HPB MainNet User Manual

V3.1

HPB Foundation

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Update List:

Versions	Date of Update	Updates
…	…	…
V2.8	20181110	Chapter 1.5 – Command: Install NTP
V2.9	20181113	Chapter 6 & 7 – Command: stop all hpb processes
V3.0	20181116	Chapter 1.1 – MainNet Software Version; Chapter 1.2 – Description of BOE node and Synchronization node; Chapter 4 – Step of Import Account
V3.1	20181120	Update list added

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Chapter 1: Overview

1.1 APPLICABLE VERSIONS

The Manual applies to the HPB BOE100 hardware unit and MainNet Software. See details below：

Name	Model	Versions
BOE	BOE100	Hardware：v1.1
		Firmware：v1.0.0.0
MainNet Software	——	V1.0.3.0

1.2 TERMS DESCRIPTION

Please see the table below for description of HPB specific terms:

No.	Name	Description
1	BOE node	Refers to nodes with a BOE hardware unit
2	Synchronization node	Refers to nodes that are only used to synchronize blocks.
3	Candidate node	A Candidate-Node can become a HP-Node through consensus algorithm election.
4	High performance node	High Performance-Node responsible for block generation and synchronization.
5	Genesis file	File that contains information of genesis blocks.
6	Boot mode configuration	Changes the boot mode of the BOE hardware unit.
7	Flash boot mode	Switching to this mode can start the BOE hardware unit by reading programs from flash.
8	SD Card boot mode	Switching to this mode can start the BOE hardware unit by reading programs from SD card.

1.3 TARGET USERS

The Manual is targeted at following users:

(1) Node owners: Individuals or organizations run the HPB MainNet and receive block rewards for verifying transactions

(2) DApp developers: Individuals and developer teams who develop distributed applications on the HPB blockchain.

(3) Regular users: HPB account owners who are able to manage, initiate and process HPB transactions through HPB Wallet and download and use HPB MainNet DApp.

The Manual aims at providing guidance of HPB MainNet Node installation and regular maintenance to Node Owners.

1.4 READING GUIDE

The BOE Nodes consist of node owners' self-configured servers that are required to install the BOE100 hardware unit provided by HPB. Node owners are required to follow the following steps for installation and daily maintenance.

No.	Steps	Target User	Descriptions
1	BOE100 hardware unit installation	BOE Node owners	To set up the BOE hardware and the server, please refer to the '*BOE100 Installation Manual*', or visit HPB's official website for video instructions.
2.	Prerequisites to the MainNet software installation	All users	Please check **1.5 Preparation for BOE Hardware Installation** and complete NTP installation in order to synchronize the local time with the internet.
3.	Go Environment setup (optional)	All users	Two options for installing the HPB MainNet software: 1. Compiling the source code: Download the latest HPB source code on GitHub and compile it to generate an executable file for MainNet software installation. Go Environment setup is required (see Chapter 2 for details). 2. Using the available executable file: Download the compiled the executable file from GitHub for direct installation of the MainNet software (skip Chapter 2).
4.	Preoperational detection of BOE	BOE Node owners	Detect the BOE hardware unit prior to the node operation to ensure the functionality of the hardware unit. See Chapter 3 for detailed instructions on **BOE hardware detection**.
5	BOE Node Setup	BOE Node owners	Download process and operation of the MainNet application, running the BOE node and accessing the MainNet. See Chapter 4 for detailed node

			setup instructions. This step is targeted at BOE Node owners.
6	Account management and transactions	All users	Account management and transaction order provided by the MainNet software. See Chapter 5 for more details.
7	BOE Firmware update	BOE Node owners	For HPB BOE Firmware update. See Chapter 6 for BOE Firmware update guidance.
8	MainNet Update Instructions	All users	For HPB mainnet software program update. See Chapter 7 for MainNet Update Instructions.

For more information please contact our HPB staff referencing to Technical Support.

1.5 PREPARATION FOR BOE INSTALLATION

Prior to installation of NTP, please check whether the partitions on your hard drive have met the following requirements:

- Swap Partition Size: 8G—32G
- Boot Partition Size: >5G
- The rest of the hard drive is set as root partition.

Note: Errors will occur on the node if there is not enough space available for root partition.

Users are required to complete NTP installation in order to synchronize the local time with the Internet time server.

No.	Steps	Descriptions
1	Switch to root user	Command: **`su root`** Enter root password as prompted
2	Install NTP	Command: **`apt-get install ntp`**
3	Switch root user	Command: **`vi /etc/ntp.conf`** Add in the last line: **`server cn.pool.ntp.org prefer`** **Tip**: '**`cn.pool.ntp.org`**' can be used both in and outside of China. Users who fail to access the server are required to change for another NTP server address.
4	Start NTP service	Command: **`/etc/init.d/ntp start`**

1.6 EXAMPLE OF NTP INSTALLATION:

1) Switch to root user

Enter '**su root**' to switch to root user. Then enter root password as prompted.

```
luxq@hpb-testpc:~$ su root
passwd:
root@hpb-testpc:/home/luxq#
```

2) Install NTP

Enter '**apt-get install ntp**' to install NTP;

```
root@hpb-testpc:/home/luxq# apt-get install ntp
Reading package lists... Done
Building dependency tree
Reading state information... Done
.....
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for systemd (229-4ubuntu21.2) ...
Processing triggers for ureadahead (0.100.0-19) ...
Setting up ntp (1:4.2.8p4+dfsg-3ubuntu5.9) ...
```

3) Add NTP server

Enter '**vi /etc/ntp.conf**' to open file **ntp.conf**;

```
root@hpb-testpc:/home/luxq# vi /etc/ntp.conf
```

Enter [**I**] key to switch to '**INSERT**' input state; Add '**server cn.pool.ntp.org prefer**' in the last line of the file; Press [**Esc**] and enter '**:wq**' to save the file and exit;

Tip: '**cn.pool.ntp.org**' can be used both in and outside of China. Users who fail to access the server are required to change to another NTP server address.

```
server ntp6.cloud.aliyuncs.com iburst minpoll 4 maxpoll 10
server ntp7.cloud.aliyuncs.com iburst minpoll 4 maxpoll 10
server ntp8.cloud.aliyuncs.com iburst minpoll 4 maxpoll 10
server ntp9.cloud.aliyuncs.com iburst minpoll 4 maxpoll 10
server cn.pool.ntp.org prefer
-- INSERT --
```

4) Start NTP service

Enter '**/etc/init.d/ntp start**' to start NTP service.

```
root@hpb-testpc:/home/luxq# /etc/init.d/ntp start
[ ok ] Starting ntp (via systemctl): ntp.service.
```

Chapter 2: Go Environment Setup

Ensure the Go Environment is ready if the source code was manually compiled for the MainNet installation and the Node setup. **If the compiled executable file provided by HPB will be used for the MainNet installation, skip this step**.

This compiled version of the HPB MainNet application is based on Go 1.9.0+.

2.1 INSTALLATION STEPS

The following table is a simplified step-by-step guide on the Go Environment set up.

Note: Please ensure your server has been connected to the internet prior to the following steps.

No.	Contents	Steps	Descriptions
0	Become Root	Become Root	This step only needs to be done if you are not already Root user. Command: `sudo su -`
1	Install GIT	Install GIT	Command：**`apt-get install -y`** *`git`*
2	Install GO 1.9	Install GO 1.9	Command**`: apt-get install -y`** *`golang-1.9`*

3	Set environment variables	Update the 'profile' file	Add the following at the end of the file：
			`export GOPATH=/usr/share/go-1.9`
			`export GOROOT=/usr/lib/go-1.9`
			`export PATH=$GOROOT/bin:$GOPATH/bin:$PATH`

		Enforce the 'profile'	Command：**`source`** */etc/profile*

		Update 'bash.bashrc' path	Add the following at the end of the file：
			`export GOPATH=/usr/share/go-1.9`
			`export GOROOT=/usr/lib/go-1.9`
			`export PATH=$GOROOT/bin:$GOPATH/bin:$PATH`

		Enforce 'bash.bashrc'	Command: `source /etc/bash.bashrc`
4	Check GO environment setup	Check go environment setup	Command：`go env`
		Check go version	GO version should show 1.9 Command：`go version`

2.2 EXAMPLE SETUP

Unless stated otherwise, press [Enter] after each command.

