

The flaka Manual

Wolfgang Häfeling
häfeling IT

February 18, 2010
version 1.0

Introduction

In the world of [Java](#), build scripts are traditionally written in [Ant](#) and recently also in [Maven](#).

When it comes to write a build script using Ant, it feels like using a Shell script in a rather awkward language (XML). Each Ant task solves a particular problem. This is similar to a Shell where you have this small masterpieces like `mkdir`, `cp`, `tar` plus some control structures to eventually being able to put the one big thing together.

flaka
häfelinger IT

2/72

Writing a build script using a Shell is serious business. And so it is when using Ant. Ant does not provide you any abstraction how the project needs to be build. There is no underlying logic. In fact you, the author, need to know what to do. Step by step. Whats more, you have to use the unfriendly [XML](#) syntax and restrictions, a control structure is missing and you have to use immutable properties to communicate between tasks. Therefore, Ant scripts are large, notoriously difficult to understand, usually not portable (usuallyt they just work on the authors host) and each author uses a different set of targets and properties.

Maven on the other side provides a high abstraction of building a project. Instead of describing how the project needs to be build, just describe project details and reports you like to have and Maven figures out what needs to be done. This is probably the reason why Maven got so much attention recently.

Despite better knowledge I wrote that Maven figures out how a project needs to be build automatically. Thats actually not quite true. In fact, Maven only works fine when following conventions setup by the Maven team. When not en route, Maven gets difficult as well. But even when following conventions, the number of options in Maven are now endless and question the idear of a declarative approach. Have a look at Mavens [POM](#) being a never ending series of XML tags]. At the end, I found myself using Ant again.

Still Im not happy with Ant.

What Im missing is the full power of a programming language. Yes, I want to have conditionals, loops and exception handling. I want to have variables which I can set or remove for pleasure. Such variables can reference any kind of object not only strings. And I need a nice expression language to retrieve and calculate in a simple yet elegant way. And there is no need to have each

and everything expressed in XML. And then I want to have some kind of higher abstraction which does the right thing most of the time. This is what Flaka is about:

- Programming Tasks (conditional, loops, exception handling, ..)
- Embedded Expression Language (EL)
- Framework to do the *right* thing, yet allows to use standard Ant when necessary
- Dependency handling (legacy, to be replaced by Ivy)

flaka
häfelinger IT

3/72

This four pillars are Flakas approach to simplify the process of writing a build script with Ant. Notice that you are by no means forced to use all four pillars. You can for example just use the programming tasks with or without elements of EL while you dont need to get in touch with Flakas dependency handling instruments and neither with the framework.

The folling example of a complete build script shall demonstrate the idear how a build script using Flaka looks like:

```
<project xmlns:c="antlib:it.haefelinger.flaka">  
  <c:build />  
  <c:dependency alias="log4j" />  
</project>
```

The author just lists the dependencies required to build the project. Flaka would do the rest by checking the underlying project structure:

- figure out what type of project should be build (jar, war, ear ..)
- figure out where projects source code, test cases etc are
- handle dependencies
- create targets like clean, compile, package, test automatically
- generate Javadoc and other reports

Current Status

Not all targets have been reached in the current version of Flaka (Release candidate 1). Programming tasks and EL are working fine and can be used. The other two pillars work partially but generally not recommended (yet) to be used.

flaka
häfelinger IT

Where to go from here?

4/72

- [Download](#) Flaka and read the [installation page](#).
- Have a look at the [basic scripting elements](#) to get an overview of tasks, types and macros provided by Flaka. Have a closer look in the reference part of this manual for all the gory details of those tasks, types and macros.
- Make sure to look into the chapter about the [expression language](#), it contains a lot of information on this enormous useful extension.
- Start writing build scripts using Flaka and give [feedback](#).

EL, The Expression Language

The [Java Unified Expression Language](#) is a special purpose programming language offering a simple way of accessing data objects. The language has its roots in Java web applications for embedding expressions into web pages. While the expression language is part of the JSP specification, it does in no way depend on the JSP specification. To the contrary, the language can be made available in a variety of contexts.

flaka
häfelinger IT

5/72

One such context is Ant scripting. Ant makes it difficult to access data objects. For example, there is no way of querying the underlying data object for the base folder (the folder containing the build script). All that Ant offers is the path name of this folder as *string* object. This makes it for example rather cumbersome to report the last modification time of this folder. With the help of EL (short for *Unified Expression Language*) this becomes an easy task:

```
<c:echo>
  ;; basedir is a standard Ant property
  basedir is ${basedir}

  ;; report last modification time (as Date object)
  was last modified at #{ '${basedir}'.tofile.mtime }

  ;; dump the full name of this build file
  ;; where 'ant.file' is a standard property
  this is #{property['ant.file']} } reporting!
</c:echo>
```

Being executed, this snippet produces something like

```
[c:echo] basedir is /projects/flaka/test
[c:echo]
[c:echo] was last modified at Mon Mar 09 13:52:29 CET
      2009
[c:echo]
[c:echo] this is /projects/flaka/test/tryme.xml
      reporting!
```

as output. Notice that Flaka's [echo](#) task has been used for this illustration because [EL](#) is by default only available on Flaka tasks. If [Ant's standard echo](#)

[task](#) is used, all `#{. .}` constructs are left as they are. It is however possible and recommended to turn [EL](#) on for *all* tasks. See [how to enable EL](#) for details.

The next code example shows another *EL in action* sample. The programming problem is to list all unreadable (sub)folders in a certain folder - here being the *root* folder:

```
<c:let>
  ; the root folder as file object
  root = '/'.tofile
  ; create empty list
  list = list()
</c:let>

<c:for var="file" in=" root.list ">
  <c:when test=" file.isdir and not file.isread ">
    <c:let>
      list = append(file,list)
    </c:let>
  </c:when>
</c:for>

<c:echo>
  ;; how many unreadable directories ??
  There are #{size(list)} unreadable directories in #{
    root}.
  And here they are #{list}.
</c:echo>
```

flaka
häfelinger IT

6/72

Executed on MacOS 10.5.6 (aka "Leopard") gives:

```
[c:echo] There are 2 unreadable directories in /.
[c:echo] And here they are [/.Trashes, /.Spotlight-
V100].
```

EL Ready Tasks

By default can EL expressions can only be used in tasks which are EL aware.
This tasks are:

- [echo](#)

- [for](#)
- [let](#)
- [properties](#)
- [unless](#)
- [when](#)

flaka
häfeling IT

7/72

It is possible though to enable [EL](#) on a global level, i.e. for all tasks.

Globally Enabling EL

To enable handling of EL references on a global level on all tasks, types or macros and vector independent, use task [property-handler](#):

```
<c:install-property-handler />
```

EL References

Those *not* familiar with the specification of [EL](#), [JSP](#) or [JSF](#) may safely skip this section. All other please read on, cause the implementation of EL has slightly be changed ¹.

For those familiar, the *term EL expression* is used in a slightly different way in this documentation than in the specification. According to the specification, `{..}` is an EL expression.

Not so in this documentation. Here only the inner part, denoted by `..` is a *EL expression* while `{ .. }` is considered a *reference to an EL expression*. A reference to an expression is used in contexts which are partially evaluated. Take task [echo](#) as example. Clearly, when writing

```
<c:echo>
  I said 'Hello world'!
</c:echo>
```

¹ EL has its roots in the context of Java Web Development and some specification details do not make sense when EL is used in a different domain content

we expect an output exactly as written. It would be nice to indicate however, that we want to have a part of the input evaluated as EL expression. This and only this is what `#{. .}` is good for:

```
<c:let>
  what = 'Hello world'
</c:let>

<c:echo>
  I said '#{ what }'!
</c:echo>
```

flaka
häfelinger IT

8/72

In other contexts, like in `<c:when test=" condition " />`, a EL expression is expected anyway and it does not make the slightest sense to require the expression to be referenced. As an example, assume that we want to check whether a property named *foobar* exists. Instead of writing

```
<c:when test=" #{has.property['foobar']} " />    -- don
't!
```

as seen in popular JSP tag libraries, just write

```
<c:when test=" has.property['foobar'] " />    -- yes!!!
```

And forget about that unnecessary clutter.

