for search results and for switching between views for the same data, such as product listings and reviews.

### Search results

Dynamic pages are generally configured to display based on a navigation trigger. This means however that the page for a particular location displays even if a user has entered a search term on your Web site from that location. For example, you may have set up a highly branded dynamic page to display as your site's home page (at location N=0) that does not include any search results. This page displays even if a user has performed a search from the home page location, unless a page has been configured specifically to trigger on that search term. In an application with a single zone, generic search results pages may never display.

You can enable more robust handling of search results pages by creating a separate zone for searches. You then create a template that uses the search zone and the content administrator creates a search results page based on this template. In the simplest case, you can have one search results page in this zone that applies everywhere. When your application receives a search query, it displays the page for the search zone rather than the navigation zone.

### Switching between views

Another use of multiple zones is to enable different views on the same data. For example, if you want to present a tabbed pane that displays either product details or user reviews of the same product, you can use separate zones for each view. In this example, you would create a ProductDetails zone and a UserReviews zone, with associated templates for each zone.

- *Creating a zone for dynamic pages* on page 16
  Dynamic pages must be assigned a rule zone in order to display. You should create at least one zone in your application for use exclusively with dynamic pages.
- *Specifying the zone and style for a template* on page 19
  Page templates are required to specify a rule zone and a style. When a page is created in the Page Builder, the zone and style are applied to any pages based on that template.

## Creating a zone for dynamic pages

Dynamic pages must be assigned a rule zone in order to display. You should create at least one zone in your application for use exclusively with dynamic pages.

Although the procedure to create a zone for dynamic pages is the same as for dynamic business rules, there are certain properties you should set for dynamic page zones.

To create a zone for use with dynamic pages:

1. In the **Project Explorer** of Developer Studio, expand **Dynamic Business Rules**.
2. Double-click **Zones** to open the **Zones** view.
3. Click **New** to open the **Zone** editor.
4. In the **Name** field, provide a unique name for the zone.
5. In the **Rule Limit** field, enter `1`.
6. Select **Valid for search**.

   Leave **Shuffle rules** and **Unique by this dimension/property** unselected.

**Note:** If you have both dynamic pages and business rules in your application, be aware that conflicts may occur if a zone being used for dynamic pages is assigned to a business rule. If a rule and a page within the same zone have overlapping triggers and the rule has higher priority, the page may never display. In order to avoid this situation, assign names to the zones being used for pages that clearly indicate that such zones are to be used for dynamic pages only so that users do not assign them to dynamic business rules in the Rule Manager.

### Dynamic pages and styles

Before you create dynamic pages, you must have at least one style defined in your application.

Endeca recommends that you create one style exclusively for use with dynamic pages. The style that you assign to a dynamic page does not affect how it displays; it is only required to make the rule that contains the page configuration valid.

## About creating templates

Templates are XML documents that define the content structure of a dynamic page or part of a page and enable content administrators to specify page content in the Page Builder.

Top-level templates, which define an entire page, and cartridge templates, which drive the content of sections, share the same structure and are defined by the same schema.

Templates can be broken down into three parts:

- **General information** such as the template type, ID, description, and thumbnail image. This information is used in the Page Builder to help the content administrator select the appropriate template for a page or section. For top-level page templates, this part of the template also allows you to specify a zone and style, which the tool assigns to any pages that are created from that template.
- **Property definitions.** In this part of the template, you explicitly declare all the properties of the `ContentItem` object that a template represents. Some properties also allow you to specify default values.
- **Property editors.** These allow you to specify whether a property can be configured and some attributes of the editing interface in the Page Builder.

Properties may include simple string properties, record lists, or template sections. Most properties are configurable and enable content administrators to define the behavior of pages that they build within the tool. However, properties can also be used to pass information directly to the front-end application, for example details about how to render the content within a template. By defining the properties in the template along with how they can be configured in the tool, you ensure that the content items returned by the Content Assembler API can be properly handled by the presentation logic in your application.

In general, when creating page templates, you have a page layout provided by your creative team. Working from a sample design or mockup, identify the high-level structure of the page -- this structure informs the sections you define in your page template. Recall that the structure of each section is in turn driven by a cartridge template, so if one portion of your page can contain either a large banner image or a three-column content area, you can implement this as one page template with a section that allows two different cartridge templates, rather than two different top-level templates.

Then, for each section, identify the information that your front-end application uses to render the content in that section. This information is then modeled in the cartridge template as properties that the content administrator can configure.

While most template properties and sections affect the visual apperance of the page, keep in mind that they can also represent page elements that are not visible in the application. For example, a property could contain meta keywords used for search engine optimization, or include embedded code that does not render in the page but enables functionality such as Web analytics reporting. Sections can also represent content that may be rendered in a number of ways (for example, a page element that may display in the left or right column of a page depending on context).

## About template validation

Templates are validated when they are uploaded to the Page Builder.

Before you upload your templates to the Page Builder, ensure that the templates validate against the template schema. All templates must include the following schema declaration:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
```

A copy of the schema is located for reference in `\doc\schema\content-template.xsd` (on Windows) or `/doc/schema/content-template.xsd` (on UNIX) in your Content Assembler API installation.

Although the `<RuleInfo>` element is not required by the schema, it is required by the Page Builder for all top-level page templates. If the `<RuleInfo>` element is missing in a page template, or if a zone or style specified in the element attributes does not exist in the application's instance configuration, the template is not available in the Page Builder and an error is written to `webstudio.log`.

- *Specifying the zone and style for a template* on page 19
  Page templates are required to specify a rule zone and a style. When a page is created in the Page Builder, the zone and style are applied to any pages based on that template.
- *Troubleshooting invalid templates* on page 40
  Some template errors are returned to the emgr_update command line call, but all errors are detailed in the `emgr.log` or `webstudio.log` files.

## About the type and ID for a template

Each template is required to have a `type` and a unique `id`.

The template *type* determines where a template can be applied. There are two general categories of templates. Top-level, or *page templates*, describe the structure of a entire Web page. These templates can include sections, which are placeholders for content driven by templates known as *cartridge* *templates*. cartridge templates can in turn include sections within them to allow for further nested content.

Page templates are identified by a special `type` string. Any template designed to be a top-level template must be of type `PageTemplate`.

Cartridge templates can be of any type you specify. This allows you to constrain the cartridgesw that can be inserted in a particular section. For example, if you have a page or cartridge template that includes a "HorizontalBanner" section, only cartridges of type "HorizontalBanner" are available to insert into that section in the Page Builder.

The template *id* is a string that is used to identify the template. It must be unique within your application; templates with non-unique IDs do not display in the Page Builder. The value should be as descriptive as possible to help the user select the appropriate template, for instance, "ThreeColumnWithLargeBanner" or "HolidaySalePromotion."

`Type` and `id` are specified as required attributes on the `<ContentItemTemplate>` element. For example:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
```

**Note:** The `type` and `id` attributes are defined as type `xs:Name` in the template schema. This means that valid values for these attributes must:

- be a single string token (no spaces or commas)
- begin with a letter, a colon (`:`), or a hyphen (`-`)

Numbers are allowed as long as they do not appear at the beginning of the string.

- *About templates and the Page Builder* on page 10
  Templates can either define the content structure of an entire page or a section of a page.

## Specifying the zone and style for a template

Page templates are required to specify a rule zone and a style. When a page is created in the Page Builder, the zone and style are applied to any pages based on that template.

Zones and styles are only used for page templates, not cartridge templates.

To specify the zone and style for a page template:

Insert a `<RuleInfo>` element immediately after the opening `<ContentItemTemplate>` tag as in the following example:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <RuleInfo zone="NavigationPageZone" style="PageStyle"/>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

The value of the `zone` attribute must be the exact name of the zone that is defined in your application's instance configuration and that you want to apply to all pages created with this template.

The value of the `style` attribute is the exact name of any style that is defined in your application's instance configuration. Endeca recommends that you create one style exclusively for use with all dynamic pages. Styles are required to make pages valid, but do not affect their display.

- *Creating a zone for dynamic pages* on page 16

Dynamic pages must be assigned a rule zone in order to display. You should create at least one zone in your application for use exclusively with dynamic pages.

- *About using zones with dynamic pages* on page 16
  Zones enable the display of dynamic pages in the application. While a single zone can be sufficient, multiple zones allow finer-grained control over the display of dynamic pages.

## About using thumbnail images in the Page Builder

You can specify thumbnail images for page templates and section templates that display along with the template description in the template selector and cartridge selector dialog boxes in the Page Builder. These images can help the content administrator identify the appropriate template to use for the pages they create.

The images may be hosted on a separate Web server from your Page Builder instance. If the thumbnail image for a template is either not specified or not accessible, a default image displays in the dialog box.

The suggested size for thumbnail images is 81 x 81 pixels; smaller images are stretched to fill this size and larger images are cropped to show only the top left corner.

