ansible-role-config-light Documentation

Release 1.4.0

Vladimir Botka

TABLE OF CONTENTS:

1	Quick start guide	1
2	User's guide 2.1 Introduction 2.2 Installation 2.3 Playbook 2.4 Debug 2.5 Tags 2.6 Variables 2.7 Best practice	7 8 8 9 9 10 26
3	Annotated source code 3.1 Tasks	27 28
4	Examples 4.1 FreeBSD Postfix	45 46 51
5	Copyright	55
6	Legal Notice	57
7	Indices and tables	59

CHAPTER

ONE

QUICK START GUIDE

For those users who want to quickly try the role this guide provides an example of how to install and configure Lighttpd on single FreeBSD host. The procedure is generic and can be easily modified to install and configure other applications on other systems. See examples in the directory *contrib*. The control node of this example is Linux and the user is member of the group *adm*.

• Install the role vbotka.config light

```
shell> ansible-galaxy install vbotka.config_light
```

• Create the playbook config-light.yml for single host srv.example.com (2)

```
shell> cat config-light.yml
hosts: srv.example.com
gather_facts: true
connection: ssh
remote_user: admin
become: yes
become_user: root
become_method: sudo
roles:
- vbotka.config_light
```

Create host_vars with customized variables of the role and with the variables of the application.

```
shell> ls -1 host_vars/srv.example.com/config-light-*
host_vars/srv.example.com/config-light-common.yml
host_vars/srv.example.com/config-light-lighttpd.yml
```

• Create *host_vars* with customized variables of the role. To speedup the execution let's set the control-flow variables (2-5) to *false* and disable some steps. Enable these steps selectively when needed. The configuration files of the role will be stored in the directory *conf-light* in the current directory of the playbook (10). Set the ownership and permissions of the directories on the cont-roll node so that the user who is running the playbook will be able both read and write the files, and create the directories (7-9) (11-14).

```
shell> cat host_vars/srv.example.com/config-light-common.yml
cl_sanity: false
cl_setup: false
cl_install: false
cl_debug: false
cl_debug: true
cl_dird_owner: "root"
cl_dird_group: "adm"
cl_dird_dmode: "0770"
```

```
cl_dird: "{{ playbook_dir }}/conf-light"

cl_dira_owner: "root"

cl_dira_group: "adm"

cl_dira_dmode: "0770"

cl_dira_fmode: "0660"
```

• Create *host_vars* with the variables of the application. Start the server (2), run the server at boot (3), and configure two files.

```
shell> cat host_vars/srv.example.com/config-light-lighttpd.yml
   cl_service_lighttpd_enable: true
   cl_service_lighttpd_state: 'started'
   # /usr/local/etc/lighttpd/lighttpd.conf
   cl_lighttpd_server_port: '80'
6
   cl_lighttpd_server_useipv6: 'disable'
   cl_lighttpd_server_username: 'www'
   cl_lighttpd_server_groupname: 'www'
   cl_lighttpd_server_document_root: "/usr/local/www/lighttpd"
   cl_lighttpd_lighttpdconf_lines:
11
12
     - regexp: '^\s*server.port\s*=\s*(.*)$'
       line: 'server.port = "{{ cl_lighttpd_server_port }}"'
13
     - regexp: '^\s*server.use-ipv6\s*=\s*(.*)$'
14
       line: 'server.use-ipv6 = "{{ cl_lighttpd_server_useipv6 }}"'
15
     - regexp: '^\s*server.username\s*=\s*(.*)$'
16
       line: 'server.username = "{{ cl_lighttpd_server_username }}"'
17
     - regexp: '^\s*server.groupname\s*=\s*(.*)$'
       line: 'server.groupname = "{{ cl_lighttpd_server_groupname }}"'
19
      regexp: '^\s*server.document-root\s*=\s*(.*)$'
20
       line: 'server.document-root = "{{ cl_lighttpd_server_document_root }}"'
21
22
   # /etc/rc.conf
23
   cl_lighttpd_rcconf_lighttpd_enable: 'YES'
24
25
   cl_lighttpd_rcconf_lines:
       - regexp: '^lighttpd_enable(.*)$'
26
         line: 'lighttpd_enable="{{ cl_lighttpd_rcconf_lighttpd_enable }}"'
27
```

• Create configuration files in the directory conf-light.

```
shell> tree conf-light
   conf-light/
2
     - files.d
3

    lighttpd-lighttpdconf

    lighttpd-rcconf

       handlers.d
6
       lighttpd-freebsd
       packages.d
       L lighttpd
       services.d
10
         — lighttpd
11
       states.d
12
        lighttpd-server-document-root
```

conf-light/files.d

```
shell> cat conf-light/files.d/lighttpd-lighttpdconf
```

```
lighttpd-lighttpdconf:
path: '/usr/local/etc/lighttpd/lighttpd.conf'
create: true
owner: 'root'
group: 'wheel'
mode: '0644'
lines: '{{ cl_lighttpd_lighttpdconf_lines }}'
handlers:
- 'reload lighttpd'
```

```
shell> cat conf-light/files.d/lighttpd-rcconf
lighttpd_rcconf:

path: '/etc/rc.conf'

create: true
owner: 'root'
group: 'wheel'
mode: '0644'
lines: "{{ cl_lighttpd_rcconf_lines }}"
handlers:
- 'reload lighttpd'
```

conf-light/handlers.d

```
shell> cat conf-light/handlers.d/lighttpd-freebsd
   lighttpd_freebsd:
     template: handlers-auto1.yml.j2
     params:
       - handler: 'enable and start lighttpd'
6
         module: service
         params:
8
9
            - 'name: lighttpd'
            - 'state: started'
10
            - 'enabled: true'
11
12
       - handler: 'disable and stop lighttpd'
13
          module: service
         params:
           - 'name: lighttpd'
16
            - 'state: stopped'
17
            - 'enabled: false'
18
19
        - handler: 'reload lighttpd'
20
21
         module: service
         params:
22
23
            - 'name: lighttpd'
            - 'state: reloaded'
24
          conditions:
25
            - '- cl_service_lighttpd_enable|bool'
26
27
       - handler: 'restart lighttpd'
          module: service
29
30
            - 'name: lighttpd'
31
            - 'state: restarted'
32
          conditions:
```

```
- '- cl_service_lighttpd_enable|bool'

- handler: 'lighttpd check'

module: command

params:
- 'cmd: /usr/local/sbin/lighttpd -t'
```

conf-light/packages.d

```
shell> cat conf-light/packages.d/lighttpd
lighttpd:
name: 'www/lighttpd'
```

conf-light/services.d

```
shell> cat conf-light/services.d/lighttpd
lighttpd:
name: 'lighttpd'
state: '{{ cl_service_lighttpd_enable }}'
enabled: '{{ cl_service_lighttpd_enable }}'
```

conf-light/states.d

```
shell> cat conf-light/states.d/lighttpd-server-document-root
lighttpd_server_document_root:

state: directory

path: '{{ cl_lighttpd_server_document_root }}'
owner: '{{ cl_lighttpd_server_username }}'
group: '{{ cl_lighttpd_server_groupname }}'
mode: '0750'
```

• Enable setup and create variables

```
shell> ansible-playbook config-light.yml -t cl_vars -e 'cl_setup=true'
```

This command will assemble the configuration data and create handlers on the control node. Take a look at directory conf-light/assemble/ what files were created. Also take a look at the directory roles/vbotka.config_light/handlers what handlers were created.

· Enable and test sanity

```
shell> ansible-playbook config-light.yml -t cl_sanity -e 'cl_sanity=true'
```

Display variables

```
shell> ansible-playbook config-light.yml -t cl_debug -e 'cl_debug=true'
```

· Install packages

```
shell> ansible-playbook config-light.yml -t cl_packages -e 'cl_install=true'
```

· Set files' states

```
shell> ansible-playbook config-light.yml -t cl_states
```

Create and modify files

```
shell> ansible-playbook config-light.yml -t cl_files
```

· Configure services

```
shell> ansible-playbook config-light.yml -t cl_services
```

• The role and the configuration data in the examples are idempotent. Once the application is installed and configured there should be no changes reported by *ansible-playbook* when running the playbook repeatedly. Disable setup, sanity, debug, and install to speedup the playbook

```
shell> ansible-playbook config-light.yml

[...]

PLAY RECAP

STV.example.com: ok=21 changed=0 unreachable=0 failed=0 skipped=35 rescued=0

Signored=0
```

• Create file /usr/local/www/lighttpd/index.html

```
shell> ll /usr/local/www/lighttpd/index.html
-rw-r--r- 1 www www 51 Apr 12 18:58 /usr/local/www/lighttpd/index.html
shell> cat /usr/local/www/lighttpd/index.html
4 <a href="https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://historycommons.org/lighttpd/">https://his
```

• Open the page in a browser http://srv.example.com/. The content should be

```
Lighttpd works!
```

TWO

USER'S GUIDE

Table of Contents

- User's guide
 - Introduction
 - Installation
 - Playbook
 - Debug
 - Tags
 - Variables
 - * Default variables
 - * cl_handlers dictionary with handlers
 - * cl_packages dictionary with packages or BSD ports
 - * cl_states dictionary of files' states
 - * cl_services dictionary with services
 - * cl_files dictionary with files
 - Best practice

2.1 Introduction

• Ansible role: config_light

• Supported systems: FreeBSD, Ubuntu

• Requirements: None

The role installs packages, creates and configures files, services, and handlers. This provides a simple, but flexible framework to apply basic Ansible modules. Substantial part of the control-flow will be determined by the structure of the data. Some attributes of the dictionaries trigger Ansible modules to modify configuration files, configure services and create handlers.

