



APPENDIX **D**

Template Usage

The following questions and answers can help you troubleshoot. The following topics are for Template Manager, which is explained in [Chapter 6, “Service Design”](#):

- [How do I split a string?, page D-1](#)
- [How do I obtain address information from the given IP address?, page D-2](#)
- [How do I obtain the octets from the given IP address?, page D-2](#)
- [How do I call a subtemplate in a template?, page D-2](#)
- [How do I concatenate two strings?, page D-3](#)
- [How can I convert a string to an integer and how can I increase the last octet of the IP address by one?, page D-3](#)
- [Can I use nested if statements?, page D-3](#)
- [How can I perform basic arithmetic operations?, page D-4](#)
- [How can I retrieve data from a two-dimensional array and what is the use of \\$velocityCount?, page D-4](#)
- [How can I print \\$a instead of its value?, page D-4](#)
- [What is the difference between #include\(\) and #parse\(\)?, page D-5](#)
- [What is a macro and how is it used?, page D-6](#)
- [What is a range operator and how can I use it?, page D-6](#)
- [How can I split strings containing special characters?, page D-7](#)
- [How can I use repository variables?, page D-7](#)
- [How can I use a variable as a dynamic URL?, page D-7](#)
- [Can I see more examples?, page D-7](#)

How do I split a string?

ISC provides a function `substringToDelim()`, which can split the given string and return the substring based on the given delimiter.

Syntax:

substringToDelim (srcString, delimChar, 0/1)

where:

0 returns the string before the delimiter.

1 returns the string after the delimiter.

Usage: **\$b=\$TMSystem.substringToDelim("10.11.230.145", ".230.145", "0")**

Result: The value of **\$b** is **10.11**. If **1** is specified instead of **0**, the value of **\$b** is **230.145**.

How do I obtain address information from the given IP address?

ISC provides the functions that can be used to get the address, mask, and reverse mask from the given IP address.

Usage:

\$TMSystem.getAddr ("10.33.4.5/30") returns 10.33.4.5

\$TMSystem.getMask ("10.33.4.5/30") returns 255.255.255.252

\$TMSystem.getReverseMask ("10.33.4.5/30") returns 0.0.0.3

\$TMSystem.getNetworkAddr ("10.33.4.5/30") returns 10.33.4.4

\$TMSystem.GetClassfulNetworkAddr ("10.33.4.5/30") returns 10.0.0.0

\$TMSystem.CurrentTimeInIOSFormat () returns hh:mm:ss day_of_month month_of_year year

How do I obtain the octets from the given IP address?

ISC provides the functions that can return the octets when called.

Usage:

\$TMSystem.getOctet1(\$ipAddr) returns the first octet of **ipAddr**

\$TMSystem.getOctet2(\$ipAddr) returns the second octet of **ipAddr**

\$TMSystem.getOctet3(\$ipAddr) returns the third octet of **ipAddr**

\$TMSystem.getOctet4(\$ipAddr) returns the fourth octet of **ipAddr**

How do I call a subtemplate in a template?

A subtemplate can be called in a main template. The subtemplate being called should be called with its datafile. The variable is declared as a subtemplate. The location of the subtemplate is specified in the datafile.

Usage: In the template body the subtemplate is declared as:

\$a. callWithDatafile("data1")

where:

the variable **a** is declared as a subtemplate in the variables

data1 is the name of the datafile of the subtemplate, and

in the datafile the path of the subtemplate path is specified.

How do I concatenate two strings?

Concatenation of strings is simple.

For example:

where: **\$a=vpnsc** and **\$b=properties**

then: **\${a}\${b}** concatenates these two strings and gives the result as **vpnscproperties**.

or, **\${a}_\${b}** gives the result as **vpnsc_properties**.

How can I convert a string to an integer and how can I increase the last octet of the IP address by one?