(1) Update apt-get Source:

Enter the following on the console to get a password prompt, and fill in the password: 'sudo apt-get update'. Wait until you see 'Reading package lists…Done', meaning the apt-get source is successfully updated. Once done (example shown below), proceed to the next step;

```
hpb@ dell-PowerEdge-R730:~$ sudo apt-get update
[sudo] password for hpb:
Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [107 kB]
Hit:2 http://cn.archive.ubuntu.com/ubuntu xenial InRelease
Get:3 http://cn.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Hit:4 http://cn.archive.ubuntu.com/ubuntu xenial-backports InRelease
Get:5 http://cn.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [839 kB]
Get:6 http://cn.archive.ubuntu.com/ubuntu xenial-updates/main i386 Packages [757 kB]
Get:7 http://cn.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [678 kB]
Get:8 http://cn.archive.ubuntu.com/ubuntu xenial-updates/universe i386 Packages [620 kB]
Fetched 3,109 kB in 5s (615 kB/s)
Reading package lists... Done
```

(2) Setup GIT

Enter '**sudo apt-get install -y git**', wait until you see the notes (example below) suggesting 'git' has been successfully set up, then proceed to the next step;

```
hpb@ dell-PowerEdge-R730:~$ sudo apt-get install -y git
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  git-man liberror-perl
.....
Unpacking git (1:2.7.4-0ubuntu1.4) ...
Processing triggers for man-db (2.7.5-1) ...
Setting up liberror-perl (0.17-1.2) ...
Setting up git-man (1:2.7.4-0ubuntu1.4) ...
Setting up git (1:2.7.4-0ubuntu1.4) ...
```

(3) Install Go

Enter '**sudo apt-get install -y** *golang-1.9*', wait until you see 'Setting up ……' suggesting the download and installation is successful, then proceed to the next step;

```
hpb@ dell-PowerEdge-R730:~$ sudo apt-get install -y golang-1.9
Reading package lists... Done
Building dependency tree
Reading state information... Done
.....
Setting up golang-1.9 (1.9.2-3ubuntu1~16.04.1) ...
Setting up golang-1.9-race-detector-runtime (0.0+svn285455-0ubuntu1~16.04.1) ...
```

(4) Go to 'profile'

Enter 'sudo vi /etc/profile' and then enter password as prompted;

```
hpb@ dell-PowerEdge-R730:~$ sudo vi /etc/profile
```

(5) Set Environment Variables

Move your pointer to the final line, press the [o]key (lowercase 'O'), then enter the following three lines of codes:

```
export GOPATH=/usr/share/go-1.9
export GOROOT=/usr/lib/go-1.9
export PATH=$GOROOT/bin:$GOPATH/bin:$PATH
```

```
if [ -d /etc/profile.d ]; then
  for i in /etc/profile.d/*.sh; do
    if [ -r $i ]; then
      . $i
    fi
  done
  unset i
fi
export GOPATH=/usr/share/go-1.9
export GOROOT=/usr/lib/go-1.9
export PATH=$GOROOT/bin:$GOPATH/bin:$PATH
```

(6) Save 'profile'

Type ':' (colon, shift+;) after pressing the [ESC] key, and press the [Enter] key after inputting ':wq' to save the file, then proceed to the next step as illustrated here:

```
:wq
```

(7) Enforce 'profile'

Enter 'source /etc/profile' to enforce the 'profile', then proceed to the next step;

```
hpb@ dell-PowerEdge-R730:~$ source /etc/profile
```

(8) Enter 'bash.bashrc'

Enter '**sudo vi** */etc/bash.bashrc*', and enter the permissions password as prompted;

```
hpb@ dell-PowerEdge-R730:~$ sudo vi /etc/bash.bashrc
```

(9) Set Environment Variables

Move your pointer to the final line, press the [o] key (lowercase 'O'), then enter the following three lines of codes:

```
export GOPATH=/usr/share/go-1.9
export GOROOT=/usr/lib/go-1.9
export PATH=$GOROOT/bin:$GOPATH/bin:$PATH
```

```
if [ -x /usr/lib/command-not-found -o -x /usr/share/command-not-found/command-not-found ];
then
        function command_not_found_handle {
                # check because c-n-f could've been removed in the meantime
                        if [ -x /usr/lib/command-not-found ]; then
                    /usr/lib/command-not-found -- "$1"
                                return $?
                        elif [ -x /usr/share/command-not-found/command-not-found ]; then
                    /usr/share/command-not-found/command-not-found -- "$1"
                                return $?
            else
                printf "%s: command not found\n" "$1" >&2
                return 127
            fi
        }
fi
export GOPATH=/usr/share/go-1.9
export GOROOT=/usr/lib/go-1.9
export PATH=$GOROOT/bin:$GOPATH/bin:$PATH
```

(10) Save '`bash.bashrc`'.

Type '`:`' (colon, shift+;) after pressing the [ESC] key, and press the [Enter] key after inputting '`:wq`' to save the file, then proceed to the next step as illustrated here:

```
:  :wq
```

(11) Enforce '`bash.bashrc`'

Enter '**`source`** *`/etc/bash.bashrc`*' to enforce '`bash.bashrc`', and proceed to the next step;

```
hpb@ dell-PowerEdge-R730:~$ source /etc/bash.bashrc
```

(12) Check the GO Environment

Enter '**`go env`**' to check GO environment; proceed to the next step once the console returns the following;

```
`hpb@ dell-PowerEdge-R730:~$ go env
GOARCH="amd64"
GOBIN=""
GOEXE=""
GOHOSTARCH="amd64"
GOHOSTOS="linux"
……
CGO_ENABLED="1"
CGO_CFLAGS="-g -O2"
CGO_CPPFLAGS=""
CGO_CXXFLAGS="-g -O2"
CGO_FFLAGS="-g -O2"
CGO_LDFLAGS="-g -O2"
PKG_CONFIG="pkg-config"
```

(13) Check Go Version

Enter '**`go version`**'. If it shows your version as GO 1.9 or above, your Go installation is complete!

```
hpb@ dell-PowerEdge-R730:~$ go version
go version go1.9.2 linux/amd64
```

Chapter 3: Preoperational Detection of BOE

Commands below are intended to be operated on the server with the BOE hardware unit installed. Unless stated otherwise, please press [Enter] after each command.

ATTENTION: 1. HPB program operation must be based on ROOT permission.
2. To ensure proper functioning of the BOE hardware unit, re-detection is required each time the hardware is moved to another place.

3.1 STEPS FOR BOE DETECTION

The following steps for the preoperational detection of BOE is to ensure a working communication channel between the server and the BOE hardware unit. Please ensure the BOE hardware self-detection is successful prior to proceeding to these steps.

No.	Contents	Steps	Descriptions
1	Preparation	Prepare for detection	Ensure the self-detection of the BOE hardware unit is successful, then connect the power cable to the server. Connect the BOE hardware unit with the GE-cable, and lastly turn on the server.
2	GIT setup	Set up GIT	Command: `sudo apt-get install git`
3	HPB MainNet software installation	Download HPB executable	Command: `sudo` **`git clone`** https://github.com/hpb-project/hpb-release
		Check HPB MainNet software	Command: **`ls`** Executed under current path, you can see 'hpb-release' being downloaded. **Note**: If prompted 'hpb-release' already exists', enter command 'rm -rf hpb-release' before you re-download file 'hpb-release'.
		Decompress HPB MainNet software	Command: **`cd`** *hpb-release/bin* Enter directory 'bin' Command: `sudo` **`tar zxvf`** *File* **Note:** *File* is the HPB MainNet file name, e.g. ghpb-v0.0.0.1.tar.gz
4	Change file permission	Change file permission	Command: **`sudo chmod +x`** *ghpb-v0.0.0.1* **`-R`**
5	Program testing process	Start program testing process	Go to directory 'ghpb-v0.0.0.1' and start testing process. Command: **`sudo ./ghpb boecheck`**

Skip Step 2- GIT Installation if it has been previously set up.

3.2 EXAMPLE OF BOE DETECTION

(1) GIT Setup

Enter '`sudo apt-get install git`' in the console to test the environment, then enter the permission password for ROOT as prompted;

```
hpb@dell-PowerEdge-R730:/$ sudo apt-get install git
[sudo] password for hpb:
Reading package lists... Done
Building dependency tree
Reading state information... Done
git is already the newest version (1:2.7.4-0ubuntu1.4).
0 upgraded, 0 newly installed, 0 to remove and 180 not upgraded.
```

(2) Download the HPB MainNet Software

Check and enter the HPB MainNet Download directory, then enter '**`sudo git clone`** *`https://github.com/hpb-project/hpb-release`*' to download the testing program. The download of the MainNet is complete when you see '`Checking connectivity ... Done`'. If prompted '`hpb-release' already exists`', enter command '`rm -rf hpb-release`' before you re-download file '`hpb-release`'.

```
hpb@dell-PowerEdge-R730:/$ sudo git clone https://github.com/hpb-project/hpb-release
Cloning into 'hpb-release'...
remote: Counting objects: 18, done.
remote: Compressing objects: 100% (15/15), done.
remote: Total 18 (delta 0), reused 15 (delta 0), pack-reused 0
Unpacking objects: 100% (18/18), done.
Checking connectivity... done.
```

To check other install paths, enter '**`sudo git clone`** *`https://github.com/hpb-project/hpb-release specify the path`*'; please update and specify the path manually.

(3) Check if the HPB MainNet Software has been Included:

Go to the directory '*`hpb-release/bin`*' and enter command '`ls`' to check if you can see the following file: '`ghpb-vx.x.x.x.tar.gz`'. (**Note:** '`x.x.x.x`' should refer to the specific version of HPB MainNet when it is launched)

```
hpb@dell-PowerEdge-R730:/$ cd hpb-release/bin
hpb@dell-PowerEdge-R730:/hpb-release/bin$ ls
ghpb-v0.0.0.1.tar.gz
```

Users that specify the path should go to the directory of specific paths they choose.

