AZURE ETHEREUM MINING ESSENTIALS GUIDE

ABSTRACT

Ethereum as we know is an open blockchain platform that lets anyone build and use decentralized applications that run on blockchain technology. Like Bitcoin, no one controls or owns Ethereum – it is an open-source project built by many people around the world. But unlike the Bitcoin protocol, Ethereum was designed to be adaptable and flexible.

This guide details on how to setup/earn mining in Azure. *please note: RBI is yet to officially recognize the cryptocurrency and had cautioned users, holders and traders of Virtual currencies, including Bitcoins.*

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What is Blockchain ?

1. **Definition :** In simple terms,Blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography.Each block contains typically a hash pointer as a link to a previous block, a timestamp and transaction data.

2. **Design :** By design, the blockchain is a decentralized technology.By allowing digital information to be distributed but not copied, blockchain technology was originally devised for the digital currency, Bitcoin, and now its finding other potential uses for the technology. Network of computing "nodes" make up the blockchain. Computer connected to the blockchain network using a client *(that performs the task of validating and relaying transactions)* gets a copy of the blockchain, which gets downloaded automatically upon joining the blockchain network.

3. **Robustness :** It has a built-in robustness,by storing blocks of information that are identical across its network, the blockchain cannot be controlled by anyone/any single entity and has no single point of failure.

4. **Transparent**: Self-auditing ecosystem, the network reconciles every transaction that happens in ten-minute intervals. Each group of these transactions is referred to as a "block".

5. **Use Cases :** Currently, finance offers the strongest use cases for the technology.For example : remittances, people use to buy things with Bitcoin, and store it along with other currencies.As of now,total market value of all Bitcoin is about $67,134,851,755 USD.1 BTC = $ 4,067.66 USD.In India, you can purchase Bitcoin from Zebpay exchange. Zebpay has Android and iPhone app which lets you link your bank account for quick transfers.Unocoin, another India-based exchange, lets you trade Bitcoins. They can help you buy, sell, store, use and accept bitcoin.*Please note : RBI is yet to officially recognize the cryptocurrency and had cautioned users, holders and traders of Virtual currencies , including Bitcoins.*

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6. **Enhanced Security**: By storing data across its network, the blockchain eliminates the risks that come with data being held centrally. A "public key" is a users' address on the blockchain. Bitcoins sent across the network gets recorded as belonging to that address. The "private key" is like a password that gives its owner access to their Bitcoin or other digital assets. Store your data on the blockchain and it is incorruptible.

7. Blockchain issues/limitations

   o Overcoming transaction delays, the verification process, and data limits will be crucial.

   o Government regulation status.

   o Due to shift to a decentralized network, this requires the buy-in of its users and operators.

   o While there are tremendous savings in transaction costs and time(due to decentralization) but there are high initial capital costs.

How to Earn Ether

Ether is the name of the currency used within Ethereum. It is used to pay for computation within the Ethereum Virtual Machine (EVM). Ethereum, like all blockchain technologies, uses an incentive-driven model of security. Consensus is based on choosing the block with the highest total difficulty. Miners produce blocks which the others check for validity. Among other well-formedness criteria, a block is only valid if it contains *proof of work* (PoW) of a given *difficulty*.

In order to obtain Ether, you need to either

- Become an Ethereum miner (steps explained below) or
- Trade other currencies for ether using centralised or trustless services
- Use the user friendly Mist Ethereum GUI Wallet

The successful *proof of work* PoW miner of the winning block receives:

- a *static block reward* for the 'winning' block, consisting of exactly 5.0 Ether
- cost of the gas expended within the block – an amount of ether that depends on the current gas price
- an extra reward for including uncles as part of the block, in the form of an extra 1/32 per uncle included

Now we will check the steps of how to setup mining in Azure

Step #1 : Setup Ubuntu 14.04 Virtual Machine

Setting up Ubuntu 14.04 Virtual Machine on Azure is straight forward,once you login to Azure portal.Click the **New** button found on the upper left-hand corner of the Azure portal.