### Hosting and security considerations

The images must be hosted on a Web server accessible from the Page Builder server. The Page Builder makes an anonymous request to the image server to fetch the images. That is, even though content administrators are authenticated when they log in to the Page Builder, the tool does not use their credentials when requesting thumbnail images.

The Page Builder also respects the cross-domain policy file of the server hosting the images. To ensure that the Page Builder can load the images, place a `crossdomain.xml` file in the root directory of the image server. This file allows you to enable access to media on this server from a specific IP address, a specific domain, or any domain. If this policy file does not allow access from the Page Builder server, a security error similar to the following displays in the Page Builder when the template selector or cartridge selector dialog box attempts to load the images:

```
Error #2044: Unhandled securityError:. text=Error #2048: Security sandbox
violation: http://pagebuilder.mycompany.com/tmgr/tmgr.swf cannot load data
 from http://www.example.com/images/3column.gif.
```

The following example of a `crossdomain.xml` file enables access from any domain to files hosted on www.example.com:

```
<?xml version="1.0"?>
<!-- http://www.example.com/crossdomain.xml -->
<cross-domain-policy>
  <allow-access-from domain="*" />
</cross-domain-policy>
```

You can also restrict access to specific domains or IP addresses, for instance, for the server on which the Page Builder is running. Wildcards are allowed in domain names but not IP addresses. The following example shows a policy file for www.example.com that allows access from anywhere in the example.com domain, www.customer.com, and 105.216.0.40:

```
<?xml version="1.0"?>
<!-- http://www.example.com/crossdomain.xml -->
<cross-domain-policy>
  <allow-access-from domain="*.example.com" />
  <allow-access-from domain="www.customer.com" />
  <allow-access-from domain="105.216.0.40" />
</cross-domain-policy>
```

For more information about cross-domain policy files, see the Adobe Flash documentation.

## Specifying the description and thumbnail image for a template

The description and thumbnail image for a template display in the template selector and cartridge selector dialog boxes in the Page Builder. Adding a description and thumbnail image to a template is optional.

To specify the description and thumbnail image for a template:

Insert the following elements within `<ContentItemTemplate>`:

| Element | Description |
|---|---|
| **`<Description>`** | One or two sentences to help the content administrator identify the template in the Page Builder. This can include information about the visual layout of the template ("Three-column layout with large top banner") or its intended purpose ("Back to school promotion"). |
| **`<ThumbnailUrl>`** | The absolute URL to a thumbnail image that shows a sample page or section that is based on the template. The images are hosted on a Web server accessible from the Page Builder server. |

**Example**

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <RuleInfo zone="NavigationPageZone" style="PageStyle"/>
  <Description>A page layout with left and right sidebars intended for
general category pages.</Description>

  <ThumbnailUrl>http://images.mycompany.com/thumbnails/PageTemplate/Three¬
ColumnNavigationPage.png</ThumbnailUrl>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

## About saving templates

Templates are saved as XML files that are then uploaded to the Page Builder.

It is possible to have multiple templates in a single file, however, for ease of maintenance Endeca recommends the following practices:

- Each template, whether it is a page template or a cartridge template, should be in a separate file.
- Name each template file using the following format: *`TemplateType`*`-`*`TemplateID`*`.xml`. For example, `PageTemplate-ThreeColumnNavigationPage.xml` or `HorizontalBanner-ImageMap.xml`

**Note:** Template file names cannot have spaces in them.

Endeca also recommends that you treat page and cartridge templates as part of your application's configuration and store them in a version control system. It can also be useful to include a template version number in a property for debugging purposes.

## About defining content properties

When you create a template, you specify all the properties that are necessary to render a page or section. These properties are returned as part of the content item object in the Content Assembler API.

You define properties within the `<ContentItem>` element in the template. Each `<ContentItem>` must have a `<Name>` property. In addition, you can define any number of properties for use by your front-end application. For each property, you specify a name and a property type. In some cases, you can optionally specify a default value for the property.

Properties can be associated with editing interfaces that enable configuration within the Page Builder. Content properties may include text, image URLs, or records that the content administrator can specify. One type of property is a section, which allows content administrators to insert a cartridge to drive the content of a specific part of a page.

You can choose not to expose a particular property in the Page Builder and simply pass its value to your front-end application. Examples of this usage can include a reference to the cartridge code that should be used to render the template content, or queries to the MDEX Engine that are hidden from the content administrator in the tool.

- *About defining the editing interface for properties* on page 27
  After you have defined the content properties in your template, you can define how those properties can be configured by the content administrator in the Page Builder.

### Specifying the default name for a ContentItem

`Name` is a required property on a `ContentItem`. Generally the content administrator provides a value for it in the Page Builder, but you can specify a default name as a placeholder.

To specify a default name for a `ContentItem`:

Insert the `<Name>` element inside `<ContentItem>` as in the following example:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <RuleInfo zone="NavigationPageZone" style="PageStyle"/>
  <Description>A page layout with left and right sidebars intended for
general category pages.</Description>
  <ThumbnailUrl>http://images.mycompany.com/thumbnails/PageTemplate/Three¬
ColumnNavigationPage.png</ThumbnailUrl>
  <ContentItem>
    <Name>New three-column page</Name>
    <!-- additional elements deleted from this example -->
  </ContentItem>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

`<Name>` is a required element, but you do not need to specify a value for the name. If you insert an empty `<Name/>` element, an empty text field displays in the Page Builder and the content administrator supplies a value.

## About content properties

You can define the properties of a page or section by nesting any number of `<Property>` elements within the `<ContentItem>` element.

Each property must have a name that is unique within the template. This is the key by which your application can access that property through the Content Assembler API. The name is specified in the `name` attribute of the `<Property>` element.

**Note:** The `name` attribute is defined as type `xs:Name` in the template schema. This means that valid values for these attributes must:

- be a single string token (no spaces or commas)
- begin with a letter, a colon (`:`), or a hyphen (`-`)

Numbers are allowed as long as they do not appear at the beginning of the string.

The child elements of `<Property>` allow you to specify the type of property. The template schema provides several basic property types. A `<String>` element specifies a string property, and a `<RecordList>` specifies a property that can contain one or more Endeca records.

The `<ContentItem>` element within `<Property>` allows you to define a section property. As the template structure suggests, a section is in essence a placeholder for a nested content item defined by a separate cartridge template. (Recall that each template, whether it is a page template or cartridge template, defines a corresponding content item.)

In addition, the `<Property>` element can also contain special content pass-through elements or arbitrary XML that is passed directly to your front-end application.

The following example shows the properties of a cartridge template that defines a buying guide. This buying guide can contain three subsections that spotlight specific products.

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="HorizontalBanner" id="BuyingGuide">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New Buying Guide</Name>
    <Property name="ui_code">
      <String>/HorizontalBanner/BuyingGuide.jsp</String>
    </Property>
    <Property name="title">
      <String/>
    </Property>
    <Property name="header">
      <String/>
    </Property>
    <Property name="footer">
      <String/>
    </Property>
    <Property name="section1">
      <ContentItem type="BuyingGuideSection"/>
    </Property>
    <Property name="section2">
      <ContentItem type="BuyingGuideSection"/>
    </Property>
    <Property name="section3">
      <ContentItem type="BuyingGuideSection"/>
    </Property>
  </ContentItem>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

The properties of the buying guide sections may look similar to the following:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="BuyingGuideSection" id="BuyingGuideSection">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New Buying Guide Section</Name>
    <Property name="title">
      <String/>
    </Property>
    <Property name="header">
      <String/>
    </Property>
    <Property name="img_src">
      <String/>
    </Property>
    <Property name="footer_text">
      <String/>
    </Property>
    <Property name="footer_href">
      <String/>
    </Property>
    <Property name="products">
      <RecordList/>
    </Property>
  </ContentItem>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

## Types of property elements

Each property type corresponds with a particular object type that is returned by the Content Assembler API.

### Configurable content properties

These property types can be associated with property editors to enable configuration by the content administrator in the Page Builder.

| Template element | Object type returned by API (Java) | Object type returned by API (RAD Toolkit for ASP.NET) |
|---|---|---|
| `<String>` | `java.lang.String` | `string` |
| `<RecordList>` | `com.endeca.naviga¬tion.ERecList` | `System.Collections.ObjectMod¬el.ReadOnlyCollection<Record>` |
| `<ContentItem>` | `com.endeca.content.Con¬tentItem` | `Endeca.Data.Content.ICon¬tentItem` |

### Pass-through content properties

These properties cannot be exposed for configuration in the Page Builder tool. They allow you to embed MDEX Engine query results in the content item object that your application accesses through the Content Assembler API.

| Template element | Object type returned by API (Java) | Object type returned by API (RAD Toolkit for ASP.NET) |
|---|---|---|
| `<UrlEneQuery>` | `com.endeca.naviga¬ tion.ERecList` | `System.Collections.ObjectMod¬ el.ReadOnlyCollection<Record>` |
| `<Supplement>` | `com.endeca.naviga¬ tion.Supplement` | `Endeca.Data.BusinessRule` |
| `<RecordQuery>` | `com.endeca.naviga¬ tion.ERecList` | `System.Collections.ObjectMod¬ el.ReadOnlyCollection<Record>` |
| `<NavQuery>` | `com.endeca.naviga¬ tion.ERecList` | `System.Collections.ObjectMod¬ el.ReadOnlyCollection<Record>` |
| `<NavigationResult>` | `com.endeca.naviga¬ tion.ENEQueryResults` | `Endeca.Data.NavigationResult` |

### Custom property elements

You can insert your own arbitrary XML within a `<Property>` element. In this case, the API returns the contained element directly as an `org.w3c.dom.Element` (in Java) or a `string` (for the RAD Toolkit for ASP.NET).