(4) Decompress HPB MainNet

Enter '**`sudo tar zxvf`** *`ghpb-vx.x.x.x.tar.gz`*' to decompress the file '`ghpb-vx.x.x.x.tar.gz`'.

```
hpb@dell-PowerEdge-R730:/hpb-release/bin$ sudo tar zxvf ghpb-v0.0.0.1.tar.gz
ghpb-v0.0.0.1/
ghpb-v0.0.0.1/iperf3
ghpb-v0.0.0.1/promfile
ghpb-v0.0.0.1/ghpb
```

(5) Revise File Permission

Enter '**sudo chmod +x** *ghpb-v0.0.0.1* **-R**'

```
hpb@dell-PowerEdge-R730:/hpb-release/bin$ sudo chmod +x ghpb-v0.0.0.1 -R
```

(6) Start Testing Procedure

Enter '`cd ghpb-v0.0.0.1/`' to go to directory '`ghpb-vx.x.x.x`', and enter '`ls`' to access three files below;

```
hpb@dell-PowerEdge-R730:/hpb-release/bin$ cd ghpb-v0.0.0.1/
hpb@dell-PowerEdge-R730:/hpb-release/bin/ghpb-v0.0.0.1$ ls
ghpb    iperf3    promfile
```

Enter '**sudo ./ghpb boecheck**' to run the testing procedure. BOE test is successful and runs properly if the system shows 'HPB： boe board is ok'.

```
hpb@dell-PowerEdge-R730:/hpb-release/bin/ghpb-v0.0.0.1$ sudo ./ghpb boecheck
INFO [08-28|15:55:18]    HPB : boe board is ok.
```

Chapter 4: BOE Node Setup

In order to proceed to operations of mining, account management, and more, nodes must be set up and HPB's blockchain must be accessed when BOE hardware testing is finished. There are two options as follows:

(1) **Set up the node through source code:** Basic software programming and code compiling knowledge is required for this option. You also must complete GO setup (see Chapter 2) prior to proceeding to the set up;

(2) **Set up through the HPB executable file:** You can follow the steps of the executable setup for this option.

ATTENTION: 1. HPB program operation should be based on ROOT.
2. Do not reveal your account and account password to others.
3. You must launch the node by yourself for password security.

4.1 NETWORK CONNECTION TESTING

Network connection testing is required prior to setting up the node. Enter the five commands below to test for any delay or data packet loss during the connection of the server to bootnode.

No.	Command	Node Location
1	`ping -c 200 47.254.133.46`	Germany
2	`ping -c 200 47.94.20.30`	Beijing
3	`ping -c 200 47.88.60.227`	Silicon Valley
4	`ping -c 200 47.75.213.166`	Hong Kong
5	`ping -c 200 47.100.250.120`	Shang Hai

Example: No. 1 is taken as an example shown below, which should be referred to by the rest of users.

Enter command '`ping 47.254.133.46`',

When the command finishes running, you will receive a summary of the information:

Information displayed	Meaning
200 packets transmitted	200 packets of data were sent
186 received	186 packets of data were received
7% packet loss	7% of packets were lost during the connection
Time 199386ms	The connection lasted for 199386ms for the 200 packets sent and 186 received
Rtt min/avg/max/mdev = 230.439/248.901/290.203/9.397 ms	Refers to Round-Trip Time. Measures the time between sending a packet and its reply (receiving).
min	Shortest response time (230.439ms)
Avg	Average response time (248.901ms)
Max	Maximum response time (290.203ms)
mdev	Standard deviation of response time (9.397ms)

Tip: For connections within the same continent (e.g. server in China connecting to Beijing), the packet loss should be 0% and delay less than 100ms. For connections to other continents, it is common to see some packet loss and delay of less than 300ms. For long-distance, intercontinental

connections, a standard of packet loss and delay times are hard to measure as circumstances may vary greatly. If there are questions or concerns regarding the acceptable levels, please ask the HPB community associates to check whether their data reaches required standard.

```
hpb@hpb-PowerEdge-R730xd:~$ ping -c 200 47.254.133.46
PING 47.254.133.46 (47.254.133.46) 56(84) bytes of data.
64 bytes from 47.254.133.46: icmp_seq=1 ttl=49 time=257 ms
64 bytes from 47.254.133.46: icmp_seq=2 ttl=49 time=245 ms
64 bytes from 47.254.133.46: icmp_seq=4 ttl=49 time=244 ms
……
64 bytes from 47.254.133.46: icmp_seq=199 ttl=49 time=257 ms
64 bytes from 47.254.133.46: icmp_seq=200 ttl=49 time=251 ms
--- 47.254.133.46 ping statistics ---
200 packets transmitted, 186 received, 7% packet loss, time 199386ms
rtt min/avg/max/mdev = 230.439/248.901/290.203/9.397 ms
```

Users whose data fails to reach standard please contact network service provider or data center for support.

4.2 NODE SETUP STEPS THROUGH SOURCE CODE

Please refer to the following steps for set up the node through source code:

No.	Contents	Steps	Descriptions
1	Confirm the execution path	Create the execution path	Command: **`sudo mkdir`** *`/home/ghpb-bin`* **Tip**: *`/home/ghpb-bin`* can be changed to a specific path
		Switch to root user	Command: **`su root`** **Tip**: Entering root owner password is required
2	Download the HPB executable and the genesis file	Choose the download path	Command: **`cd`** *`/home/`* **Tip**: *`/home/`* can be changed to a specific path
		Download HPB HPB MainNet executable	Command: **`sudo git clone`** https://github.com/hpb-project/hpb-release **Note:** If prompted 'hpb-release' already exists', enter command 'rm -rf hpb-release' before you re-download file 'hpb-release'.
		Check HPB HPB MainNet executable	Command: **`cd`** *`hpb-release/`* Command: **`ls`**
		Copy the genesis file to the execution path	Command: **`cd`** *`config/`* Command: **`sudo cp`** *`gensis.json /home/ghpb-bin/`*
3	Download and compile 'go-hpb' source code	Go to the download path	Command: **`cd`** *`/home/`* **Note:** *`/home/`* can be changed to a specific path
		Download the 'go-hpb' source code	Command: **`sudo git clone -b version_x.x.x.x`** *https://github.com/hpb-project/go-hpb* **Tip**: x.x.x.x should refer to the latest version of HPB MainNet program; **Note:** If prompted that 'go-hpb' already exists', enter command 'rm -rf hpb-release' before you re-download file 'go-hpb'.
		Compile the 'go-hpb'	Command: **`cd`** *`go-hpb/`* Command: **`make all`**
		Copy to the execution path	Command: **`sudo cp`** *`build/bin/* /home/ghpb-bin/`* **Note**: *'build/bin/*'* is the compile path, *'/home/ghpb-bin/'* is the execution path.

4	Initialize the node	Go to the execution path	Command: **cd** */home/ghpb-bin/* **Tip**: /home/ghpb-bin/ is the default execution path
		Node Initialization	Command: **sudo** *./ghpb* **--datadir** *node/data* **init** *gensis.json*
5	Import the account	Export account	Export account information from the HPB Wallet;
		Create 'keystore'	Command: **cd node/data/** Command: **mkdir keystore** Command: **ls**
		Import the Node	Command: cd keystore Command: vi keystore Enter 'keystore' text, press [Esc] then enter :wq to save the file and exit
6	Launch the node **Tip**: **You must launch the node by yourself for password security.**	Option 1	Command: **cd** */home/ghpb-bin/* Command: **sudo** *./ghpb* **--datadir** *node/data* **--unlock "account address" --networkid** *100* **--port** *3004* **console** Enter password as prompted; **Note**: *100* stands for the HPB MainNet network number; *3004* stands for local 'ghpb' port; **Tip**: Port number of testing wideband between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number of testing wideband should be 3004+100=3104); Both the local port in firewall (e.g. 3004) and the testing wide band port (e.g. 3104) should be open.
		Option 2	Command: **cd** */home/ghpb-bin/* Command: **vi** *pwd* Enter password in the pop-up page, then press [ESC], and enter ':wq' before pressing [Enter] to save the password file. Command: **sudo nohup ./ghpb --datadir node/data --networkid 100 --port 8545 --unlock "account address" --password "pwd" --verbosity 3 --rpc --rpcapi hpb,web3,admin,txpool,debug,personal,net,miner,prometheus &** **Tip**: Port number of testing wideband between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number of testing

			wideband should be 3004+100=3104); Both the local port in firewall (default: 30303) and the testing wide band port (e.g. 30403) should be open. Command: **sudo ./ghpb attach** *http://127.0.0.1:8545* *127.0.0.1* stands for local IP. Command: `rm -rf pwd(separate the console)` Delete the password file in case of password disclosure.
7	Start mining	Start mining	Command: **miner.start()**

4.3 EXAMPLE OF NODE SETUP THROUGH SOURCE CODE

Confirm the Execution Path

Enter '**sudo mkdir** */home/ghpb-bin*' to create execution path;

'/home/ghpb-bin' can be changed to a specific path;

```
hpb@dell-PowerEdge-R730:/$ sudo mkdir /home/ghpb-bin
```

(1) Switch to root user by entering 'su root', and enter root account password as prompted;

```
hpb@dell-PowerEdge-R730:/$ su root
Password:
```

(2) Choose the Download Path

Enter '**cd** */home/*';

'/home/' can be changed to a specific path;

```
root@dell-PowerEdge-R730:/# cd /home/
```

(3) Download the HPB MainNet Executable

Enter '**sudo git clone** *https://github.com/hpb-project/hpb-release*' to download the MainNet Executable ; If prompted 'hpb-release' already exists', enter command 'rm -rf hpb-release' before you re-download file 'hpb-release'.

```
root@dell-PowerEdge-R730:/home# sudo git clone https://github.com/hpb-project/hpb-release
Cloning into 'hpb-release'...
remote: Counting objects: 18, done.
remote: Compressing objects: 100% (15/15), done.
remote: Total 18 (delta 0), reused 15 (delta 0), pack-reused 0
Unpacking objects: 100% (18/18), done.
Checking connectivity... done.
```

(4) Check the HPB MainNet Executable

Enter '**cd** *hpb-release/*' to go to directory 'hpb-release'.