The role can be used with any supported OS to install and configure arbitrary applications. The role is tested with supported releases of FreeBSD and Ubuntu. It can be expected that other BSD and Linux distributions, that support

the Ansible modules mentioned below, should work with minimal changes. Red Hat and Debian *ansible_os_family* should work out of the box.

Used Ansible modules comprise package to install Linux packages, and both pkgng and portinstall to install FreeBSD packages or ports.

Ansible modules file, template, lineinfile, blockinfile and ini_file are used to configure files. Module service is used to manage both Linux and FreeBSD services.

The directory contrib comprises examples of how to install and configure various applications, and how to create the handlers and templates.

The user of this role is expected to master at least the following Ansible topics:

- · Basic Concepts
- Roles
- Working With Playbooks

Feel free to share your feedback and report issues. The contributions to the project are welcome.

2.2 Installation

The most convenient way how to install an Ansible role is to use Ansible Galaxy CLI ansible-galaxy. The utility comes with the standard Ansible package and provides the user with a simple interface to the Ansible Galaxy's services. For example take a look at the current status of the role

```
shell> ansible-galaxy info vbotka.config_light
```

and install it

```
shell> ansible-galaxy install vbotka.config_light
```

See also:

- To install specific versions from various sources see Installing content.
- Take a look at other roles shell> ansible-galaxy search --author=vbotka

2.3 Playbook

Below is simple playbook that applies this role at single host srv.example.com (2)

```
shell> cat config-light.yml
- hosts: srv.example.com
gather_facts: true
connection: ssh
remote_user: admin
become: yes
become_user: root
become_method: sudo
roles:
- vbotka.config_light
```

Note: gather_facts: true (3) must be set to gather facts needed to evaluate OS specific options of the role. For example to install packages the variable *ansible_os_family* is needed to select the appropriate Ansible module.

See also:

- For details see Connection Plugins (4-5)
- and Understanding Privilege Escalation (6-8).

2.4 Debug

To see additional debug information enable debug output in the configuration

```
cl_debug: true
```

, or set the extra variable in the command:

```
shell> ansible-playbook config-light.yml -e 'cl_debug=true'
```

Note: The debug output of this role is optimized for the yaml callback plugin. Set this plugin for example in the environment shell> export ANSIBLE_STDOUT_CALLBACK=yaml.

See also:

· Playbook Debugger

2.5 Tags

The tags provide very useful tool to run selected tasks of the role. To see what tags are available list the tags of the role with the command:

For example display the list of the variables and their values with the tag cl_debug (when the debug is enabled cl_debug: true). With this tag specified -t cl_debug all imported tasks before the task *debug.yml* will also run because of the tag always (when sanity testing is enabled cl_sanity: true and setup is enabled cl_setup: true). This is the default. See *main.yml*.

```
shell> ansible-playbook config-light.yml -t cl_debug
```

See what packages will be installed

```
shell> ansible-playbook config-light.yml -t cl_packages --check
```

Install packages and exit the play

2.4. Debug 9

```
shell> ansible-playbook config-light.yml -t cl_packages
```

2.6 Variables

In this chapter we describe role's default variables stored in the directory defaults.

See also:

• Ansible variable precedence: Where should I put a variable?

2.6.1 Default variables

Most of the variables are self-explaining. There are five very important variables cl_handlers, cl_packages, cl_states, cl_services, and cl_files (11-15). These dictionaries, which comprise the configuration data of handlers, packages, services, and files, will be explained in details. By default these dictionaries are empty.

Best practice is to provide the data either in *host_vars* and *group_vars* or as a files in the directories <code>cl_handlersd_dir</code>, <code>cl_packagesd_dir</code>, <code>cl_statesd_dir</code>, <code>cl_servicesd_dir</code>, and <code>cl_filesd_dir</code> (22-26). Both methods can be applied at the same time. The variables will be assembled and combined by the tasks <code>vars_handlers.yml</code>, <code>vars_packages.yml</code>, <code>vars_states.yml</code>, <code>vars_services.yml</code>, and <code>vars_files.yml</code>. The assembled dictionaries customized for each host in the play will be stored in the host-specific files <code>cl_packagesd</code>, <code>cl_statesd</code>, <code>cl_servicesd</code>, and <code>cl_filesd</code> (35-38). The variable <code>cl_handlers</code> is not host-specific because the handlers will be create at the controller (localhost). Assembled dictionary <code>cl_handlers</code> will be stored in the file <code>cl_handlersd</code> (34). Take a look at the directory <code>cl_dira</code> (33) to see assembled data.

By default the base of the directories is role_path (21). The user is expected to put the configuration data to more suitable directory, e.g., to playbook_dir directory.

[defaults/main.yml]

```
# defaults for config_light
2
3
   cl_sanity: true
                                # Import tasks/sanity.yml
4
   cl_setup: true
                                # Import tasks/setup.yml
  cl_install: true
                               # Install packages or ports
                               # Print debug output
  cl_debug: false
  cl_backup: false
                               # Backup files
   # Combine assembled data with these variables
10
  cl_handlers: {}
11
  cl_packages: {}
12
  cl_services: {}
13
   cl_files: {}
14
   cl_states: {}
15
16
   # Assemble data from these directories
17
  # cl_dird_owner: root  # no default
18
  # cl_dird_group: adm
                               # no default
19
  cl_dird_dmode: "0775"
                                # default very permissive, restrict if necessary
  cl_dird: "{{ role_path }}/files"
  cl_handlersd_dir: "{{ cl_dird }}/handlers.d"
  cl_packagesd_dir: "{{ cl_dird }}/packages.d"
```

```
cl_servicesd_dir: "{{ cl_dird }}/services.d"
24
   cl_filesd_dir: "{{ cl_dird }}/files.d"
25
   cl_statesd_dir: "{{ cl_dird }}/states.d"
26
27
   # Assemble inventory_hostname data into these files
28
   # cl_dira_owner: root  # no default
29
   # cl_dira_group: adm
                                # no default
30
   cl_dira_dmode: "0775"
                                # default very permissive, restrict if necessary
31
                          # default very permissive, restrict if necessary
   cl_dira_fmode: "0664"
32
   cl_dira: "{{ cl_dird }}/assemble"
33
   cl_handlersd: "{{ cl_dira }}/handlersd" # localhost; not inventory_hostname specific
   cl_packagesd: "{{ cl_dira }}/packagesd.{{ inventory_hostname }}"
   cl_servicesd: "{{ cl_dira }}/servicesd.{{ inventory_hostname }}"
   cl_filesd: "{{ cl_dira }}/filesd.{{ inventory_hostname }}"
37
   cl_statesd: "{{ cl_dira }}/statesd.{{ inventory_hostname }}"
38
   cl_assemble_regexp: '^(.*)[^~]$' # Any string but terminated with ~
39
   # cl_assemble_validate: 'ansible-lint -x 205 %s' # no default
40
   # Handlers
42
   cl_handlers_validate: 'ansible-lint %s'
43
44
   # OS common
45
   install_retries: 10
46
   install_delay: 5
47
   # FreeBSD
   freebsd install method: packages
50
   # freebsd_install_method: ports
51
   freebsd_use_packages: true
52
53
   # EOF
54
```

Warning: Defaults of the variables cl_dird_dmode (20), cl_dira_dmode (31) and cl_dira_fmode (32) are very permissive. These are the permissions to access the configuration data and the assembled dictionaries. Restrict the permissions if these dictionaries might comprise classified data.

<TODO: complete description of all default variables>

2.6.2 cl_handlers - dictionary with handlers

```
Synopsis
Parameters
Example
See Also
Notes
```

Synopsis

The variable *cl_handlers* is a dictionary of the handlers. Structure of the dictionary depends on the template that is used to create the file with the handlers. For example, the structure below can be used with the template *handlers-auto1.yml.j2*.