Notice however, that in all contexts where a expression is expected, a expression reference can be used. This allows for advanced meta programming like shown in the following example:

```
<c:when test=" has.property['#{propertyname}'] " />
  -- sic!
```

Handling of `${. .}`

EL defines two types of references:

- **deferred**, indicated by `#{. .}` ; and
- **dynamic**, indicated by `${. .}`

Dynamic references `${..}` are handled by Ant to resolve properties. There are two exceptions to this however. Ant will leave a dynamic reference as is if the reference value does not denote a (existing) property. Secondly, Ant allows to escape a reference by doubling character `$` as in `$$a`. In any case, `${..}` does not denote a legal EL reference and will be left as is. Be aware that you can install a property handler to get rid of unresolved `${..}` property references.

flaka
häfelinger IT

Handling of `#{..}`

9/72

Deferred references `#{..}` are evaluated according to regular EL rules. Each reference is evaluated independently. Thus

```
| The #{ 'Good' }, the Bad and the #{ 'Ug' 'ly' }, a  
    well known #{ 'movie' }.
```

Would print

```
| The Good, the Bad and the , a well known movie.
```

cause the second reference is illegal. Notice however that all valid references are evaluated.

Nested References

Nested references are not supported. The following reference is therefore illegal

```
| #{ item[ #{index} ] }
```

The Great Escape

This section is about how to stop a EL reference from being evaluated and treated as text instead:

- Use character backslash like in `\#{abc}` ; or use this rather awkward
- `#{'#{'}abc` construct.

Both variants have the same result, the string `#{abc}`.

Gory EL Details

The gory details of *EL* are laid out in the [the official JSR 245 specification](#) and are not repeated here. In short however, *EL* lets you formulate [programming expressions](#) like

```
7 * (5.0+x) >= 0          ;; 1
a and not (b || false)    ;; 2
empty x ? 'foo' : x[0]    ;; 3
```

flaka
häfelinger IT

10/72

The expression in line (1) is a algebraic while (2) contains a boolean expression. The result of (1) depends on the resolution of variable *x* and similar does (2) on *a* and *b*. Line (3) shows the usage of two built-in [operators](#) ([see below for details](#)).

The rest of this chapter introduces relevant details of EL in order to use it within Flaka.

Data Types

EL's data types are integral and floating point numbers, strings, boolean and type `null`. Example data values of each type, except type `null`, are given above (1-3). Type `null` has once instance value also named `null`. While `null` cant be used to formulate an expression, it is important to understand that the result of evaluating an expression can be `null`. For example, the evaluation of a variable named *x* is the data object associated with that name. If no data is associated however (i.e. if *x* is undefined), then *x* evaluates to `null`.

Strings

A EL string starts and ends with the same quotation character. Possible quotation characters are single the quote `'` and double quote `"` character. If string uses `'` as quotation character, then there is no need to *escape* quotation character `"` within that string. Thus the following strings are valid:

```
"a'b"    --> a'b
'a"b'    --> a"b
```

If however the strings quotation character is to be used within the string, then the quotation character needs to be escaped from its usual meaning. This is

done by prepending character backslash:

```
"a\"b"    --> a"b
'a\'b'    --> a'b
```

To escape the backslash character from its usual meaning (escaping that is), escape the backslash character with a backslash:

```
"a\\ "    --> a\
'a\\'     --> a\
```

flaka
häfelinger IT

11/72

Other characters than the quotation and backslash character cant be escaped. Thus

```
"a\bc"    --> a\bc , NOT abc
```

However, a escaped backslash evaluates always into a single backslash character:

```
"a\\b"    --> a\b , NOT a\\b
```

This rules allow for an easy handling of strings. Just take an quoation character. Then, escape any occurences of the quoation and escape character within the string to preserve the original input string.

Here are same further examples strings:

```
"abc"      -- abc
'abc'      -- abc
"a'c'      -- illegal
"a'c"      -- a'c
'a\'c'     -- a'c
'a\bc'     -- a\bc
'a\\bc'    -- a\\bc
'a\"bc'    -- a\"bc
'a\\"bc'   -- a\\"bc
'ab\'     -- illegal
'ab\\'     -- ab\
```

Operators

Four *operators* are defined in *EL*:

1. `empty` checks whether a variable is empty or not and returns either `true` or `false`. It is important to understand that `null` is considered empty.
2. condition operator `c ? a : b` evaluates `c` in a boolean context and returns the evaluation of expression `a` if `c` evaluates to `true`; otherwise `eval(b)` will be the result of this operator.
3. `.` and `;`
4. `[]` are property operators described in [section Properties](#) below.

flaka
häfelinger IT

12/72

Properties

Every data object in *EL* may have properties associated. Which properties are available has not been standardized in the [specification](#). In fact, this depends heavily on the underlying implementation and usage domain. What *EL* specifies however, is how to query a property:

```
| a.b.c
```

This expression can be translated into pseudo code as

```
| (property 'c' (property 'b' (eval a)))
```

which means that first variable `a` is evaluated, then property `b` is looked up on the evaluation result (giving a new evaluation result) and finally `c` is looked up giving the final result.

Perhaps the most important point to notice is looking up a property on `null` is not an error but perfectly legal. No exception gets raised and no warning message generated. In fact, the result of such a operation is just `null` again.

From a practical point a question might be asked how to query a property which happens to contain the dot (`.`) character. In `a.b.c` example shown above, how would we lookup property `b.c` on `a`? Operator `[]` comes to rescue:

```

a['b']          => a.b
(a['b'])['c']   => a.b.c
a['b']['c']     => a.b.c
a[b]           => can't be expressed using '.'
a[b.c]         => neither this ..
a['b.c']        => query property 'b.c' on a

```

flaka
häfeling IT

So far, properties don't seem of any good use. The picture changes perhaps with this example:

13/72

```

'abc'.toupper          => 'ABC'
'abc'.length*4         => 12
'abc')['tofile'].mkdir => true/false

```

The last example demonstrates that there might also be [side effects](#) querying a property. In the example above, which is specific for Flaka, a directory `abc` gets created and the whole expression evaluates to `true` if the directory could get created and `false` otherwise.

See further down which properties are available on various data types.

Implicit Objects

Properties are good to query the state of data objects. The question is however, how do we get a data object to query in the first place? To start with *something*, [EL](#) allows the implementation to provide *implicit* objects and [top level functions](#) (see below).

The following implicit objects are defined by Flaka:

Implicit Object	Type	Description
<i>name</i>		If <i>name</i> is not a predefined name as listed in the rest of this table, then <i>name</i> will be the same as <code>var[name]</code> , i.e. <i>name</i> will resolve to the object associated with variable <i>name</i> .

project		Ants underlying project object. It can be used to query the default target, base folder and other things. If you want to query properties, references, targets, tasks, taskdefs, macrodefs, filters etc., use appropriate implicit object instead.
property		Use this object to query project properties.
var		A object containing all project references.
reference		Same as var
target		Use this object to query a target
taskdef		Query taskdefs
macrodefs		Macros
tasks		Either taskdef or macrodef. Macros are specialized task and thus same the same namespace.
filter		A object containing all filters defined in this project.
e	double	The mathematical constant e , also known as Euler's number .
pi	double	The mathematical constant pi

flaka
häfelinger IT

14/72

An example for an EL expression fetching property foo is:

```
property.foo
project.properties.foo
```

Similar, a variable named foo is fetched like

```
foo                -- (1)
var.foo            -- (2)
reference.foo       -- (3)
project.references.foo -- (4)
```

Functions

EL also allows the implementation to provide top level functions. The following sections describe functions provided by Flaka. Some functions take an arbitrary number of arguments (inclusive no argument at all). This is denoted by two

dots (..). An example of such a function is `list(object..)` which takes an arbitrary number of object to create a list.

Function	Type	Meaning
<code>typeof(object)</code>	string	The type of object, int, string, file etc
<code>size(object)</code>	int	Returns the objects size. The size of the object is given by the number of entities it contains. This is 0 (zero) for all primitive types. Otherwise the size is determined by an underlying <code>size()</code> method or <code>size</code> or <code>length</code> attribute of the object in question.
<code>sizeof(object)</code>	int	same as <code>size(object)</code> , see above
<code>null(object)</code>	bool	Evaluates to <code>true</code> if object is the <code>nil</code> entity; otherwise <code>false</code> . This function can be used to check whether a reference (var) or property exists. Operator <code>empty</code> cant be used for this task, cause <code>empty</code> returns <code>true</code> if either not existing or if literatly <i>empty</i> (for example the empty string).
<code>file(object)</code>	File	Creates and returns a file object out of object. If object is already a file, the object is simply returned. Otherwise, the object is streamed into a string and that string is taken as the files path name.
<code>concat(object..)</code>	string	Creates a string by concatenating all stringized objects. If no object is provided, the empty string is returned.
<code>list(object..)</code>	list	Returns a list where the lists elements consists of the objects provided. If no objects are provided, the empty list is returned.

flaka
häfelinger IT

15/72

append(object..)	list	This function is similar to <code>list</code> . It takes the objects in order and creates a list elements out of them. If a object is a list, then elements of that list are inserted instead of the list object itself. For example <code>append('a',list('b'),'c')</code> evaluates to list ('a','b','c')
------------------	------	---

flaka
häfeling IT

16/72

Some mathematical functions are defined as well:

sin(double)	double	The mathematical sine function
cos(double)	double	The mathematical cosine function
tan(double)	double	The mathematical tangent function
exp(double)	double	The mathematical exponential function, e raised to the power of the given argument
log(double)	double	The mathematical logarithm function of base e
pow(double)	double	Returns the value of the first argument raised to the power of the second argument.
sqrt(double)	double	Returns the correctly rounded positive square root of a double value.
abs(double)	double	Returns the absolute value of a double value.
min(double, double)	double	Returns the smaller of two double values.
max(double, double)	double	Returns the larger of two double values.
rand()	double	Returns a double value with a positive sign, greater than or equal to 0.0 and less than 1.0.