Enter command 'ls' and you will see three files named 'bin', 'config', and 'README.md'.

```
root@dell-PowerEdge-R730:/home# cd hpb-release/
root@dell-PowerEdge-R730:/home/hpb-release# ls
bin    config    README.md
```

(5) Copy the Genesis File to Execution Path

Enter '**cd** *config/*' to go to directory 'config', then enter '**sudo cp** *gensis.json /home/ghpb-bin/*';

Note: '/home/gphb-bin/' stands for the execution path you set.

```
root@dell-PowerEdge-R730:/home/hpb-release# cd config/
root@dell-PowerEdge-R730:/home/hpb-release/config# sudo cp gensis.json /home/ghpb-bin/
```

(6) Go to the Download Path

Enter '**cd** */home/*' to download the source code to directory 'home'.

'/home/' can be changed to the source code download path.

```
root@dell-PowerEdge-R730:/home/hpb-release/config# cd /home/
```

(7) Download 'go-hpb'

Enter '**sudo git clone -b version_x.x.x.x** *https://github.com/hpb-project/go-hpb*' (x.x.x.x should refer to the latest version of HPB MainNet program)

When the process turns to '100%' and shows 'Checking connectivity ... done', 'go-hpb' has been successfully downloaded. Proceed to the next step.

Tip: If prompted 'go-hpb' already exists, enter command 'rm -rf go-hpb' before you re-download 'go-hpb'.

```
root@dell-PowerEdge-R730:/home# sudo git clone -b version_1.0.1.0 https://github.com/hpb-project/go-hpb
Cloning into 'go-hpb'...
remote: Counting objects: 10547, done.
remote: Compressing objects: 100% (150/150), done.
Receiving objects: 100% (10547/10547), 14.09 MiB | 395.00 KiB/s, done.
Resolving deltas: 100% (5824/5824), done.
Checking connectivity... done.
Note: checking out '89d88c8e23f7761a76dd8eebe9b08fd3750a04b6'.

You are in 'detached HEAD' state. You can look around, make experimental
changes and commit them, and you can discard any commits you make in this
state without impacting any branches by performing another checkout.

If you want to create a new branch to retain commits you create, you may
do so (now or later) by using -b with the checkout command again. Example:

  git checkout -b <new-branch-name>
```

(8) Compile the 'go-hpb'

Enter '**cd** *go-hpb/*', then enter '**make all**';

Compile 'go-hpb';

```
root@dell-PowerEdge-R730:/home# cd go-hpb/
root@dell-PowerEdge-R730:/home/go-hpb# make all
build/env.sh go run build/ci.go install ./cmd/ghpb
>>> /usr/lib/go-1.9/bin/go install -ldflags -X main.gitCommit=04fa6c874b447f0de0a4296b9e573119e1997fcc -v ./cmd/ghpb
github.com/hpb-project/go-hpb/vendor/github.com/mitchellh/go-wordwrap
.....
`Done building.
Run "/home/go-hpb/build/bin/promfile" to launch promfile.
cp "/home/go-hpb/network/iperf3/iperf3" "/home/go-hpb/build/bin/iperf3"
cp "/home/go-hpb/network/p2p/binding.json" "/home/go-hpb/build/bin/binding.json"
cp "/home/go-hpb/network/p2p/config.json" "/home/go-hpb/build/bin/config.json"
```

(9) Copy to the Execution Directory

Enter '**sudo cp** *build/bin/* /home/ghpb-bin/*';

'/home/ghpb-bin/' stands for the execution directory;

```
root@dell-PowerEdge-R730:/home/go-hpb# sudo cp build/bin/* /home/ghpb-bin/
```

(10) Node Initialization

Enter '**cd** */home/ghpb-bin/*' to go to the execution path, then enter '**sudo** *./ghpb* **--datadir** *node/data* **init** *gensis.json*'.

Proceed to the next step when the screen displays 'Successfully wrote genesis state database=chaindata';

Note: '/home/ghpb-bin/' is the execution path;

```
root@dell-PowerEdge-R730:/home/go-hpb# cd /home/ghpb-bin/
root@dell-PowerEdge-R730:/home/ghpb-bin# sudo ./ghpb --datadir node/data init gensis.json
INFO [08-28|17:46:29]  HPB : Create New HpbConfig object
INFO [08-28|17:46:29]  HPB : Allocated cache and file handles  database=/home/ghpb-bin/node/data/ghpb/chaindata cache=16 handles=16
INFO [08-28|17:46:29]  HPB : Writing custom genesis block
INFO [08-28|17:46:29]  HPB : Successfully wrote genesis state  database=chaindata hash=6a068f…3e45f1
```

(11) Export Your Account

Export your account information from the HPB Wallet;

(12) Create 'keystore'

Enter '**cd node/data/**', then enter '**mkdir keystore**';

Enter '**ls**' so that you can see files '**ghpb**' and '**keystore**';

```
root@dell-PowerEdge-R730:/home/ghpb-bin# cd node/data/
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# mkdir keystore
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# ls
ghpb keystore
```

Import the node

Enter '**cd keystore**' to enter directory '**keystore**';

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# cd keystore
```

Then enter '**vi keystore**' which is to create file '**keystore**' ('**keystore**' can be replaced with another file name).

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data/keystore# vi keystore
```

Enter [**I**] key in the pop-up window to switch to '**INSERT**' input state, then paste in the

window the user's account information, namely the '**keystore**' text;

Then press [**Esc**] and enter '**:wq**' to save the file and exit;

Tip: Pressing [**Esc**] and entering '**:q!**' is to exit without saving the file; If prompted '**No access to this directory**', enter command '**chmod 777 /home/ghpb-bin -R**' to access the directory again.

(13) Node Launch

Option 1:

Enter '**cd /home/ghpb-bin/** ' to go to the directory '**ghpb-bin**', then enter '**sudo** *./ghpb* **--datadir** *node/data* **--unlock "account address" --networkid** *100* **--port** *3004* **console**', then enter password as prompted;

The node has been successfully launched when the screen displays 'Welcome to the GHPB JavaScript console!'.

Tip: Port number of testing wideband between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number of testing wideband should be 3004+100=3104); Both the local port in firewall (e.g. 3004) and the testing wide band port (e.g. 3104) should be open.

CAUTION: If the user exits the remote server or turns off the terminal, the node launch will be terminated for this option.

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data#cd    /home/ghpb-bin/
root@dell-PowerEdge-R730:/home/ghpb-bin# sudo ./ghpb --datadir node/data --networkid 100 --port
3004    console
INFO [08-28|13:44:11]    HPB : Create New HpbConfig object
INFO [08-28|13:44:11]    HPB : Initialising Hpb node                    network=100
……
Welcome to the GHPB JavaScript console!

instance:
coinbase: 0x84b5113ca960ce72d2b8ff7a239ff22a575703b0
at block: 0 (Tue, 07 Aug 2018 10:30:01 CST)
 datadir: /home/ghpb-bin/node/data
 modules: admin:1.0 debug:1.0 hpb:1.0 miner:1.0 net:1.0 personal:1.0 prometheus:1.0 rpc:1.0
txpool:1.0 web3:1.0
```

Option 2:

Enter '**cd /home/ghpb-bin/** ' to go to the directory '**ghpb-bin**'.

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# cd    /home/ghpb-bin/
```

Once at the new directory, enter '**vi** *pwd*' to create a password file,

Enter letter '**i**' on the pop-up page to change to input state, then enter account password.