Parameters

Parameter	Туре	Comments
template	string required	Template filename
handler	string required	Name of the handler
module	string required	Ansible module in handler
params	list required	Ansible module parameters
conditions	list	List of conditions

Example

FreeBSD handlers for postfix

[contrib/postfix/conf-light/handlers.d/postfix-freebsd]

```
11
        - handler: 'disable and stop postfix'
12
          module: service
13
14
          params:
            - 'name: postfix'
15
            - 'state: stopped'
16
            - 'enabled: false'
17
18
        - handler: 'reload postfix'
19
          module: service
20
          params:
21
            - 'name: postfix'
22
23
            - 'state: reloaded'
          conditions:
24
            - '- cl_service_postfix_enable|bool'
25
26
        - handler: 'restart postfix'
27
          module: service
28
          params:
29
            - 'name: postfix'
30
            - 'state: restarted'
31
          conditions:
32
            - '- cl_service_postfix_enable|bool'
33
34
        - handler: 'postfix check'
          module: command
37
          params:
            - 'cmd: /usr/local/sbin/postfix check'
38
39
        - handler: 'newaliases'
40
41
          module: command
          params:
42
            - 'cmd: /usr/bin/newaliases'
43
44
         - handler: 'postmap smtp sasl passwords'
45
          module: command
46
          params:
47
   #
            - 'cmd: /usr/local/sbin/postmap {{ postfix_main_cf_smtp_sasl_password_maps }}
49
         - handler: 'postmap virtual aliases'
50
          module: command
51
52
           params:
             - cmd: /usr/local/sbin/postmap {{ postfix_virtual }}'
```

See Also

See also:

- See vars-handlers.yml how the variable *cl_handlers* is combined with the content of the directory *cl_handlersd_dir*.
- See setup.yml how the handlers are created.
- For details see the template handlers-auto1.yml.j2.

Notes

Note: The template *handlers-auto1.yml.j2* is available in the role's directory templates. The user is expected to create new templates when needed. Feel free to change the structure of the data and to create new templates that might fit the purpose better. Feel free to contribute new templates and configuration examples to the project.

2.6.3 cl_packages - dictionary with packages or BSD ports

- Synopsis
- Parameters
- Example
- See Also

Synopsis

The variable $cl_packages$ is a dictionary of the packages, or BSD ports to be installed.

Parameters

Parameter	Туре	Comments
name	string required	Package or BSD port

Example

FreeBSD package for Postfix

[contrib/postfix/conf-light/packages.d/postfix]

```
postfix:
name: 'mail/postfix'
```

Armbian package for Simple SMTP

[contrib/ssmtp/conf-light/packages.d/ssmtp]

```
ssmtp:
name: 'ssmtp'
```

See Also

See also:

- See vars-packages.yml how the variable *cl_packages* is combined with the content of the directory *cl_packagesd_dir*.
- See packages.yml how the packages or BSD ports are installed.

2.6.4 cl_states - dictionary of files' states

- Synopsis
- Parameters
- Example
- See Also

Synopsis

The variable *cl_states* is a dictionary of the files' states.

Parameters

Parameter	Туре	Comments
state	string required	State of the filename
path	string required	Path to file
owner	string	Owner of the file
group	string	Group of the file
mode	string	Mode of the file

<TODO: complete parameters. See tasks/states.yml>

Example

File's states

[contrib/lighttpd/conf-light/states.d/lighttpd-server-document-root]

```
lighttpd_server_document_root:
state: directory
path: '{{ cl_lighttpd_server_document_root }}'
owner: '{{ cl_lighttpd_server_username }}'
group: '{{ cl_lighttpd_server_groupname }}'
mode: '0640'
```

See Also

See also:

- See vars-states.yml how the variable *cl_states* is combined with the content of the directory *cl_statesd_dir*.
- See states.yml how the file's states are set.

2.6.5 cl_services - dictionary with services

- Synopsis
- Parameters
- Example
- See Also

Synopsis

The variable $cl_services$ is a dictionary with the services managed by this role.

Parameters

Parameter	Туре	Comments
name	string required	Service
state	string	State of the service default: started
enabled	boolean	Start on boot default: true

Example

FreeBSD services for Postfix and Sendmail

[contrib/postfix/conf-light/service.d/postfix]

```
postfix:
   name: 'postfix'
state: '{{ cl_service_postfix_state }}'
enabled: '{{ cl_service_postfix_enable }}'
```

[contrib/postfix/conf-light/service.d/sendmail]

```
sendmail:
name: 'sendmail'
state: '{{ cl_service_sendmail_state }}'
enabled: '{{ cl_service_sendmail_enable }}'
```

See Also

See also:

- See vars-services.yml how the variable *cl_services* is combined with the content of the directory *cl_servicesd_dir*.
- See services.yml how the services are configured.

2.6.6 cl_files - dictionary with files

- Synopsis
- See Also
- Parameters for template
- Example of template
- See Also
- Notes
- Parameters for lineinfile
- Example of lineinfile
- See Also
- Parameters for blockinfile
- Example of blockinfileinfile
- See Also
- Parameters for ini_file
- Example of ini_file
- See Also

Synopsis

The variable cl_files is a dictionary of the files that shall be created or modified by this role. It's optional which Ansible module will be used to create or modify a file. More options can be applied at the same file. For example, it is possible to create a file by the Ansible module template and modify it with the module template later. Several options are available:

- 1. template: If the attribute template is defined in the dictionary
- 2. lineinfile: If the attribute *lines* is defined in the dictionary
- 3. blockinfile: If the attribute *blocks* is defined in the dictionary
- 4. ini_file: If the attribute *ini* is defined in the dictionary

Multiple options, when defined in the dictionary, will be applied in this order.

See Also

See also:

- See vars-files.yml how the variable *cl_files* is combined with the content of the directory *cl_filesd_dir*.
- See files.yml how the files are created and modified.
- See files-create-backup.yml how the backups are created (when enabled by *cl_backup*).
- See files-delete-backup.yml how the backup files are deleted when the files haven't been modified.

Parameters for template

Parameter	Туре	Comments
path	string required	Path to file
template	string required	Template filename
owner	string	Owner of the file
group	string	Group of the file
mode	string	Mode of the file
force	boolean	Replace when different default: true
validate	string	Command to validate file
handlers	list	List of handlers

Example of template

File /etc/mail/mailer.conf for postfix

[contrib/postfix/conf-light/files.d/mailer-conf]

```
mailerconf:
   path: '/etc/mail/mailer.conf'
force: true
   owner: 'root'
   group: 'wheel'
   mode: '0644'
   template: 'mailer.conf.j2'
```

See Also

See also:

• See files-template.yml how the files are modified or created by the Ansible module template.

Notes

Note: There are couple of templates ready to be used in the directory templates. The user is expected to create new templates when needed. Feel free to contribute new templates to the project.

Parameters for lineinfile

Parameter	Туре	Comments
path	string required	Path to file
lines	list required	List of regexp and lines
owner	string	Owner of the file
group	string	Group of the file
mode	string	Mode of the file
create	boolean	Create if does not exist default: false
validate	string	Command to validate file
handlers	list	List of handlers

Example of lineinfile

File /usr/local/etc/postfix/main.cf for postfix

[contrib/postfix/conf-light/files.d/postfix-main.cf]

```
postfix_main_cf:
    path: '/usr/local/etc/postfix/main.cf'
    create: true
    owner: 'root'
    group: 'wheel'
    mode: '0644'
    handlers:
        - 'postfix_freebsd reload postfix'

lines:
        - regexp: '^myhostname\s*=\s*(.*)$'
        line: 'myhostname = {{ cl_myhostname }}'
```

See Also

See also:

• See files-lineinfile.yml how the files are modified or created by the Ansible module lineinfile.

Parameters for blockinfile

Parameter	Туре	Comments
path	string required	Path to file
blocks	<i>list</i> required	List of blocks and markers
owner	string	Owner of the file
group	string	Group of the file
mode	string	Mode of the file
create	boolean	Create if does not exist default: false
validate	string	Command to validate file
handlers	list	List of handlers

Example of blockinfileinfile

<TODO: No example yet>

See Also

See also:

• See files-blockinfile.yml how the files are modified or created by the Ansible module blockinfile.

Parameters for ini_file

Parameter	Туре	Comments
path	string required	Path to file
ini	<i>list</i> required	List of {section,option, value} dictionaries
owner	string	Owner of the file
group	string	Group of the file
mode	string	Mode of the file
create	boolean	Create if does not exist default: true
handlers	list	List of handlers

Example of ini_file

<TODO: No example yet>

See Also

See also:

• See files-inifile.yml how the files are modified or created by the Ansible module ini_file.

2.7 Best practice

Create variables. Take a look at directory conf-light/assemble/ what files were created.

```
shell> ansible-playbook config-light.yml -t cl_vars
```

Test sanity. Then disable this task cl_sanity: false to speedup the playbook.

```
shell> ansible-playbook config-light.yml -t cl_sanity
```

Create handlers. Take a look at directory roles/vbotka.config_light/handlers what handlers were created. Run this task once to create the handlers. Then disable this task cl_setup: false to speedup the playbook.

```
shell> ansible-playbook config-light.yml -t cl_setup
```

Display variables. Display the variables for debug if needed. Then disable this task cl_debug: false to speedup the playbook.

```
shell> ansible-playbook config-light.yml -t cl_debug
```

Install packages. Then disable this task cl_install: false to speedup the playbook.

```
shell> ansible-playbook config-light.yml -t cl_packages
```

Set files' states.

```
shell> ansible-playbook config-light.yml -t cl_states
```

Create and modify files

```
shell> ansible-playbook config-light.yml -t cl_files
```

Configure services

```
shell> ansible-playbook config-light.yml -t cl_services
```

The role and the configuration data in the examples are idempotent. Once the application is installed and configured there should be no changes reported by *ansible-playbook* when running the playbook repeatedly. Disable setup, sanity, debug, and install to speedup the playbook

```
shell> ansible-playbook config-light.yml
```

THREE

ANNOTATED SOURCE CODE

Table of Contents

- Annotated source code
 - Tasks
 - * main.yml
 - * vars.yml
 - * vars-packages.yml
 - * vars-states.yml
 - * vars-services.yml
 - * vars-files.yml
 - * sanity.yml
 - * setup.yml
 - * vars-handlers.yml
 - * debug.yml
 - * packages.yml
 - * states.yml
 - * files.yml
 - $*\ files-create-backup.yml$
 - * files-delete-backup.yml
 - * files-template.yml
 - $*\ \mathit{files-line in file.yml}$
 - $*\ files-blockinfile.yml$
 - * files-inifile.yml
 - * services.yml

3.1 Tasks

3.1.1 main.yml

Synopsis: Tasks of the playbook.

