



Useful Commands:

```
remountrw - mount disk as read-write
remountro - mount disk as read-only
remove.docs - remove all docs and
```

manpages

```
{ V o y a g e } - L i n u x
< http://linux.voyage.hk >
```

Version: 0.9

1. Introduction

=====

Voyage Linux is Debian derived distribution that is best run on a x86 embedded platforms such as PC Engines ALIX/WRAP, Soekris 45xx/48xx and Atom-based boards.

It can also run on low-end x86 PC platforms. Typical installation requires 128MB disk space, although larger storage allows more packages to be installed.

Voyage Linux is so small that it is best suitable for running a full-feature firewall, wireless access point, Asterisk/VoIP gateway, music player or network storage device.

Currently, Voyage Linux has the following editions:

- * Voyage Linux - the basic version
- * Voyage MPD - Music Player Daemon
- * Voyage ONE - VoIP software - Asterisk, dahdi etc

All editions are delivered as distribution tarball and Live CD in i386 architecture. AMD64 architecture is available for Voyage Linux only. We also offer SDK to ease customizing Voyage Linux.

For more information about Voyage Linux, please visit:
<http://linux.voyage.hk>

2. Installation

=====

Download the Voyage Linux software package from
<http://www.voyage.hk/download/voyage/>
to a Linux machine.

extract the software tarball:

```
tar --numeric-owner -jxf voyage-.tar.bz2
```

as root, run the installation script:

```
cd voyage-
./usr/local/sbin/voyage.update
```

Before you run the installer you may have to format the disk device.
Assuming

Compact Flash device on /dev/sda.

```
fdisk /dev/sda
mkfs.ext2 /dev/sda1
tune2fs -c 0 /dev/sda1
```

To save more spaces for not having reserved filesystem block, you may also run:

```
tune2fs -r 0 -c 0 /dev/sda1
```

There is a helper script in `./usr/local/sbin/format-cf.sh` to ease formatting and creation of ext2 file system. Use it at your own risk!

```
./usr/local/sbin/format-cf.sh /dev/sda
```

Voyage Linux now requires at least 128MB storage to run. However, more disk space is recommended if you want to add more software and be able to run "apt-get upgrade".

voyage.update scripts will ask you a couple of questions to complete the installation:

- 1 - Create new Voyage Linux disk
- 2 - Update existing Voyage configuration
- 3 - Exit

Press 1 to install voyage to disk device. After all, you will be prompted to the main installation menu. You should go through the menu item 1 - 6 in sequence.

- 1 - Specify Distribution Directory
- 2 - Select Target Profile
- 3 - Select Target Disk
- 4 - Select Target Bootstrap Loader
- 5 - Configure Target Console
- 6 - Copy Distribution to Target
- 7 - Exit

It will take a short while (1-5 min.) to copy all files from software package to disk device. The above configuration will be saved to `.voyage.config`. If you run `voyage.update` next time, it will use same configuration as default.

Once Voyage Linux is booted up, you will be prompted for login. The default root password is "voyage", please change the root password after first login.

```
# remountrw
# passwd
```

3. Configuration

```
=====
```

3.1 Network Interface

```
=====
```

By default, `eth0` requests IP address using DHCP.

In `/etc/network/interfaces`,

```
auto eth0
iface eth0 inet dhcp
```

```
auto br0
iface br0 inet dhcp
```

```
bridge_ports eth0 eth1
```

This will create a bridge interface br0 with eth0 and eth1 as slave.

For wireless device configuration, edit /etc/network/interfaces and have the follow interface configuration section:

```
# for nl80211 driver (e.g. ath5k, ath9k, p54pci)
auto wlan0
iface wlan0 inet static
    address 10.1.10.1
    netmask 255.255.255.0
    broadcast 10.1.10.255
    hostapd /etc/hostapd/hostapd.wlan0.conf
    up nat.sh wlan0 eth0 "10.1.10.0/24"
```

Also see below for hostapd configuration:

```
# for hostap driver (Prism 2.5)
auto wlan0
iface wlan0 inet static
    address 10.1.10.1
    netmask 255.255.255.0
    broadcast 10.1.10.255
    up iwconfig wlan0 essid voyage mode Master
    up nat.sh wlan0 eth0 "10.1.10.0/24"
```

Both enable wlan0 device as wireless interface in a separate network and the wireless interface runs in NAT mode.