Available Properties

In general properties are mapped as *attribute* on the underlying data object. In Java, every *getX* method taking no arguments identifies property x. As an example, assume that we have

```
| public class Foo {
```



```
| public .. getBar() { .. }  
| }
```

then an data object of type *Foo* will have property *bar* and thus the following expression `x.bar` would eventually call `Foo.getBar()` assuming that `x` evaluates to an object of type *Foo*. Such properties are the **natural** properties of a type.

flaka
häfelinger IT

17/72

Primitive Types

Primitve data types (`int`, `double`, `bool`, `null`) have no properties.

List and Arrays

Besides their *natural* properties (see discussion above) are *index* properties available:

```
| list('a','b')[1] => 'b'
```

Negative indexes are currently not supported. If an index is species an not existing element, `null` is returned.

String Properties

Besides *natural* properties (see discussion above) are the following properties supported:

Property	Type	Description
<code>length</code>	<code>int</code>	number of characters in this string
<code>size</code>	<code>int</code>	same as property <code>length</code>
<code>tolower</code>	<code>string</code>	return this string in lowercase characters only
<code>toupper</code>	<code>string</code>	return this string in uppercase characters only
<code>trim</code>	<code>string</code>	remove leading and trailing whitespace characters

tofile	file	create a file based on this string; the so created will be relative to the current build files base folder if the strings value does not denote a absolute path. Furthermore, the empty string will create a file object denoting the projects base folder (i.e. the folder containing the build script currently executed). Notice that . and .. denote absolute paths, not relative ones.
--------	------	---

flaka
häfelinger IT

18/72

File Properties

Files and folders is Ants bread and butter. A couple of properties are defined on file objects to simplify scripting (see below). Most important is however how to *get* a file object in the first place. This is most easily done by using string property tofile:

```
|      'myfolder'.tofile.isdir
```

In this example of an EL expression, string `myfolder` is converted in a File object using property `tofile`. In addition, the so created object is checked whether it is a folder or not.

The following *properties* are defined on File objects:

Property	Type	Description
parent	File	parent of file or folder as file object
toabs	File	file or folder as absolute file object
exists	bool	check whether file or folder exists
isfile	bool	check whether a file
isdir	bool	check whether a folder (directory)
ishidden	bool	check whether a hidden file or folder
isread	bool	check whether a file or folder is readable
iswrite	bool	check whether a file or folder is writable
size	int	number of bytes in a (existing) file; 0 otherwise
length	int	same as size
mtime	Date	last modification date
list	File	array of files in folder ; otherwise null
tostr	String	file name as string object
touri	URI	file as URI object

<code>tourl</code>	URL	file as URL object
<code>delete</code>	bool	deletes the file or folder (true); false otherwise
<code>mkdir</code>	bool	creates the folder (and intermediate) folders (true); false otherwise

flaka
häfelinger IT

19/72

Matcher Properties

A *matcher object* is created by task [switch](#) if a regular expression matches a input value. Such a matcher object contains details of the match like the start and end position, the pattern used to match and it allows to explore details of capturing groups (also known as `_` marked subexpression).

Property	Type	Description
<code>start</code>	int	The position within the input where the match starts.
<code>s</code>	int	Same as <code>start</code>
<code>end</code>	int	The position within the input where the match ends (the character at <code>end</code> is the last matching character)
<code>e</code>	int	Same as <code>end</code>
<code>groups</code>	int	The number of capturing groups in the (regular) expression.
<code>size</code>	int	Same as <code>groups</code>
<code>length</code>	int	Same as <code>groups</code>
<code>n</code>	int	Same as <code>groups</code>
<code>pattern</code>	string	The regular expression that was used for this match. Notice that glob expressions are translated into regular expressions.
<code>p</code>	string	Same as <code>pattern</code>
<code>i</code>	matcher	The matcher object for <i>i</i> 'th capturing group. See task switch for examples.

Evaluating in a boolean context

When evaluation a `expr` in a string context, a string representation of the final object is created. Similar, when a evaluation in a boolean context takes place, a conversion into a boolean value of the evaluated object takes place. The following table describes this boolean conversion:

evaluated object type	true	false
file	if the file exists	false otherwise
string	if string is empty	false otherwise
null	never	always
boolean	if true	otherwise
<i>other</i>	always	never

flaka
häfelinger IT

20/72

Programming Constructs

This chapter provides an overview of programming constructs Flaka provides. This programming constructs are one of the Flakas pillars.

Strings

Like Ant, Flaka supports currently strings and, when applicable, pointer to resources (by referencing a symbol). Ant provides no functionality manipulate a string value and neither does Flaka. However, Flakas expression language contains string functions to create new strings.

flaka
häfelinger IT

21/72

Symbols

Symbols are names carrying associated data. The name of a symbol is a sequence of characters. The allowed characters are basically unlimited. It is recommended to stick with well known characters [a-zA-Z0-9._-]. Symbols can be used as variables, target, task, type or macro names.

- `<property name=sym value=expr />` Use *sym* as variable: assign the value of *expr* to *sym*. **A symbol associated with a string value is called a property.** Notice that Ant and Flaka provide further ways of creating properties.
- `<macrodef name=sym>` Use *sym* as macro name
- `<target namesym>` Use *sym* as target name
- `<taskdef name=sym>` Use *sym* as task name
- `<typedef name=sym>` Use *sym* as type name
- `id=sym` Use *sym* as reference: assign the evaluation of task (or macro) to *id*

Properties

To reference a property, enclose its symbol name with curly braces and prefix with the dollar character like:

```
<property name="x" value="99" />
<echo>
  value of property x is ${x}      -- .. is 99
</echo>
```

```
<property name="x" value="99" />
<property name="x" value="The quick brown fox .." />
<echo>
  value of property x is ${x}      -- .. is 99
</echo>
```

flaka
häfelinger IT

22/72

It can be done using Flakas task [let](#) or [unet](#) as the following snippet demonstrates.

```
<property name="x" value="99" />
<c:let>
  x ::= "The quick brown fox .."
</c:let>
<echo>
  value of property x is ${x}      -- .. is The quick
    brown ..
</echo>
```

Properties have their own symbol table (as targets, tasks, macros and types have). This means for example that it is possible to have a property and a task *sharing* the same symbol name:

```
<property name="foobar" ../>
<macrodef name="foobar" ../>  -- property foobar not
    harmed!
```

Sequencing

To evaluate a sequence of expressions (tasks or macros) where only one expression is allowed, use [Ants sequential task](#):

```
<sequential>
  -- any sequence of tasks or macros
</sequential>
```

Note that *sequential* returns nothing. Use properties to communicate with the caller if necessary.

Conditionals

With standard Ant, task `condition` is used to set a property if a condition is given. Then a macro, task or target can be conditionally executed by checking the existence or absence of that property (using standard attributes *if* or *unless*). Flaka defines a couple of control structures to handle conditionals in a simpler way.

flaka
häfelinger IT

23/72

when and unless

Task `when` evaluates an `EL` expression. If the evaluation gives `true`, the sequence of tasks are executed. Nothing else happens in case of `false`.

```
<c:when test=" expr ">
  -- executed if expr evaluates to true
</c:when>
```

The logical negation of `when` is task `unless` which executes the sequence of tasks only in case the evaluation of `expr` returns `false`.

```
<c:unless test=" expr ">
  -- executed if expr evaluates to false
</c:unless>
```

The body of `when` and `unless` may contain any sequence of tasks or macros (or a combination of both).

choose

Task `choose` tests each `when` condition in turn until an `expr` evaluates to `true`. It executes then the body of that `when` condition. Subsequent `whens` are then not further tested (nor executed). If all expressions evaluate to `false`, an optional *catch-all* clause gets executed.

```
<c:choose>
  <when test="expr_1">
    -- body_1
```

```

    </when>
    ..
    <otherwise> -- optional_
        -- catch all body
    </otherwise>
<c:/choose>

```

flaka
häfelinger IT

switch

24/72

A programming task often seen is to check whether a (string) value matches a given (string) value. If so, a particular action shall be carried out. This can be done via a series of *when* statements. The nasty thing is to keep track of whether a value matched already. Flaka provides a handy task for this common scenario, the [switch](#) task:

```

<c:switch value=" 'some string' ">
    <matches re="regular expression or pattern" >
        -- body_1
    </case>
    ..
    <otherwise> -- optional
        -- catch all body
    </otherwise>
</c:switch>

```

Each case is tried in turn *to match* the string value (given as [EL](#) expression). If a case matches, the appropriate case body is executed. If it happens that no case matches, then the optional default body is executed. To be of greater value, a regular expression or pattern expression can be used in a case condition.