Description of the task.

[main.yml]

```
# tasks for config_light
2
3
   - import_tasks: setup.yml
     when: cl_setup|bool
     delegate_to: localhost
     run_once: true
     tags: [cl_setup, always]
   - import_tasks: vars.yml
10
     tags: [cl_vars, always]
11
12
   - import_tasks: sanity.yml
13
     when: cl_sanity|bool
     tags: [cl_sanity, always]
16
     import_tasks: debug.yml
17
     when: cl_debug|bool
18
     tags: [cl_debug, always]
19
20
   - import_tasks: packages.yml
21
     when: cl_install|bool
22
     tags: cl_packages
23
24
   - import_tasks: states.yml
25
     tags: cl_states
26
   - import_tasks: files.yml
28
29
     tags: cl_files
30
   - import_tasks: services.yml
31
     tags: cl_services
32
33
   # EOF
34
```

3.1.2 vars.yml

Synopsis: Combine dictionaries of packages, services and files.

Description of the task.

[vars.yml]

1 2

```
name: "vars: Debug"
     when: cl_debug|bool
4
     vars:
       msg:
6
         cl_handlersd_dir [{{ cl_handlersd_dir }}]
         cl_packagesd_dir [{{ cl_packagesd_dir
8
         cl_statesd_dir [{{ cl_statesd_dir }}]
         cl_servicesd_dir [{{ cl_servicesd_dir }}]
10
         cl_filesd_dir [{{ cl_filesd_dir }}]
11
         cl_dira [{{ cl_dira }}]
12
         cl_handlersd [{{ cl_handlersd }}]
13
         cl_packagesd [{{ cl_packagesd }}]
         cl_statesd [{{ cl_statesd }}]
         cl_servicesd [{{ cl_servicesd }}]
16
         cl_filesd [{{ cl_filesd }}]
17
     debug:
18
       msg: "{{ msg.split('\n') }}"
19
20
   - name: "vars: Packages"
21
     import_tasks: vars-packages.yml
22
23
   - name: "vars: States"
24
     import_tasks: vars-states.yml
25
26
   - name: "vars: Services"
     import_tasks: vars-services.yml
29
   - name: "vars: Files"
30
     import_tasks: vars-files.yml
31
32
   # EOF
33
```

3.1.3 vars-packages.yml

Synopsis: Combine dictionaries of packages.

Description of the task.

[vars-packages.yml]

```
2
   - name: "vars-packages: Assemble packages to {{ cl_packagesd }}"
3
     assemble:
4
       regexp: "{{ cl_assemble_regexp }}"
       src: "{{ cl_packagesd_dir }}"
6
       dest: "{{ cl_packagesd }}"
7
       owner: "{{ cl_dira_owner|default(omit) }}"
       group: "{{ cl_dira_group|default(omit) }}"
9
       mode: "{{ cl_dira_fmode }}"
10
       validate: "{{ cl_assemble_validate|default(omit) }}"
11
     delegate_to: localhost
12
13
   - name: "vars-packages: Include files from {{ cl_packagesd }} to cl_packagesd_items"
14
     include_vars:
                                                                                (continues on next page)
```

3.1. Tasks 29

```
file: "{{ cl_packagesd }}"
16
       name: cl_packagesd_items
17
18
   - name: "vars-packages: Combine cl_packages with cl_packagesd_items"
     set_fact:
20
       cl_packages: "{{ cl_packages|combine(cl_packagesd_items|default({}))) }}"
21
22
   - name: "vars-packages: Debug"
23
     debug:
24
       var: cl_packages
25
     when: cl_debug|bool
26
   # EOF
```

3.1.4 vars-states.yml

Synopsis: Combine dictionaries of files' states.

Description of the task.

[vars-states.yml]

```
2
   - name: "vars-states: Assemble states to {{ cl_states }}"
     assemble:
4
       regexp: "{{ cl_assemble_regexp }}"
       src: "{{ cl_statesd_dir }}"
       dest: "{{ cl_statesd }}"
       owner: "{{ cl_dira_owner|default(omit) }}"
       group: "{{ cl_dira_group|default(omit) }}"
       mode: "{{ cl_dira_fmode }}"
10
       validate: "{{ cl_assemble_validate|default(omit) }}"
11
     delegate_to: localhost
12
13
   - name: "vars-states: Include files from {{ cl_statesd }} to cl_statessd_items"
     include_vars:
15
       file: "{{ cl_statesd }}"
16
       name: cl statesd items
17
18
   - name: "vars-states: Combine cl_statess with cl_statesd_items"
19
20
     set fact:
       cl_states: "{{ cl_states|combine(cl_statesd_items|default({}))) }}"
21
22
   - name: "vars-states: Debug"
23
     debug:
24
25
       var: cl_states
     when: cl_debug|bool
26
   # EOF
28
   . . .
```

3.1.5 vars-services.yml

Synopsis: Combine dictionaries of services.

Description of the task.

[vars-services.yml]

```
2
   - name: "vars-services: Assemble services to {{ cl_servicesd }}"
     assemble:
       regexp: "{{ cl_assemble_regexp }}"
       src: "{{ cl_servicesd_dir }}"
6
       dest: "{{ cl_servicesd }}"
       owner: "{{ cl_dira_owner|default(omit) }}"
       group: "{{ cl_dira_group|default(omit) }}"
Q
       mode: "{{ cl_dira_fmode }}"
10
       validate: "{{ cl_assemble_validate|default(omit) }}"
11
     delegate_to: localhost
12
13
   - name: "vars-services: Include files from {{ cl_servicesd }} to cl_cervicesd_items"
14
     include_vars:
15
       file: "{{ cl_servicesd }}"
16
       name: cl_servicesd_items
17
   - name: "vars-services: Combine cl_services with cl_servicesd_items"
     set_fact:
20
       cl_services: "{{ cl_services|combine(cl_servicesd_items|default({})) }}"
21
22
23
   - name: "vars-services: Debug"
24
     debug:
       var: cl_services
25
     when: cl_debug|bool
26
27
   # EOF
28
```

3.1.6 vars-files.yml

Synopsis: Combine dictionaries of files.

Description of the task.

[vars-files.yml]

```
2
   - name: "vars-files: Assemble files to {{ cl_filesd }}"
3
     assemble:
4
       regexp: "{{ cl_assemble_regexp }}"
5
       src: "{{ cl_filesd_dir }}"
6
       dest: "{{ cl_filesd }}"
       owner: "{{ cl_dira_owner|default(omit) }}"
       group: "{{ cl_dira_group|default(omit) }}"
       mode: "{{ cl_dira_fmode }}"
10
       validate: "{{ cl_assemble_validate|default(omit) }}"
11
     delegate_to: localhost
```

(continues on next page)

3.1. Tasks 31

```
13
   - name: "vars-files: Include files from {{ cl_filesd }} to cl_filesd_items"
14
     include_vars:
15
       file: "{{ cl_filesd }}"
       name: cl_filesd_items
18
     name: "vars-files: Combine cl_files with cl_filesd_items"
19
     set_fact:
20
       cl_files: "{{ cl_files|combine(cl_filesd_items|default({}))) }}"
21
22
   - name: "vars-files: Debug"
23
     debug:
25
       var: cl_files
     when: cl_debug|bool
26
27
   # EOF
28
```

3.1.7 sanity.yml

Synopsis: Test sanity.

Description of the task.

[sanity.yml]

```
- name: "sanity: Directories to assemble data from must exist"
4
       - name: "sanity: Directories to assemble data from must exist"
         debug:
6
           msg: "{{ msg.split('\n')[:-1] }}"
         vars:
           msg:
             Directories to assemble data from do not exist. End of host.
10
             Hint: Double check existence of the directories
11
12
              {{ cl_packagesd_dir }}
13
15
              {{ cl_filesd_dir }}
16
       - name: "sanity: End of host"
17
         meta: end_host
18
19
       - cl_handlersd_dir is not exists or
20
         cl_packagesd_dir is not exists or
21
22
         cl_statesd_dir is not exists or
         cl_servicesd_dir is not exists or
23
         cl_filesd_dir is not exists
24
25
   - name: "sanity: Check mode not possible without assembled data"
26
27
     block:
       - name: "sanity: Check mode not possible without assembled data"
28
29
           msg: "{{ msg.split('\n')[:-1] }}"
```

```
vars:
31
           msg:
32
             Check mode not possible without assembled data. End of host.
33
             Hint: Assemble the variables first.
34
             Run: ansible-playbook playbook.yml -t cl_vars
       - name: "sanity: End of host"
36
         meta: end_host
37
     when:
38
       ansible_check_mode
39
       - cl_packagesd is not exists or
40
         cl_statesd is not exists or
41
         cl_servicesd is not exists or
         cl_filesd is not exists
44
   # EOF
45
```

3.1.8 setup.yml

Synopsis: Setup. Create dirs. Create handlers.

