

# 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**
  - Overcoming [transaction delays](#), the verification process, and data limits will be crucial.
  - Government regulation status.
  - Due to shift to a decentralized network, this requires the buy-in of its users and operators.
  - 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.

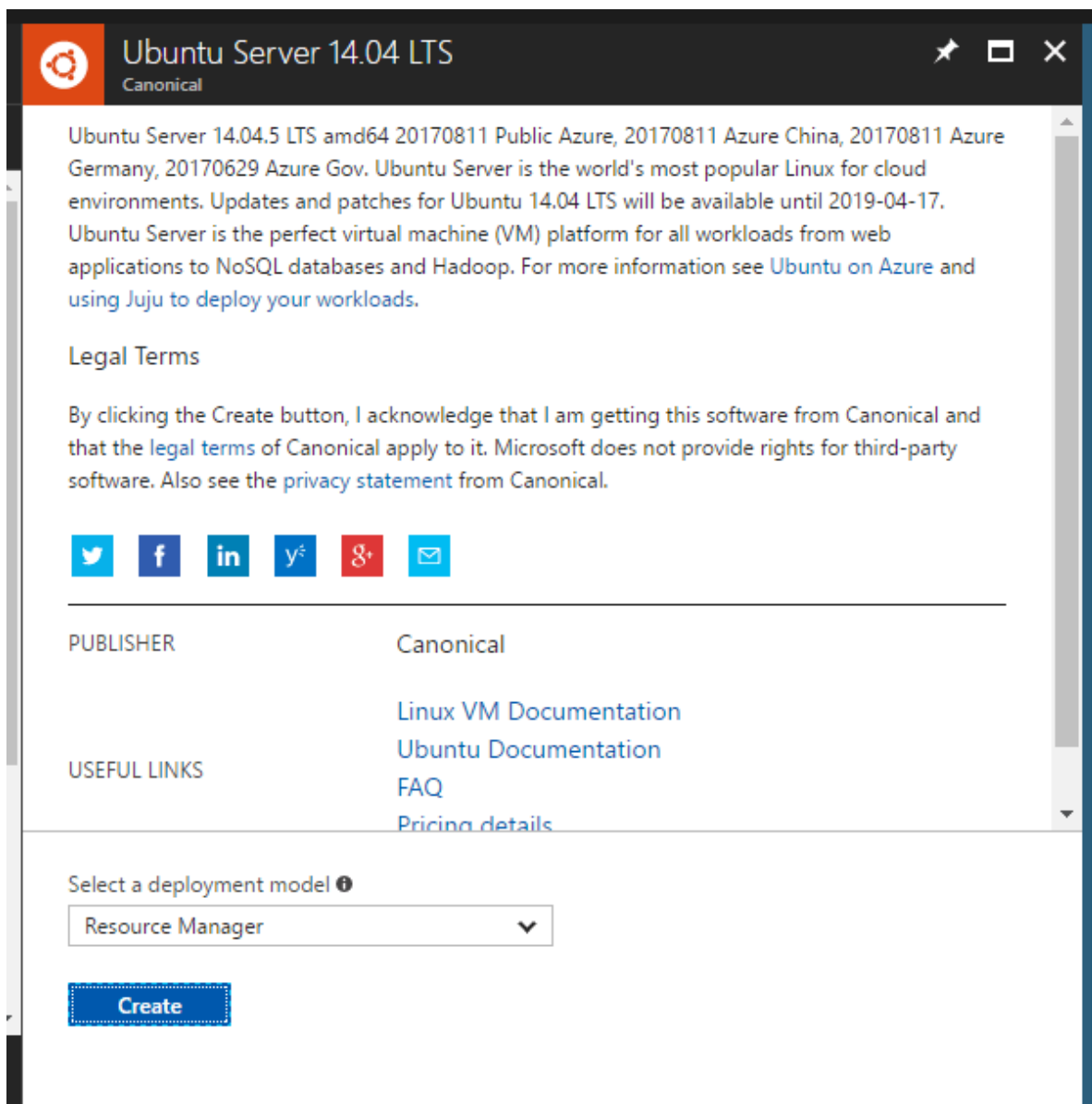


Image – Ubuntu 14.04 VM Launch Page

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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The image shows a screenshot of the 'Create virtual machine' dialog box in the Azure portal, specifically the 'Basics' tab. The dialog is divided into two main sections: a left-hand navigation pane and a right-hand configuration area.

**Left-hand navigation pane:**

- 1 Basics** (highlighted in light blue): Configure basic settings
- 2 Size**: Choose virtual machine size
- 3 Settings**: Configure optional features
- 4 Summary**: Ubuntu Server 14.04 LTS

**Right-hand configuration area:**

- \* Name:** karthik ✓
- VM disk type:** SSD
- \* User name:** wpadmin ✓
- \* Authentication type:** SSH public key Password
- \* Password:** [masked] ✓
- \* Confirm password:** [masked] ✓
- Subscription:** Visual Studio Enterprise: BizSpark
- \* Resource group:**  Create new  Use existing
- Resource group:** karthik-ubuntu-linux

At the bottom of the configuration area, there is a blue button labeled 'OK'.

Image – Ubuntu VM information

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**Create virtual machine** × **Choose a size** □ ×

Browse the available sizes and their features

costs. Recommended sizes are determined by the publisher of the selected image based on hardware and software requirements.