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Select **Compute**, and then select,Ubuntu 14.04 Virtual Machine.Since this is an example,I'm choosing lower configuration machine,ideally you should use higher configuration & Ubuntu latest versions.
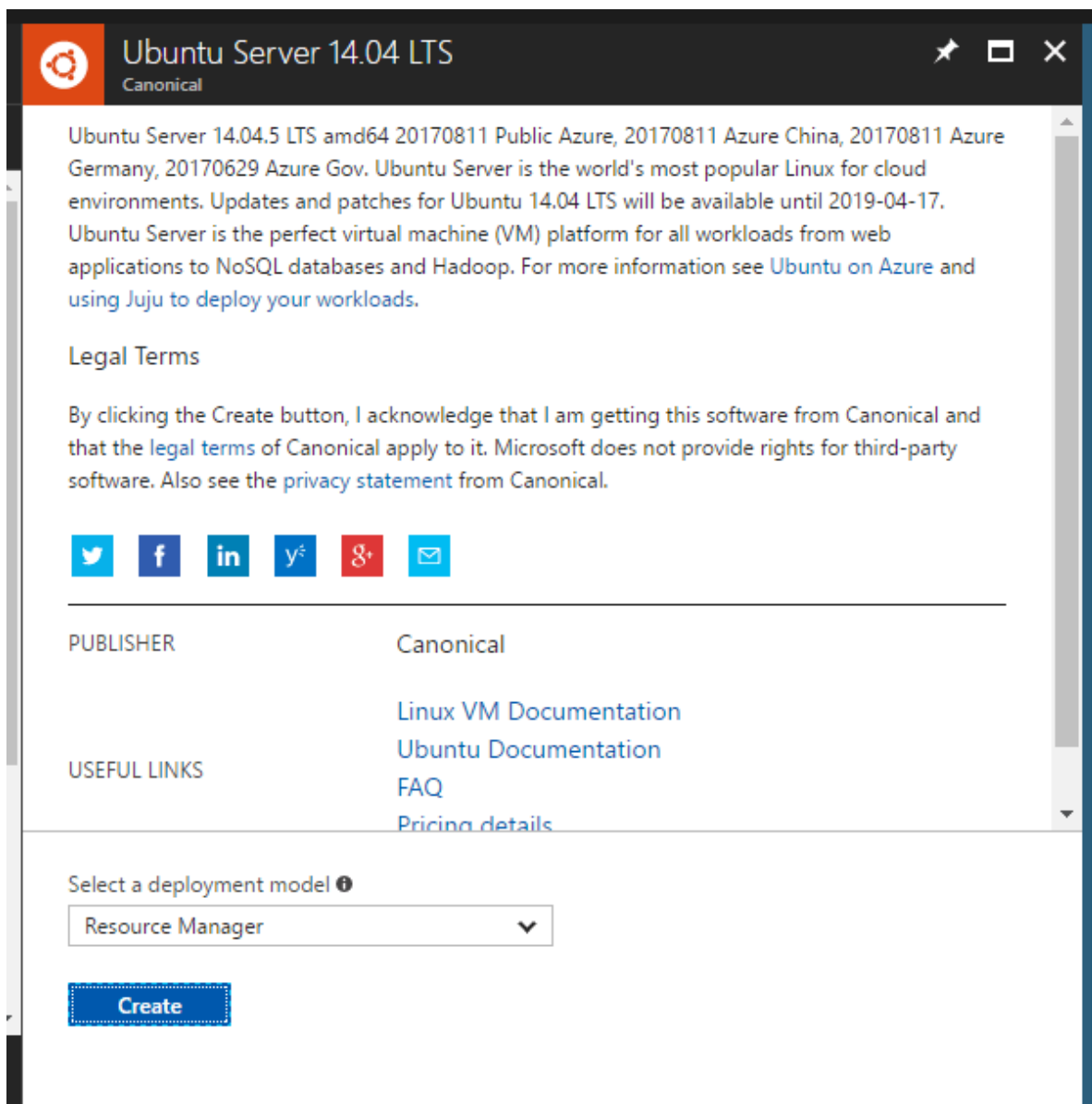

Image – Ubuntu 14.04 VM Launch Page

Enter the virtual machine information. Provide user name and password to log in to the virtual machine. When complete, click **OK**.