Description of the task.

[setup.yml]

```
# directories
   - name: "setup: Create directories in {{ cl_dird }}"
     file:
       state: directory
6
       path: "{{ item }}"
       owner: "{{ cl_dird_owner|default(omit) }}"
       group: "{{ cl_dird_group|default(omit) }}"
       mode: "{{ cl_dird_dmode }}"
10
     loop:
11
       - "{{ cl_dird }}"
12
       - "{{ cl_handlersd_dir }}"
13
       - "{{ cl_packagesd_dir }}"
14
       - "{{ cl_servicesd_dir }}"
       - "{{ cl_filesd_dir }}"
16
       - "{{ cl_statesd_dir }}"
17
18
   - name: "setup: Create directory {{ cl_dira }}"
19
     file:
20
       state: directory
21
22
       path: "{{ cl_dira }}"
23
       owner: "{{ cl_dira_owner|default(omit) }}"
       group: "{{ cl_dira_group|default(omit) }}"
24
       mode: "{{ cl_dira_dmode }}"
25
26
   # handlers
27
   - name: "setup: Assemble handlers"
28
     import_tasks: vars-handlers.yml
29
30
   - name: "setup: Create handlers"
```

(continues on next page)

```
template:
32
       dest: "{{ role_path }}/handlers-auto-{{ item.key }}.yml"
33
       src: "{{ item.value.template }}"
34
       validate: "{{ cl_handlers_validate|default(omit) }}"
35
       backup: "{{ cl_backup }}"
     loop: "{{ cl_handlers|dict2items }}"
37
     loop_control:
38
       label: "{{ role_path }}/handlers/handlers-auto-{{ item.key }}.yml"
39
40
   - name: "setup: Include handlers"
41
     lineinfile:
42
       path: "{{ role_path }}/handlers/main.yml"
       line: "- import_tasks: handlers-auto-{{ item.key }}.yml"
       validate: "{{ cl_handlers_validate|default(omit) }}"
45
       backup: "{{ cl_backup }}"
46
       create: true
47
     loop: "{{ cl_handlers|dict2items }}"
48
     loop_control:
       label: "{{ role_path }}/handlers/handlers-auto-{{ item.key }}.yml"
50
51
   # EOF
52
53
   . . .
```

3.1.9 vars-handlers.yml

Synopsis: Combine dictionaries of handlers.

Description of the task.

[vars-handlers.yml]

```
2
   - name: "vars-handlers: Assemble handlers to {{ cl_handlersd }}"
4
       regexp: "{{ cl_assemble_regexp }}"
5
       src: "{{ cl_handlersd_dir }}"
6
       dest: "{{ cl_handlersd }}"
       owner: "{{ cl_dira_owner|default(omit) }}"
       group: "{{ cl_dira_group|default(omit) }}"
       mode: "{{ cl_dira_fmode }}"
10
       validate: "{{ cl_assemble_validate|default(omit) }}"
11
     delegate_to: localhost
12
13
   - name: "vars-handlers: Include files from {{ cl_handlersd }} to cl_handlersd_items"
14
     include vars:
15
       file: "{{ cl_handlersd }}"
16
       name: cl_handlersd_items
17
18
   - name: "vars-handlers: Combine cl_handlers with cl_handlersd_items"
19
     set fact:
20
       cl_handlers: "{{ cl_handlers|combine(cl_handlersd_items|default({}))) }}"
21
22
   - name: "vars-handlers: Debug"
23
     debug:
24
       var: cl_handlers
25
```

3.1.10 debug.yml

Synopsis: Display variables.

Description of the task.

[debug.yml]

```
2
   - name: "debug: Config Light"
3
     vars:
4
       msq:
         ansible_os_family [{{ ansible_os_family }}]
6
         ansible_distribution [{{ ansible_distribution }}]
         ansible_distribution_major_version [{{ ansible_distribution_major_version }}]
         ansible_distribution_version [{{ ansible_distribution_version }}]
         ansible_distribution_release [{{ ansible_distribution_release }}]
10
         ansible_python_version [{{ ansible_python_version }}]
11
12
         cl_sanity [{{ cl_sanity }}]
13
         cl_setup [{{ cl_setup }}]
15
         cl backup [{{ cl backup }}]
16
17
         cl_handlers
18
         {{ cl_handlers|to_nice_yaml }}
19
         {{ cl_packages|to_nice_yaml }}
21
22
         {{ cl_services|to_nice_yaml }}
23
         cl_files
24
         {{ cl_files|to_nice_yaml }}
25
         cl_states
26
         {{ cl_states|to_nice_yaml }}
27
28
         cl_dird [{{ cl_dird }}]
29
         cl_dird_owner [{{ cl_dira_owner|default('UNDEFINED') }}]
30
         cl_dird_group [{{ cl_dira_group|default('UNDEFINED') }}]
31
         cl_dird_dmode [{{ cl_dira_dmode }}]
32
         cl_handlersd_dir [{{ cl_handlersd_dir }}]
         cl_packagesd_dir [{{ cl_packagesd_dir }}]
35
         cl_servicesd_dir [{{ cl_servicesd_dir }}]
36
         cl_filesd_dir [{{ cl_filesd_dir }}]
37
         cl_statesd_dir [{{ cl_statesd_dir }}]
38
39
         cl_dira [{{ cl_dira }}]
40
         cl_dira_owner [{{ cl_dira_owner|default('UNDEFINED') }}]
41
         cl_dira_group [{{ cl_dira_group|default('UNDEFINED') }}]
42
         cl_dira_dmode [{{ cl_dira_dmode }}]
```

(continues on next page)

```
cl_dira_fmode [{{ cl_dira_fmode }}]
44
         cl_assemble_regexp [{{ cl_assemble_regexp }}]
45
46
         cl_handlersd [{{ cl_handlersd }}]
47
         cl_packagesd [{{ cl_packagesd }}]
         cl_servicesd [{{ cl_servicesd }}]
49
         cl_filesd [{{ cl_filesd }}]
50
         cl_statesd [{{ cl_statesd }}]
51
52
         cl_assemble_validate [{{ cl_assemble_validate|default('UNDEFINED') }}]
53
         cl_handlers_validate [{{ cl_handlers_validate|default('UNDEFINED') }}]
54
         install_retries [{{ install_retries }}]
         install_delay [{{ install_delay }}]
57
58
         freebsd_install_method [{{ freebsd_install_method }}]
59
         freebsd_use_packages [{{ freebsd_use_packages }}]
60
61
     debug:
62
       msg: "{{ msg.split('\n') }}"
63
64
   # EOF
65
```

3.1.11 packages.yml

Synopsis: Install packages.

Description of the task.

[packages.yml]

```
2
3
   - name: "packages: Install packages FreeBSD"
4
     block:
5
       - name: "packages: Install packages FreeBSD"
6
         pkgng:
           name: "{{ item.value.name }}"
           state: "{{ item.value.state|default(omit) }}"
           annotation: "{{ item.value.annotation|default(omit) }}"
10
           autoremove: "{{ freebsd_pkgng_autoremove|default(omit) }}"
11
           cached: "{{ freebsd_pkgng_cached|default(omit) }}"
12
           chroot: "{{ freebsd_pkgng_chroot|default(omit) }}"
13
           jail: "{{ freebsd_pkgng_jail|default(omit) }}"
14
           pkgsite: "{{ freebsd_pkgng_pkgsite|default(omit) }}"
15
           rootdir: "{{ freebsd_pkgng_rootdir|default(omit) }}"
16
         loop: "{{ cl_packages|dict2items }}"
17
         loop_control:
18
           label: "{{ item.key }}"
19
         register: result
20
         until: result is succeeded
21
         retries: "{{ install_retries }}"
22
         delay: "{{ install_delay }}"
23
       - name: "packages: Debug FreeBSD packages"
```

(continues on next page)

36

```
debug:
25
            var: result
26
         when: cl_debug|bool
27
28
     when:
        - ansible_os_family == "FreeBSD"
29
        - freebsd_install_method|lower == "packages"
31
     name: "packages: Install ports FreeBSD"
32
     block:
33
       - name: "packages: Install ports FreeBSD"
34
         portinstall:
35
            name: "{{ item.value.name }}"
            state: "{{ item.value.state|default(omit) }}"
            use packages: "{{ item.value.use_packages|default(freebsd_use_packages) }}"
38
          loop: "{{ cl_packages|dict2items }}"
39
          loop_control:
40
            label: "{{ item.key }}"
41
          register: result
42
          until: result is succeeded
43
44
          retries: "{{ install_retries }}"
          delay: "{{ install_delay }}"
45
        - name: "packages: Debug FreeBSD ports"
46
          debug:
47
48
            var: result
          when: cl_debug|bool
49
     when:
51
       - ansible_os_family == "FreeBSD"
        - freebsd_install_method|lower == "ports"
52
53
   # Tinux -----
54
   - name: "packages: Install packages Linux"
55
     block:
56
        - name: "packages: Install packages Linux"
57
         package:
58
            name: "{{ item.value.name }}"
59
            state: "{{ item.value.state|default('present') }}"
60
            use: "{{ item.value.use|default('auto') }}"
61
          loop: "{{ cl_packages|dict2items }}"
62
          loop_control:
            label: "{{ item.key }}"
64
         register: result
65
         until: result is succeeded
66
         retries: "{{ install_retries }}"
67
          delay: "{{ install_delay }}"
68
        - name: "packages: Debug Linux"
69
          debug:
70
            var: result
71
          when: cl debug|bool
72
     when: ansible_os_family == "RedHat" or
73
            ansible_os_family == "Debian"
74
   # EOF
   . . .
```

3.1.12 states.yml

Synopsis: Configure states of files.

