Ada Wiki Engine Programmer's Guide

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1 Introduction

Ada Wiki is a small library that provides a Wiki engine supporting several Wiki syntaxes.

The library allows to:

- Parse a wiki text such as Markdown, Mediawiki, Creole, PhpBB, Dotclear and Google Code,
- Parse HTML content in embedded wiki text,
- Filter out the wiki, HTML or text through customizable filters,
- Render the wiki text in HTML, text or another wiki format.

This document describes how to build the library and how you can use the different features and integrate it in your own Ada application.

2 Installation

This chapter explains how to build and install the library.

2.1 Before Building

Before building the library, you will need:

- The GNAT Ada compiler,
- Ada Utility Library.

The build process may also need the following commands:

- make (GNU make),
- gprbuild,
- gprinstall,
- gcc (with Ada language support)

2.2 Configuration

The library uses the `configure` script to detect the build environment, check for Ada Utility Library library. The `configure` script provides several standard options and you may use:

- `--prefix=DIR` to control the installation directory,
- `--disable-static` to disable the build of static libraries,
- `--enable-distrib` to build for a distribution and strip symbols,
- `--disable-distrib` to build with debugging support,
- `--enable-coverage` to build with code coverage support (`-fprofile-arcs -ftest-coverage`),
- `--with-ada-util=PATH` to control the installation path of Ada Utility Library,
- `--help` to get a detailed list of supported options.

In most cases you will configure with the following command:

```
1 ./configure
```

By default, the library will be installed in `/usr/local` directory. If you want to install the library in a specific directory, use the `--prefix` option as follows:

```
1 ./configure --prefix=/opt
```

2.3 Build

After configuration is successful, you can build the library by running:

```
make
```

After building, it is good practice to run the unit tests before installing the library. The unit tests are built and executed using:

```
make test
```

And unit tests are executed by running the `bin/wiki_harness` test program.

2.4 Installation

The installation is done by running the `install` target:

```
make install
```

If you want to install on a specific place, you can change the `prefix` and indicate the installation direction as follows:

```
make install prefix=/opt
```

2.5 Using

To use the library in an Ada project, add the following line at the beginning of your GNAT project file:

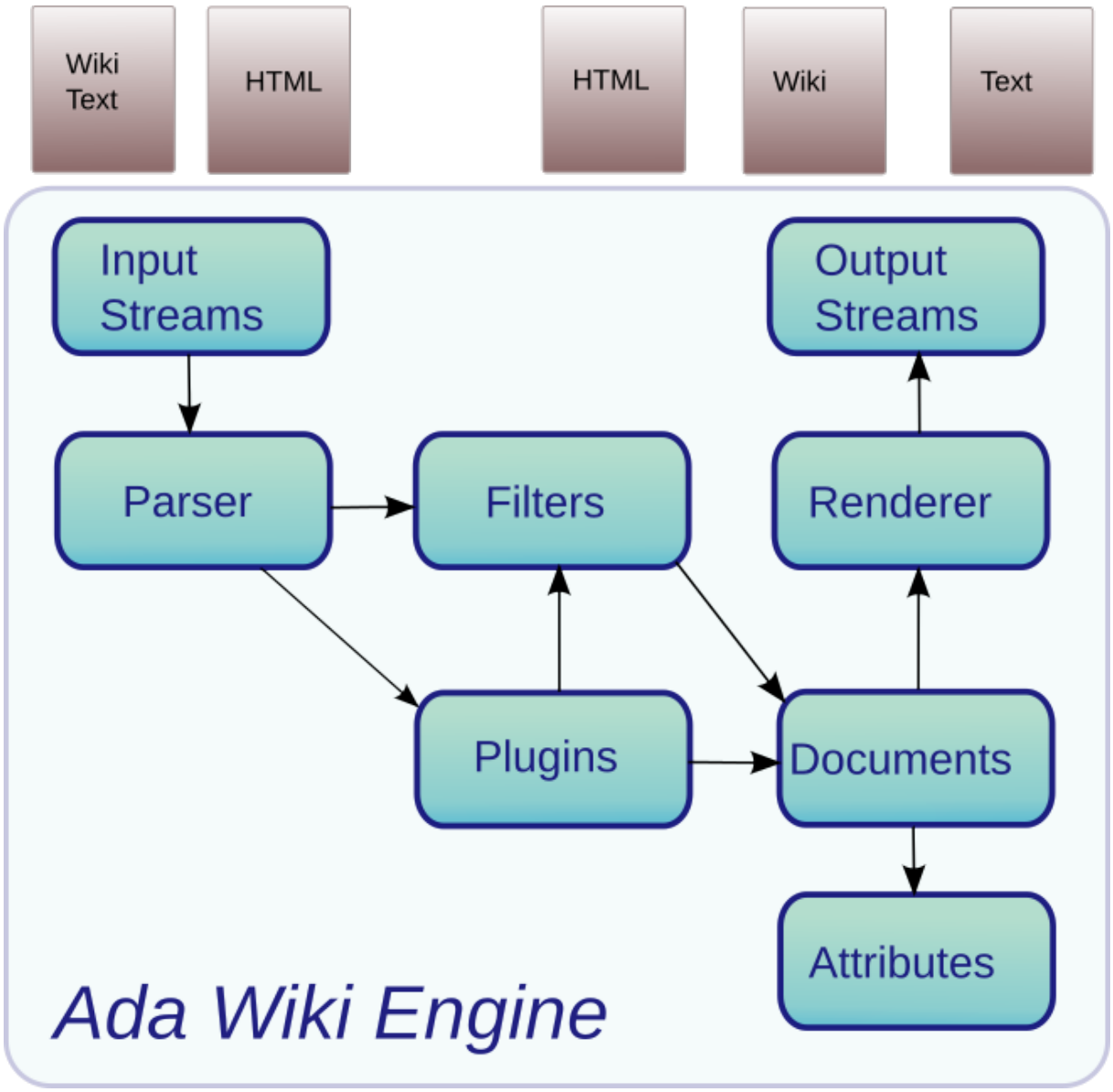
```
with "wikiada";
```

3 Wiki

The Wiki engine parses a Wiki text in several Wiki syntax such as `MediaWiki`, `Creole`, `Markdown`, `Dotclear` and renders the result either in HTML, text or into another Wiki format. The Wiki engine is used in two steps:

- The Wiki text is parsed according to its syntax to produce a Wiki Document instance.
- The Wiki document is then rendered by a renderer to produce the final HTML, text.

Through this process, it is possible to insert filters and plugins to customize the parsing and the rendering.



The Ada Wiki engine is organized in several packages:

- The Wiki Streams packages define the interface, types and operations for the Wiki engine to read the Wiki or HTML content and for the Wiki renderer to generate the HTML or text outputs.
- The Wiki parser is responsible for parsing HTML or Wiki content according to a selected Wiki syntax. It builds the final Wiki document through filters and plugins.
- The Wiki Filters provides a simple filter framework that allows to plug specific filters when a Wiki document is parsed and processed. Filters are used for the table of content generation, for the HTML filtering, to collect words or links and so on.
- The Wiki Plugins defines the plugin interface that is used by the Wiki engine to provide pluggable extensions in the Wiki. Plugins are used for the Wiki template support, to hide some Wiki text content when it is rendered or to interact with other systems.
- The Wiki documents and attributes are used for the representation of the Wiki document after the Wiki content is parsed.
- The Wiki renderers are the last packages which are used for the rendering of the Wiki document to produce the final HTML or text.

3.1 Parsing and rendering example

3.1.1 Parsing a Wiki Document

To render a Wiki text you will first need to parse the Wiki text and produce a Wiki document instance. For this you will need to declare the Wiki document instance and the Wiki parser instance:

```
1  with Wiki.Documents;
2  with Wiki.Parsers;
3  ...
4     Doc      : Wiki.Documents.Document;
5     Engine   : Wiki.Parsers.Parser;
```

The Ada Wiki Engine has a filter mechanism that is used while parsing the input and before building the target wiki document instance. Filters are chained together and a filter can do some work on the content it sees such as blocking some content (filtering), collecting some data and doing some transformation on the content. When you want to use a filter, you have to declare an instance of the corresponding filter type.

```
1  with Wiki.Filters.Html;
2  with Wiki.Filters.Autolink;
3  with Wiki.Filters.TOC;
```

```
4  ...
5     Filter   : aliased Wiki.Filters.Html.Html_Filter_Type;
6     Autolink : aliased Wiki.Filters.Autolink.Autolink_Filter;
7     TOC      : aliased Wiki.Filters.TOC.TOC_Filter;
```

We use the `Autolink` filter that detects links in the text and transforms them into real links. The `TOC` filter is used to collect header sections in the Wiki text and builds a table of content. The `Html` filter is used to filter HTML content that could be contained in a Wiki text. By default it ignores several HTML tags such as html, head, body, title, meta (these tags are silently discarded). Furthermore it has the ability to hide several elements such as style and script (the tag and its content is discarded).