Repetition

Flaka has a looping statement. Use task [for](#) to iterate over a *list* of items. Use [break](#) and [continue](#) to terminate the loop or to continue the loop with the next item.

```

<c:for var=" name " in=" ''.tofile.list ">
    -- sequence of task or macros
    -- used <c:continue /> to continue ; and
    -- <c:break /> to stop looping

```



```

-- use #{name} to refer to current item (as shown
  below)
<c:echo>#{name}</c:echo>
</c:for>

```

Attribute `in` will be evaluated as [EL](#) expression. In the example above, that [EL](#) expression is `'' .tofile.list` which, when evaluated, creates a list of all files in the folder containing the current build script. To understand the expression, have a look at [properties](#) of a string] and [properties](#) of a file.

flaka
häfeling IT

25/72

Exception Handling

Flaka has been charged with exception handling tasks.

trycatch

Flaka contains a task to handle exceptions thrown by tasks, [trycatch](#). This task implements the usual *try/catch/finally* trinity found in various programming languages (like in Java for example):

```

<c:trycatch>
  <try>
    -- sequence of task or macros
  </try>
  <catch>
    -- sequence of task or macros
  </catch>
  <finally>
    -- sequence of task or macros
  </finally>
</c:trycatch>

```

Element *try*, *catch* and *finally* are all optional or can appear multiple times. If *catch* is used without any argument, then that catch clause will match any **build exception**. To differentiate between different exception types, *catch* can additionally be used with a *type* and *match* argument. The former can be used to select a particular exception type (like a `'java.lang.NullPointerException`), the latter can be used to select an exception based on the message carried. Both arguments are interpreted as pattern expression. For example:

```

<c:trycatch>

```

```

<try>
  ..
  <fail message="#PANIC!" unless="ant.file"/>
  ..
</try>
<catch match="*#PANIC!*">
  <echo>Ant initialization problem!!</echo>
  <fail/>
<catch type="java.lang.*">
  -- handle Java runtime problems
</catch>
<catch>
  -- handle all other build exceptions
</catch>
</c:trycatch>

```

flaka
häfelinger IT

26/72

Property *ant.file* is a standard Ant property that should always be set. If not, there's something seriously wrong and it does not make much sense to continue. Use attribute *type* to catch (runtime) exceptions thrown by the underlying implementation.

throw

Task [throw](#) throws a (build) exception.

```
<c:throw [var="sym"] />
```

This task can also be used to rethrow an existing exception.

Macros

The (almost) equivalent of a function is a macro in Ant and Flaka. For example:

```

<macrodef name="hello">
  <attribute name="msg" />
  <element name="body" implicit="true" />
  <sequential>
    <body />
  </sequential>
</macrodef>

```

Once defined, simply use it:

```
<hello msg="Hello , world!">  
  <echo>@{msg}</echo>  
</hello>
```

This macro evaluates into

```
<echo>Hello , world!</echo>
```

which eventually prints the desired greeting.

Macros are a standard feature of Ant.

flaka
häfelinger IT

27/72

Part II

Each of the following chapters describes a task in all it's details.

flaka
häfelinger IT

28/72

break

A task mirroring a break statement. When used within a [for](#)-loop, the loop will be terminated. If this task is used outside of a [for](#)-loop, a build exception will be thrown.

flaka
häfelinger IT

29/72

```
<c:for var="i" in=" list(1,2,3,4,5,6) ">
  <c:echo>i = #{i}</echo>
  <c:when test=" i == 3 ">
    <c:break />
  </c:when>
</c:for>
```

Being executed, the following will be dumped on stdout:

```
[c:echo] i = 1
[c:echo] i = 2
[c:echo] i = 3
```

Attributes

Attribute	Type	Default	EL	Description
test	string	-	expr	Terminate loop when EL expression evaluates to <code>true</code>
if	string	-	<code>#{}</code>	Terminate if property exists
unless	string	-	<code>#{}</code>	Terminate if property does not exist

Behaviour

When used without any attributes, the surrounding [for](#) or [while](#) loop will terminate at once. When used with attributes, then the loop will terminate if at least one attribute evaluates to `true`. Otherwise, the loop will not be terminated and continues as usual.

The example given above can thus be shortened to

```
<c:for var="i" in=" list(1,2,3,4,5,6) ">
  <c:echo>i = #{i}</echo>
```

```
<c:break test=" i == 3 " />
</c:for>
```

Further Links

- [Javadoc](#)
- [Source](#)

flaka
häfelinger IT

30/72

choose

A task implementing a series of *ifelse* statements, i.e. a generalized *if-then-else* statement.

Attributes

Attribute	Type	Default	EL	Description
<i>when.test</i>	string	false	=	A EL condition. When true corresponding clause will be executed.
<i>unless.test</i>	string	true	=	A EL condition. When false corresponding clause will be executed.
debug	boolean	false	=	Turn on extra debug information.

flaka
häfelinger IT

31/72

Elements

Element	Cardinality	Description
when	infinite	To be executed if condition evaluates to true
unless	infinite	To be executed if condition evaluates to false
otherwise	[0,1]	To be executed if no when or unless clause got executed
default	[0,1]	Synonym for otherwise

Behaviour===

Each **when** and **unless** clauses conditions are evaluated in order given until a claus gets executed. Then, further processing stops ignoring all further elements not taken into account so far. If no **when** or **unless** clause got executed, then a present **otherwise** or **default** clause gets executed.

The shortest possible **choose** statement is

```
| <c:choose />
```

Its useless and does nothing, its completely harmless.

The following example would execute all macros or tasks listed in the otherwise clause cause no when or unless clause got executed.

```
<c:choose>
  <otherwise>
    <!-- macros/tasks -->
  </otherwise>
</c:choose>
```

flaka
häfelinger IT

32/72

This would execute all macros and tasks listed in the otherwise clause since no when clause got executed.

```
<c:choose>
  <when test=" true == false" >
    <echo>new boolean logic detected ..</echo>
  </when>
  <unless test=" 'mydir'.tofile.isdir ">
    <echo> directory mydir exists already </echo>
  </when>
  <otherwise>
    <echo> Hello,</echo>
    <echo>World</echo>
  </otherwise>
</c:choose>
```

Further Links

- [Javadoc](#)
- [Source](#)

continue

A task mirroring a continue statement. When used within a [for-loop](#), the loop will be continued with the next loop item (i.e. any statements after task continue are ignored). If this task is used outside of a for-loop, a build exception will be thrown.

flaka
häfelinger IT

33/72

```
<c:for var="i" in=" list(1,2,3,4,5,6) ">
  <c:when test=" i > 3 ">
    <c:continue />
  </c:when>
  <c:echo>i = #{i}</echo>
</c:for>
```

This would print:

```
[c:echo] i = 1
[c:echo] i = 2
[c:echo] i = 3
```

Attributes

Attribute	Type	Default	EL	Description
test	string	-	expr	Continue loop when EL expression evaluates to true
if	string	-	#{ }	Continue if property exists
unless	string	-	#{ }	Continue if property does not exist

Behaviour

When used without any attributes, the surrounding [for](#) or [while](#) be continued while following tasks or macros are ignored in the current iteration step. When used with attributes, then the loop will be continued if at least one attribute evaluates to true. Otherwise, the subsequent tasks or macros are executed.

The example given above can thus be shortened to

```
<c:for var="i" in=" list(1,2,3,4,5,6) ">
```

```
<c:continue test=" i > 3 " />
<c:echo>i = #{i}</echo>
</c:for>
```

Further Links

- [Javadoc](#)
- [Source](#)
- Task [for](#)
- Task [break](#)

flaka
häfelinger IT

34/72

echo

Ant has an echo task to dump some text on a screen or into a file. A problem with this task is, that the output produced is rather fragile when it comes to reformatting your XML source. Here is a simple example.

```
| <echo>foobar</echo>
```

flaka
häfelinger IT

35/72

When executed by Ant, this dumps

```
| [echo]  foobar
```

However, one day you reformat your XML build file footnote::[xmlint](#)[is a good choice] and you end up in

```
| <echo>  
| ...foobar  
| </echo>
```

Notice the usage of character . (dot) in this example and the rest of this (and only this) chapter to visualize a *space* ² character. If you execute this, you will get

```
| [echo]  
| [echo]  ...foobar  
| [echo]
```

This is definitely not what you had in mind.