Description of the task.

[states.yml]

```
2
   - name: "states: Apply states"
     file:
       state: "{{ item.value.state }}"
       path: "{{ item.value.path }}"
6
       src: "{{ item.value.src|default(omit) }}"
       owner: "{{ item.value.owner|default(omit) }}"
8
       group: "{{ item.value.group|default(omit) }}"
Q
       mode: "{{ item.value.mode|default(omit) }}"
10
       attributes: "{{ item.value.attributes|default(omit) }}"
11
       recurse: "{{ item.value.recurse|default(omit) }}"
12
       force: "{{ item.value.force|default(omit) }}"
13
       follow: "{{ item.value.follow|default(omit) }}"
14
       access_time: "{{ item.value.access_time|default(omit) }}"
15
       access_time_format: "{{ item.value.access_time_format|default(omit) }}"
16
       modification_time: "{{ item.value.modification_time|default(omit) }}"
17
       modification_time_format: "{{ item.value.modification_time_format|default(omit) }}
       unsafe_writes: "{{ item.value.unsafe_writes|default(omit) }}"
19
     loop: "{{ cl_states|dict2items }}"
20
     loop_control:
21
       label: "{{ item.value.path }}"
22
23
   # EOF
   . . .
```

3.1.13 files.yml

Synopsis: Create or modify files.

Description of the task.

[files.yml]

```
2
   - name: "files: Create backup"
     import_tasks: files-create-backup.yml
     when: cl_backup|bool
6
   - name: "files: Template"
     import_tasks: files-template.yml
   - name: "file: Lineinfile"
10
     import_tasks: files-lineinfile.yml
11
12
   - name: "file: Blockinfile"
13
     import_tasks: files-blockinfile.yml
14
```

```
name: "files: INI file"
16
     import_tasks: files-inifile.yml
17
18
   - name: "file: Delete backup"
     import_tasks: files-delete-backup.yml
20
     when:
21
       - cl_backup|bool
22
        - not ansible_check_mode
23
24
   # EOF
25
```

3.1.14 files-create-backup.yml

Synopsis: Create backup files.

Description of the task.

[files-create-backup.yml]

```
2
   - name: "file-create-backup: Create time-stamp"
       cl_timestamp: "{{ '%Y-%m-%d_%H_%M_%S'|strftime }}"
   - name: "file-create-backup: Stat {{ item.path }}"
     stat:
       path: "{{ item.path }}"
     loop: "{{ cl_files.values() }}"
10
     loop_control:
11
       label: "{{ item.path }}"
12
     register: result
13
14
   - name: "file-create-backup: Debug result"
15
     debug:
16
       var: result
     when: cl_debug|bool
18
19
   - name: "file-create-backup: Create backup files"
20
21
     copy:
       remote_src: true
22
       src: "{{ item.item.path }}"
23
       dest: "{{ item.item.path }}_{{{ cl_timestamp }}.bak"
       mode: "preserve"
25
     loop: "{{ result.results }}"
26
     loop_control:
27
       label: "{{ item.item.path }}"
28
     when: item.stat.exists
29
     changed_when: false
31
   # EOF
32
33
```

3.1.15 files-delete-backup.yml

Synopsis: Delete backup files if the files haven't been modified.

Description of the task.

[files-delete-backup.yml]

```
2
   - name: "files-delete-backup: Delete backup files that did not change"
     when: cl_backup|bool
     file:
       state: absent
6
       path: "{{ item }}_{{{ cl_timestamp }}.bak"
     loop: "{{ cl_files.values()|json_query('[].path')|
8
                difference(
Q
                cl_results_template.results|default([])|
10
                json_query('[?changed==`true`].invocation.module_args.path'))|unique|
11
                difference (
12
                cl_results_lines.results|default([])|
13
                json_query('[?changed==`true`].invocation.module_args.path'))|unique|
14
                difference (
15
                cl_results_blocks.results|default([])|
                json_query('[?changed==`true`].invocation.module_args.path'))|unique|
17
                difference (
                cl_results_inifile.results|default([])|
19
                json_query('[?changed==`true`].invocation.module_args.path'))|unique
20
                }}"
21
     changed_when: false
22
23
   # EOF
24
```

3.1.16 files-template.yml

Synopsis: Create or modify files by Ansible module template.

Description of the task.

[files-template.yml]

```
# TODO: Complete parameters
2
   - name: "files-template: Template"
3
     template:
4
       dest: "{{ item.path }}"
       src: "{{ item.template }}"
6
       owner: "{{ item.owner|default(omit) }}"
7
       group: "{{ item.group|default(omit) }}"
8
       mode: "{{ item.mode|default(omit) }}"
9
       force: "{{ item.force|default(omit) }}"
10
       validate: "{{ item.validate|default(omit) }}"
11
       # backup: "{{ cl_backup }}"
12
     loop: "{{ cl_files.values()|selectattr('template', 'defined')|list }}"
13
     loop_control:
14
       label: "{{ item.path }}"
15
     notify: "{{ item.handlers|default(omit) }}"
```

```
register: cl_results_template
17
18
   - name: "files-template: Debug"
19
     block:
20
        - name: Debug cl_results_template
21
          debug:
22
            var: cl_results_template
23
        - name: Debug changed template path
24
          debug:
25
            msg: "{{ cl_results_template|default([])|
26
                      json_query('[?changed==`true`].invocation.module_args.path')
27
                      } } "
     when: cl_debug|bool
30
   # EOF
31
32
```

3.1.17 files-lineinfile.yml

Synopsis: Create or modify files by Ansible module lineinfile.

Description of the task.

[files-lineinfile.yml]

```
# TODO: Complete parameters
   - name: "files-lineinfile: Lineinfile"
     lineinfile:
       path: "{{ item.0.path }}"
       regexp: "{{ item.1.regexp }}"
6
       line: "{{ item.1.line }}"
       owner: "{{ item.0.owner|default(omit) }}"
       group: "{{ item.0.group|default(omit) }}"
       mode: "{{ item.0.mode|default(omit) }}"
10
       create: "{{ item.0.create|default(omit) }}"
11
       validate: "{{ item.0.validate|default(omit) }}"
12
       # backup: "{{ cl_backup }}"
13
     loop: "{{ cl_files.values()|subelements('lines', skip_missing=true) }}"
14
     loop_control:
15
       label: "{{ item.0.path }}"
16
     notify: "{{ item.0.handlers|default(omit) }}"
17
     register: cl_results_lines
18
19
   - name: "files-lineinfile: Debug"
20
     block:
21
       - name: Debug cl_results_lines
22
         debug:
23
           var: cl_results_lines
24
       - name: Debug changed lines paths
25
         debug:
26
           msg: "{{ cl_results_lines.results|default([])|
27
                     json_query('[?changed==`true`].invocation.module_args.path')
28
                     } } "
29
     when: cl_debug|bool
30
31
```

(continues on next page)

```
32 # EOF
33 ...
```

3.1.18 files-blockinfile.yml

Synopsis: Create or modify files by Ansible module blockinfile.

Description of the task.

[files-blockinfile.yml]

```
# TODO: Complete parameters
2
   - name: "files-blockinfile: Blockinfile"
4
     blockinfile:
       path: "{{ item.0.path }}"
       marker: "# {mark} ANSIBLE MANAGED BLOCK {{ item.1.marker }}"
6
       block: "{{ item.1.block }}"
       owner: "{{ item.0.owner|default(omit) }}"
8
       group: "{{ item.0.group|default(omit) }}"
       mode: "{{ item.0.mode|default(omit) }}"
10
       create: "{{ item.0.create|default(omit) }}"
11
       validate: "{{ item.0.validate|default(omit) }}"
12
       # backup: "{{ cl_backup }}"
     loop: "{{ cl_files.values()|subelements('blocks', skip_missing=true) }}"
14
     loop_control:
15
       label: "{{ item.0.path }}"
16
     notify: "{{ item.0.handlers|default(omit) }}"
17
     register: cl_results_blocks
     name: "files-blockinfile: Debug"
20
     block:
21
       - name: Debug cl_results_blocks
22
         debug:
23
           var: cl_results_blocks
24
       - name: Debug changed blocks paths
25
         debug:
           msg: "{{ cl_results_blocks.results|default([])|
27
                     json_query('[?changed==`true`].invocation.module_args.path')
28
                     }}"
29
30
     when: cl_debug|bool
31
   # EOF
32
   . . .
```

3.1.19 files-inifile.yml

Synopsis: Create or modify files by Ansible module ini_infile.