Press [ESC] before you enter ':wq' and press [Enter] again to save the password file.

```
root@dell-PowerEdge-R730:/home/ghpb-bin # vi pwd
（Enter letter ‘i’ on the pop-up page to change to input state）
111（enter account password.）
~
~
~
~
:wq （Press [ESC] before you enter ‘:wq’ and press [Enter] again to save the password file.）
```

Then enter ‘**sudo nohup** *./ghpb* **--datadir** *node/data* **--unlock "account password" --password "pwd" --networkid** *100* **--port 8545 --verbosity 3 --rpc --rpcapi hpb,web3,admin,txpool,debug,personal,net,miner,prometheus &**‘, and press [Enter] twice;

Tip: Port number of testing wideband between nodes is the port number of local ‘ghpb’ plus 100 (e.g. if the local ‘ghpb’ port number is 3004, the port number of testing wideband should be 3004+100=3104); Both the local port in firewall (default: 30303) and the testing wide band port (e.g. 30403) should be open.

```
root@dell-PowerEdge-R730:/home/ghpb-bin# sudo nohup ./ghpb --datadir node/data --unlock “0x84b5113ca960ce72d2b8ff7a239ff22a575703b0” --password “pwd” --networkid 100 --port 8545 --verbosity 3 --rpc --rpcapi hpb,web3,admin,txpool,debug,personal,net,miner,prometheus &
[1] 5406
root@dell-PowerEdge-R730:/home/ghpb-bin# nohup: ignoring input and appending output to 'nohup.out'
```

Wait for 10 seconds, then enter Command: ‘**sudo** *./ghpb* **attach** *http://127.0.0.1:8545*’.

The node has been successfully launched when the screen displays ‘Welcome to the GHPB JavaScript console!’.

```
root@ dell-PowerEdge-R730:/home/ghpb-bin# sudo ./ghpb attach http://127.0.0.1:8545
Welcome to the GHPB JavaScript console!

instance:
coinbase: 0x84b5113ca960ce72d2b8ff7a239ff22a575703b0
at block: 0 (Tue, 07 Aug 2018 10:30:01 CST)
 datadir: /home/ghpb-bin/node/data
 modules: admin:1.0 debug:1.0 hpb:1.0 miner:1.0 net:1.0 personal:1.0 prometheus:1.0 rpc:1.0 txpool:1.0 web3:1.0
```

Enter ’rm -rf pwd’ to delete the password file when the launch is successful. If /home/ghpb-bin/ is not the path of the new console, please enter cd /home/ghpb-bin/ to enter the execution path.

```
root@ dell-PowerEdge-R730:/home/ghpb-bin# rm -f pwd
```

Tip: Please remember your password and keep it safe. Once the password file is deleted, it cannot be recovered. Do not tell your password to others.

(14) Start Mining

Enter ‘**miner.start()**’ and start mining

```
>miner.start()
true
```

4.4 SETUP THROUGH EXECUTABLE FILE

Steps of setting up the executable file:

No.	Contents	Steps	Descriptions
1	Confirm execution path	Create the execution path	Command：**sudo mkdir** */home/ghpb-bin* **Tip**：*/home/ghpb-bin* can be changed to a specific path
		Switch to root user	Command：**su root** **Tip**：Entering the root owner password is required
2	Download the HPB executable file and the genesis file	Choose the download path	Command: **cd** */home/* **Tip**: */home/* can be changed to a specific path
		Download HPB MainNet executable program	Command: **sudo git clone** *hpb-release-address* If prompted that 'hpb-release' already exists', enter command 'rm -rf hpb-release' before you re-download 'hpb-release'.
		Check the HPB HPB MainNet executable program	Command: **cd** *hpb-release/* Command: **ls**
		Copy the genesis file to execution path	Command: **cd** *config/* Command: **sudo cp** *gensis.json /home/ghpb-bin/*
3	Decompress the executable file	Decompress HPB MainNet	Command: **cd ..** Command: **cd** *bin/* Command: **sudo tar zxvf** *ghpb-vx.x.x.x.tar.gz* **Note**: *x.x.x.x* refers to the latest version number of the HPB MainNet program
		Change the file permission	Command: **sudo chmod +x ghpb-v0.0.0.1 -R**
		Copy to the execution path	Command: **sudo cp** *ghpb-vX.X.X.X/* /home/ghpb-bin/*
4	Initialize the node	Go to the execution path	Command: **cd** */home/ghpb-bin/* **Tip**:/home/ghpb-bin/ is the program execution path you set

		Node initialization	Command: **sudo** *./ghpb* **--datadir** *node/data* **init** *gensis.json*
5	Import the account	Export the account	Export your account information from HPB Wallet;
		Create 'keystore'	Command: **cd node/data/** Command: **mkdir keystore** Command: **ls**
		Import the node	Command: `cd keystore` Command: `vi keystore` Enter 'keystore' text, press [Esc] then enter `:wq` to save the file and exit
6	Node Launch **Tip**: **You must launch the node by yourself for password security.**	Option 1	Command: **cd** */home/ghpb-bin/* Command: **sudo** *./ghpb* **--datadir** *node/data* **--unlock "account address" --networkid** *100* **--port** *3004* **console** Enter password as prompted; **Note**: *100* stands for the HPB MainNet network number; *3004* stands for local 'ghpb' port; **Tip**: Port number of testing wideband between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number of testing wideband should be 3004+100=3104); Both the local port in firewall (e.g. 3004) and the testing wide band port (e.g. 3104) should be open.
		Option 2	Command: **cd** */home/ghpb-bin/* Command: **vi** *pwd* Enter password in the pop-up page, then press [ESC] and enter ':wq'. Press [Enter] to save the password file. Command: **sudo nohup ./ghpb --datadir node/data --networkid 100 --port 8545 --unlock "account address" --password "pwd" --verbosity 3 --rpc --rpcapi hpb,web3,admin,txpool,debug,personal,net,miner,prometheus &** **Tip**: Port number of testing wideband between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number of testing wideband should be 3004+100=3104); Both the local

			port in firewall (default: 30303) and the testing wide band port (e.g. 30403) should be open. Command: **sudo ./ghpb attach** *http://127.0.0.1:8545* *127.0.0.1* stands for local IP, *8545* stands for port number. Command: `rm -rf pwd(separate the console)` Delete the password file.
7	Start mining	Start mining	Command: **`miner.start()`**

4.5 EXAMPLE OF SETTING UP THE EXECUTABLE FILE

(1) Confirm the Execution Path

Enter '**sudo mkdir** */home/ghpb-bin*' to create execution path;

'/home/ghpb-bin' can be changed to specific path

```
hpb@dell-PowerEdge-R730:/$ sudo mkdir /home/ghpb-bin
```

(2) Switch to Root User

Enter 'su root', and enter root account password as prompted;

```
hpb@dell-PowerEdge-R730:/$ su root
Password:
```

(3) Choose the Downloading Path

Enter '**cd** */home/*';

Note: '/home/' can be changed to specific path;

```
root@dell-PowerEdge-R730:/# cd /home/
```

(4) Download the HPB MainNet Executable program

Enter '**sudo git clone** *https://github.com/hpb-project/hpb-release*' to download MainNet executable program; If prompted 'hpb-release' already exists', enter command 'rm -rf hpb-release' before you re-download 'hpb-release'.

```
root@dell-PowerEdge-R730:/home# sudo git clone https://github.com/hpb-project/hpb-release
Cloning into 'hpb-release'...
remote: Counting objects: 18, done.
remote: Compressing objects: 100% (15/15), done.
remote: Total 18 (delta 0), reused 15 (delta 0), pack-reused 0
Unpacking objects: 100% (18/18), done.
Checking connectivity... done.
```

(5) Check HPB HPB MainNet executable

Enter '**cd** *hpb-release/*'to go to directory 'hpb-release'.

Enter command 'ls' and you will see three files named 'bin", 'config', and 'README.md'.

```
root@dell-PowerEdge-R730:/home# cd hpb-release/
root@dell-PowerEdge-R730:/home/hpb-release# ls
bin    config    README.md
```

(6) Copy the Genesis File to Execution Path

Enter '**cd** *config/*' to go to directory 'config', then enter '**sudo cp** *gensis.json /home/ghpb-bin/*';

Note: '/hone/gphb-bin/' stands for the execution path you set.

```
root@dell-PowerEdge-R730:/home/hpb-release# cd config/
root@dell-PowerEdge-R730:/home/hpb-release/config# sudo cp gensis.json /home/ghpb-bin/
```

(7) Decompress HPB MainNet

Enter '**cd ..** ', then '**cd** *bin/*' to get to the download directory.

```
root@rootroot:/home/hpb-release/config# cd ..
root@rootroot:/home/hpb-release# cd bin/
```

To decompress HPB MainNet, enter '**sudo tar zxvf** *File*'

Note: *File* stands for HPB MainNet file, e.g. 'ghpb-v0.0.0.1.tar.gz'

```
root@rootroot:/home/hpb-release/bin# sudo tar zxvf ghpb-v0.0.0.1.tar.gz
ghpb-v0.0.0.1/
ghpb-v0.0.0.1/iperf3
ghpb-v0.0.0.1/promfile
ghpb-v0.0.0.1/ghpb
```

Change the file permission

Enter '**sudo chmod +x ghpb-v0.0.0.1 -R**'.

```
hpb@dell-PowerEdge-R730:/hpb-release/bin# sudo chmod +x ghpb-v0.0.0.1 -R
```

Copy to the Execution Path

Enter '**sudo cp** *ghpb-vX.X.X.X/* /home/ghpb-bin/*'.