Task `<c:echo/>` is an extension of Ant's standard `echo` task. That standard task is used for doing all that low level work, i.e. dumping text on streams on loggers. On top of it, some features have been implemented intended to generate nicely formatted output.

Here is the `foobar` example again:

```
| <c:echo>
```

² Also known as *blank* character

```
foo\  
bar  
; supports continuation and \  
comment lines  
</c:echo>
```

This would output

```
[c:echo] foobar
```

flaka
häfelinger IT

36/72

which I believe is just what you had in mind.

Attributes

This task supports all attributes inherited from Ants echo task. In addition, further supported attributes are:

Attribute	Type	Default	Description
debug	boolean	false	Enables additional debug output for this particular task.
comment	string	;	Allows for comments.
shift	string	` `	Allows to prefix each line with <code>shift</code> characters. See also Behaviour below.

Notice that **debug** output will be written on stream `stderr` regardless whether `debug` has been globally enabled on Ant or not. Also standard Ant loggers and listeners are ignored. The default value is `false`, i.e. no additional output is created.

The trimmed `comment` attribute value is used to construct a regular expression like `^\s*Q<<comment>>\E`. Every line matching this regular expression will not show up in the output. Notice that the comment value given does not allow for regular expression meta characters. Thus something like `(;|#)` does *not* mean either `;` or `#`. Instead it means that a line starting with `(;#)` is ignored from output. By default, lines starting with character `;` - like in Lisp - are ignored.

Elements

This task optionally accepts implicit text. That text may contain Ant property `${..}` or [EL](#) `#{..}` references.

Behaviour

Continuation Lines are lines where the last character before the line termination character is the backslash character. Such a line is continued, i.e. the line will be merged with the next one (which could also be a continuation line).

A (merge continuation) line starting with an arbitrary number of whitespace characters followed by the characters given in attribute `comment` is a **comment line**. Such lines are removed from output. The characters given are taken literally and have no meta character functionality. To disable comment lines altogether use an empty string ³.

To allow a **decent formatting** unnecessary whitespace characters are removed. The process is illustrated ⁴ using the introduction example used above:

```
<c:echo>
  ..foo\
  ..bar
</c:echo>
```

In a first step is the first non-whitespace character determined. In the example above, this is character `f`. From there Flaka counts backwards until a line termination character or the begin of input is reached. The counted number is the amount of whitespace characters stripped from the begin of each line. If a line starts with less than that amount of whitespace characters, then only those available are removed. Additionally, all whitespace characters before the first non-whitespace character are removed from the input.

There are two whitespace characters before `foo\`. If support for continuation lines would have been disabled, Flaka would dump the following:

```
| [c:echo] foo\
```

³ A string consisting only of whitespace characters

⁴ Again character dot `.` is used to illustrate a whitespace character with the exception of line ending characters

```
[c:echo] bar
```

Handling of continuation lines takes place **after** whitespace has been stripped.
Thus Flaka prints

```
[c:echo] foobar
```

flaka
häfelinger IT

as shown in the introduction example. A slight variation of the example above
is given next:

38/72

```
<c:echo>
..foo\
.bar
...indended by one character, right?
</c:echo>
```

Notice that in front of `bar` is only one whitespace character while there are
three in the line after. What will be Flakas output?

```
[c:echo] foobar
[c:echo] .indended by one character, right?
```

As you can see, no more than the initial counted amount of whitespace is
removed from each line.

However, assume that you really want to have a couple of empty lines dumped
before any real content. How can this be done. There are two options. Firstly
you can always fall back to use Ants standard `echo` task. Secondly, you can
use a comment line like shown next

```
<c:echo>
..; two empty lines following

..foobar
</c:echo>
```

which would dump:

```
[c:echo]
[c:echo]
[c:echo]  foobar
```

This all works because comment lines are removed from the input **after** the position of the first non-whitespace character gets determined. It obviously means that this kind of comments do matter and can't simply be stripped off. They may carry some semantics, so it's probably best to avoid this kind of trick. Make use of it when appropriate.

flaka
häfelinger IT

39/72

We have seen how to force leading empty lines in the example above. What needs to be done if some leading whitespace is intended? Again there are two options. First you may attack the problem using the comment line trick:

```
<c:echo>
..; dummy comment
.....foobar
</c:echo>
```

This would produce like `[c:echo]foobar`. Or you may use the **shift** attribute to right-shift the whole output by an arbitrary amount of characters like

```
<c:echo shift="5">
..foobar
</c:echo>
```

producing the same as before, namely

```
[c:echo] .....foobar
```

Attribute `shift` expects a unsigned integral number followed by an optional arbitrary sequence of characters. This allows for a different *shift* character sequence as shown next:

```
<c:echo shift="5">
..foobar
</c:echo>
```

This produces >>>>> as shift character sequence for every line dumped as shown next:

```
| [c:echo] >>>>>foobar
```

Notice that every character after the integral number counts. Thus `5>` would produce

```
| [c:echo] > > > > > foobar
```

flaka
häfelinger IT

40/72

instead.

This feature also allows to create some horizontal lines which might be useful to get attention for a particular message of importance like

```
| [c:echo] %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Those line of 40 per cent character % got created using

```
| <c:echo shift="39%">  
|. %  
|</c:echo>
```

Further Links

- [Javadoc](#)
- [Source](#)

fail

This task has been derived from [Ants standard fail task](#). All attributes and elements are supported. When defining a message however, EL references can be used:

```
| <c:fail message="illegal state #{whichstate} seen" />
```

flaka
häfelinger IT

41/72

Furthermore, attribute `test` has been added. The value of `test` will be evaluated as EL expression in a boolean context. Being `true`, `fail` will throw a build exception. When used in this way, `<c:fail test='expr' />` behaves exactly the same as

```
| <c:when test="expr">  
|   <fail />  
| </c:when>
```

Further Links

- [Javadoc](#)
- [Source](#)

for

A task that implements a loop statement. Iterating over a list of *objects*:

```
<c:for var="x" in=" list('a', 2, 'src'.tofile, typeof
    (list())) ">
  <c:echo>
    #{x}
  </c:echo>
</c:for>
```

flaka
häfelinger IT

42/72

Attributes

Attribute	Type	Default	EL	Description
var	string		#{}	The variable holding each loop item. This variable can be referenced within the body like <code>#{var}</code> where <code>var</code> is the string used in this attribute. If not used, then no iteration takes place and no warning is issued. Notice that you can use <code>#{..}</code> only in EL enabled tasks.
in	string		expr	The items to be iterated over as EL expression. A iteration takes place except if <code>null</code> is the evaluation result. Otherwise, if the evaluation result is <i>not iterable object</i> , a temporary list containg that object is created on the fly. Iteration takes then place over that list and otherwise over the iterable collection.

Elements

The body of this task may contain an arbitrary number of tasks or macros.

Behaviour

This is the shortest possible for statement. Its legal albeit completely useless.

```
| <c:for />
```

Further Links

- [Javadoc](#)
- [Source](#)
- Task [for](#)
- Task [break](#)
- Task [continue](#)
- Quickref [[BasicScriptingConstructs#Looping](#) Looping] for an introduction to looping in Flaka

flaka
häfeling IT

43/72

install-property-handler

A task to install Flakas property handler. When installed, Ant *understands* [EL](#) references like `#{. .}` in addition to standard property references `${. .}`.

An example will illustrate this:

```
<c:let>
  ;; let variable foo to string 'bar'
  foo = 'bar'
</c:let>
<echo>
  [1] #{foo}
</echo>
<c:install-reference-handler />
<echo>
  [2] #{foo}
</echo>
```

flaka
häfelinger IT

44/72

Assume in this example, that the standard Ant property handler is installed. In the first `<c:let/>` task you can use EL because this task is provided by Flaka and thus EL aware. This is not the case for the `<echo/>` task following. Thus something like `#{foo}` has no meaning. However, after Flakas property handler is installed, the situation changed.

This is the output of aboves snippet:

```
[echo] [1] #{foo}
[echo] [2] bar
```

Attributes

Attributes	Type	Default	EL	Description
type	string	elonly	<code>#{ }</code>	Install handler with certain additional features enabled (see below)

Behaviour

If `type` is `elonly` (exactly as written), then the new handler will only handle `#{..}` in addition. If `type` is `remove`, then unresolved property references are discarded.

Further Links

- [Javadoc](#)
- [Source](#)

flaka
häfelinger IT

45/72

let

XML is not particular easy to read for humans. When assigning a couple of variables and properties, this becomes obvious. This elementary task allows to set multiple variables and properties in one go. In addition, comments and continuation lines are allowed for additional readability and comfort. For example:

flaka
häfelinger IT

46/72