Description of the task.

[files-inifile.yml]

```
# TODO: Complete parameters
2
   - name: "files-inifile: INI files"
     ini_file:
       path: "{{ item.0.path }}"
       section: "{{ item.1.section }}"
6
       option: "{{ item.1.option }}"
       value: "{{ item.1.value }}"
8
       owner: "{{ item.0.owner|default(omit) }}"
9
       group: "{{ item.0.group|default(omit) }}"
10
       mode: "{{ item.0.mode|default(omit) }}"
11
       create: "{{ item.0.create|default(omit) }}"
12
       # backup: "{{ cl_backup }}"
13
     loop: "{{ cl_files.values()|subelements('ini', skip_missing=true) }}"
14
     loop_control:
15
       label: "{{ item.0.path }}"
     notify: "{{ item.0.handlers|default(omit) }}"
17
     register: cl_results_ini
   - name: "files-inifile: Debug"
20
     block:
21
       - name: Debug cl_results_ini
22
23
         debug:
           var: cl_results_ini
       - name: Debug changed ini paths
25
         debug:
26
           msq: "{{ cl_results_ini.results|default([])|
27
                     json_query('[?changed==`true`].invocation.module_args.path')
28
                     }}"
29
     when: cl_debug|bool
30
   # EOF
```

3.1.20 services.yml

Synopsis: Configure services.

Description of the task.

[services.yml]

(continues on next page)

```
dest: "/etc/rc.conf"
           regexp: "^\\s*{{ item.value.name }}_enable\\s*="
10
           line: "{{ item.value.name }}_enable=\"YES\""
11
           backup: "{{ cl_backup }}"
12
          loop: "{{ cl_services|dict2items }}"
13
          loop_control:
14
           label: "{{ item.key }}"
15
         when: "item.value.enabled|default(true)|bool"
16
17
       - name: "services: Disable service in rc.conf FreeBSD"
18
         lineinfile:
19
           dest: "/etc/rc.conf"
21
           regexp: "^\\s*{{ item.value.name }}_enable\\s*="
22
           line: "{{ item.value.name }}_enable=\"NO\""
           backup: "{{ cl_backup }}"
23
         loop: "{{ cl_services|dict2items }}"
24
         loop_control:
25
           label: "{{ item.key }}"
26
         when: "not item.value.enabled|default(true)|bool"
27
28
     when: "ansible_os_family == 'FreeBSD'"
29
30
   # All -----
31
   - name: "services: Manage services"
32
     block:
35
       - name: "services: Manage services"
         service:
36
           name: "{{ item.value.name }}"
37
           state: "{{ item.value.state|default('started') }}"
38
           enabled: "{{ item.value.enabled|default(true) }}"
39
         loop: "{{ cl_services|dict2items }}"
40
         loop_control:
41
           label: "{{ item.key }}"
42
43
     when: "ansible_os_family == 'RedHat' or
44
            ansible_os_family == 'Debian' or
45
            ansible_os_family == 'FreeBSD'"
48
   # EOF
   . . .
```

CHAPTER

FOUR

EXAMPLES

Table of Contents

- Examples
 - FreeBSD Postfix
 - * Handlers
 - · contrib/postfix/conf-light/handlers.d/postfix-freebsd
 - $\cdot \ contrib/post fix/conf-light/handlers.d/sendmail-freebsd$
 - * Packages
 - · contrib/postfix/conf-light/packages.d/postfix
 - * Services
 - contrib/postfix/conf-light/services.d/postfix
 - · contrib/postfix/conf-light/services.d/sendmail
 - * Files
 - · contrib/postfix/config-light-postfix.yml
 - · contrib/postfix/conf-light/files.d/mailer-conf
 - contrib/postfix/conf-light/files.d/periodic-conf
 - · contrib/postfix/conf-light/files.d/postfix-main-cf
 - · contrib/postfix/conf-light/files.d/rc-conf
 - Armbian Simple SMTP
 - * Packages
 - $\cdot \ contrib/ssmtp/conf-light/packages.d/ssmtp$
 - * Files
 - · contrib/ssmtp/config-light-ssmtp.yml
 - · contrib/ssmtp/conf-light/files.d/revaliases
 - · contrib/ssmtp/conf-light/files.d/ssmtp-conf

4.1 FreeBSD Postfix

4.1.1 Handlers

contrib/postfix/conf-light/handlers.d/postfix-freebsd

Synopsis: Create handlers for Postfix.

Use template (2) to create handlers.

[contrib/postfix/conf-light/handlers.d/postfix-freebsd]

```
postfix_freebsd:
     template: handlers-auto1.yml.j2
     params:
       - handler: 'enable and start postfix'
5
         module: service
6
         params:
7
           - 'name: postfix'
           - 'state: started'
           - 'enabled: true'
11
       - handler: 'disable and stop postfix'
12
         module: service
13
         params:
14
           - 'name: postfix'
15
           - 'state: stopped'
           - 'enabled: false'
17
18
       - handler: 'reload postfix'
19
         module: service
20
         params:
21
           - 'name: postfix'
22
           - 'state: reloaded'
23
          conditions:
           - '- cl_service_postfix_enable|bool'
25
26
       - handler: 'restart postfix'
27
28
         module: service
29
         params:
           - 'name: postfix'
           - 'state: restarted'
31
         conditions:
32
            - '- cl_service_postfix_enable|bool'
33
34
       - handler: 'postfix check'
35
         module: command
           - 'cmd: /usr/local/sbin/postfix check'
38
39
       - handler: 'newaliases'
40
         module: command
41
42
         params:
           - 'cmd: /usr/bin/newaliases'
44
        - handler: 'postmap smtp sasl passwords'
45
```

See also:

See setup.yml how the handlers are created.

contrib/postfix/conf-light/handlers.d/sendmail-freebsd

Synopsis: Create handlers for Sendmail.

Use template (2) to create handlers.

[contrib/postfix/conf-light/handlers.d/sendmail-freebsd]

```
sendmail_freebsd:
   template: handlers-auto1.yml.j2
2
     params:
       - handler: 'enable and start sendmail'
         module: service
6
         params:
            - 'name: sendmail'
            - 'state: started'
            - 'enabled: true'
10
11
       - handler: 'disable and stop sendmail'
12
         module: service
13
         params:
14
           - 'name: sendmail'
15
            - 'state: stopped'
            - 'enabled: false'
18
        - handler: 'reload sendmail'
19
         module: service
20
21
         params:
            - 'name: sendmail'
22
            - 'state: reloaded'
23
          conditions:
24
            - '- cl_service_sendmail_enable|bool'
25
26
        - handler: 'restart sendmail'
27
         module: service
28
29
         params:
            - 'name: sendmail'
            - 'state: restarted'
31
32
          conditions:
            - '- cl service sendmail enable|bool'
33
34
       - handler: 'start sendmail'
```

```
module: service
36
          params:
37
            - 'name: sendmail'
38
            - 'state: started'
        - handler: 'stop sendmail'
41
          module: service
42
          params:
43
            - 'name: sendmail'
44
            - 'state: stopped'
```

See also:

See *setup.yml* how the handlers are created.

4.1.2 Packages

contrib/postfix/conf-light/packages.d/postfix

Synopsis: Install Postfix.

Use package or port (2) to install Postfix.

[contrib/postfix/conf-light/packages.d/postfix]

```
postfix:
name: 'mail/postfix'
```

See also:

See *packages.yml* how the FreeBSD packages or ports are installed.

4.1.3 Services

contrib/postfix/conf-light/services.d/postfix

Synopsis: Configure Postfix service.

Set service (2) state (3). Run the service on boot (4).

[contrib/postfix/conf-light/services.d/postfix]

```
postfix:
name: 'postfix'
state: '{{ cl_service_postfix_state }}'
enabled: '{{ cl_service_postfix_enable }}'
```

See also:

See custom Postfix variables contrib/postfix/config-light-postfix.yml. See services.yml how the services are configured.

contrib/postfix/conf-light/services.d/sendmail

Synopsis: Configure Sendmail service.

Set service (2) state (3). Do not run the service on boot (4).

[contrib/postfix/conf-light/services.d/sendmail]

```
sendmail:
name: 'sendmail'
state: '{{ cl_service_sendmail_state }}'
enabled: '{{ cl_service_sendmail_enable }}'
```

See also:

See custom Postfix variables *contrib/postfix/config-light-postfix.yml*.

4.1.4 Files

contrib/postfix/config-light-postfix.yml

Synopsis: Custom variables for Postfix.

Put the host-specific variables (6) into the host_vars. Optionally other variables might be put into the group_vars.