A friendly script, nat.sh, is located in /usr/local/sbin/, generates all necessary iptables rules for NAT'ing interface. nat.sh is now integrated to work with nocat. Syntax:

```
nat.sh
```

- a tag to identify the NAT interface, no need to be a real device name, but should be unqiue if multiple NAT devices are configured
- the outbound device name for NAT
- the IP network with mask for NAT

3.2 Hostapd

```
=====
```

Assume you have nl80211 compatible wireless driver, e.g. ath5k, ath9k, p54pci, and want to setup a wireless access points where wireless client are in a NAT network. Add the following lines in /etc/network/interfaces:

```
auto wlan0
iface wlan0 inet static
    address 10.1.10.1
    netmask 255.255.255.0
    broadcast 10.1.10.255
    hostapd /etc/hostapd/hostapd.wlan0.conf
    up nat.sh wlan0 eth0 "10.1.10.0/24"
```

This assumes you wireless device is wlan0 and the above will setup wlan0

interface with IP address 10.1.10.1 assigned and all traffics are NAT'd to eth0.
All wireless clients connected to this access point will be assigned with IP range 10.1.10.0/24.

Then create a file /etc/hostapd/hostapd.wlan0.conf:

```
interface=wlan0
driver=nl80211
logger_syslog=-1
logger_syslog_level=2
logger_stdout=-1
logger_stdout_level=2
debug=4
#dump_file=/tmp/hostapd.dump
#ctrl_interface=/var/run/hostapd
#ctrl_interface_group=0
channel=6
hw_mode=g
macaddr_acl=0
auth_algs=3
eapol_key_index_workaround=0
eap_server=0
wpa=3
ssid=voyage-wpa
wpa_passphrase=voyage-wpa
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP
eapol_version=1
```

The above configuration will setup both WPA and WPA2. To setup WPA2 only, set "wpa=2". The wireless AP service name (ESSID) will be "voyage-wpa" with passphrase "voyage-wpa". Change ssid, wpa_passphrase and channel values if desirable.

Then run:
ifup wlan0

to activate the wireless access point now. The above setting also automatically enables wireless access point after reboot.

3.3 wpa-supPLICANT

=====

If you run nl80211 compatible wireless driver, e.g. ath5k, ath9k, p54pci, and want to connect to an existing wireless access point or router in your network, update with the following lines in /etc/network/interfaces:

```
auto wlan0
iface wlan0 inet dhcp
    wpa-driver wext
    wpa-ssid
    wpa-psk
    wpa-key-mgmt WPA-PSK
    wpa-pairwise TKIP
    wpa-group TKIP
    wpa-proto WPA
```

wireless-mode Managed

Replace `ssid` to the SSID and `wpa_key` to WPA shared key of your wireless access point / router. If you use WPA2 in your wireless network, you need to change `wpa-proto` to "RSN". You also need to change `wpa-pairwise` and `wpa-group` to "CCMP TKIP" as well. Then run:

```
# ifup wlan0
```

to connect to the wireless access point / router now. The above settings also automatically connect to wireless access point / router after reboot.

3.4 Bridging

=====

To setup a bridge `br0` with slave device `eth0` and `wlan0`, add the following in `/etc/network/interfaces`

```
auto br0
iface br0 inet dhcp
    bridge_ports eth0 wlan0
```

The `wlan0` device (for AP functionality) setup will be slightly different:

```
auto eth0
    iface eth0 inet manual

auto wlan0
iface wlan0 inet manual
    hostapd /etc/hostapd/hostapd.wlan0.conf
```

Then run:

```
# ifup br0
```

to activate the wireless bridge device.

3.5 DHCP/DNS - dnsmasq

=====

DHCP support from `dnsmasq` is now enabled by default.

Edit `/etc/dnsmasq.more.conf` and there are following lines:

```
dhcp-leasefile=/var/tmp/dnsmasq.leases
dhcp-range=wlan0,10.1.10.10,10.1.10.250,24h
dhcp-range=eth1,10.1.20.10,10.1.20.250,24h
dhcp-range=eth2,10.1.30.10,10.1.30.250,24h
dhcp-range=eth3,10.1.40.10,10.1.40.250,24h
```

`dnsmasq` will provide IP address lease 10.1.10.10-250, 10.1.20.10-250, 10.1.30.10-250, 10.1.40.10-250.