'/home/ghpb-bin/' stands for the execution path you set;

```
root@rootroot:/home/hpb-release/bin# sudo cp ghpb-v0.0.0.1/*    /home/ghpb-bin/
```

(8) Node Initialization

Enter '**cd** */home/ghpb-bin/*' to go to the execution path, then enter '**sudo** *./ghpb* **--datadir** *node/data* **init** *gensis.json*'.

Proceed to the next step when the screen displays 'Successfully wrote genesis state database=chaindata';

Note: '/home/ghpb-bin/' stands for the execution path you set;

```
root@dell-PowerEdge-R730:/home/go-hpb# cd /home/ghpb-bin/
root@dell-PowerEdge-R730:/home/ghpb-bin# sudo ./ghpb --datadir node/data init gensis.json
INFO [08-28|17:46:29]  HPB : Create New HpbConfig object
INFO [08-28|17:46:29]  HPB : Allocated cache and file handles  database=/home/ghpb-bin/node/data/ghpb/chaindata cache=16 handles=16
INFO [08-28|17:46:29]  HPB : Writing custom genesis block
INFO [08-28|17:46:29]  HPB : Successfully wrote genesis state  database=chaindata hash=6a068f…3e45f1
```

(9) Export the Account

Export your account information from HPB Wallet;

(10) Create 'keystore'

Enter 'cd node/data/' before entering 'mkdir keystore'; Enter 'ls' so that you can see files 'ghpb' and 'keystore'.

```
root@dell-PowerEdge-R730:/home/ghpb-bin# cd node/data/
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# mkdir keystore
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# ls
ghpb keystore
```

Import the node

Enter '**cd keystore**' to enter directory '**keystore**';

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# cd keystore
```

Then enter '**vi keystore**' which is to create file '**keystore**' ('**keystore**' can be replaced with another file name).

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data/keystore# vi keystore
```

Enter [**I**] key in the pop-up window to switch to '**INSERT**' input state, then paste in the window the user's account information, namely the '**keystore**' text;

Then press [**Esc**] and enter '**:wq**' to save the file and exit;

Tip: Pressing [**Esc**] and entering '**:q!**' is to exit without saving the file; If prompted '**No access to this directory**', enter command '**chmod 777 /home/ghpb-bin -R**' to access the directory again.

(11) Node Launch

Option 1:

Enter '**cd /home/ghpb-bin/** ' to go to the directory '**ghpb-bin**', then enter '**sudo** *./ghpb* **--datadir** *node/data* **--unlock "account address" --networkid** *100* **--port** *3004* **console**

Enter password as prompted;

The node has been successfully launched when the screen displays 'Welcome to the GHPB JavaScript console!'.

Tip: Port number of testing wideband between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number of testing wideband should be 3004+100=3104); Both the local port in firewall (e.g. 3004) and the testing wide band port (e.g. 3104) should be open.

CAUTION: If the user exits the remote server or turns off the terminal, the node launch will be terminated for this option.

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# cd /home/ghpb-bin/
root@dell-PowerEdge-R730:/home/ghpb-bin#  sudo  ./ghpb  --datadir  node/data  --unlock
“0x84b5113ca960ce72d2b8ff7a239ff22a575703b0” --networkid 100  --port 3004  console
INFO [08-28|13:44:11]  HPB : Create New HpbConfig object
INFO [08-28|13:44:11]  HPB : Initialising Hpb node                network=100
……
Welcome to the GHPB JavaScript console!

instance:
coinbase: 0x84b5113ca960ce72d2b8ff7a239ff22a575703b0
at block: 0 (Tue, 07 Aug 2018 10:30:01 CST)
 datadir: /home/ghpb-bin/node/data
 modules:  admin:1.0  debug:1.0  hpb:1.0  miner:1.0  net:1.0  personal:1.0  prometheus:1.0  rpc:1.0
txpool:1.0 web3:1.0
```

Option 2:

Enter '**cd /home/ghpb-bin/** ' to go to the directory '**ghpb-bin**',

```
root@dell-PowerEdge-R730:/home/ghpb-bin/node/data# cd  /home/ghpb-bin/
```

Once at the new directory, enter '**vi** *pwd*' to create a password file. Enter letter '**i**' on the pop-up page to change to input state, then enter account password. Press [ESC] before you enter ':wq' and press [Enter] to save the password file.

```
root@dell-PowerEdge-R730:/home/ghpb-bin# vi pwd
Enter letter 'i' on the pop-up page to change to input state
111（Enter your account password, e.g.111）
~
~
~
~
:wq （Press [ESC] before you enter ':wq' and press [Enter] to save the password file）
```

Enter '**sudo nohup** *./ghpb* **--datadir** *node/data* **--unlock "account password" --password "pwd" --networkid** *100* **--port 8545 -verbosity 3 --rpc --rpcapi hpb,web3,admin,txpool,debug,personal,net,miner,prometheus &**'

Press [Enter] twice;

Tip: Port number for a wideband test between nodes is the port number of local 'ghpb' plus 100 (e.g. if the local 'ghpb' port number is 3004, the port number for wideband testing should be 3004+100=3104); Both the local port in firewall (default: 30303) and the wideband testing port (e.g. 30403) should be open.

```
root@dell-PowerEdge-R730:/home/ghpb-bin# sudo nohup ./ghpb --datadir node/data --networkid 100
--verbosity 3 --rpc --rpcapi hpb,web3,admin,txpool,debug,personal,net,miner,Prometheus  &
[1] 5406
root@dell-PowerEdge-R730:/home/ghpb-bin# nohup: ignoring input and appending output to
'nohup.out'
```

Wait 10 seconds, then enter Command: '**sudo** *./ghpb* **attach** *http://127.0.0.1:8545*'. The node has been successfully launched when the screen displays 'Welcome to the GHPB JavaScript console!'.

```
root@ dell-PowerEdge-R730:/home/ghpb-bin# sudo ./ghpb attach http://127.0.0.1:8545
Welcome to the GHPB JavaScript console!

instance:
coinbase: 0x84b5113ca960ce72d2b8ff7a239ff22a575703b0
at block: 0 (Tue, 07 Aug 2018 10:30:01 CST)
 datadir: /home/ghpb-bin/node/data
 modules: admin:1.0 debug:1.0 hpb:1.0 miner:1.0 net:1.0 personal:1.0 prometheus:1.0 rpc:1.0
txpool:1.0 web3:1.0
```

Enter 'rm -rf pwd' to delete the password file when the launch is successful. If /home/ghpb-bin/ is not the path of the new console, please enter cd /home/ghpb-bin/ to enter the execution path.

```
root@ dell-PowerEdge-R730:/home/ghpb-bin# rm -f pwd
```

Tip: Please remember your password and keep it safe. Once the password file is deleted, it cannot

be recovered. Do not tell your password to others.

(12) Start Mining

Enter '**miner.start()**' and start mining

```
>miner.start()
true
```

4.6 CHECK NODE STATUS

You may check the node status when it is launched;
Enter the following commands only after the node has successfully launched.

No.	Purpose	Command	Descriptions
1	Check if the node is connected to the MainNet	`net`	Check the current peerCount of the node
2	Check node status	`admin.nodeInfo`	Check the type of the node (candidate node or high-performance node)
3	Check mining status	`hpb.mining`	Check if the node is mining

(1) Check Connection Status

Enter '`net`', and wait a moment to check if it can be connected to the MainNet.

'`peerCount`' stands for the number of the node's servers connected to the MainNet.

e.g.

```
> net
{
  listening: true,
  peerCount: 5,
  version: "100",
  getListening: function(callback),
  getPeerCount: function(callback),
  getVersion: function(callback)
}
```

Note: The example above shows a `peerCount of 5`, indicating that 5 servers are currently connected to the network. Nodes must have a **peerCount of no less than 5** for a successful connection to the MainNet.

Version stands for the current network number which is 100.

(2) Check Node Type

Enter 'admin.nodeInfo' to check the node information. 'Prenode' in 'local' stands for the Candidate Node, and Hpnode represents the High-Performance Node.

Note: The type of nodes is set as 'prenode' when first launched and will change after elected through the software.

e.g.

```
>admin.nodeInfo
{
id:
"df787c4c04a6c9307cefedbc857010e5306be9096153adf3b1351964a27d0ac607464cf28ba3d93
c42c5e7a371d7281bdb1a9e5d19a16e30b24d1c3595e2180a",
   ip: "::",
   listenAddr: "[::]:3001",
   local: "PreNode",
   name: "",
   ports: {
      tcp: 3001,
      udp: 3001
    }
}
```

In this case, 'id' stands for the node's ID number; 'PreNode' means the node type is Candidate Node; 'listenAddr' represents the listening port address number ; 'ports' stands for the local port number;

(3) Check Mining Status

Enter 'hpb.mining' to check the mining status of the node. Returning 'true' means it is mining, 'false' means not. To start mining, enter 'miner.start()';

e.g.