[contrib/postfix/config-light-postfix.yml]

```
2
   # 28.4.2. Replace the Default MTA
   # https://www.freebsd.org/doc/en_US.ISO8859-1/books/handbook/mail-changingmta.html
   cl_myhostname: host99.region9.example.com
   # conf-light/files.d/mailer-conf
   # Execute the Postfix sendmail program, named /usr/local/sbin/sendmail
   cl_mailerconf:
     - 'sendmail
                      /usr/local/sbin/sendmail'
     - 'send-mail
                      /usr/local/sbin/sendmail'
12
     - 'mailq
                      /usr/local/sbin/sendmail'
13
     - 'newaliases
                      /usr/local/sbin/sendmail'
14
15
   # conf-light/files.d/rc-rconf
16
   cl_rcconf_postfix_enable: 'YES'
17
   cl_rcconf_sendmail_enable: 'NO'
18
   cl_rcconf_sendmail_submit_enable: 'NO'
19
   cl_rcconf_sendmail_outbound_enable: 'NO'
20
   cl_rcconf_sendmail_msp_queue_enable: 'NO'
21
22
   # conf-light/files.d/periodic-conf
23
   cl_periodicconf_daily_clean_hoststat_enable: "NO"
24
   cl_periodicconf_daily_status_mail_rejects_enable: "NO"
25
   cl_periodicconf_daily_status_include_submit_mailq: "NO"
26
   cl_periodicconf_daily_submit_queuerun: "NO"
27
28
   # Services
29
   cl_service_sendmail_enable: false
```

(continues on next page)

4.1. FreeBSD Postfix 49

```
cl_service_sendmail_state: 'stopped'
31
   cl_service_postfix_enable: true
32
   cl_service_postfix_state: 'started'
33
34
   # If you are using SASL, you need to make sure that postfix has access
   # to read the sasldb file. This is accomplished by adding postfix to
36
   # group mail and making the /usr/local/etc/sasldb* file(s) readable by
37
   # group mail (this should be the default for new installs).
38
39
   # EOF
40
```

contrib/postfix/conf-light/files.d/mailer-conf

Synopsis: Create file.

Create file (2) from the template (7).

[contrib/postfix/conf-light/files.d/mailer-conf]

```
mailerconf:
   path: '/etc/mail/mailer.conf'
   force: true
   owner: 'root'
   group: 'wheel'
   mode: '0644'
   template: 'mailer.conf.j2'
```

contrib/postfix/conf-light/files.d/periodic-conf

Synopsis: Modify file.

Modify file (2) with the lines (7).

[contrib/postfix/conf-light/files.d/periodic-conf]

```
periodic_conf:
   path: '/etc/periodic.conf'
2
     create: true
     owner: 'root'
     group: 'wheel'
     mode: '0644'
6
    lines:
       - regexp: '^daily_clean_hoststat_enable(.*)$'
        line: 'daily_clean_hoststat_enable="{{ cl_periodicconf_daily_clean_hoststat_
   →enable }}"'
       - regexp: '^daily_status_mail_rejects_enable(.*)$'
10
         line: 'daily_status_mail_rejects_enable="{{ cl_periodicconf_daily_status_mail_
11
   →rejects_enable }}"'
       - regexp: '^daily_status_include_submit_mailq(.*)$'
12
         line: 'daily_status_include_submit_mailq="{{ cl_periodicconf_daily_status_
13
   →include_submit_mailq }}"'
       - regexp: '^daily_submit_queuerun(.*)$'
14
         line: 'daily_submit_queuerun="{{    cl_periodicconf_daily_submit_queuerun }}"'
```

contrib/postfix/conf-light/files.d/postfix-main-cf

Synopsis: Modify file and notify handlers.

Modify file (2) with the lines (9) and notify handlers (7).

[contrib/postfix/conf-light/files.d/postfix-main-cf]

```
postfix_main_cf:
     path: '/usr/local/etc/postfix/main.cf'
2
     create: true
     owner: 'root'
     group: 'wheel'
     mode: '0644'
6
     handlers:
       - 'postfix_freebsd reload postfix'
9
     lines:
       - regexp: '^myhostname\s*=\s*(.*)$'
10
         line: 'myhostname = {{ cl_myhostname }}'
11
```

contrib/postfix/conf-light/files.d/rc-conf

Synopsis: Modify file.

Modify file (2) with the lines (7).

[contrib/postfix/conf-light/files.d/rc-conf]

```
rcconf:
   path: '/etc/rc.conf'
2
     create: true
     owner: 'root'
4
     group: 'wheel'
     mode: '0644'
     lines:
       - regexp: '^sendmail_enable(.*)$'
8
         line: 'sendmail_enable="{{ cl_rcconf_sendmail_enable }}"'
9
       - regexp: '^sendmail_submit_enable(.*)$'
10
        line: 'sendmail_submit_enable="{{ cl_rcconf_sendmail_submit_enable }}"'
11
       - regexp: '^sendmail_outbound_enable(.*)$'
12
        line: 'sendmail_outbound_enable="{{ cl_rcconf_sendmail_outbound_enable }}"'
       - regexp: '^sendmail_msp_queue_enable(.*)$'
14
         line: 'sendmail_msp_queue_enable="{{ cl_rcconf_sendmail_msp_queue_enable }}"'
15
       - regexp: '^postfix_enable(.*)$'
16
         line: 'postfix_enable="{{ cl_rcconf_postfix_enable }}"'
```

4.2 Armbian Simple SMTP

4.2.1 Packages

contrib/ssmtp/conf-light/packages.d/ssmtp

Synopsis: Install Simple SMTP.

Use package (2) to install sSMTP.

[contrib/ssmtp/conf-light/packages.d/ssmtp]

```
ssmtp:
name: 'ssmtp'
```

See also:

See packages.yml how the Linux packages are installed.

4.2.2 Files

contrib/ssmtp/config-light-ssmtp.yml

Synopsis: Custom variables for sSMTP.

Put the host-specific variables (7) into the host_vars. Optionally other variables might be put into the group_vars.

[contrib/ssmtp/config-light-ssmtp.yml]

```
# sSMTP - Simple SMTP
3
   # https://wiki.debian.org/sSMTP
   # linux-postinstall FQDN
   lp_fqdn: "host99.region9.example.com"
   # NEVER USE PLAINTEXT PASSWORD. USE VAULT INSTEAD
   smtp_client_password_mail_example_com: "PASSWORD"
10
11
   # conf-light/files.d/ssmtp-conf
12
   cl_ssmtp_srv: "mail.example.com"
13
   cl_ssmtp_srv_domain: "example.com"
14
   cl_ssmtp_postmaster_address: "postmaster@{{ lp_fqdn }}"
16
   cl_ssmtp_mailhub: "{{ cl_ssmtp_srv }}:587"
17
   cl_ssmtp_rewriteDomain: "{{ cl_ssmtp_srv_domain }}"
18
19
   cl_ssmtp_UseTLS: "Yes"
20
   cl_ssmtp_UseSTARTTLS: "Yes"
21
22
   cl_ssmtp_AuthUser: "smtp_client"
23
   cl_ssmtp_AuthPass: "{{    smtp_client_password_mail_example_com }}"
24
   cl_ssmtp_AuthMethod: "LOGIN"
25
26
   cl_ssmtp_FromLineOverride: "yes"
27
28
   # conf-light/files.d/revaliases
29
   cl_ssmtp_revaliases:
30
     - "root:root@{{ cl_ssmtp_srv_domain }}:{{ cl_ssmtp_srv }}:587"
31
     - "admin:admin@{{ cl_ssmtp_srv_domain }}:{{ cl_ssmtp_srv }}:587"
32
     - "user1:user1@{{ cl_ssmtp_srv_domain }}:{{ cl_ssmtp_srv }}:587"
33
34
   # EOF
```

contrib/ssmtp/conf-light/files.d/revaliases

Synopsis: Create file.

Create file (2) from the template (7).

[contrib/ssmtp/conf-light/files.d/revaliases]

```
revaliases:

path: '/etc/ssmtp/revaliases'

force: true

owner: 'root'

group: 'mail'

mode: 'u=rw, g=r'

template: 'revaliases.j2'
```

See also:

See template revaliases.j2. See how files are created from template *files-template.yml*.

contrib/ssmtp/conf-light/files.d/ssmtp-conf

Synopsis: Create file.

Create file (2) from the template (7).

[contrib/ssmtp/conf-light/files.d/ssmtp-conf]

```
ssmtp_conf:
path: '/etc/ssmtp/ssmtp.conf'
force: true
owner: 'root'
group: 'mail'
mode: 'u=rw,g=r'
template: 'ssmtp.conf.j2'
```

See also:

See template ssmtp.conf.j2. See how files are created from template *files-template.yml*.

CHAPTER

FIVE

COPYRIGHT

Redistribution and use in source (RST DocUtils) and 'compiled' forms (XML, HTML, PDF, PostScript, RTF and so forth) with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code (RST Docutils) must retain the above copyright notice, this list of conditions and the following disclaimer as the first lines of this file unmodified.

Redistributions in compiled form (transformed to other DTDs, converted to PDF, PostScript, RTF and other formats) must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

Important: THIS DOCUMENTATION IS PROVIDED "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE PROVIDER BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

CHAPTER	
SIX	

LEGAL NOTICE

All product names, logos, and brands are property of their respective owners.

CHAPTER

SEVEN

INDICES AND TABLES

- genindex
- modindex
- search