- *About working with content items* on page 52
  The `ContentResults.getContent()` method returns the root `ContentItem` object that contains dynamic page content.

## Adding a string property

String properties are very flexible and can be used to specify information such as text to display on a page, URLs for banner images, or meta keywords for search engine optimization.

To add a string property to a template:

1. Insert a `<String>` element inside a `<Property>` element.
2. Optionally, you can specify the default value for the property as the content of the `<String>` element.

The following example shows a variety of string properties:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New Three-Column Navigation Page</Name>
    <Property name="ui_code">
      <String>/ThreeColumnNavigationPage.jsp</String>
    </Property>
    <Property name="title">
      <String>Endeca Wine Superstore</String>
    </Property>
    <Property name="meta_keywords">
      <String/>
    </Property>
    <Property name="meta_description">
      <String/>
    </Property>
  </ContentItem>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

- *Adding a string editor* on page 28
  You add a string editor to enable configuration of string properties in the Page Builder.

## Adding a record list property

A record list property can contain one or more Endeca records.

To add a record list property to a template:

Insert a `<RecordList>` element inside a `<Property>` element.

**Note:** Although you cannot specify a default value for the `<RecordList>` element, you can specify default records or queries using pass-through content elements.

The following example shows the definition of a record list property:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="BuyingGuideSection" id="BuyingGuideSection">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New Buying Guide Section</Name>
    <!-- additional properties deleted from this example -->
    <Property name="products">
      <RecordList/>
    </Property>
  </ContentItem>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

- *Adding a record selector* on page 30
  You add a record selector to enable an interface in the Page Builder to specify featured records or queries.

## Adding a content item property

A content item property defines a template section by creating a placeholder for a nested content item.

Recall that each template corresponds to a content item object, so a cartridge template is returned by the Content Assembler API as a nested content item. Content administrators can configure a section in the Page Builder by choosing a cartridge to insert in the section then configuring the properties of the cartridge.

To add a content item property to a template:

1. Insert a `<ContentItem>` element inside a `<Property>` element.
2. Specify the section `type`.

   Only cartridge templates with a type that matches the section type will be presented as options for the content administrator to choose from in the Page Builder. For example, when a content administrator goes to choose the cartridge to insert in a `RecommendedContent` section, only templates of type `RecommendedContent` will display in the **Select Cartridge** dialog box . (Recall that the cartridge template is the part of a cartridge that is exposed in the Page Builder.) Because the type of the section property and cartridge templates must match exactly, the type attribute is also defined as type `xs:Name` in the schema and all restrictions to template types apply to section types.

The following example defines three sections within a template. Note that more than one section in a template can have the same type, as long as your front-end application expects this kind of content.

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New three-column page</Name>
    <!-- additional properties deleted from this example -->
    <Property name="top">
      <ContentItem type="HorizontalBanner"/>
    </Property>
    <Property name="left">
      <ContentItem type="VerticalBanner"/>
    </Property>
    <Property name="right">
      <ContentItem type="VerticalBanner"/>
    </Property>
  </ContentItem>
  <!-- additional elements deleted from this example -->
</ContentItemTemplate>
```

- *About cartridge selectors* on page 31
  Unlike string and record list properties, section properties are always editable; you do not need to explicitly specify an editor in the template.
- *About content items and the Content Assembler API* on page 11
  When a content administrator creates pages in the Page Builder, the resulting configurations are saved as XML documents in the MDEX Engine.

## About defining the editing interface for properties

After you have defined the content properties in your template, you can define how those properties can be configured by the content administrator in the Page Builder.

You add content editors inside the `<EditorPanel>` element in the template. The `<BasicCon¬ tentItemEditor>` allows you to specify individual property editors that display in the Page Builder and associate them with a particular property.

The template schema provides elements that define editors for string and record list properties. For example, this excerpt from a sample template defines a configurable string property named `title`:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New Sample Section</Name>
    <Property name="title">
      <String/>
    </Property>
    <!-- additional properties deleted from this example -->
  </ContentItem>
  <EditorPanel>
    <BasicContentItemEditor>
      <StringEditor propertyName="title" label="Title"/>
    </BasicContentItemEditor>
    <!-- additional editors deleted from this example -->
  </EditorPanel>
</ContentTemplate>
```

The `propertyName` is a required attribute and specifies the property that this editor is associated with. The property must be defined in the `<ContentItem>` part of the template, and must be of the appropriate type for that editor. For example, a `<StringEditor>` cannot be associated with a `<RecordList>` property. If you define a content editor for a property that does not exist, or that is of the wrong type, an warning displays in the Page Builder when a content administrator attempts to configure the content.

Property editors do not have to be defined in the same order as the properties in the template. The `<BasicContentItemEditor>` renders the editors in a vertical layout in the Page Builder, in the order in which you define them in the template. If you do not want a property to be exposed in the Page Builder interface, do not define an editor associated with it.

It is possible to create more than one editor associated with the same property, however, be aware that all editors that you define in the template display in the Page Builder, which may be confusing to the content administrator. When the value of a property is changed, any other editors associated with that property are instantly updated with the new value.

- *About defining content properties* on page 22
  When you create a template, you specify all the properties that are necessary to render a page or section. These properties are returned as part of the content item object in the Content Assembler API.
- *Adding a group label* on page 31
  In the Page Builder interface, group labels can serve as a visual cue that several properties are related.

## Adding a string editor

You add a string editor to enable configuration of string properties in the Page Builder.

To add a string editor to a template:

1. Insert a `<StringEditor>` element within `<BasicContentItemEditor>`.
2. Specify additional attributes for the string editor:

| Attribute | Description |
|---|---|
| **`propertyName`** | Required. The `name` of the string property that this editor is associated with. This property must be declared in the same template as the string editor. |
| **`label`** | This attribute allows you to specify a more descriptive label for this field in the Page Builder. If no label is specified, the property name is used by default. |
| **`editable`** | If set to `false`, this attribute makes the property read-only in the Page Builder so that the value of the property is visible, but it cannot be edited. Use this option only if you specify a default value in the definition of the string property. Properties are editable by default. |
| **`width`** | The width in pixels of the text field presented in the Page Builder interface. The default width is 300 pixels. |
| **`height`** | The height in pixels of the text field presented in the Page Builder interface. The default height is 24 pixels. |

The following example shows a variety of editing options for string properties:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="PageTemplate" id="ThreeColumnNavigationPage">
  <!-- additional elements deleted from this example -->
  <!-- First define all the content properties -->
  <ContentItem>
    <Name>New Sample Page</Name>
    <Property name="title">
      <String>Page Title</String>
    </Property>
    <Property name="meta_keywords">
      <String/>
    </Property>
    <Property name="img_src">
      <String>/imgs/logo.jpg</String>
    </Property>
    <Property name="ui_code">
      <String>~/Resources/UserControls/HorizontalBanner/SamplePage.as¬
cx</String>
    </Property>
  </ContentItem>
  <!--  Define editors for properties that should be configurable -->
  <EditorPanel>
    <BasicContentItemEditor>
      <!--
      # This example allows the content administrator to
      # specify the title of the page.
      # A default value was provided above as a placeholder,
      # and it is editable in the Page Builder. The label
      # indicates that this field must be filled in by the
      # content administrator.
      -->
      <StringEditor propertyName="title" label="Title (required)"/>

      <!--
      # The meta.keywords property allows a content administrator
      # to specify keywords for search engine optimization that the
      # application can insert into the meta tags when it renders
      # a page. The default width and height values have been
      # overridden to provide a larger text box to enter content.
      # This property is editable, but there is no default
      # value.
      -->
      <StringEditor propertyName="meta_keywords"
        label="Meta keywords" width="300" height="120"/>

      <!--
      # In this example the template includes a particular
      # image that displays on every page that is created
      # using this template. This information can be
      # displayed in the Page Builder for information only
      # but it cannot be edited or deleted.
      -->
      <StringEditor propertyName="img_src" label="Logo URL"
        editable="false"/>