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Image – Ubuntu VM information

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Image – Choose Ubuntu VM Size

Since this is an example,I'm choosing lower configuration machine,ideally you should use higher configuration.

Under **Settings**, keep the defaults and click **OK**.
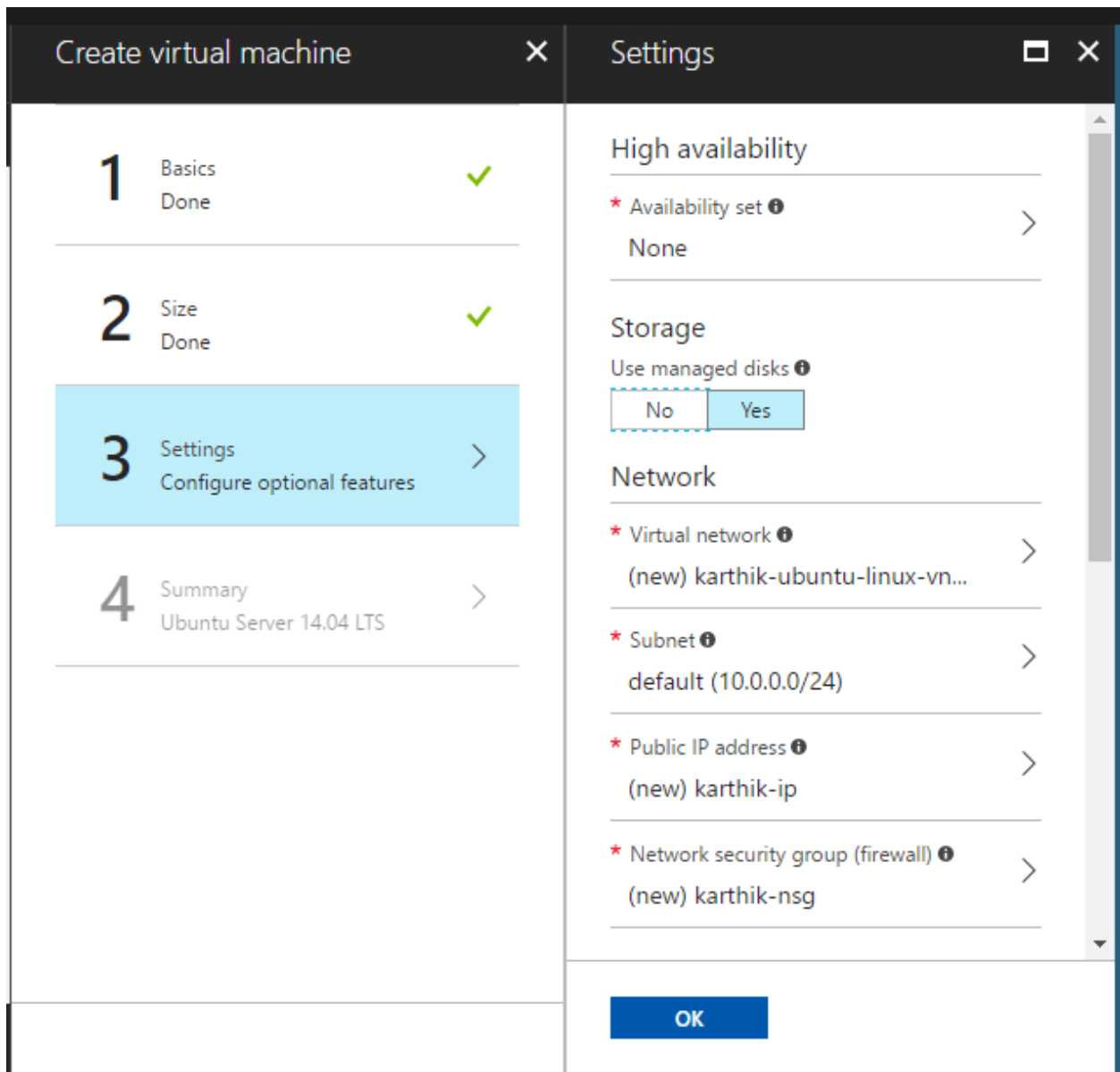
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Image – Ubuntu VM Settings

On the summary page, click **Ok** to start the virtual machine deployment. Once the deployment has completed, the VM summary automatically opens.