You will then configure the Wiki engine to build the filter chain and then define the Wiki syntax that the parser must use:

```
1  Engine.Add_Filter (TOC'Unchecked_Access);
2  Engine.Add_Filter (Autolink'Unchecked_Access);
3  Engine.Add_Filter (Filter'Unchecked_Access);
4  Engine.Set_Syntax (Syntax);
```

The Wiki engine gets its input from an `Input_Stream` interface that only defines a `Read` procedure. The Ada Wiki Engine provides several implementations of that interface, one of them is based on the Ada `Text_IO` package. This is what we are going to use:

```
1  with Wiki.Streams.Text_IO;
2  ...
3     Input    : aliased Wiki.Streams.Text_IO.File_Input_Stream;
```

You will then open the input file. If the file contains UTF-8 characters, you may open it as follows:

```
1  Input.Open (File_Path, "WCEM=8");
```

where `File_Path` is a string that represents the file's path.

Once the Wiki engine is setup and the input file opened, you can parse the Wiki text and build the Wiki document:

```
1  Engine.Parse (Input'Unchecked_Access, Doc);
```

3.1.2 Rendering a Wiki Document

After parsing a Wiki text you get a `Wiki.Documents.Document` instance that you can use as many times as you want. To render the Wiki document, you will first choose a renderer according to the target format that you need. The Ada Wiki Engine provides three renderers:

- A Text renderer that produces text outputs,
- A HTML renderer that generates an HTML presentation for the document,
- A Wiki renderer that generates various Wiki syntaxes.

The renderer needs an output stream instance. We are using the `Text_IO` implementation:

```
1  with Wiki.Stream.Html.Text_IO;
2  with Wiki.Render.Html;
3  ...
4     Output   : aliased Wiki.Streams.Html.Text_IO.
          Html_File_Output_Stream;
5     Renderer : aliased Wiki.Render.Html.Html_Renderer;
```

You will then configure the renderer to tell it the output stream to use. You may enable or not the rendering of Table Of Content and you just use the `Render` procedure to render the document.

```
1  Renderer.Set_Output_Stream (Output'Unchecked_Access);
2  Renderer.Set_Render_TOC (True);
3  Renderer.Render (Doc);
```

By default the output stream is configured to write on the standard output. This means that when `Render` is called, the output will be written to the standard output. You can choose another output stream or open the output stream to a file according to your needs.

3.2 Documents

The `Document` type is used to hold a Wiki document that was parsed by the parser with one of the supported syntax. The `Document` holds two distinct parts:

- A main document body that represents the Wiki content that was parsed.
- A table of contents part that was built while Wiki sections are collected.

Most of the operations provided by the `Wiki.Documents` package are intended to be used by the wiki parser and filters to build the document. The document is made of nodes whose knowledge is required by the renderer.

A document instance must be declared before parsing a text:

```
1  Doc    : Wiki.Documents.Document;
```

After parsing some HTML or Wiki text, it will contain a representation of the HTML or Wiki text. It is possible to populate the document by using one of the `Append`, `Add_Link`, `Add_Image` operation. ## Attributes The `Attributes` package defines a simple management of attributes for the wiki document

parser. Attribute lists are described by the `Attribute_List` with some operations to append or query for an attribute. Attributes are used for the Wiki document representation to describe the HTML attributes that were parsed and several parameters that describe Wiki content (links, ...).

The Wiki filters and Wiki plugins have access to the attributes before they are added to the Wiki document. They can check them or modify them according to their needs.