The last octet of the IP address can be increased by using the following code:

```
#set($d=$TMSystem.getOctet1($c))
#set($e=$TMSystem.getOctet2($c))
#set($f=$TMSystem.getOctet3($c))
#set($g=$TMSystem.getOctet4($c))
#set($valueOfString = $g)
#set($valueOfCharsCount = $valueOfString.length() - 1)
#set($valueOfVector = "0123456789")
#set($valueOfBase = 1)
#set($valueOfInt = 0)
#foreach($valueOfCharIterator in $valueOfCharsCount..0)
#set($valueOfChar=$valueOfString.charAt($valueOfCharIterator).toString())
#set($valueOfInt = $valueOfInt + $valueOfVector.indexOf($valueOfChar) * $valueOfBase)
#set($valueOfBase = $valueOfBase * 10)
#end
#set($valueOfInt = $valueOfInt+1)
```

The incremental value is **\$d.\$e.\$f.\$valueOfInt**

Can I use nested if statements?

If statements can be nested. Proper care must be taken for indentation when nesting **if** statements. The following code shows the usage of nested **if** statements, **elseif** statements, and the comparisons made in the **if** clause.

#if(\$a=="a") // here: string comparison is made

--

#if(\$b || \$d) // here: **\$b** and **\$d** are the Boolean expressions. **||** equals **OR** and **&&** equals **AND**

--

#if(!\$c) // here: **\$c** can be integer, string, or Boolean.

#if(\$p<10)// here: **\$p** is a integer.

#elseif(\$p==10)

#end

#end

#end

#end

How can I perform basic arithmetic operations?

Velocity Template Language (VTL) supports built-in mathematical functions that can be used in the templates with the set directives.

Usage:

```
#set($a = $b + 3)
#set($a = $b - 6)
#set($a = $b * 6)
#set($a = $b / 5)
#set($a = $b % 2)
```



Note

Only integers are valid for performing mathematical operations in the VTL.

How can I retrieve data from a two-dimensional array and what is the use of \$velocityCount?

The default name for the loop counter variable reference, which is specified in the velocity.properties file, is **\$velocityCount**. By default the counter starts at **1**, but this can be set to either **0** or **1** in the velocity.properties file at:

\$ISC_HOME/resources/webserver/tomcat/shared/lib/velocity-dep-VelocityVersion.jar (where the current *VelocityVersion* is 1.3.1-rc2). The associated settings are:

```
directive.foreach.counter.name=velocityCount
directive.foreach.counter.initial.value=1
```

Data from an array can be obtained by using **get(\$i)**

where: **\$i** is the \$velocityCount.

The following example illustrates the usage of the method **get()**:

```
Usage: #foreach ($Acl in $ACL-List)
      #set ($i = $velocityCount)
      #foreach ($protocol in $Protocol-Lists.get($i))
      #set ($j = $velocityCount)
          access-list $Acl permit $protocol $Source-IP.get($i).get($j)
      #end
      #end
```

where:

\$ACL-List is a one-dimensional array.

\$Protocol-Lists and **\$Source-IP** are two-dimensional arrays.

Here the \$velocityCount is set to **1** by default. It can be changed in velocity.properties, if desired.

How can I print \$a instead of its value?

Printing a value without processing is done by use of the character ****, even if the value of the variable for **a** is defined.

Usage:

\\$a gives output as \$a if \$a is defined. If \$a is not defined, it is printed as \\$a.

What is the difference between #include() and #parse()?

The **#include("velocity.txt")** directive allows you to import a file and then include the file in the location where it is defined. The content of the file is made available to the template engine. The *.vm files can also be called by using **#include**. The name of the file can also be passed by a variable. For security reasons, the file should be included under **TEMPLATE_ROOT** (/vob/ntg/dev/resources/templatesystem).