Once the deployment has been completed,you can connect to VM using any of SSH client like putty using the username/password or SSH certificate.

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Image – Connecting to Ubuntu VM via Putty

Step #2 : Update proper drivers for mining

Once we have connected,first step is to update drivers to latest using following command

sudo apt-get install software-properties-common

Step #3 : Setup ethereum client

Add Ethereum PPA repository using the following command

sudo add-apt-repository ppa:ethereum/ethereum

Below is an example of output

More info: https://launchpad.net/~ethereum/+archive/ubuntu/ethereum

Press [ENTER] to continue or ctrl-c to cancel adding it

gpg: keyring `/tmp/tmp516xhjf0/secring.gpg' created

gpg: keyring `/tmp/tmp516xhjf0/pubring.gpg' created

gpg: requesting key 923F6CA9 from hkp server keyserver.ubuntu.com

gpg: /tmp/tmp516xhjf0/trustdb.gpg: trustdb created

gpg: key 923F6CA9: public key "Launchpad PPA for Ethereum" imported

gpg: Total number processed: 1

gpg: imported: 1 (RSA: 1)

OK

Run update to get the required packages by using following command.

sudo apt-get update

This would have installed all the required packages for ethereum mining like EthMiner,it is standalone miner. This can be used to mine or benchmark a mining set-up. It is compatible with eth, geth, and pyethereum.Running this locally will allow you to easily interact with the Ethereum blockchain.

Step #4 : Create new geth account & start mining

geth account new

Your new account is locked with a password. Please give a password. Do not forget this password.

Passphrase:

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Repeat passphrase:

Address: {You will get new address}

ex.

{7f444580bfef4b9bc7e14eb7fb2a029336b07c9d}

You must save this address for future.Now there are 2 options for us to start mining,either we can do on our own or join pool.When you join a Pool, you will be mining together with other people in the Pool on a certain block. The chance you will find a block will be higher than when you mine solo. The disadvantage is that you will pay a fee to the pool, this is mostly 1%-2% of your revenue.The mining pool submits blocks with proof of work from a central account and redistributes the reward to participants in proportion to their contributed mining power.

In this below example we are going to use a pool named 'Dwarfpool', but there are others out there.Please check here.

Dwarfpool is one of the largest Ethereum mining pools due to its Anonymous registration (no registration required) system, its ability to mine directly to an exchange address, quick payments (multiple times per day once your balance is over 1 ETH), and ability to keep track of your miners via its statistics page.

Dwarfpool currently serves about five different geographic areas with servers located in various data-centers.

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Image – Dwarfpool availability

The currently available servers are:

- EU-Server: eth-eu.dwarfpool.com (France)
- US-Server: eth-us.dwarfpool.com (Montreal,Canada)
- US-Server2: eth-us2.dwarfpool.com (Las Vegas)
- RU-Server: eth-ru.dwarfpool.com (Moscow)
- HK-Server: eth-hk.dwarfpool.com (Hong-Kong)
- ASIA-Server: eth-asia.dwarfpool.com (Taiwan)

```
ethminer -F http://eth-eu.dwarfpool.com:80/YOUR_WALLET
ethminer -F http://eth-
eu.dwarfpool.com:80/0x7f444580bfef4b9bc7e14eb7fb2a029336b07c9d
```

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Image – Start mining using ethminer client

Congrats! You have just started mining!!