The Wiki renderers use the attributes to render the final HTML content. ## Wiki Parsers {#wiki-parsers} The `Wikis.Parsers` package implements a parser for several well known wiki formats but also for HTML. While reading the input, the parser populates a wiki `Document` instance with headers, paragraphs, links, and other elements.

```
1   Engine : Wiki.Parsers.Parser;
```

Before using the parser, it must be configured to choose the syntax by using the `Set_Syntax` procedure:

```
1  Engine.Set_Syntax (Wiki.SYNTAX_HTML);
```

The parser can be configured to use filters. A filter is added by using the `Add_Filter` procedure. A filter is added at begining of the chain so that the filter added last is called first. The wiki `Document` is always built through the filter chain so this allows filters to change or alter the content that was parsed.

```
1  Engine.Add_Filter (TOC'Unchecked_Access);
2  Engine.Add_Filter (Filter'Unchecked_Access);
```

The `Parse` procedure is then used to parse either a string content or some stream represented by the `Input_Stream` interface. After the `Parse` procedure completes, the `Document` instance holds the wiki document.

```
1  Engine.Parse (Some_Text, Doc);
```

3.3 Filters

The `Wiki.Filters` package provides a simple filter framework that allows to plug specific filters when a wiki document is parsed and processed. The `Filter_Type` implements the operations that the `Wiki.Parsers` will use to populate the document. A filter can do some operations while calls are made so that it can:

- Get the text content and filter it by looking at forbidden words in some dictionary,
- Ignore some formatting construct (for example to forbid the use of links),
- Verify and do some corrections on HTML content embedded in wiki text,

- Expand some plugins, specific links to complex content.

To implement a new filter, the `Filter_Type` type must be used as a base type and some of the operations have to be overriden. The default `Filter_Type` operations just propagate the call to the attached wiki document instance (ie, a kind of pass through filter).

3.3.1 TOC Filter

The `TOC_Filter` is a filter used to build the table of contents. It collects the headers with the section level as they are added to the wiki document. The TOC is built in the wiki document as a separate node and it can be retrieved by using the `Get_TOC` function. To use the filter, declare an aliased instance:

```
1  TOC : aliased Wiki.Filters.TOC.TOC_Filter;
```

and add the filter to the Wiki parser engine:

```
1  Engine.Add_Filter (TOC'Unchecked_Access);
```

3.3.2 HTML Filters

The `Wiki.Filters.Html` package implements a customizable HTML filter that verifies the HTML content embedded in the Wiki text. The HTML filter can be customized to indicate the HTML tags that must be accepted or ignored. By default, the filter accepts all HTML tags except "script", "noscript", "style".

- A tag can be `Forbidden` in which case it is not passed to the document. If this tag contains inner HTML elements, they are passed to the document. By default, the `html`, `head`, `meta`, `title`, `script`, `body` are not passed to the document.
- A tag can be `Hidden` in which case it is not passed to the document and the inner HTML elements it contains are also silently ignored. By default this is the case for `script`, `noscript` and `style`.

The HTML filter may be declared and configured as follows:

```
1  F : aliased Wiki.Filters.Html.Html_Filter_Type;
2  ...
3  F.Forbidden (Wiki.Filters.Html.A_TAG);
```

With this configuration the HTML links will be ignored by the parser. The following configuration:

```
1  F.Hide (Wiki.Filters.Html.TABLE_TAG);
```

will remove the table and its content.

The filter is added to the Wiki parser filter chain by using the Add_Filter operation:

```
1  Engine.Add_Filter (F'Unchecked_Access);
```

3.3.3 Collector Filters

The `Wiki.Filters.Collectors` package defines three filters that can be used to collect words, links or images contained in a Wiki document. The collector filters are inserted in the filter chain and they collect the data as the Wiki text is parsed. After the parsing, the collector filters have collected either the words or the links and they can be queried by using the `Find` or `Iterate` operations. The following collectors are defined:

- The `Word_Collector_Type` collects words from text, headers, links,
- The `Link_Collector_Type` collects links,
- The `Image_Collector_Type` collects images,

The filter is inserted in the filter chain before parsing the Wiki document.

```
1  Words : aliased Wiki.Filters.Collectors.Word_Collector_Type;
2  ...
3  Engine.Add_Filter (Words'Unchecked_Access);
```

Once the document is parsed, the collector filters contains the data that was collected. The `Iterate` procedure can be used to have a procedure called for each value collected by the filter.

```
1  Words.Iterate (Print'Access);
```

3.3.4 Autolink Filters

The `Wiki.Filters.Autolink` package defines a filter that transforms URLs in the Wiki text into links. The filter should be inserted in the filter chain after the HTML and after the collector filters. The filter looks for the text and transforms `http://`, `https://`, `ftp://` and `ftps://` links into real links. When such links are found, the text is split so that next filters see only the text without links and the `Add_Link` filter operations are called with the link. ### Variables Filters The `Wiki.Filters.Variables` package defines a filter that replaces variables in the text, links, quotes. Variables are represented as `$name`, `$(name)` or `${name}`. When a variable is not found, the original string is not modified. The list of variables is either configured programatically through the `Add_Variable` procedures but it can also be set from the Wiki text by using the `Wiki.Plugins.Variables` plugin.