The **#parse("velocity.vm")** directive allows you to import a local file that contains VTL. Velocity will parse the VTL and render the template specified. The template that **#parse** references must be included under **TEMPLATE_ROOT**. The **#parse** directive only takes a single argument. VTL templates can have **#parse** statements referring to templates that in turn have **#parse** statements. The default value of the **directive.parse.max.depth** property is set to 10, in the **velocity.properties** file at: **\$ISC_HOME/resources/webserver/tomcat/shared/lib/velocity-dep-VelocityVersion.jar** (where the current *VelocityVersion* is 1.3.1-rc2) and can be modified, if desired.



Note

If the **directive.parse.max.depth** property is not present in the **velocity.properties** file, the default is set to 10.

Example:

In **TEMPLATE_ROOT**, the file **velocity.vm** has the following content:

```
welcome to the parse file
The count is $count
#set($count = $count - 1)
#set($cl-list="cl1","cl2","cl3")
#foreach($i in $cl-list)
ipcommunity-list permit $i 30:20
#end
The count is $count
returning from parse
```

The template body contains the following:

```
#set($count=8)
#include("velocity.vm")
-----
#parse("velocity.vm")
-----
welcome back to template
The value of count is $count
```

The following O/P is obtained:

```
welcome to the parse file
The count is $count
#set($count = $count - 1)
#set($cl-list="cl1","cl2","cl3")
#foreach($i in $cl-list)
```

```

ipcommunity-list permit $i 30:20
#end
The count is $count
returning from parse
-----
welcome to the parse file
The count is 8
ipcommunity-list permit cl1 30:20
ipcommunity-list permit cl2 30:20
ipcommunity-list permit cl3 30:20
The count is 7
returning from parse
-----
welcome back to template
The value of count is 7.

```

**Note**

The previous examples clearly show that variables are parsed in the **#parse** directive and not in the **#include** directive.

What is a macro and how is it used?

The directive macro is almost similar to a function. This has a set of statements, which can be called repetitively.

Example:

```

#macro(community $CL $bgp-list)
  #foreach($bgp in $bgp-list)
    ip $CL standard permit $bgp
  #end
#end

#set($bgp_list = "20:10","30:10","40:10","50:10")
#set($CL = "community-list")

#community($CL $bgp_list)

```

Here, the macro name of **community** is defined. The macro takes two arguments **\$CL** and **\$bgp-list**. The macro is called at the end line.

The output of the previous template is:

```

ip community-list standard permit 20:10
ip community-list standard permit 30:10
ip community-list standard permit 40:10
ip community-list standard permit 50:10

```

What is a range operator and how can I use it?

The range operator can be used in conjunction with **#set** and **#foreach** statements. It is used to produce an object array containing integers. The range operator has the following construction **n..m**.

Example:

```
#set($a=0..2)
#foreach($b in $a)
  $b
#end
#foreach($c in -2..2)
  $c
#end
```

How can I split strings containing special characters?

```
#foreach ($i in $PE_Intf_Name.split('\.')) $i #end
```

here: In the first iteration, **\$i** contains the string before the period, and in the second iteration, **\$i** contains the string after the period.

How can I use repository variables?

Repository variables can be selected in the datafile. When a template along with a datafile is associated with a Service Request and the Service Request is deployed, then the value of the repository variable gets substituted.

How can I use a variable as a dynamic URL?

A variable declared as a dynamic URL can call the URL, by the method:

```
callUrl(String S)
```

For example: **\$a.callUrl("http://www.cisco.com")**

Can I see more examples?

Examples are given for:

- [Usage of Strings, page D-8](#)
- [Usage of a Macro, page D-9](#)
- [Usage of Subtemplates, page D-10](#)

Usage of Strings

The body of the template contains:

This example illustrates the usage of strings

```
#set($a="Fast")
#set($b="ethernet")
interface ${a}_${b}
```

```
#foreach ($i in $PE_Intf_Name.split('\.'))
$i
#end
```

```
#set($c="10.11.230.145")
#set($b=$TMSsystem.substringToDelim($c, ".230.145", "0"))
interface Loopback1
description By VPN-SC
ip vrf forwarding V31:eigrpfm
ip address ${b}.20.34 255.255.255.255
no ip directed-broadcast
```

```
#set($b=$TMSsystem.substringToDelim($c, ".230.145", "1"))
interface Loopback1
description By VPN-SC
ip vrf forwarding V31:eigrpfm
ip address 20.45.${b} 255.255.255.255
no ip directed-broadcast
```

```
#set($c="10.33.4.5/30")
#set($d=$TMSsystem.getAddr($c))
The Address of $c is $d
#set($d=$TMSsystem.getMask($c))
The mask of $c is $d
#set($d=$TMSsystem.getReverseMask($c))
The Reverse mask of $c is $d
#set($d=$TMSsystem.getNetworkAddr($c))
The network address of $c is $d
```

```
#set($e=$TMSsystem.currentTimeInIOSFormat())
The current time in IOS format is : $e
```

```
-----
getting the octets from the ipaddress
#set($c="10.33.4.5")
#set($e=$TMSsystem.getOctet1($c))
The first Octet of $c is $e
#set($e=$TMSsystem.getOctet2($c))
The second Octet of $c is $e
#set($e=$TMSsystem.getOctet3($c))
The third Octet of $c is $e
#set($e=$TMSsystem.getOctet4($c))
The fourth Octet of $c is $e
```

The variables are declared as strings, integers, or sub-templates accordingly.

The Output of the above template body is:

```
interface Fast_ethernet
```

```
10
11
12
13
```

```
interface Loopback1
description By VPN-SC
ip vrf forwarding V31:eigrpfm
ip address 10.11.20.34 255.255.255.255
no ip directed-broadcast
```

```
interface Loopback1
description By VPN-SC
ip vrf forwarding V31:eigrpfm
ip address 20.45.230.145 255.255.255.255
no ip directed-broadcast
```

```
The Address of 10.33.4.5/30 is 10.33.4.5
The mask of 10.33.4.5/30 is 255.255.255.252
The Reverse mask of 10.33.4.5/30 is 0.0.0.3
The network address of 10.33.4.5/30 is 10.33.4.4
```

The current time in IOS format is: 00:17:01 21 Aug 2006

```
-----
getting the octets from the ipaddress
The first Octet of 10.33.4.5 is 10
The second Octet of 10.33.4.5 is 33
The third Octet of 10.33.4.5 is 4
The fourth Octet of 10.33.4.5 is 5
```

Usage of a Macro

The body of the template contains:

```
## This example illustrates the usage of macro
```

```
#macro(community $CL $bgp-list)
#foreach($bgp in $bgp-list)
ip $CL standard permit $bgp
#end
#end
```

```
#set($bgp_list = "20:10","30:10","40:10","50:10")
#set($CL = "community-list")
```

```
#community($CL $bgp_list)
```

The Output is obtained as:

```
ip community-list standard permit 20:10
ip community-list standard permit 30:10
ip community-list standard permit 40:10
ip community-list standard permit 50:10
```

Usage of Subtemplates

The body of the template is as follows:

```
## This example illustrates the usage of the sub-template
```

```
$a.callWithDatafile("data1")
```

The screenshot shows a 'Template Editor' window. It contains the following fields:

- Template Name:** /demo/demo_subtemplate
- Description:** demonstrates the usage of subtemplate
- Body:**

```
## This example illustrates the usage of the sub-template

$a.callWithDatafile("data1")
```

At the bottom, there are two checkboxes: 'Required Fields' (checked) and 'Has User Section' (unchecked).

The variable **a** is declared as a subtemplate. The datafile provided here, **data**, must be a datafile for the template **a**, which must also exist. In the datafile of the main template, the path of the subtemplate is specified.

General	
Template:	/demo/demo_subtemplate
Data File Name:	data_file
Description:	sub-template
Variables	
a *	/sample/demo_strings (Sub-Template)
*Required Fields ☐ Display Optional Variables	
Save Configlet Close	

In the datafile of the main template, the specified path of the subtemplate might be the same directory or a different directory.

■ Can I see more examples?