```
<c:let>
  f = 'folder'
  ; turn f into a file object
  f = f.toFile
  b = f.isDir ? true : false
  ; assign a *property*
  p := 'hello world'
  ; override a property if you dare
  p ::= "HELLO \
    WORLD"
</c:let>
```

In this example, `f` is first assigned to be string `"folder"`. The comment line - the one starting with character `;` - tells what the next line is going to do: turn `f` into a file object which can then be used further. Here we assign a variable `b` which becomes true if `f` is a directory.

While character `=` is used to assign a variable, use character sequence `:=` to assign a property instead. If such a property already exists, it will not be changed in accordance with Ants standard behaviour. If you dare and insist to override a property, use `::=` to do so.

Notice that the right side of `=`, `:=` and `::=` are in any cases a EL expression while the left side are expected to contain valid identifiers for variables and properties.

Attributes

Attribute	Type	Default	EL	Meaning
comment	string	;	no	The comment character sequence.

debug	bool	false	no	Turn on extra debug information.
-------	------	-------	----	----------------------------------

All attributes follow the rule that leading and trailing whitespace is ignored. Any attribute combination is allowed and will not result necessarily in a build error. If in doubt, turn on extra debug information.

flaka
häfelinger IT

47/72

Elements

This task accepts implicit text. Text may contain any amount of [EL](#) and property references references. Continuation and comment lines are supported.

Behaviour

The comment character sequence is ";" by default. It can be changed to an arbitrary sequence using attribute `comment`. Once set, it cant be changed during the execution of this task. A comment characters are used to identify lines to be ignored from execution. Such a line is given if the first non whitespace characters of that line are identical with the sequence of comment characters. In other words, a line is being ingnored if matches the regular expression `^\s*<comment>`. The comment characters itself are not interpreted as regular expression characters. Therefore a given comment sequence like `"(#|;)"` does not mean that either ";" or "#" start a comment. Instead it means that a comment line starts with the characters `"(#|;)"` which would be rather awkward (while perfectly *legal*).

To support readability continuation lines are supported. Such a line is indicated by having \ as last character. Be careful not to put any whitespace characters after \, otherwise the line will not be recognized as such. Continuation lines are also working on comments as the example above shows. If a line is a continuation line, the last character \ is removed, the line is accumulated and the next line is read. If finally a non-continuation line is red (and only then), an evaluation of the accumulated line takes place: If the accumulated line is a comment it will be ignored and otherwise either treated as property or variable assignment.

Leading and trailing whitespace characters ignored in every (accumulated) line. For example, the property assignment `x := 'foo bar'` will assign the string

foo bar to property x. Notice that whitespace before and after x and before and *after* 'foo bar' is ignored. This is slightly different from reading Java properties where whitespace after 'foo bar' would *not* have been ignored!

When evaluating, each line is independent of other lines evaluated. Each line is evaluated in the order written. Evaluating means that the right side of the assignment is evaluated as [EL](#) expression and the resulting object is assigned to the variable stated on the left side. When evaluating properties, then the right side is evaluated into an object and additionally streamed into a sequence of characters (string).

flaka
häfelinger IT

48/72

Notice that it is perfectly legal to use property or variable references as the following example shows:

```
<c:let>
  f = '${ant.file}'
  F = '#{f}'
</c:let>
```

Be aware that property references are evaluated *before* [EL](#) expressions. Consider:

```
<c:let>
  ;; let s hold string ant.file
  s = 'ant.file'
  ;; bad, f will not assigned
  f = ${#{s}}
</c:let>
```

The second assignment will not work as expected because, in a first step, all occurrences of `${..}` are resolved by Ant itself. In a second step, the expression `${#{s}}` will be evaluated. Since this expression is invalid, `f` will not be assigned.

Each line is evaluated in order. Therefore the following works as expected:

```
<c:let>
  s := '3 * 5'
  ;; defines r as 15
  r = ${s}
</c:let>
```


The following kind of meta programming will not work for let:

```
<c:let>
  property_or_var := condition ? '=' : ':='

  name ${property_or_var} expr
</c:let>
```

flaka
häfelinger IT

In a first step all continuation lines are accumulated. Then each line is split in left and right part and in addition the assignment type. After that, properties are resolved on both sides by Ants property resolver. In an additional step are *EL references* evaluated on both sides. Eventually, the right side is evaluated as EL expression and its result is assigned to the stringized and whitespace-chopped left side.

49/72

Then meaning of null and void

Task let can also be used to *remove* variables and even properties. To illustrate this, here are example behaviours:

```
<c:let>
  x = 3 * 5
  ;; remove x
  x =
  ;; remove x
  x = null

  ;; let property p to '3*5' (a string)
  p := 3 * 5
  ;; ignored
  p := null
  ;; remove property 'p'
  p ::= null
  ;; .. same as
  p ::=
</c:let>
```

The following table gives an overview of the meaning of null and void ⁵ on the right side of an assignment:

⁵ void means that the absense of any characters

Assignment	Right Side	Result
<code>=</code>	<code>null</code>	If the right side evaluates to <code>null</code> , then the variable will be removed if existing.
<code>=</code>	<code>void</code>	The evaluation of an empty expression is <code>null</code> . See above how <code>null</code> is handled`
<code>:=</code>	<code>null</code>	Cause a <i>read only</i> property cant be removed, nothing will happen with this assignment. The property will also not be created.
<code>:=</code>	<code>void</code>	Same as <code>:= null</code>
<code>::=</code>	<code>null</code>	Removes the property denoted by the left side
<code>::=</code>	<code>void</code>	Same as <code>::= null</code>

flaka
häfelinger IT

50/72

Further Links

- [Javadoc](#)
- [Source](#)

list

A elementary task to create a variable containing a *list* of objects.

```
<c:list var="mylist">
  ;; each line is a EL expression
  3 * 5
  ;; each line defines a list element
  list('a',1,').tofile)
</c:list>
```

flaka
häfelinger IT

51/72

Attributes

Attribute	Type	Default	EL	Meaning
var	string		r	The name of the variable to be assigned.
comment	string	;		The comment character
debug	bool	false		Turn on extra debug information.
el	bool	true	no	Enable evaluation as EL expression

Elements

This task may contain a implicit text element.

Behaviour

This task creates and assigns in any case a (possible) empty list, especially if no text element is present. The variables name is given by attribute `var`. This attribute may contain references to EL expressions.

If given text element is parsed on a line by line basis, honouring comments and continuation lines. Each line will be evaluated as EL expression after having resolved `${..}` and `#{..}` references. A illegal EL expression will be discarded while the evaluation of lines continues. Turn on extra debug information in case of problems.

The evaluation of a valid EL expression results in an object. Each such object will be added to a list in the order imposed by the lines.

flaka
häfelinger IT

A single line cant have more than one EL expressions. Thus the following example is invalid:

52/72

```
<c:list var="mylist">
  ;; not working
  3 * 5 'hello, world'
</c:list>
```

Use attribute `el` to disable the interpretation of a line as EL expression:

```
<c:list var="mystrings" el="false">
  3 * 5
  ;; assume that variable message has (string) value '
    world'
  hello, #{message}
</c:list>
```

This creates a list variable `mystrings` containing two elements. The first element will be string `3 * 5` and the second element will be string `hello, world`. Notice that even if EL evaluation has been turned off, EL references can still be used.

Further Links

- [Javadoc](#)
- [Source](#)

properties

A task to set multiple properties in one go. It is typically used to *inline* properties otherwise written in an additional properties file. Thus using this task reduces the clutter on your top level directory:

```
<c:properties>
  ; this is \
  a comment

  ; assume that variable 'foo' has been defined here
  and that
  ; foo.name resolves into 'foo', then the next line
  will set
  ; property foo to be the string 'foo'.
  foo      = #{foo.name}
  ; next lines creates property 'foobar' to be the
  string 'foobar'.
  foobar   = ${name}bar
</c:properties>
```

flaka
häfelinger IT

53/72

Attributes

Attribute	Type	Default	EL	Description
debug	boolean	false	no	Turn extra debug information on
comment	String	;	no	The character that starts a comment line

Elements

This task accepts a implicit text element.

Behaviour

This task is similar to [let](#). The difference is that this task only allows to define properties while [let](#) also supports the creation of variables. Furthermore, the right side of = will be literally taken as string value. This is different from [let](#) where the right side will be additionally evaluted as [EL](#) expression. The

following example defines each property `foobar`, once done with task `let` and once with this *properties* task:

```
<c:let>
  foobar := 'foobar'
</c:let>
<c:properties>
  foobar = foobar
</c:properties>
```

flaka
häfelinger IT

54/72

Notice the usage of the quote character `'` in the former example and the absence of it in the latter.

Task *properties* supports, like task `let` does, continuation lines and comments. Furthermore, variable references `#{..}` and property references `${..}` are resolved on both sides of `=`.

If the right side is empty, then no property will be created and an existing property will not be changed. If the right side is `null`, a property with string value `null` will be assigned if the property does not already exist (this is very much different than when using task `[#let let]` to create properties).

Leading and trailing (!) whitespace characters are ignored. This is different from standard Ant where trailing whitespace is significant (and responsible for unexpected and hard to track script behaviour).

Further Links

- [Javadoc](#)
- [Source](#)

rescue

Task `rescue` is essentially a container for an arbitrary number of tasks. In addition, it allows to rescue variables and properties.