Comment out all the lines in `/etc/dnsmasq.more.conf` to disable DHCP in `dnsmasq`.

3.6 LED Support

=====

Voyage kernel >= 2.6.23 (from Voyage 0.5) comes with LED driver for WRAP, ALIX and Soekris 48xx boards.

To enable LED control, simply load the corresponding kernel module

```
# modprobe leds-alix (for ALIX)
# modprobe leds-wrap (for WRAP)
# modprobe leds-net48xx (for Soekris 48xx)
```

LED could then be controlled in /sys/class/leds/:#. For example,

To turn on LED on ALIX:

```
# echo 1 > /sys/class/leds/alix\1/brightness
# echo 1 > /sys/class/leds/alix\2/brightness
# echo 1 > /sys/class/leds/alix\3/brightness
```

To turn off LED:

```
# echo 0 > /sys/class/leds/alix\1/brightness
# echo 0 > /sys/class/leds/alix\2/brightness
# echo 0 > /sys/class/leds/alix\3/brightness
```

There are more interesting feature for LED control, first load the following LED trigger modules:

```
# modprobe ledtrig-heartbeat
# modprobe ledtrig-timer
```

1. enable LED1 for heartbeat trigger - higher the load, faster it blinks

```
# echo heartbeat > /sys/class/leds/alix\1/trigger
```

2. enable LED2 to show ide disk activity

```
# echo ide-disk > /sys/class/leds/alix\2/trigger
```

3. enable LED3 for net device, on eth0 for link, send and receive

```
echo netdev > /sys/class/leds/alix\3/trigger
echo eth0 > /sys/class/leds/alix\3/device_name
echo "link tx rx" > /sys/class/leds/alix\3/mode
```

4. enable LED3 for timer-based control, 1 sec on, 5 sec off

```
# echo timer > /sys/class/leds/alix\3/trigger
# echo 1000 > /sys/class/leds/alix\3/delay_on
# echo 5000 > /sys/class/leds/alix\3/delay_off
```

to turn off trigger

```
# echo none > /sys/class/leds/alix\1/trigger
# echo none > /sys/class/leds/alix\2/trigger
# echo none > /sys/class/leds/alix\3/trigger
```

From 0.5.1, if ALIX and WRAP install profile is selected, heartbeat and ide-disk

driver will be automatically enabled at boot. To disable this feature, edit /etc/default/voyage-util and update VOYAGE_LED variable to "NO":

```
VOYAGE_LEDS="NO"
```

Known Issues:

On ALIX3D3, LEDES may not work properly, you need to add

```
leds-alix2.force=1
```

in the kernel boot parameter (i.e. /boot/grub/menu.lst). This is because ALIX3D3 is with different BIOS version than ALIX3D2.

3.7 voyage-sync script

```
=====
```

Starting from 0.6, the legacy /ro and /rw directories will be replaced by voyage-sync script, which is located under /etc/init.d/. At boot, /var/tmp and /var/log are by default mounted under tmpfs. All the changes will be synchronized back to disk at shutdown. To sync back to disk manually while running, run:

```
# remountrw
# /etc/init.d/voyage-sync sync
# remountro
```

If you want to add more directories to tmpfs, modify VOYAGE_SYNC_DIRS in /etc/default/voyage-util.

For more information on the usage, please read /etc/default/voyage-util.

4. Board-specific Notes

```
=====
```

Please note that some of the information in this section are obsoleted (FIXME).

4.1 ALIX support

```
=====
```

4.1.1 Temperature sensors for ALIX.1 and ALIX2/3

```
=====
```

When running Voyage Linux with ALIX, choose ALIX profile in voyage update, the required modules would be added to /etc/modules. It adds the following modules in /etc/modules:

```
w83627hf
lm90
geodewdt
```

ALIX.1 board uses w83627hf driver while ALIX.2/3 uses lm90. You can get the temperature reading from sensors program, or get the values from sysfs:

(for ALIX.1)

```
cat /sys/devices/platform/w83627hf.656/temp1_input
cat /sys/devices/platform/w83627hf.656/temp2_input
cat /sys/devices/platform/w83627hf.656/temp3_input
```

You may also use sensors utility to get the temperature reading. If temp1 reading may not be ready at boot up, you need to modify w83627hf section in /etc/sensors.conf:

```
chip "w83782d-*" "w83627hf-*"
...
    set sensor1 1
```

Known Issue: the readings returned from w83627hf is not very accurate. temp1 reading is too low (~30C) and some offset should be applied. But temp1 reading can move down to 20C if you apply cooling agent on the Geode processor. temp2 and temp3 do not move up or down too much at idle or under high low.