Step #5 : Check earnings

You can check your earnings by visiting your pool website, here in this case it would be https://www.dwarfpool.com/

ex.http://dwarfpool.com/eth/address?wallet=0x7f444580bfef4b9bc7e14eb7fb2a029336b07c9d
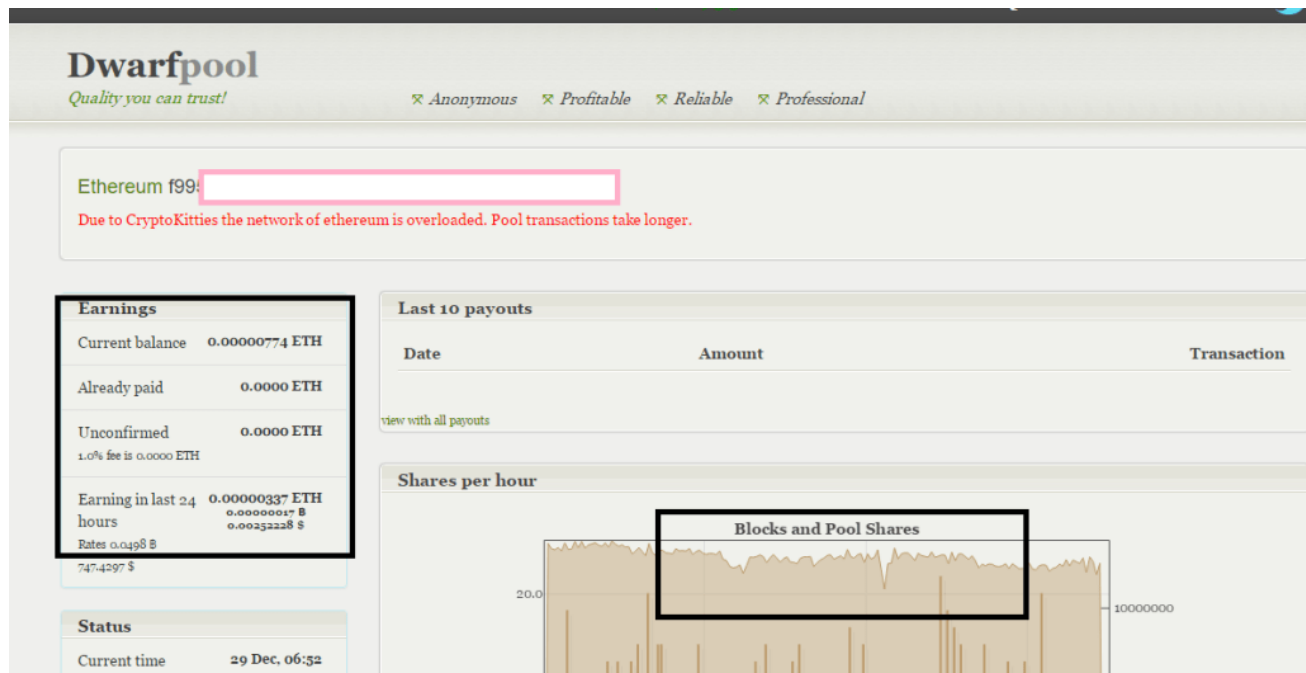
Replace your own wallet address.

Image – Dwarfpool stats

Key considerations while mining

1. Use higher configuration machines ex.N-Series GPUs for mining.Also check Microsoft reference for the latest commands on how to setup GPU drivers. CPU Mining is not much profitable, since GPU miners are roughly two orders of magnitude more efficient.

2. If you don't see your miner on the stats page, 99.9% that you have corrupted DAG file. You must delete it and restart ethminer.

3. Join any of the pool to maximize your earnings.The mining pool submits blocks with proof of work from a central account and redistributes the reward to participants in proportion to their contributed mining power.

4. For advanced users Dwarfpool also allows the use of a proxy. A proxy is useful for people who have several miners and they can point them all to a single proxy server that will be the single point of contact for the pool. This

can help efficiency somewhat and is especially useful once you get over a critical number of miners, such as greater than 10.