```
<c:rescue>
  <vars>
    foo
  </vars>
  <properties>
    bar
  </properties>
  task_1
  ..
  task_N
</c:rescue>
```

flaka
häfelinger IT

55/72

No matter what will happen with property `var` and variable `foo` within `sequential`, this will be unnoticable outside of `rescue` cause the values (or better: state) will be restored after having executed all embedded tasks. This will of course also work in case an exception is thrown by one of the tasks.

Attributes

This task does not define attributes.

Elements

Name	Cardinality	Description
vars	0..1	Defines a [#list list] of variable names. Attributes and behaviour is that of task [#list list] except that interpretation of lines as EL expressions are disabled.
properties	0..1	Defines a [#list list] of property names. Attributes and behaviour is that of task [#list list] except that interpretation of lines as EL expressions are disabled.

<i>task</i>	arbitrary	A (arbitrary) task or macro to be executed
-------------	-----------	--

Behaviour ==

Executes all embedded tasks. Variables and properties listed in `vars` and `properties` are restored to their previous state, i.e. if not existing before the execution, they will not exist afterwards. If existed, their value will be restored.

flaka
häfelinger IT

56/72

Further Links

- [Javadoc](#)
- [Source](#)

<hr/>

switch

Task switch has been designed to ease pattern matching. The idea is to try to match a pattern, a [regular expression](#) or [glob expression](#) against a given string value and carry out a sequence of actions in case of a hit.

```
<c:switch value=" 'a${string}#{value}' ">
  <matches glob="*.jar">          -- #1
    -- string ending in .jar
  </matches>
  <matches re="1|2|3">          -- #2
    -- one or two or three
  </matches>
  <matches re="-\d+">          -- #3
    -- negative integral number
  </matches>
  <otherwise>
    -- no match so far ..
  </otherwise>
</c:switch>
```

flaka
häfelinger IT

57/72

Notice the usage of a glob expression in the first and the usage of regular expressions in the second and third matches element. Utilization of glob and regular expressions make switch a very flexible and powerful conditional statement.

Attributes

Attribute	Type	Default	EL	Description
value	string	-	el	The (string) value that needs to be matched against. Note that the value given is <i>normalized</i> , i.e. leading and trailing whitespace is removed. Whitespace characters are controlled by the underlying implementation which is Java in this case.

var	string	-	#{..}	Save details of this match as <code>matching</code> object using the variable name given. See [EL#Matcher_Properties matcher properties] for a list of available properties; see also below for examples.
ignore-case	bool	false	no	Enables case-insensitive matching. By default, case-insensitive matching assumes that only characters in the US-ASCII charset are being matched. Unicode-aware case-insensitive matching can be enabled by specifying the <code>UNICODE_CASE</code> flag in conjunction with this flag. Case-insensitive matching can also be enabled via the embedded flag expression <code>(?i)</code>
comments	bool	false	no	Permits whitespace and comments in pattern. In this mode, whitespace is ignored, and embedded comments starting with <code>#</code> are ignored until the end of a line. Comments mode can also be enabled via the embedded flag expression <code>(?x)</code>
dotall	bool	false	no	In <code>dotall</code> mode, the literal <code>.</code> matches any character, including a line terminator. By default this expression does not match line terminators. <code>Dotall</code> mode can also be enabled via the embedded flag expression <code>(?s)</code> , where <code>s</code> is a mnemonic for <i>single-line</i> mode, which is what this mode is called in Perl .

flaka
häfelinger IT

58/72

<code>unixlines</code>	bool	false	no	In this mode, only character LF is accepted as line terminator character when using <code>.</code> , <code>^</code> , and <code>\$</code> . Unix lines mode can also be enabled via the embedded flag expression <code>(?d)</code> .
<code>multiline</code>	bool	false	no	In multiline mode, the literals <code>^</code> and <code>\$</code> match just after or just before, respectively, a line terminator or the end of the input sequence. By default these expressions only match at the beginning and the end of the entire input sequence. Multiline mode can also be enabled via the embedded flag expression <code>(?m)</code> .
<code>debug</code>	bool	false	no	Turn on extra debug information
<code>matches.re</code>	string		<code>#{..}</code>	Element matches: Specify a matching pattern as regular expression.
<code>matches.pattern</code>	string		<code>#{..}</code>	Element matches: Specify a matching pattern as glob expression

flaka
häfelinger IT

59/72

Note that each `switch` attribute (but value) can be applied to a `matches` element. Applied on `switch` has the effect of providing the default value for subsequent `matches` elements.

Elements

Element	Cardinality	Description
---------	-------------	-------------

<code>matches</code>	0..infinity	An element to specify a single regular or a glob expression. This element supports all the attributes of the enclosing <code>switch</code> (but <code>value</code>). It may contain any number of tasks or macros as sub elements. They are carried out if the expression matches.
<code>default</code>	0..1	The default statement will be executed if no <code>matches</code> element matched the input value. This element is optional. This element can only be specified once. A build exception will be raised if used more than once. This element does not accept any attributes. It may contain any number of tasks or macros as sub elements. They are carried out if no expression matched.
<code>otherwise</code>	0..1	This element is a synonym for element <code>default</code>

flaka
häfeling IT

60/72

Behaviour

Attribute `value` is the basis for all further matching. It is a string value which may contain [Glossary#Property_Reference references to properties] or [Glossary#Expression_Reference EL expressions]. Leading and trailing whitespace will be discarded after having resolved all references.

All other attributes (see above) are default values for subsequent `matches` elements. For example, setting attribute `debug` to `true` will turn on debug on all `matches` elements.

Any number of `matches` elements are allowed and at most one `otherwise` (resp. `default`) element. Whether the `otherwise` element is at the end, in the middle or at the begin does not matter. The order of the `matches` elements are relevant however. Each `matches` element will be tried in the order given

until no more untried elements are left. Then, if no element matched, a given otherwise element is carried out. Otherwise the matching element will.

Carrying out an element means that all enclosed tasks or macros are executed in the order given.

The underlying regular expression engine is the one given by Java. Its [Javadoc](#) documentation is a pretty good source of information if you are familiar with regular expressions. For all the gory details, have a look at [Mastering Regular Expressions](#) by Jeffrey E. F. Friedl.

flaka
häfelinger IT

61/72

Be aware that there is no need to escape the escape character. For example, people using regular expressions in Java are used to write `*` if they want match the literal `*` character and thus escaping from the usual semantics (match zero or more times). This is not necessary in Flaka where the input sequence `*` remains `*`.

So called *globs* are a kind of simplified regular expressions. They lack the full power while simplifying the expression. For example, to specify whether a name input string end in `jar`, we can simply write

```
<c:switch value=" #{myfile}.name ">
  <matches glob="*.jar">
    -- do something with jar file ..
  </matches>
</c:switch>
```

The very same can also be expressed as `re=".jar$"` using regular expressions. The biggest disadvantage of globs are that capturing groups are not supported. Thus the match above just indicates that the file name ends in `.jar` while there is nothing to figure the file's basename. Compare this with

```
<c:switch value=" #{myfile}.name ">
  <matches re="^(.*)\.jar$" var="m">
    <c:echo>
      basename = #{m[1]}
    </c:echo>
  </matches>
</c:switch>
```

Here we use a capturing group for the basename. A matcher object will be

associated with variable `m`. This object can then be [evaluated using properties](#) for matching details.

Here is a more complicated example. It was used once to examine a CVS tag which was supposed to follow the convention `schema-(env_)version`, where `(env_)` was optional, `schema` indicated the tags semantic and where `version` was the products version or build number:

flaka
häfelinger IT

62/72