```
>hpb.mining
true
```

Chapter 5 Account Management and Transactions

5.1 COMMON COMMANDS

Node users may enter commands on the console and access functions such as an information search. Please find the spreadsheet below for command examples.

Module	Function	Number of Commands
Account	Account management	5
Transaction	Transaction management	2
Node	Node information management	5

(1) Account

- `personal.newAccount()`: Create new account
- `hpb.accounts`: Get account address
- `hpb.getBalance (account address)`: Check balance
- `personal.getListAccounts`: Get account list
- `personal.unlockAccount("account address")`: unlock account

(2) Transactions

- `hpb.sendTransaction({from:" My address", to: "Receiving address",value:web3.toWei(amount,"currency")})}` : Send transaction request and transfer the amount to the receiving account.
- `txpool.status`: Check transaction status

(3) Node

- `hpb.blockNumber`: Check the highest block number
- `hpb.getBlock(block number)`: Check the block information according to the block number
- `prometheus.getCandidateNodes()`: Get candidate Nodes list
- `prometheus.getHpbNodes()`: Get high-performance Nodes list
- `net`: Check the peer count

5.2 EXAMPLES OF COMMON COMMANDS

(1) Create account

Enter 'personal.newAccount()' to set up a new account. You will be returned to new account address after setting your password;

e.g.

```
> personal.newAccount()
Passphrase:
Repeat passphrase:
"0x101e04724a52e214ec49b950964a707c4725042c"
```

In this example, the account "0x101e04724a52e214ec49b950964a707c4725042c"is successfully created after entering password twice.

(2) Check balance

Enter 'hpb.getBalance("Account address")'.

The value returned is the balance of your account.

e.g.

```
> hpb.getBalance("0x6fa696461c8583dd389a331b38bd2fa5a0cb73ce")
        184637
```

The example shows a balance of 184,637 HPB in the account "0x6fa696461c8583dd389a331b38bd2fa5a0cb73ce"

(3) Transfer

Enter 'hpb.sendTransaction({from:"My address",to:"Receiving address",value:web3.toWei(amount,"currency")})';

Send transaction request to transfer the amount to the receiving address. The transaction hash returned suggests successful transfer;

Note: Please check your balance if the transfer failed and confirm whether there are enough funds available.

e.g.

```
>hpb.sendTransaction({from:"0x6fa696461c8583dd389a331b38bd2fa5a0cb73ce",to:"0x5c1fd922380e4d2dc1d31018a133cf3d629172a4",value:web3.toWei(1,"hpb")})
"0x74fda2724a713322abc60f7f7bf67ec72af5f84b3bafb9903e4aff954ea97cc6"
```

Example shows 1hpb was transferred from"0x6fa696461c8583dd389a331b38bd2fa5a0cb73ce" to "0x5c1fd922380e4d2dc1d31018a133cf3d629172a4".

"0x74fda2724a713322abc60f7f7bf67ec72af5f84b3bafb9903e4aff954ea97cc6" represents the hash value for this transaction.

(4) Unlock Account

Enter '`personal.unlockAccount("account address")`' to unlock your account, transactions can only be sent after the node user unlock his account.
Example:

```
> personal.unlockAccount("0xafa5ac62af5eb5135e38ae7439348f71c990f7a6")
Unlock account 0xafa5ac62af5eb5135e38ae7439348f71c990f7a6
Passphrase:
true
```

Example demonstrates unlocking the account,

"0xafa5ac62af5eb5135e38ae7439348f71c990f7a6". Enter password when prompted. The

account is unlocked if '`true`' is returned.

Chapter 6 BOE Firmware Update Instructions

If you are a BOE Node owner, you may update your BOE hardware unit through an online update or an SD card update when prompted by HPB system. Switching to the SD card update is recommended if the online update fails.

6.1 STEPS FOR AN ONLINE UPDATE

No.	Contents	Steps	Descriptions
1	Stop All ghpb processes	Stop all ghpb Processes	Command: **sudo killall** *ghpb iperf3*
2	Start to update	Start to update	Command: **sudo ./ghpb boeupdate**
3	Node launch	Launch the node	Please refer to Chapter 4: BOE Node Setup for detailed command of launching BOE node

6.2 EXAMPLES OF AN ONLINE UPDATE

Please follow the instructions below to update your BOE Firmware:

(1) Stop All 'ghpb' Processes

Execute the command '**sudo killall ghpb iperf3**' in the console. Make sure you stop all 'ghpb' programs before updating. If `/home/ghpb-bin/` is not the path of the new console, please enter `cd /home/ghpb-bin/` to enter the execution path;

```
root@ dell-PowerEdge-R730:/home/ghpb-bin# sudo killall ghpb iperf3
```

(2) Start the Update

Enter '**sudo ./ghpb boeupdate**', and wait until prompted 'Upgrad 100%,upgrade successed', confirming a successful update;

```
root@ dell-PowerEdge-R730:/home/ghpb-bin# sudo ./ghpb boeupdate
tmdir : /tmp/hpbupgrade331425344
json download ok.
.....
Upgrade 80%, msg:receive finished
Upgrade 88%, msg:flash erase finished
Upgrade 95%,msg: flash write finished
upgrade successed
upgrade successed.
```

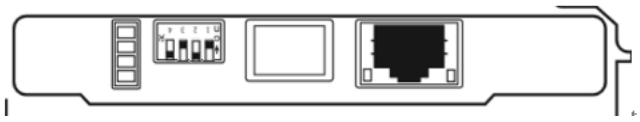
6.3 STEPS TO UPDATE VIA SD CARD

Switch to the Update via SD Card if an online update fails.

No.	Steps	Descriptions
1	Switch to SD Card boot mode	(1) Turn off and power off the server (2) Change the boot mode switch to SD Card boot mode
2	Restore Factory Settings	Restart the server and automatically restore factory settings
3	Switch to Flash boot mode	(1) Turn off and power off the server; (2) Change the boot mode switch to Flash boot mode
4	Update online	Execute the steps for Update Online

6.4 DETAILED STEPS TO AN UPDATE VIA SD CARD

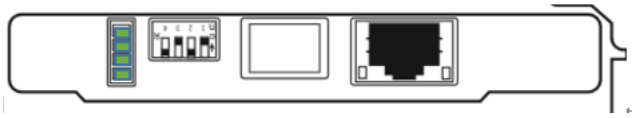
(1) Turn off and power off the server. Change the boot mode switches 1/2/3/4 below to switch the starting mode to SD Card boot mode;



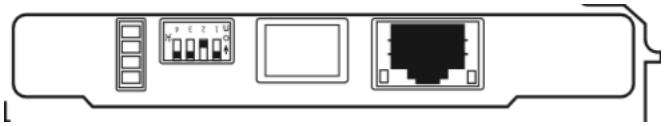
(2) Ensure the memory card has been inserted securely into the SD card slot in the BOE hardware unit before restarting the server;

(3) When the server has restarted, wait several minutes until all system lights are blinking (once per second). This indicates a successful factory settings restore;

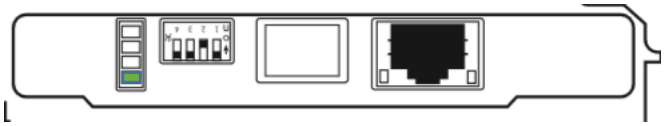
ATTENTION： The factory settings restoration has failed if the system lights are blinking fast (with an interval of 300ms).



(4) Turn off the server and pull out the power cable. Reset the dip switch to its original position to switch the boot mode to Start via Flash;



(5) Plug in the power cable and turn on the server. The board functions properly if there is only one green system light that blinks;



(6) Execute the steps for an online update. If the update doesn't work, please contact HPB staff for technical support.

Chapter 7 MainNet Update Instructions

When HPB updates the MainNet version, there are two ways for node users to proceed with the process.

1. Update through the **source code**: Download and compile the source code to complete the MainNet update by following the steps laid out;
2. Update through the **executable file**: Download and run the executable file to complete the MainNet update by following the steps laid out.

7.1 STEPS OF UPDATE THROUGH SOURCE CODE

Users who choose to update through source code can refer to this section. Refer to the table below for detailed steps:

No.	Contents	Steps	Descriptions
1	Stop hpb program	Stop Option 1	Command: **`exit`** **Tip**: This is suitable for users choosing Option 1 for the Node Launch.
		Stop Option 2	Command: `sudo killall ghpb iperf3` Command: **`sudo killall ghpb`** **Tip:** This is suitable for users choosing Option 2 for the Node Launch.
2	Confirm the MainNet download path	Switch to root user	Command: **`su root`** **Tip:** Password of root user is required.
		Choose a download path	Command: **`cd`** *`/home/`* **`Tip:`** *'/home/'* can be changed to a specified path.
3	Download and compile source code 'go-hpb'	Download source code 'go-hpb'	Command: **`sudo git clone -b version_x.x.x.x`** *https://github.com/hpb-project/go-hpb* **`Tip:`** *`x.x.x.x`* refers to the latest version of HPB MainNet program. If prompted 'go-hpb' already exists, enter the command 'rm -rf go-hpb' before you re-download 'go-hpb' source code.
		Compile 'go-hpb'	Command: **`cd`** *`go-hpb/`* Command: **`make all`**
		Copy the program to the executable path	Command: **`cd bulid/bin/`** Command: **`sudo cp`** *`ghpb iperf3 /home/ghpb-bin/`* Description: *'/home/ghpb-bin/'* is the execution path of the program.
4	Node Launch	Node Launch	Please see Chapter 4: BOE Node Setup for detailed BOE node launch commands

7.2 EXAMPLE OF UPDATE THROUGH SOURCE CODE

(1) Stop HPB program

Stop option 1: Enter '`exit`'

Tip: This is suitable for users choosing Option 1 for Node Launch.