(for ALIX.2/3)

```
cat /sys/class/i2c-adapter/i2c-0/0-004c/temp1_input
cat /sys/class/i2c-adapter/i2c-0/0-004c/temp2_input
```

4.2 WRAP support

4.2.1 Watchdog for WRAP

For WRAP board, wd1100 has been ported to kernel 2.6. If you choose WRAP option in voyage.update, wd1100 driver will be added to /etc/module.

To load wd1100 to kernel, run the following commands:

```
modprobe wd1100
echo 0 > /proc/sys/dev/wd/graceful
echo 30 > /proc/sys/dev/wd/timeout
```

or

```
modprobe wd1100 sysctl_wd_graceful=0 sysctl_wd_timeout=30
```

This will set timeout value to 30 seconds.

You will have to restart watchdog userland program to activate watchdog timer
/etc/init.d/watchdog restart

In addition, you will need to make sure that /etc/watchdog.conf is properly configured. For above watchdog module configuration for WRAP, the following settings should do:

```
watchdog-device = /dev/watchdog
interval          = 15
```

And make sure the watchdog device is available:

```
mknod -m 600 /dev/watchdog c 10 130
```

You may also add the following line to /etc/modules to enable loading wd1100 driver at startup:

```
wd1100 sysctl_wd_graceful=0 sysctl_wd_timeout=30
```

To test watchdog module, you can try to stop the watchdog userland program.
/etc/init.d/watchdog stop

The hardware will restart after 30 seconds at most.

4.2.2 Temperature sensors for WRAP

If you choose WRAP in voyage.update, the required modules would be added

to /etc/modules. It adds the following modules in /etc/modules:
scx200_acb base=0x810,0x820
lm77

You will find a new driver in /sys/bus/i2c/drivers/lm77/. To read the temperature,
cat /sys/class/i2c-adapter/i2c-1/1-0048/temp1_input

Divide the temps by 1000 you will get the temperature reading in Celcius. Unfortunately, the temperature reading can not be retrieved using "sensors" util.

Please note that latest WRAP2D/E does not host lm77 sensor anymore.

If you are using commodity hardware other than WRAP, the easiest way would be installing lm-sensors package by

```
apt-get install lm-sensors
```

and then run sensors-detect

5. General Issues

=====

How can I add a program:

- use "apt-get install " of course

How can I add a file or install a program from sources (without using apt-get)

so it comes up every time I boot:

- /usr/local/sbin/remountrw to allow Read-Write
- Move the file or the program to it's location in /ro
- Symlink the file's original location to /rw
- fastreboot

EXAMPLE:

You install "webmin" from sources, the miniserver is in /var/webmin directory, configuration files are in /etc/webmin directory and the start on

is in /etc/init.d/webmin :

- move /var/webmin directory to /ro/var/webmin
- symlink in the original /var to /rw//var/webmin
- create a symlink in /etc/rcS.d/ to start automagically as last one

at boot time

```
#remountrw
#mv /var/webmin /ro/var/webmin
#ln -s /rw//var/webmin /var/webmin
#ln -s /etc/init.d/webmin /etc/rcS.d/S56webmin
#fastreboot
```

6. Support

=====

6.1 Mailing Lists

=====

A mailing list is setup for discussing supporting and development issues for Voyage Linux:

To subscribe, send an empty message to :
voyage-linux-subscribe@list.voyage.hk

To unsubscribe, send an empty message to :
voyage-linux-unsubscribe@list.voyage.hk

To post a message, send mail to :
voyage-linux@list.voyage.hk

The list archives can be viewed and searched at :
<http://list.voyage.hk/pipermail/voyage-linux/>

6.2 Development

Starting from 0.6.0, Voyage Linux is built by Debian Live. You can find the subversion repository for Debian Live config in:

<http://svn.voyage.hk/repos/voyage/trunk/voyage-live>

Getting start to build Voyage Linux under Debian r6.0 (squeeze) or Voyage SDK:

```
# apt-get install live-helper
# svn co http://svn.voyage.hk/repos/voyage/trunk/voyage-live voyage-live
# cd voyage-live
# ./build.sh iso      <= this will build the Live CD
# ./build.sh tar     <= this will build .tar.bz2 distro
# ./build.sh sdk     <= this will build sdk Live CD
```

6.3 Known Issues

- In ALIX3D3, i2c may not work on Voyage 0.8.5, try changing kernel options in /boot/grub/menu.lst as follow:

```
kernel /vmlinuz root=LABEL=VOYAGE_FS acpi_enforce_resources=no
alix.force=1
```

After than loading i2c-dev module will make the bus available

- When using CF card for heavy write operation, the following settings on pdflush should be applied (Recommended by PCEngines).

```
# echo 500 > /proc/sys/vm/dirty_expire_centisecs
# echo 1024000 > /proc/sys/vm/dirty_bytes
# echo 100 > /proc/sys/vm/dirty_writeback_centisecs
```

You can also put these files to /etc/sysctl.conf

```
vm.dirty_expire_centisecs=500
vm.dirty_bytes=1024000
vm.dirty_writeback_centisecs=100
```

- When installing from Voyage Linux amd64 Live CD to disk, grub installation may

not work properly. Please use lilo as bootloader instead.

- Older generation of VIA C3 processor may not be booted properly.

- Timezone files are removed to save space. To restore it, run:
apt-get install --reinstall tzdata

- If Voyage cannot boot complaining rootfs can't be located, tty to added the following to the kernel boot parameters:

```
"ide=nodma all_generic_ide"
```

or try (on or after 0.6.5):

```
"ide_core.nodma=0.0"
```

- Sometimes, grub boot screen may not appear after BIOS post if the boot partition is too large (~4GB). Creating a smaller boot partition (512MB) and install Voyage to it may solve this issue.

- There have been repeatedly reported problem for lilo installation problem while voyage.update is installing lilo bootloader to the flash media. This problem should have be fixed in Voyage 0.5. If you encounter a similar problem again, please report to voyage-linux mailing list.

- In case you encountered locale and dialog complain when installing package via "apt-get install", you can carry out the following commands to get rid of the error message:

```
apt-get install dialog apt-utils
```

- There is a problem reported when installing voyage over usb device using ub kernel module. Moreover, it is assumed that voyage is installed in /dev/hda1 of the target platform.

6.4 Live CD and PXE boot

=====

Voyage Live CD is now available for every stable voyage release:

```
http://www.voyage.hk/download/ISO/
```

Daily build Live CD is also available at:

```
http://www.voyage.hk/download/ISO/voyage-current.iso
```

You can run the Live CD under VMWare for testing purpose. In addition, it can act as a installation CD and PXE boot server as well.

You can find README.live-cd and README.pxe from the root direcorey of Live CD.

7.0 Unsupport or Deprecated Documentation

=====

This section documents deprecated documentation which is no longer supported.

7.1 NoCatSplash

=====

NoCatSplash is included in Voyage Linux, but it is disabled by default. Edit /etc/default/nocatsplash and set ENABLE="true" to enable it. You will can start

or stop NoCatSplash by

```
/etc/init.d/nocatsplash [start|stop]
```

Next, you will also need to edit /etc/nocat.conf to setup NoCatSplash properly.

The most common way is to add the following lines at the end of

```
/etc/nocat.conf:
```

```
ExternalDevice eth0
```

```
InternalDevice wlan0
```

```
LocalNetwork 10.1.10.0/24
```

Make sure that wlan0 matches the LocalNetwork IP address, you should double-check that from ifconfig.

7.2 NoCatAuth

=====

NoCatAuth is not included in Voyage Linux. However, it can be installed by running:

```
apt-get install nocatauth-gateway
```

Same as NoCatSplash, set ENABLE="true" in /etc/default/nocatauth-gateway to enable it in boot up. Note that nocat.conf is located in /etc/nocatauth/gateway and the most common to configure nocatauth-gateway is appending the following to nocat.conf:

```
ExternalDevice eth0
InternalDevice wlan0
LocalNetwork 10.1.10.0/24
```

You may also want to touch GatewayMode (default=Passive):

```
GatewayMode [Passive|Captive|Open]
```

It is better to un-install NoCatSplash by "apt-get remove nocatsplash" and "rm /etc/nocat.conf" explicitly to avoid confusion.