The variable filter must be configured with the plugin by declaring the instance:

```
F : aliased Wiki.Filters.Html.Html_Filter_Type;
 Engine.Add_Filter (F'Unchecked_Access);
```

And variables can be inserted by using the `Add_Variable` procedure:

```
F.Add_Variable ("username", "gandalf");
```

3.4 Plugins

The `Wiki.Plugins` package defines the plugin interface that is used by the wiki engine to provide pluggable extensions in the Wiki. The plugins works by using a factory that finds and gives access to a plugin given its name. The plugin factory is represented by the `Wiki_Plugin` limited interface which must only implement the `Find` function. A simple plugin factory can be created by declaring a tagged record that implements the interface:

```
type Factory is new Wiki.Plugins.Plugin_Factory with null record;
overriding function
Find (Factory : in Factory;
      Name    : in String) return Wiki.Plugins.Wiki_Plugin_Access;
```

3.4.1 Variables Plugins

The `Wiki.Plugins.Variables` package defines a the variables plugin that allows to set or update a variable that will be replaced by the `Wiki.Filters.Variables` filter. ### Conditions Plugins The Wiki.Plugins.Conditions package defines a set of conditional plugins to show or hide wiki content according to some conditions evaluated during the parsing phase.

3.4.2 Template Plugins

The `Wiki.Plugins.Templates` package defines an abstract template plugin. To use the template plugin, the `Get_Template` procedure must be implemented. It is responsible for getting the template content according to the plugin parameters.

3.5 Wiki Renderer

The `Wiki.Render` package represents the renderer that takes a wiki document and render the result either in text, HTML or another format.

3.5.1 HTML Renderer

The `Html_Renderer` allows to render a wiki document into an HTML content.

3.5.2 Link Renderer

The Wiki.Render.Links package defines the Link_Renderer interface used for the rendering of links and images. The interface allows to customize the generated links and image source for the final HTML.

3.5.3 Text Renderer

The `Text_Renderer` allows to render a wiki document into a text content. The formatting rules are ignored except for the paragraphs and sections. ### Wiki Renderer The `Wiki_Renderer</tt>
 allows to render a wiki document into another wiki content. The formatting
 rules are ignored except for the paragraphs and sections. ## Input and
Output streams {#wiki-streams} The`Wiki.Streams' package defines the interfaces used by the parser or renderer to read and write their outputs.

The `Input_Stream` interface defines the interface that must be implemented to read the source Wiki content. The `Read` procedure is called by the parser repeatedly while scanning the Wiki content.

The `Output_Stream` interface is the interface used by the renderer to write their outpus. It defines the `Write` procedure to write a single character or a string.

3.5.4 HTML Output Stream

The `Wiki.Writers` package defines the interfaces used by the renderer to write their outputs.

The `Input_Stream` interface defines the interface that must be implemented to read the source Wiki content. The `Read` procedure is called by the parser repeatedly while scanning the Wiki content. ### Output Builder Stream The Output_Builder_Stream is a concrete in-memory output stream. It collects the output in a Wiki.Strings.Bstring object and the content can be retrieved at the end by using the To_String or Iterate operation. ### HTML Output Builder Stream The `Html_Output_Builder_Stream` type defines a HTML output stream that collects the HTML into expandable buffers. Once the complete HTML document is rendered, the content is retrieved either by the `To_String` or the `Iterate` operations.

3.5.5 Text_IO Input and Output streams

The`Wiki.Streams.Text_IO` package defines the `File_Input_Stream` and the `File_Output_Stream` types which use the `Ada.Wide_Wide_Text_IO` package to read or write the output streams.

By default the `File_Input_Stream` is configured to read the standard input. The `Open` procedure can be used to read from a file knowing its name.

The `File_Output_Stream` is configured to write on the standard output. The `Open` and `Create` procedure can be used to write on a file.