      <!--
      # Because the app.code property is used only by the
      # front-end application and is not of interest to the
      # content administrator, there is no editor to expose
      # it in the Page Builder.
      -->
    </BasicContentItemEditor>
  </EditorPanel>
</ContentItemTemplate>
```

- *Adding a string property* on page 25
  String properties are very flexible and can be used to specify information such as text to display on a page, URLs for banner images, or meta keywords for search engine optimization.

## Adding a record selector

You add a record selector to enable an interface in the Page Builder to specify featured records or queries.

The record selector dialog box allows a content administrator to designate specific records to spotlight in a section, or to specify a query to return a dynamic list of records.

To add a record selector to a template:

1. Insert a `<RecordSelector>` element within `<BasicContentItemEditor>`.
2. Specify additional attributes for the record selector:

| Attribute | Description |
|---|---|
| **`propertyName`** | Required. The `name` of the record list property that this editor is associated with. This property must be declared in the same template as the record selector. |
| **`label`** | This attribute allows you to specify a more descriptive label for this editor in the Page Builder. If no label is specified, the property name is used by default. |
| **`maxRecords`** | Sets the maximum number of records that this property can contain. If the content administrator designates specific records in the Page Builder, the number of records cannot exceed the value of `maxRecords`. If the content administrator specifies a query, it will return no more than this number of records. When configuring this property, the content administrator may choose to designate |

| Attribute | Description |
|---|---|
| | fewer static records or to further limit the number of records returned by a query. The default value for `maxRecords` is `10`. |

The following example shows a record selector associated with a "recommended" property. This allows a content administrator to specify up to three specific records or a query that returns up to three records.

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
type="BuyingGuideSection" id="BuyingGuideSection">
  <!-- additional elements deleted from this example -->
  <ContentItem>
    <Name>New Buying Guide Section</Name>
    <!-- additional properties deleted from this example -->
    </Property>
    <Property name="products">
      <RecordList/>
    </Property>
  </ContentItem>
  <EditorPanel>
    <BasicContentItemEditor>
      <!-- additional editors deleted from this example -->
      <RecordSelector propertyName="products" label="Products"
maxRecords="3"/>
    </BasicContentItemEditor>
  </EditorPanel>
</ContentTemplate>
```

- *Adding a record list property* on page 26
  A record list property can contain one or more Endeca records.

## About cartridge selectors

Unlike string and record list properties, section properties are always editable; you do not need to explicitly specify an editor in the template.

In the Page Builder, content administrators can select cartridges to insert in sections either by clicking the cartridge Add button in the content detail panel or by right-clicking the section in the content tree. Both options bring up the cartridge selector dialog box and are enabled automatically when you define a section in the template.

- *Adding a content item property* on page 26
  A content item property defines a template section by creating a placeholder for a nested content item.

## Adding a group label

In the Page Builder interface, group labels can serve as a visual cue that several properties are related.

Group labels are only used to provide additional context in the editing interface of the Page Builder and do not affect rendering in the front-end application. Group labels are optional.

One use of group labels is to give the content administrator information about properties that they need to configure the cartridge. For example, if a template defines properties that are required in order to render the content properly, you can indicate these with a descriptive group label so that the content administrator can easily identify the required fields in the Page Builder.

The editor panel in the Page Builder includes a default heading of "Section settings." This heading includes the required `Name` field and the read-only `type` of a template, as well as any properties that are defined before the first group label.

To add a group label to the editor panel:

Insert the `<GroupLabel>` element inside `<BasicContentItemEditor>` as in the following example:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
 type="BuyingGuideSection" id="BuyingGuideSection">
  <!-- additional elements deleted from this example -->
  <EditorPanel>
    <BasicContentItemEditor>
      <GroupLabel label="Image info"/>
      <StringEditor propertyName="title" label="Title"/>
      <StringEditor propertyName="header" label="Header text"/>
      <StringEditor propertyName="img_src" label="Image file"/>
      <GroupLabel label="Mouse-over info"/>
      <StringEditor propertyName="footer_text" label="Footer text"/>
      <StringEditor propertyName="footer_href" label="Footer link"/>
      <RecordSelector propertyName="products" label="Products"
maxRecords="3"/>
    </BasicContentItemEditor>
  </EditorPanel>
</ContentTemplate>
```

`<GroupLabel>` is an empty tag that allows you to specify the label text with the `label` attribute.

## About using XML pass-through properties

In addition to configurable content properties, the template schema also allows you to define non-configurable properties that are passed directly to the front-end application.

While you can use hidden string properties to pass simple pieces of information to the application, pass-through properties can be useful if the following conditions apply:

- The property never needs to be configured or exposed in the Page Builder.
- The property contains structured data that can be represented in XML.

Pass-through properties may take the form of *pass-through content properties* or any arbitrary XML that does not conform to the template schema as long as you specify a different namespace from the template schema.

**Note:** The Page Builder does not perform any validation on XML within a different namespace from the template schema. If you are using pass-through properties, be sure to validate your templates before uploading them.

### About using pass-through content properties

Pass-through content properties allow you to embed MDEX Engine query results in the content item object that you can access through the Content Assembler API.

Pass-through content properties follow the same schema as the page configurations generated by the Page Builder. When the Content Assembler processes these properties, it evaluates them and executes any necessary queries exactly as if the property had been configured with specific values by a content administrator in the Page Builder.

The schema for pass-through content properties is located in `doc\schema\content-tags.xsd` (on Windows) or `doc/schema/content-tags.xsd` (on UNIX) in your Content Assembler API installation. You must specify the namespace for the content tags in order for the Content Assembler to evaluate the properties as if they were content properties.

The following example shows several types of pass-through content properties:

```
<Property name="sample_navigation_query">
  <NavQuery xmlns="http://endeca.com/schema/content-tags/2008"
    augment="true" maxRecords="7">
    <DimensionValue id="60" dimensionId="2"/>
    <DimensionValue id="40" dimensionId="1"/>
  </NavQuery>
</Property>

<Property name="sample_urlenequery">
  <UrlEneQuery xmlns="http://endeca.com/schema/content-tags/2008"
    maxRecords="3">N=8021&amp;Ns=P_Price</UrlEneQuery>
</Property>

<Property name="sample_supplement_property">
  <Supplement xmlns="http://endeca.com/schema/content-tags/2008">
    <SupplementId>547</SupplementId>
  </Supplement>
</Property>

<Property name="another_sample_supplement_property">
  <Supplement xmlns="http://endeca.com/schema/content-tags/2008">
    <Zone>ZoneOne</Zone>
    <Style>StyleOne</Style>
  </Supplement>
</Property>

<!-- In the unusual case that you need specific records
     hard-coded into the template -->
<Property name="sample_record_query">
  <RecordQuery xmlns="http://endeca.com/schema/content-tags/2008">
    <RecordId>123</RecordId>
    <RecordId>456</RecordId>
    <RecordId>789</RecordId>
    <RecordId>abc</RecordId>
  </RecordQuery>
</Property>

<!-- <NavigationResult> is an empty tag that enables access to
     query results from nested content items -->
<Property name="navigation_results">
 <NavigationResult xmlns="http://endeca.com/schema/content-tags/2008"/>

</Property>
```

## About passing arbitrary XML to the front-end application

You can nest arbitrary XML in templates within a `<Property>` element.

Embedding arbitrary XML in template properties allows you to pass structured data to your application such as configuration for third-party packages used by your front-end application. If the Content Assembler does not recognize a tag, it returns the XML as an `org.w3c.dom.Element` (in Java) or a `string` (for the RAD Toolkit for ASP.NET) .

The only requirement is that the namespace must be different from any of the template or content schemas located in `doc\schema\` (on Windows) or `doc/schema/` (on UNIX) in your Content Assembler API installation. The Page Builder does not perform any validation on XML within a different namespace from the template schema. However, the Content Assembler API must be able to access the namespace that you specify.

The following example shows XML inserted within a property:

```
<Property name="sample_XML_pass-through">
  <widget xmlns="http://mycompany.com/schema/widgets">
    <name>Example widget</name>
    <description>Sample for embedded XML in a template</description>
    <icon src="icons/example.png" />
    <content src="index.html"/>
    <access network="true"/>
  </widget>
</Property>
```

Chapter 3

# Supporting the Page Builder

This section describes the tasks needed to enable content administrators to create pages in the Page Builder.

## Making templates available in the Page Builder

This section describes how to manage Page Builder templates using the emgr_update utility.

The emgr_update utility assists you in updating the instance configuration of a production system based on the changes made with the Endeca tools in a staging environment. You can also use emgr_update to add, retrieve, and remove templates from the Page Builder.

For a complete list of accepted emgr_update syntax, refer to "emgr_update syntax" in the *Endeca Administrator's Guide*.

### Uploading templates to the Page Builder

Before Page Builder users can access new templates, you must upload them using the emgr_update utility.

**Note:** Template file names cannot have spaces in them.

To upload a new template:

1. Open a command prompt or UNIX shell.
2. Run emgr_update with the `--action` of `set_templates` and the following parameters:

| Parameter | Value |
|---|---|
| **`--host`** | The machine name and port for the staging Endeca Workbench environment, in the format *host*:*port*. |
| **`--app_name`** | The name of the application to which you want the templates to apply. |
| **`--dir`** | The path to the local directory where your templates are stored. |

The following is a Windows example:

```
emgr_update.bat --action set_templates --host localhost:8888
--app_name My_application --dir c:\endeca-app\templates\
```

The following is a UNIX example:

```
emgr_update --action set_templates --host localhost:8888
--app_name My_application --dir /apps/endeca/templates/
```

If templates do not display in the Page Builder after uploading them using emgr_update, check the log in `%ENDECA_CONF%\logs\webstudio.log` (on Windows) or `$ENDECA_CONF/logs/webstudio.log` (on UNIX) for possible causes.

- *Updating templates in the Page Builder* on page 38
  Updating templates using emgr_update is a multi-step process.
- *About updating templates* on page 37
  When updating templates in the Page Builder, you should be aware of how conflicts are handled.
- *Troubleshooting invalid templates* on page 40
  Some template errors are returned to the emgr_update command line call, but all errors are detailed in the `emgr.log` or `webstudio.log` files.

## About modifying templates that are used by existing pages

During the development and testing phase of your application deployment, you may need to make adjustments to your page or cartridge templates and update them in the Page Builder.

When updating templates, you should be aware of the following effects on existing pages that use an updated template:

**Note:** Existing page configurations are not updated to the new template until a content administrator edits and saves the affected page or cartridge in the Page Builder.

- If a template has new properties that did not previously exist, any corresponding property editors become available in the Page Builder when a content administrator edits a page or cartridge based on the updated template. If you specify any default values for new properties, they are applied when a content administrator edits and saves the page or cartridge using the updated template.
- If a template no longer contains properties that previously existed, the corresponding property editors no longer display in the Page Builder when a content administrator edits a page or cartridge based on the updated template. The properties and their values are deleted from the page configuration.
- If the type of a property has changed (for example from string to record list) within a template, the corresponding property editor (if one is specified) becomes available in the Page Builder when a content administrator edits a page or cartridge based on the updated template. The existing value for the property does not display in the Page Builder and is deleted or replaced when the content administrator saves the content.
- If a content item property has changed to specify a different cartridge type, then any existing cartridge in that section is ejected and its configured properties deleted.
- If a property has not changed its name or type, the existing values are migrated to the new template. If the `maxRecords` value for a record selector is lower than the previous value and the content administrator had specified static records to display, any records beyond the new maximum value are deleted.
- If XML pass-through properties have been changed, they are updated when a content administrator edits and saves the page or cartridge using the updated template.
- If the default value of an existing property has changed, it is only applied to new pages or cartridges based on the updated template. In existing pages, the previously saved value of the property (even

if it is an empty string) is preserved regardless of whether it was originally a default or user-specified value.

- Changing the `name` of a property is equivalent to removing the property with the old name and adding a property with the new name. Avoid changing the names of properties that are being used by existing pages. To change the display name of a property on the Page Builder, use the `label` attribute instead.

**Note:** Because existing content is not automatically updated to the new templates, and default values can never be updated in existing pages, any changes that you make to your rendering code to reflect changes to a template must be backward-compatible. For this reason, you should avoid making changes to existing templates that are being used in production. You should limit updates to templates to the early stages of application development when you have little or no legacy content to support.

If you do need to update templates that are being used in production, you can include a version number in a property that your code can check so that it can render the content appropriately. In order for this number to be updated when existing content is updated to a new version of a template, it must be stored as the template `name` or as an XML pass-through property.

- *About updating templates* on page 37
  When updating templates in the Page Builder, you should be aware of how conflicts are handled.
- *Updating templates in the Page Builder* on page 38
  Updating templates using emgr_update is a multi-step process.

## About updating templates

When updating templates in the Page Builder, you should be aware of how conflicts are handled.

The Page Builder uses the most recently uploaded template. If you have an existing template in the Page Builder and upload a template with the same file name, the new template replaces the previously uploaded template.

Templates with non-unique IDs do not display in the template selector or cartridge selector dialog box. If you upload two template files with the same ID but different file names, then two separate templates are stored in the Page Builder but neither one displays to content administrators. For this reason, you should avoid renaming template files after they have been uploaded to the Page Builder unless you make sure to remove the old template first.

If a template is created with a duplicate ID, no error message is returned to the emgr_update command line call when uploading templates. Instead, an error message is written to the `webstudio.log` file similiar to the following:

```
Jan 1, 2008 12:34:56 AM com.endeca.etools.io.ConfigStoreAPI loadContentTem¬
plates
SEVERE: The template "HorizontalBanner-ImageMap.xml" has a non-unique ID
("ImageMap").
Jan 1, 2008 12:34:56 AM com.endeca.etools.io.ConfigStoreAPI loadContentTem¬
plates
SEVERE: The template "VerticalBanner-ImageMap.xml" has a non-unique ID
("ImageMap").
```

To re-enable the templates, edit the `id` attribute of the `<ContentTemplate>` element so that each template ID is unique, remove the templates from the Page Builder, and re-upload the templates. In general, it is a best practice to remove templates from the Page Builder and upload a complete set of templates whenever you need to update templates.

- *About modifying templates that are used by existing pages* on page 36
  During the development and testing phase of your application deployment, you may need to make adjustments to your page or cartridge templates and update them in the Page Builder.
- *Updating templates in the Page Builder* on page 38
  Updating templates using emgr_update is a multi-step process.

## Updating templates in the Page Builder

Updating templates using emgr_update is a multi-step process.

**Note:** Before updating templates in the Page Builder, be sure you have a backup of the current set of templates. Endeca recommends that you store page and cartridge templates in a version control system.

When removing or updating templates, make sure that all users are logged out of the Page Builder.

To update existing templates in the Page Builder:

1. Retrieve the current set of templates from the Page Builder.
2. Make any necessary edits to the templates on your local machine.
3. Remove all templates from the Page Builder.
4. Upload the revised templates from your local directory to the Page Builder.

- *About modifying templates that are used by existing pages* on page 36
  During the development and testing phase of your application deployment, you may need to make adjustments to your page or cartridge templates and update them in the Page Builder.
- *About updating templates* on page 37
  When updating templates in the Page Builder, you should be aware of how conflicts are handled.
- *Uploading templates to the Page Builder* on page 35
  Before Page Builder users can access new templates, you must upload them using the emgr_update utility.
- *Retrieving the current templates from the Page Builder* on page 38
  If you need to view or edit an existing template on a local machine, use emgr_update to copy the templates from the Page Builder into a local directory.
- *Removing templates from the Page Builder* on page 40
  You can remove all the templates from the Page Builder using the emgr_update utility.

## Retrieving the current templates from the Page Builder

If you need to view or edit an existing template on a local machine, use emgr_update to copy the templates from the Page Builder into a local directory.

If you need to retrieve the current set of templates:

1. Open a command prompt or UNIX shell.

2. Run emgr_update with the `--action` of `get_templates` and the following parameters:

| Parameter | Value |
|---|---|
| **`--host`** | The machine name and port for the staging Endeca Workbench environment, in the format *host*:*port*. |
| **`--app_name`** | The name of the application from which you want to retrieve the templates. |
| **`--dir`** | The path to the local directory to which you want the templates copied. |

The following is a Windows example:

```
emgr_update.bat --action get_templates --host localhost:8888
--app_name My_application --dir c:\endeca-app\templates\
```

The following is a UNIX example:

```
emgr_update --action get_templates --host localhost:8888
--app_name My_application --dir /apps/endeca/templates/
```

## About removing templates

If you remove a page or cartridge template that is being used for an existing page, the properties of the page or section are no longer editable in the Page Builder.

When a content administrator attempts to edit an existing page that uses a missing template, one of the following occurs:

- If the missing template is the page template, then the top-level page properties cannot be edited in the content details panel, but the content tree is still active. The content administrator can still change or edit the cartridges in that page as long as their corresponding templates are available.
- If the missing template is a cartridge template, the properties of that cartridge cannot be edited in the content details panel. All other cartridges, including cartridges that are nested within the missing cartridge, can still be edited via the content tree.

In both cases, all the configured values of the missing template's properties are preserved unless the content administrator removes or changes the template.

The content administrator has the following options:

- Leave the existing content as is. The Content Assembler continues to evaluate and process page configurations regardless of whether the template exists in the Page Builder, and existing pages continue to display in the front-end application as long as the appropriate rendering code is still in place.
- Replace the missing template or cartridge with another template. This action deletes all configured properties of the template as well as any nested cartridges.
- The existing content can be re-enabled for editing by uploading the missing template.

**Note:** Changing the ID of a template is equivalent to removing the template with the old ID and creating a new template with the new ID. Avoid changing the ID of templates that are being used for existing pages.

- *Removing templates from the Page Builder* on page 40
  You can remove all the templates from the Page Builder using the emgr_update utility.

## Removing templates from the Page Builder

You can remove all the templates from the Page Builder using the emgr_update utility.

**Note:** Before removing templates from the Page Builder, be sure you have a backup of the current set of templates. Endeca recommends that you store page and cartridge templates in a version control system.

When removing or updating templates, make sure that all users are logged out of the Page Builder.

The `emgr_update --action remove_templates` command removes all templates from an application, not specific templates. Removing specific templates from the Page Builder consists of the following steps:

1. Retrieving the current set of templates from the Page Builder.
2. Deleting the templates that are no longer needed from your local copy.
3. Removing all templates from the Page Builder using the procedure below.
4. Uploading the remaining templates to the Page Builder.

To remove templates from the Page Builder:

1. Open a command prompt or UNIX shell.
2. Run emgr_update with the `--action` of `remove_templates` and the following parameters:

| Parameters | Value |
|---|---|
| **`--host`** | The machine name and port for the staging Endeca Workbench environment, in the format *host*:*port*. |
| **`--app_name`** | The name of the application from which you want to remove the templates. |

The following is a Windows example:

```
emgr_update.bat --action remove_templates --host localhost:8888
--app_name My_application
```

The following is a UNIX example:

```
emgr_update --action remove_templates --host localhost:8888
--app_name My_application
```

- *About removing templates* on page 39
  If you remove a page or cartridge template that is being used for an existing page, the properties of the page or section are no longer editable in the Page Builder.

## Troubleshooting invalid templates

Some template errors are returned to the emgr_update command line call, but all errors are detailed in the `emgr.log` or `webstudio.log` files.

The `emgr.log` and `webstudio.log` files are located in:

- `%ENDECA_CONF%\logs` on Windows platforms
- `$ENDECA_CONF/logs` on UNIX platforms

Uploading templates can fail for the following reasons:

### Schema validation

Schema validation failure issues an error returned to the emgr_update command line call similar to the following:

```
C:\Endeca\ContentAssemblerAPIJava\1.0.0\reference\templates>emgr_update --
host localhost:8888 --app_name wine --action set_templates --dir
\apps\myapp\template
ERROR: Failed to set the following components: type='CONTENT' loca¬
tor='PageTemplate-ThreeColumnPage.xml' size='2236' , type='CONTENT' loca¬
tor='Banner-ImageMap.xml' size'2034' ,
ERROR: Failed to set app config. Make sure you can connect to http://local¬
host:8888.
```

Each template that fails validation will appear as a separate component. If you receive a schema validation message, check the `emgr.log` file for a more detailed validation error.

### Invalid zone or style

If a template is uploaded and refers to an invalid zone or style, no error message is returned to the emgr_update command line call, but the template is not available in the Page Builder. An error message is written to the `webstudio.log` file similiar to the following:

```
Jan 1, 2008 12:34:56 AM com.endeca.etools.io.ConfigStoreAPI loadContentTem¬
plates
SEVERE: The template "NavigationPage" has an invalid style("PageStyle3").
Jan 1, 2008 12:34:56 AM com.endeca.etools.io.ConfigStoreAPI loadContentTem¬
plates
SEVERE: The template "NavigationPage" has an invalid zone("NavigationPage¬
Zone3").
```

The `zone` and `style` attributes of the `<RuleInfo>` element must correspond to one of the zones and styles defined in your application's instance configuration in Endeca Workbench.

### Empty directory

When uploading templates, if the specified directory does not contain any XML files, the emgr_update command line call displays a message similar to the following:

```
C:\Endeca\ContentAssemblerAPIJava\1.0.0\reference\templates>emgr_update --
host localhost:8888 --app_name wine --action set_templates --dir
\apps\myapp\template
There are no templates in the specified directory.
```

If you receive this message, check to make sure that you specified the correct directory.

- *About template validation* on page 18
  Templates are validated when they are uploaded to the Page Builder.
- *Specifying the zone and style for a template* on page 19
  Page templates are required to specify a rule zone and a style. When a page is created in the Page Builder, the zone and style are applied to any pages based on that template.

## Troubleshooting invalid pages

If a page is displaying in the Page Builder as invalid, it is using a template with invalid zones or styles.

To determine whether the template is referring an invalid style or an invalid zone:

1. Retrieve the currently-loaded instance configuration.
   - Using the "Get Instance Configuration" feature of Developer Studio, copy the configuration files into the project folder.
   - Using the emgr_update utility, specify a destination directory.
2. In the destination directory, locate and open the *appname*.merch_rule_group_*groupname*.xml file that corresponds to the invalid template's rule group.
   For example, if the application name is "wineapp" and the rule group is "dynamicpages", the file would be wineapp.merch_rule_group_dynamicpages.xml
3. Look for the invalid zone or invalid style properties:

```
//Invalid zone property:
 <PROP NAME ="endeca.internal.landingpage.invalid.zone">
 <PVAL>true</PVAL>
 </PROP>

//Invalid style property:
 <PROP NAME ="endeca.internal.landingpage.invalid.style">
 <PVAL>true</PVAL>
 </PROP>
```

These properties are for debugging purposes only, and can be safely removed.

Once you have identified the invalid zone or style, you can either restore the zone or style or edit the rule to use a valid zone or style. You must run a baseline update for your changes to appear in the preview application.

- *Creating a zone for dynamic pages* on page 16
  Dynamic pages must be assigned a rule zone in order to display. You should create at least one zone in your application for use exclusively with dynamic pages.
- *Specifying the zone and style for a template* on page 19
  Page templates are required to specify a rule zone and a style. When a page is created in the Page Builder, the zone and style are applied to any pages based on that template.
- *About using zones with dynamic pages* on page 16
  Zones enable the display of dynamic pages in the application. While a single zone can be sufficient, multiple zones allow finer-grained control over the display of dynamic pages.

## About the preview application

The preview application in the Page Builder allows content administrators to verify the behavior of the pages they create. The Page Builder shares the same preview application as the Rule Manager.

Before content administrators create pages in the Page Builder, be sure to replace the default preview application with one that can render pages appropriately based on the templates you have created. This ensures that the preview application can provide an accurate representation of the way pages display in the final front-end application. In addition, in order to allow content administrators to save their progress and preview pages incrementally, the application should be able to gracefully handle empty sections or cartridges that have not been fully configured.

Note that if your preview application is not instrumented, the status messages for dynamic pages do not update when previewing by navigating in the preview application, making it difficult to determine why a page may not be firing. (The status messages do update when previewing through the Location links in the List View.) For more information about setting up a preview application, see the *Endeca Administrator's Guide*.

# Working with the Content Assembler API

This section provides information on working with the Endeca Content Assembler API classes.

## Overview of the Content Assembler API

The Content Assembler API for Java enables your front-end application to pass an `ENEQuery` object to the MDEX Engine and access dynamic page content.

The Content Assembler retrieves the appropriate page configuration (created by a content administrator in the Page Builder) based on search, navigation state (also known as refinement state), date, and user profile triggers. The Assembler then executes any additional queries specified by that configuration, such as navigation or record queries for spotlighted content, and returns the assembled page content as a `ContentItem` object. Content items can contain various properties including strings, records, and nested content items as specified in the page or cartridge templates.

### API class model overview

The Content Assembler API consists of two packages, `com.endeca.content` and `com.endeca.content.ene`.

The `com.endeca.content` package contains the core classes and interfaces for the Content Assembler API:

| Class | Description |
|---|---|
| `ContentManager` | A service for creating and managing dynamic content queries. |
| `ContentQuery` | An object used for executing content queries. |
| `ContentResults` | An object containing the results of an executed `ContentQuery`. |
| `ContentItem` | A single content item from an instance of a `ContentResults` object. |
| `Property` | A property value contained within a `ContentItem` object. |
| `ContentException` | Represents an exception when interacting with the Content Assembler API. |
| `InvalidQueryException` | Indicates that the specified query is invalid and cannot be executed. |

| Class | Description |
|---|---|
| `InitializationException` | Represents an unrecoverable exception while initializing a content assembler |

The `com.endeca.content.ene` package contains an implementation of the Content Assembler API that uses the Presentation API.

| Class | Description |
|---|---|
| `ENEContentManager` | An implementation of the `ContentManager` interface that creates an `ENEContentQuery`. |
| `ENEContentQuery` | An object used for executing content queries based on a `com.endeca.navigation.ENEQuery`. |
| `ENEContentResults` | An object containing the results of an executed `ENEContent¬Query`, including the `ENEQueryResults` object returned for the query. |

## Installing the Content Assembler API and reference application

This section describes the prerequisites and installation tasks for the Content Assembler API and reference application for Java.

### Prerequisites for installing the Content Assembler API

Before you install the Content Assembler API and reference application for Java, ensure that you have the following requirements in place.

The Content Assembler API requires Endeca Information Access Platform version 5.1.3 or later, with the following components installed:

- The Endeca Presentation API for Java.
- If you wish to run the Content Assembler reference application in the Endeca HTTP service, you must install the Web Studio and EAC Agent component.

The Content Assembler API for Java is supported for all hardware and operating system platforms that are supported by Endeca IAP 5.1.3.

The Content Assembler API requires Java 1.5.

#### Additional requirements

The Endeca Page Builder, a component of the Endeca Workbench suite of tools, is required for content administrators to configure template-based pages. For details about installing Endeca Workbench, see the *Endeca Merchandising Workbench Installation and Migration Guide*.

### Installing the Content Assembler API

The Content Assembler API and reference application for Java are distributed in a Zip package.

Before you install the Content Assembler API, you should first ensure that the Endeca IAP is installed, including the Presentation API for Java. For details about installing the Endeca IAP, see the *Endeca Installation Guide*.

To install the Content Assembler API:

1. In your local environment, locate the Content Assembler API package that you downloaded from the Endeca Support Center (*https://support.endeca.com*).

   The Content Assembler API package is named `ContentAssemblerAPIJava-*version*.zip`, where *version* is the version number of the Content Assembler API.
2. Extract the Zip file. Endeca recommends that you extract the file into the Endeca directory. In a default installation, this is `C:\Endeca` (on Windows) or `/usr/local/endeca` (on UNIX).

Installing the Content Assembler API creates the following directory structure under your Endeca directory:

```
\ContentAssemblerAPIs
   \Java
      \version
         \doc
            \api
            \schemas
         \lib
            \reference
               \content_jspref
               \templates
```

- *Installing the Content Assembler reference application* on page 48

  While the reference application can be installed into any application server with J2EE support, the following steps assume that you are installing into an instance of the Endeca HTTP service.

## Installation package contents

This topic describes in detail the directories that are created in the Content Assembler API installation.

The `ContentAssemblerAPIs/Java/1.0.0` directory contains the release notes for the Content Assembler API for Java (`README_CAJ.txt`) and the following directories:

| Directory | Contents |
|---|---|
| `/doc` | The documentation for the Content Assembler API, including the *Endeca Content Assembler API Developer's Guide for Java* (this guide). |
| `/doc/api` | The API reference (Javadoc) for the Content Assembler API for Java. |
| `/doc/schemas` | The XML schema documents for templates (`content-template.xsd`) and for the page configurations generated by the Page Builder (`content.xsd` and `content-tags.xsd`). |
| `/lib` | The Content Assembler API, distributed as a Jar file. |
| `/reference` | The sample context file, `content_jspref.xml`, for the Content Assembler reference application. |

| Directory | Contents |
|---|---|
| `/reference/content_jspref` | The Content Assembler reference application. |
| `/reference/templates` | A collection of sample templates for use with the Page Builder and the Content Assembler API. |

## About the Content Assembler reference application

The Content Assembler API distribution includes a modified version of the Endeca reference application for use with the Page Builder and the Content Assembler API.

The Content Assembler reference application is intended primarily as a validation and diagnostic tool for developers. Although it demonstrates how to query the MDEX Engine using the Content Assembler API, the reference application does not represent the best practices for building a front-end application using cartridges.

The reference application enables you to browse your data in the same way as the reference implementation for the Presentation API for Java. In addition, the Content Assembler reference application features a new section called **nav_content** that allows you to browse the content items that are returned by the Content Assembler API based on your navigation state.

## Installing the Content Assembler reference application

While the reference application can be installed into any application server with J2EE support, the following steps assume that you are installing into an instance of the Endeca HTTP service.

To install the Content Assembler API reference application:

1. Stop the Endeca HTTP service.
2. Navigate to the `reference` subdirectory of your Content Assembler API installation.
3. Copy the `content_jspref.xml` file and paste it into:
   - `%ENDECA_CONF%\conf\Standalone\localhost` (on Windows)
   - `$ENDECA_CONF/conf/Standalone/localhost` (on UNIX)
4. Open the `content_jspref.xml` file in a text editor and edit the `@FULL.PATH.TO.CON¬TENT_JSPREF@` variable so that it specifies the absolute path to the `content_jspref` directory. For example, if you are installing on Windows and your Content Assembler API is located in `C:\Endeca\ContentAssemblerAPIs`, your `content_jspref.xml` file would look similar to the following:

```
<Context
    path="/content_jspref"
    docBase="C:\Endeca\ContentAssemblerAPIs\Java\1.0.0\reference\con¬
tent_jspref"
    debug="0"
    privileged="false"
/>
```

5. Start the Endeca HTTP service.

## Using the Content Assembler reference application

The Content Assembler reference application allows you to browse the content items that are returned by the Content Assembler API based on your navigation state.

In order to use the reference application to view dynamic page results, you must first have created dynamic page configurations in the Page Builder.

To view dynamic page results in the reference application:

1. Open a Web browser and enter the following URL:
   `http://`*`host:8888`*`/content_jspref/?`

   Replace *host* with the host name or IP address of the server running the reference application. Replace *8888* with the Endeca HTTP service port if it is not running on the default port.
2. Click **ENDECA-JSP Reference Implementation**.
3. Specify the **host** and **port** of your MDEX Engine server.
4. Click **Go**.
5. Specify a zone in the **Content Rule Zone** field of the **nav_content** area. The value corresponds to the zone for the page you want to view. The zone is set based on the zone specified in the page template.
6. Click **Set**.
   If there is a dynamic page in the specified zone for the current navigation state, an XML representation of the content item returned at that navigation state displays. Otherwise, the following message displays: `There are no content results for zone '`*`ZoneName`*`' at the current navigation state.`
7. Search or navigate to another location trigger to view the page content that is returned for each trigger.

**Note:** The XML that displays in the reference application is not the same as the XML that represents the page configuration in the MDEX Engine. Rather, it is an XML representation of the content items that are returned by the API after the Content Assembler has evaluated the page configurations and includes the results of any additional queries the Assembler makes to the MDEX Engine.

## Uninstalling the Content Assembler API

You can uninstall the Content Assember API from your system by deleting the installed directories.

To uninstall the Content Assembler API:

1. Locate the `ContentAssemblerAPIJava` directory. In a typical installation this is in your Endeca directory, that is, `C:\Endeca\ContentAssemblerAPIJava` (on Windows) or `/usr/local/endeca/ContentAssemblerAPIJava` (on UNIX).
2. Delete the `ContentAssemblerAPIJava` directory along with its contents.

   **Note:** Deleting this directory will also remove the Content Assembler reference application for Java unless you have moved the `ContentAssemblerAPIs\Java\`*`version`*`\reference\content_jspref` directory to another location.

## Uninstalling the Content Assembler reference application

The following steps assume that you installed the reference application in the Endeca HTTP service.

To uninstall the Content Assembler reference application:

1. Stop the Endeca HTTP service.
2. Navigate to `%ENDECA_CONF%\conf\Standalone\localhost` (on Windows) or `$ENDECA_CONF/conf/Standalone/localhost` (on UNIX).
3. Locate and delete the `content_jspref.xml` file.
4. Locate and delete the Content Assembler reference application directory along with its contents. In a typical installation this is `C:\Endeca\ContentAssemblerAPIJava\`*`version`*`\reference\content_jspref` (on Windows) or `/usr/local/endeca/ContentAssemblerAPIJava/`*`version`*`/reference/content_jspref` (on UNIX).
5. Start the Endeca HTTP service.

# Writing applications with the Content Assembler API

This section describes how to use the Content Assembler API for Java to query the MDEX Engine.

## About using the Content Assembler API with the Presentation API

The Content Assembler API is used in conjunction with the Presentation API for Java. It does not replace the Presentation API.

The Content Assembler API is designed primarily for search and navigation queries and returns dynamic content if any dynamic pages are triggered by those queries. However, because it is possible to access the `ENEQueryResults` object through the Content Assembler API, all queries to the MDEX Engine can be sent through the Content Assembler API.

Queries submitted using the Content Assembler API must contain valid `ENEQuery` and `ENEConnection` objects from the Presentation API.

## Importing API packages

There are three API packages that you must import.

- `com.endeca.content` contains the core classes and interfaces for the Content Assembler API.
- `com.endeca.content.ene` contains a `ContentManager` implementation for the Endeca Presentation API.
- `com.endeca.navigation` is the Endeca Presentation API and contains all implementation-specific classes and interfaces.

To import the necessary classes:

Add the following lines at the top of your code:

```
import com.endeca.content.*;
import com.endeca.content.ene.*;
import com.endeca.navigation.*;
```

## Creating a ContentManager

You use a `ContentManager` to create a `ContentQuery` object and obtain `ContentResults`.

**Note:** The `ContentManager` should be scoped at a global or application level. You should not create new `ContentManager` instances for each request or query.

To create a `ContentManager`:

1. Create a new `ENEContentManager`.

   ```
   ENEContentManager contentManager = new ENEContentManager();
   ```

2. Optionally, you can enable XML validation of page configurations:

   ```
   contentManager.setValidating(true);
   ```

   **Note:** Validation can be useful in a testing environment for debugging purposes, particularly if templates are changing often. Because of the performance impact of validating content XML, this option should never be used in production. XML validation is disabled by default.

## Executing a content query and retrieving the results

A `ContentQuery` object sends dynamic content queries to the Endeca MDEX engine.

`ContentQuery` objects are created using the `ContentManager.createQuery()` method.

To execute a content query and retrieve content results:

Add code similar to the following example:

```
// Create a ContentQuery.
ENEContentQuery query = (ENEContentQuery)contentManager.createQuery();

// Configure the ContentQuery.
query.setENEQuery(new UrlENEQuery(request.getQueryString(), encoding));
query.setENEConnection(new HttpENEConnection(eneHost, enePort));
query.setRuleZone("NavigationPageZone");

// Execute the query.
ENEContentResults results = query.execute();

// Get the root content item.
ContentItem content = results.getContent();

// Optionally, get the ENEQueryResults object.
ENEQueryResults eneResults = results.getENEQueryResults();
```

**Note:** This example uses an `ENEContentManager` to create an `ENEContentQuery` that returns `ENEContentResults` -- these are specific implementations of the Content Assembler API that use the standard Presentation API.

This guide describes how to work with `ContentItem` objects returned by the ContentAssembler API. For information about how to work with `ENEQueryResults` objects, see the *Endeca Developer's Guide for Java*.

### About setting the zone for a query

When querying the MDEX Engine using the Content Assembler API, you must specify the zone that corresponds to that of the dynamic page content that you want to retrieve.

Using multiple zones can enable your application to implement more fine-grained trigger functionality than is provided by the dynamic business rules feature of the MDEX Engine. For example, zones can allow the front-end application to retrieve dynamic content based on:

- Searches (`Ntt` and `Ntk` parameters) for terms that are not designated as specific search term triggers, including search within results.
- Record offset (`No` parameter) to present different content when a user is browsing subsequent pages of search results.
- Different views of the same content, for example to present different content depending on whether a user is viewing product details or a product reviews page.

Your front-end application can set the zone for the content query based on conditions like the ones above. However, because the zone for a dynamic page is set based on the `zone` attribute of the `<RuleInfo>` element in the page template, the content administrator must have set up a page intended for a particular condition based on a template that uses the appropriate zone. You can provide information in the template `id` (for example, `ThreeColumnPage-Search`) or `description` to help the content administrator select the appropriate template.

- *Specifying the zone and style for a template* on page 19
  Page templates are required to specify a rule zone and a style. When a page is created in the Page Builder, the zone and style are applied to any pages based on that template.

## Building cartridges to render template-based content

Cartridges consist of cartridge templates and their associated rendering code, allowing you to separate the structure of dynamic page content from its presentation.

Building a front-end application based on cartridges involves the following tasks:

- Writing code to render content items based on each template.
- When rendering content items that contain nested content items, include code to dynamically call the appropriate code that is designed to render the nested content.

### About working with content items

The `ContentResults.getContent()` method returns the root `ContentItem` object that contains dynamic page content.

The `ContentItem` class provides several methods that allow you to iterate over the content properties. However, because the properties are defined by the template on which a content item is based, you can access the content properties directly based on the property `name` attribute defined in the template.

The `ContentItem.getProperty()` method returns a `Property` object. A `Property` can contain any type of object returned by the MDEX Engine. The type of object depends on the property elements specified in the template. Common object types include:

- `String`
- `ERecList`
- `ContentItem`

- `ENEQueryResults`

Typically, you access a specific property value using `ContentItem.getProperty("`*`name`*`").getValue()` and cast it to the appropriate object type.

For more details about `ContentItem` methods, see the *Endeca API Reference for the Content Assembler API for Java*.

- *Types of property elements* on page 24
  Each property type corresponds with a particular object type that is returned by the Content Assembler API.

## Rendering section content

Because a template defines the number and types of properties in a content item, you can write rendering code that is tailored to render the content driven by a specific template. This combination of a template and its renderer forms a cartridge.

**Note:** The following examples use Java Server Pages syntax for convenience. The Content Assembler API for Java is not limited to use in Java Server Pages applications and can be used with any Java application framework.

For example, if you have the following properties defined in a section template:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="SampleTemplate" id="PageMetadata">
  <!-- additional elements not shown in this example -->
  <ContentItem>
    <Name>Page Metadata</Name>
    <Property name="title">
      <String/>
    </Property>
    <Property name="meta_description">
      <String/>
    </Property>
    <Property name="meta_keywords">
      <String/>
    </Property>
  </ContentItem>
  <!-- additional elements not shown in this example -->
</ContentTemplate>
```

To render content based on this template:

1. Access the configured values from the `ContentItem` for the properties defined in the template.

```
<%
ContentItem contentItem = contentResults.getContent();

String title = (String)(contentItem.getProperty("title").getValue());
String metaDescription =
  (String)(contentItem.getProperty("meta_description").getValue());
String metaKeywords =
  (String)(contentItem.getProperty("meta_keywords").getValue());

%>
```

2. Add code to render the page based on the design from the creative team, using the values specified in the `ContentItem` object.

   ```
   <title><%= title %></title>
   <meta name="description" content="<%= metaDescription %>">
   <meta name="keywords" content="<%= metaKeywords %>">
   ```

The following example shows a record list property in a template and how the corresponding rendering code can display the results.

If the template (`HorizontalBanner-ThreeColumnProductBanner.xml`) includes the following:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="HorizontalBanner" id="ThreeColumnProductBanner">
  <!-- additional elements not shown in this example -->
  <ContentItem>
    <Name>Three Column Product Banner</Name>
    <Property name="products">
      <RecordList/>
    </Property>
  </ContentItem>
  <!-- additional elements not shown in this example -->
</ContentTemplate>
```

The associated rendering code (`ThreeColumnProductBanner.jsp`) may look similar to the following:

```
<%
ERecList products =
  (ERecList)(contentItem.getProperty("products").getValue());

%>
<table>
  <tr><%
    ListIterator i = products.listIterator();
    while(i.hasNext()) {
      ERec record = (ERec)i.next(); %>
      <td><%
        // Access appropriate record properties for rendering a product
        // using the Presentation API %>
      </td><%
    } %>
  </tr>
</table>
```

## Using dynamic includes to render page content

If you are using JavaServer Pages technology, you can use the `RequestDispatcher` functionality from the Java Servlet API to dynamically include rendering code to handle cartridge content.

The following example assumes that the template for each content item that you want to handle in this way includes a hidden property that specifies the JSP page used to render a particular page or cartridge, such as the `ui_code` property in the following example:

```
<ContentTemplate xmlns="http://endeca.com/schema/content-template/2008"
  type="HorizontalBanner" id="ThreeColumnProductBanner">
  <!-- additional elements not shown in this example -->
  <ContentItem>
    <Name>Three Column Product Banner</Name>
```

```
    <Property name="ui_code">
      <String>/HorizontalBanner/ThreeColumnProductBanner.jsp</String>
    </Property>
    <!-- additional properties not shown in this example -->
  </ContentItem>
  <!-- additional elements not shown in this example -->
</ContentTemplate>
```

You may choose not to specify the JSP code that is intended to render a template via a hidden property. Alternatives include constructing the name of the relevant JSP file programmatically based on properties such as the `type` and `id` of the template, or using an external mapping file to match a template to its associated rendering code.

Some simple cartridges, such as image hotspots or sub-sections of other cartridges, may be rendered by their parent cartridge code. In these cases you do not need to use this procedure.

To render dynamic pages using a `RequestDispatcher`:

1. Import the `RequestDispatcher` class:

   ```
   import javax.servlet.RequestDispatcher;
   ```

2. For each nested `ContentItem`, use a `RequestDispatcher` to dynamically include the appropriate code to render the content. For example:

   ```
   <%
   ContentItem pageContent = contentRequest.getContent();

   ContentItem topSection =
     (ContentItem)(pageContent.getProperty("top").getValue())
   if(null != topSection) {
     String uiCode = (String)(topSection.getProperty("ui_code").getValue());

     RequestDispatcher dispatcher = request.getRequestDispatcher(uiCode);
     // pass the ContentItem object to be rendered
     request.setAttribute("LocalContentItem", topSection);
     dispatcher.include(request, response);
   }

   %>
   ```

**Note:** For more details about using the `RequestDispatcher`, see Sun's Java Servlet API documentation.

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