As nocatauth requires perl to run, you are required to have a larger disk space to run (probably 128MB). Please also make sure that you can only run either NoCatSplash or NoCatAuth, not both.

8. Appendix

=====

8.1 Release History

=====

Voyage 0.9

- * [2014-11-11] voyage-0.9.5
- * [2013-12-20] voyage-0.9.2
- * [2013-06-20] voyage-0.9.1
- * [2013-05-10] voyage-0.9.0
- * [2012-12-31] voyage-0.9-rc2
- * [2012-09-30] voyage-0.9-rc1

Voyage 0.8

- * [2012-05-22] voyage-0.8.5
- * [2011-10-29] voyage-0.8.0

Voyage 0.7

- * [2011-06-28] voyage-0.7.5
- * [2011-02-08] voyage-0.7.0

Voyage 0.6

- * [2010-02-17] voyage-0.6.5
- * [2009-07-07] voyage-0.6.2
- * [2009-02-17] voyage-0.6.1
- * [2008-12-30] voyage-0.6.0

Voyage 0.5

- * [2008-06-29] voyage-0.5.2
- * [2008-06-23] voyage-0.5.1
- * [2008-02-29] voyage-0.5.0

Voyage 0.4

- * [2007-07-23] voyage-0.4.1
- * [2007-06-23] voyage-0.4.0

Voyage 0.3

- * [2007-04-14] voyage-0.3.1
- * [2007-03-20] voyage-0.3
- * [2007-01-28] voyage-0.3pre3
- * [2006-12-05] voyage-0.3pre2
- * [2006-11-17] voyage-0.3pre1

Voyage 0.2

- * [2006-04-05] voyage-0.2
- * [2006-02-25] voyage-0.2pre4
- * [2006-02-05] voyage-0.2pre3
- * [2006-01-06] voyage-0.2pre2
- * [2005-07-21] voyage-0.2pre1

Voyage 0.1

- * [2005-07-07] voyage-0.1sarge
- * [2005-02-14] voyage-0.1
- * [2005-02-01] voyage-0.1pre5
- * [2005-01-19] voyage-0.1pre4
- * [2005-01-13] voyage-0.1pre3
- * [2005-01-06] voyage-0.1pre2
- * [2005-01-02] voyage-0.1pre1

8.2 Corresponding Debian and Kernel release

=====

- * Wheezy 7.7, 3.14.12-rt9 - Voyage 0.9.5 (MPD)
- * Wheezy 7.7, 3.14.12 - Voyage 0.9.5 (Linux)
- * Wheezy 7.3, 3.10.11 - Voyage 0.9.2 (Linux and MPD)
- * Wheezy 7.1, 3.8.13 - Voyage 0.9.1 (Linux and MPD)
- * Wheezy 7.0, 3.8.11 - Voyage 0.9.0 (Linux and MPD)
- * Wheezy, 3.6.9 - Voyage 0.9-rc2 (Linux and MPD)
- * Wheezy, 3.4.4 - Voyage 0.9-rc1 (Linux and MPD)
- * Squeeze 6.0.5, 3.2.17 - Voyage 0.8.5 (Linux, ONE and MPD)
- * Squeeze 6.0.3, 3.0.0 - Voyage 0.8.0 (Linux, ONE and MPD)
- * Squeeze 6.0.2, 2.6.38 - Voyage 0.7.5 (Linux, ONE and MPD)
- * Squeeze, 2.6.33rt - Voyage 0.7.0 ONE and MPD
- * Squeeze, 2.6.32 - Voyage 0.7.0
- * Lenny, 2.6.30 - Voyage 0.6.5
- * Lenny, 2.6.26 - Voyage 0.6
- * Etch, 2.6.23 - Voyage 0.5
- * Etch, 2.6.20 - Voyage 0.4
- * Etch, 2.6.17 - Voyage 0.3
- * Sarge, 2.6.15 - Voyage 0.2
- * Sarge, 2.6.8 - Voyage 0.1

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