```
> exit
```

Stop option 2: Command '`sudo killall ghpb iperf3`'

Tip: This is suitable for users choosing Option 2 for Node Launch.

```
root@hpb-PowerEdge-R730xd:/$ killall ghpb iperf3
```

(2) Confirm the MainNet download path

Switch to root user: Enter '`su root`', then enter the account password as prompted.

```
hpb@dell-PowerEdge-R730:/$ su root
Password:
```

Choose the download path: Enter '`cd /home/`', '`/home/`' can be replaced with specified path.

```
root@ dell-PowerEdge-R730: ~$ cd /home/
```

(3) Download and compile 'go-hpb' source code

Enter '**`sudo git clone -b version_x.x.x.x`** **https://github.com/hpb-project/go-hpb**'. When the process turns to 100% and shows '`Checking conectivity ... done`', 'go-hpb' has been successfully downloaded. Proceed to the next step. Note: '`x.x.x.x`' should refer to the latest version of HPB MainNet program.

If prompted 'go-hpb' already exists, enter the command '`rm -rf go-hpb`' before you re-download 'go-hpb' source code.

```
root@dell-PowerEdge-R730:/home# sudo git clone -b version_1.0.1.0 https://github.com/hpb-project/go-hpb
Cloning into 'go-hpb'...
remote: Counting objects: 10547, done.
remote: Compressing objects: 100% (150/150), done.
Receiving objects: 100% (10547/10547), 14.09 MiB | 395.00 KiB/s, done.
Resolving deltas: 100% (5824/5824), done.
Checking connectivity... done.
Note: checking out '89d88c8e23f7761a76dd8eebe9b08fd3750a04b6'.

You are in 'detached HEAD' state. You can look around, make experimental
changes and commit them, and you can discard any commits you make in this
state without impacting any branches by performing another checkout.

If you want to create a new branch to retain commits you create, you may
do so (now or later) by using -b with the checkout command again. Example:

  git checkout -b <new-branch-name>
```

Compile 'go-hpb': Enter '**`cd`** *`go-hpb/`*'; then enter '**`make all`**' to compile 'go-hpb';

```
root@dell-PowerEdge-R730:/home# cd go-hpb/
root@dell-PowerEdge-R730:/home/go-hpb# make all
build/env.sh go run build/ci.go install ./cmd/ghpb
>>> /usr/lib/go-1.9/bin/go install -ldflags -X
main.gitCommit=04fa6c874b447f0de0a4296b9e573119e1997fcc -v ./cmd/ghpb
github.com/hpb-project/go-hpb/vendor/github.com/mitchellh/go-wordwrap
……
`Done building.
Run "/home/go-hpb/build/bin/promfile" to launch promfile.
cp "/home/go-hpb/network/iperf3/iperf3" "/home/go-hpb/build/bin/iperf3"
cp "/home/go-hpb/network/p2p/binding.json" "/home/go-hpb/build/bin/binding.json"
cp "/home/go-hpb/network/p2p/config.json" "/home/go-hpb/build/bin/config.json"
```

Copy the program to the executable path: Enter `cd build/bin/` to go to directory 'bin'; Enter '**sudo cp** *ghpb iperf3 /home/ghpb-bin/*'; '/home/ghpb-bin/' is the executable path that you set;

```
root@dell-PowerEdge-R730:/home/go-hpb# sudo cp ghpb iperf3 /home/ghpb-bin/
```

(4) Node Launch

Please see Chapter 4: BOE Node Setup for detailed BOE node launch commands.

7.3 STEPS OF UPDATE THROUGH THE EXECUTABLE FILE

No.	Contents	Steps	Description
1	Stop hpb program	Stop Option 1	Command: **`exit`** **Tip**: This is suitable for users choosing Option 1 for the Node Launch.
		Stop Option 2	Command: `sudo killall ghpb iperf3` **Tip**: This is suitable for users choosing Option 2 for the Node Launch.
2	Confirm the MainNet download path	Switch to root user	Command: **`su root`** **Tip**: Password of root user is required.
		Choose a download path	Command: **`cd`** *`/home/`* **Tip**: '*`/home/`*' can be changed to a specified path.
3	Download and decompress the HPB executable program	Download the HPB MainNet executable program	Commands: **`sudo git clone`** https://github.com/hpb-project/hpb-release **Note**: If prompted 'hpb-release' already exists', enter command `'rm -rf hpb-release'` before you re-download file 'hpb-release'.
		Decompress the HPB MainNet program	Command: **`cd`** *`hpb-relese/bin/`* Command: **`ls`** Command: **`sudo tar zxvf`** *`ghpb-vx.x.x.x.tar.gz`* **Tip**: *`x.x.x.x`* should refer to the latest version of HPB MainNet, e.g. 'ghpb-v1.0.1.0.tar.gz'
		Modify the file permission	Command: **`sudo chmod +x`** *`ghpb-vx.x.x.x`* **`-R`**
		Copy the program to the executable path	Command: **`sudo cp`** *`ghpb-vx.x.x.x/* /home/ghpb-bin/`*
4	Node Launch	Node Launch	Please see Chapter 4: BOE Node Setup for detailed BOE node launch commands.

7.4 EXAMPLE OF UPDATE THROUGH THE EXECUTABLE FILE

(1) Stop HPB Program

Stop Option 1:

Enter '`exit`'

Tip: This is suitable for users choosing Option 1 for Node Launch.

```
> exit
```

Stop Option 2:

Command '`sudo killall ghpb iperf3`'.

```
root@hpb-PowerEdge-R730xd:/home/ghpb-bin# killall ghpb iperf3
```

Tip: This is suitable for users choosing Option 2 for Node Launch.

(2) Confirm the MainNet Download Path

Switch to root user: Enter '`su root`', and enter the account password as prompted;

```
hpb@dell-PowerEdge-R730:/$ su root
Password:
```

Choose the download path: Enter '`cd /home/`'. '`/home/`' can be replaced with the specified path;

```
root@ dell-PowerEdge-R730: ~$ cd /home/
```

(3) Download and Decompress HPB Executable Program

Download the HPB MainNet executable program: Enter '**`sudo git clone`** *`https://github.com/hpb-project/hpb-release`*' to download the MainNet Executable program;

```
root@dell-PowerEdge-R730:/home# sudo git clone https://github.com/hpb-project/hpb-release
Cloning into 'hpb-release'...
remote: Counting objects: 32, done.
remote: Compressing objects: 100% (4/4), done.
Unpacking objects: 100% (32/32), done.
Checking connectivity... done.
```

Check the HPB MainNet program: Enter '**`cd`** *`hpb-release/bin/`*' then enter '`ls`', check the latest version of the MainNet;

```
root@ dell-PowerEdge-R730:/home/# cd hpb-release/bin/
root@ dell-PowerEdge-R730:/home/hpb-release/bin# ls
ghpb-v0.0.0.1.tar.gz    ghpb-v1.0.0.0.tar.gz    ghpb-v1.0.1.0.tar.gz
```

Enter '**`sudo tar zxvf`** *`ghpb-vx.x.x.x.tar.gz`*' to decompress file 'ghpb-v*`x.x.x.x`*`.tar.gz`'.

'*`x.x.x.x`*' refers to the version number of HPB software, which should be changed to the highest version number (Example 1.0.1.0 shown above).

```
root@ dell-PowerEdge-R730:/home/hpb-release/bin# sudo tar zxvf ghpb-v1.0.1.0.tar.gz
ghpb-v1.0.1.0/
ghpb-v1.0.1.0/iperf3
ghpb-v1.0.1.0/ghpb
```

Modify the file permission: Enter '**`sudo chmod +x`** *`ghpb-vx.x.x.x`* **`-R`**',

```
hpb@dell-PowerEdge-R730:/hpb-release/bin$ sudo chmod +x ghpb-v1.0.1.0    -R
```

Copy the program to the executable path: Enter '**sudo cp** *ghpb-vX.X.X.X/* /home/ghpb-bin/*',

'/home/ghpb-bin/' is the path you set;

```
root@ dell-PowerEdge-R730:/home/hpb-release/bin# sudo cp ghpb-v1.0.1.0/*    /home/ghpb-bin/
```

(4) Launch the Node

Please see Chapter 4: BOE Node Setup for detailed BOE node launch commands.

Annex Technical Support

If you require further technical assistance, please contact our HPB Staff by one of the following methods:

Hot-line service：+86 021-5895 9195 (China)

E-mail: node@hpb.io

HPB Official Website：http://www.hpb.io/

Telegram：https://t.me/hpbglobal

Facebook：HPB Blockchain

Twitter: @HPB_Global

Reddit: r/HPB_Global

Alternatively, you may scan the QR code below to contact our HPB community associates:

HPB Global