```
<c:switch value=" 'v-uat_3_20_500' " var="m">
  <matches re="v-(?:([^\d][^_]*_)?(\d.*)" >
    <c:echo>
      pattern      = #{m.p}          -- v-(?:([^\d][^_
        ]*)_)?(\d.*)
      groups       = #{m.n}          -- 2
      matched text = #{m}            -- v-uat_3_20_500
        (same as m[0])
      env          = #{m[1]}         -- uat
      version      = #{m[2]}         -- 3_20_500
      ;; refering to non existing group
      ??          = #{m[3]}         -- (empty string)
      ;; start and end index of first group
      start        = #{m[1].s}       -- 2
      end          = #{m[1].e}       -- 5
    </c:echo>
  </matches>
</c:switch>
```

Further Links

- [Javadoc](#)
- [Source](#)

throw

A task to re-throw a previously thrown exception. If no exception has been thrown before, a new exception is thrown. In that case, throw acts like standard fail task .

Note that throw would re-throw the last thrown exception - regardless of the current context. The following would therefore work:

flaka
häfelinger IT

63/72

```
<c:trycatch>
  <try>
    <fail message="4711" />
  </try>
  <catch>
    -- handle the exception ..
  <catch>
</c:trycatch>
..
.. -- very much later
..
<c:throw /> -- re-throws "4711" exception!!!
```

Attributes

Attribute	Type	Default	EL	Description
reference	string	trycatch-object	no	The name of the reference holding the previously thrown exception
var			no	Same as reference

Behaviour

A typical usage example:

```
<c:trycatch>
  <try> ..<fail message="4711"/> </try>
  <catch>
    <echo>caught exception ..</echo>
  <c:throw />
```

```
</c:catch>  
</c:trycatch>
```

When being executed, Ant would receive a build exception (re-thrown within the catch clause) containing "4711" and terminate.

Further Links

- [Javadoc](#)
- [Source](#)
- Task [trycatch](#)

flaka
häfelinger IT

64/72

trycatch

A task mirroring try-catch-finally exception handling found in various languages.

All tasks inside try are executed in order. If an exception is thrown by one of them, then several things may happen:

- If there is a matching catch clause, then all tasks in that clause are executed. If there isn't a catch clause, the exception will be passed to the enclosing environment (except if an exception is also thrown in the finally clause - see below).
- An optional finally clause is always executed, regardless of whether an exception gets thrown or whether a try or catch clause exists.
- If a property is set, then that property will hold the message of the exception thrown in a try clause. If a reference is given, then that reference will hold the exception object thrown in the try clause. If an exception is also thrown in a catch or finally clause, then neither will the property or reference update nor set.
- If an exception is thrown in a matching catch clause and in a finally clause, then the latter will be passed to the enclosing environment and the former will be discarded.

A catch clause can be given a type and a match argument. Both arguments expect a regular or pattern expression. A catch clause matches if the type and match matches. The type argument is matched against the classname of the thrown exception. The match argument is matched against the exception message (if any). Both default values ensure that a build exception thrown by Ant is caught while an implementation dependent exception passes.

When matching against the error message, be aware that the actual error message might be slightly different from the actual message given: usually the error message contains also information about where the exception got thrown. It is therefore wise to accept any leading and trailing space. For example:

```
<c:trycatch>
  <try><fail message="4711" /></try>
  <catch match="4711">
    -- does (very likely) not match
```

flaka
häfelinger IT

65/72

```

</catch>
<catch match="4711*">
  -- neither this one ..
</catch>
<catch match="*4711">
  -- bon chance
</catch>
<catch match="*4711*">
  -- this is it!
</catch>
</c:trycatch>

```

flaka
häfelinger IT

66/72

Attributes

Attribute	Type	Default	EL	Description
proper-ty	string		no	The name of the property that should hold the exception message
refere-nce	string	tryc-atch-.obj-ect	no	>The name of the reference to hold the exception object
catch.-type	glob	*.Bu-ildE-xcep-tion	no	A pattern against the type (Java classname) of the exception object
catch.-match	glob	*	no	A pattern to be applied against the exception message

Elements

- try
 A task container to hold tasks and macros to be given a try.
- catch
 A task container to be executed if an exception gets thrown
- finally
 A task container to be executed in any case

Note that all elements are optional. However, if theres no try element, then theres no chance to execute catch at all, so this constellation does not make

too much sense. The optional finally clause will be executed regardless of whether a try clause exists or not.

It is allowed to have more multiple try, catch or finally clauses and further does the order in which they appear not matter. Be aware though that eventually all try and finally clauses are merged into one try resp. finally clause.

flaka
häfelinger IT

67/72

Behaviour

The following snippet demonstrates the usage of trycatch:

```
<c:trycatch property="reason">
  <try>
    <echo>1st try ..</echo>
  </try>
  <try>
    <echo>2nd try ..</echo>
    <fail message="fail within 2nd try" />
  </try>
  <try>
    <fail message="fail within 3rd try" />
  </try>
  <catch type="*.BuildException" match="*">
    <echo>..caught : ${reason}</echo>
  </catch>
  <finally>
    <echo>..finally</echo>
  </finally>
</c:trycatch>
```

Giving:

```
[echo] 1st try ..
[echo] 2nd try ..
[echo] ..caught : fail within 2nd try
[echo] ..finally
```

Further Links

- [Javadoc](#)
- [Source](#)

unless

This task is the logical opposite of task [when](#). Its body is only executed if the condition evaluates to false. See [when](#) for details. This example shows how to create a folder named libdir if such a folder does not already exist.

```
<c:unless test=" 'libdir'.tofile.isdir ">  
  <mkdir dir="libdir" />  
</c:unless>
```

flaka
häfelinger IT

68/72

Further Links

- [Javadoc](#)
- [Source](#)

unset

The unset statement allows the removal of properties. Use this task with care as properties are not meant to be changed during execution of a project.

```
<c:unset>
  p1
  ;; use embedded EL references for dynamic names
  p#{ index }
</c:unset>
```

flaka
häfelinger IT

69/72

This example demonstrates how to remove properties p1 and a property whose name depends on the current value of index.

Attributes

Attribute	Type	Default	EL	Description
debug	boolean	false	no	Turn extra debug information on
comment	String	;	no	The character that starts a comment line

Elements

This element accepts implicit text.

Behaviour

Each non comment line defines a property name to be removed. The property does not need to exist to be removed. User properties (i.e. given by command line) and system properties (i.e. ant.file) are also removed.

Comment lines and empty lines are ignored. Continuation lines, i.e. lines ending in \ but not in \\, are accumulated before being processed.

References to properties \${..} and expressions #{..} are resolved.

The content of a line defines the property name, for example:

```
<c:unset>
```

```
;; property 'foo bar', not 'foo' and 'bar'
foo bar

;; a line is *not* a EL expression (this will be
  property '3 * 5')
3 * 5

;; use #{..} references for dynamic content (this
  will be 'p15')
p#{3*5}
</c:unset>
```

flaka
häfelinger IT

70/72

Further Links

- [Javadoc](#)
- [Source](#)

when

Task when represents a else-less if statement. The following example dumps the content of a file to stdout via Ants echo task if the file exists.

```
<c:when test=" 'path/to/file'.tofile.isfile" >
  <c:let var="fname" property="true" value=" f " />
  <loadfile property="__z__" srcFile="${fname}"/>
  <echo message="${__z__}" />
</c:when>
```

flaka
häfelinger IT

71/72

Note that the example is bit artificial cause Ants loadfile task is sufficient.

Attributes

Attribute	Type	Default	EL	Description
test	string	false	expr	A EL expression that must evaluate to <code>true</code> in order to execute the body of this if statement.

Elements

- Any tasks or macro instances.

Further Links

- [Javadoc](#)
- [Source](#)

while

A task implementing a while loop:

```
<c:let>
  i = 3
</c:let>
<c:while test=" countdown >= 0 ">
  <c:echo>#{countdown > 0 ? countdown : 'bang!' }</c:
    echo>
</c:while>
```

flaka
häfelinger IT

72/72

Attributes

Attribute	Type	Default	EL	Description
test	string	false	expr	The condition for looping as EL expression

Elements

The body of this task may contain an arbitrary number of tasks or macros.

Behaviour

All tasks listed as elements are executed as long as the [EL](#) expression evaluates to true.

Further Links

- [Javadoc](#)
- [Source](#)
- [break](#) to stop the iteration
- [continue](#) to hide tasks from being executed during a iteration step.
- See also [\[BasicScriptingConstructs#Looping Looping\]](#) for an introduction to looping in Flaka

Colophon

This document got written in AsciiDoc markup and translated into DocBook by using the `asciidoc` command. From DocBook it got translated into \LaTeX using `dblatex` and from \LaTeX eventually into PDF by using \XeTeX .

flaka
häfelinger IT

73/72