Supported disk type:  Minimum vCPUs:  Minimum memory (GiB):

★ Recommended | [View all](#)

DS1_V2 Standard ★	DS2_V2 Standard ★	DS11_V2 Standard ★
1 vCPU	2 vCPUs	2 vCPUs
3.5 GB	7 GB	14 GB
2 Data disks	4 Data disks	4 Data disks
3200 Max IOPS	6400 Max IOPS	6400 Max IOPS
7 GB Local SSD	14 GB Local SSD	28 GB Local SSD
Premium disk support	Premium disk support	Premium disk support
Load balancing	Load balancing	Load balancing
3,147.24 INR/MONTH (ESTIMATED)	6,245.30 INR/MONTH (ESTIMATED)	8,163.15 INR/MONTH (ESTIMATED)

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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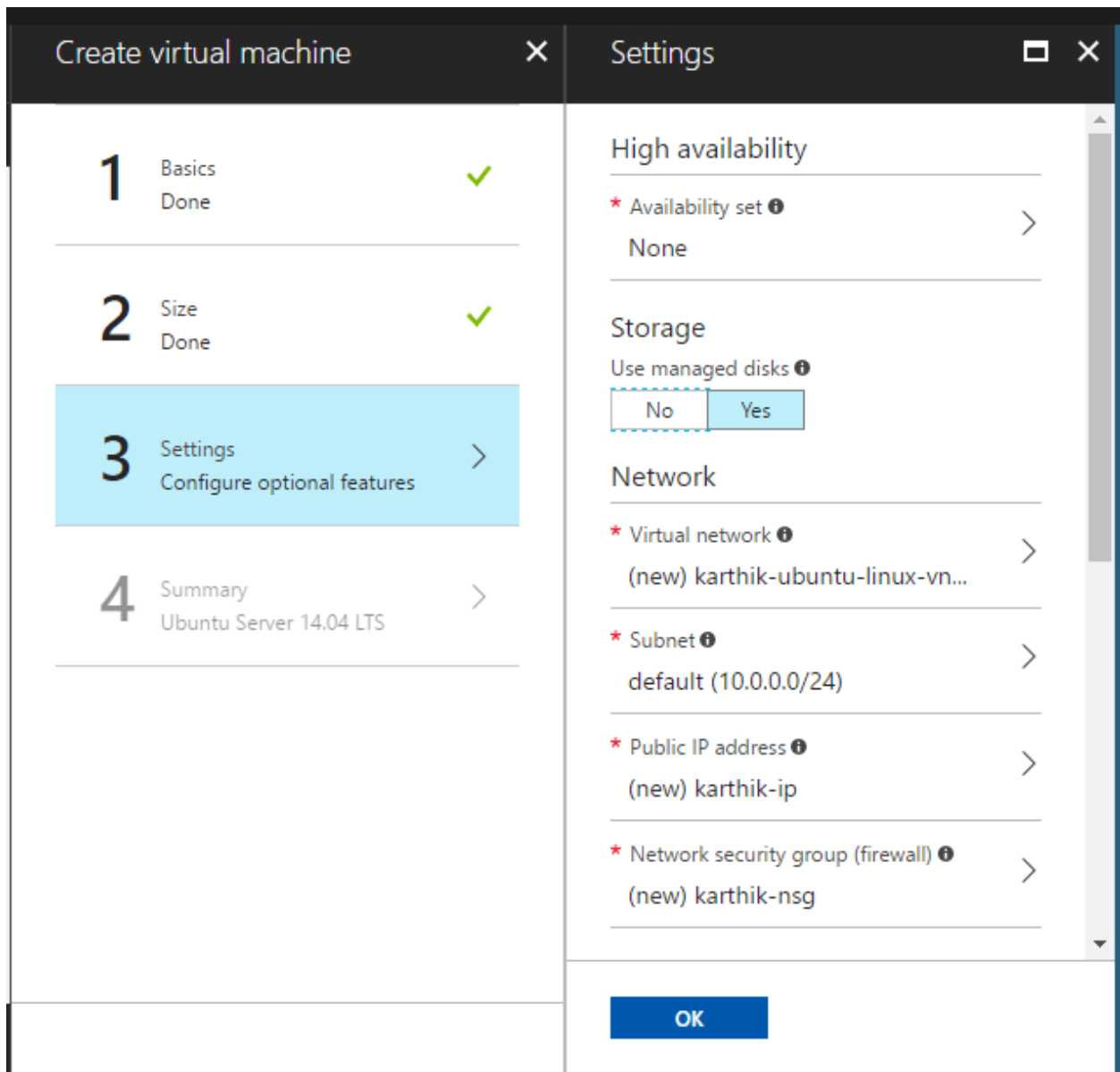


Image – Ubuntu VM Settings

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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```
wpadmin@karthik: ~  
wpadmin@13.85.77.171's password:  
Welcome to Ubuntu 14.04.5 LTS (GNU/Linux 4.4.0-97-generic x86_64)  
  
* Documentation:  https://help.ubuntu.com/  
  
System information as of Tue Dec 26 13:38:10 UTC 2017  
  
System load:  0.05          Processes:            107  
Usage of /:   19.6% of 29.50GB  Users logged in:    0  
Memory usage: 7%           IP address for eth0: 10.0.0.4  
Swap usage:  0%  
  
Graph this data and manage this system at:  
https://landscape.canonical.com/  
  
Get cloud support with Ubuntu Advantage Cloud Guest:  
http://www.ubuntu.com/business/services/cloud  
  
New release '16.04.3 LTS' available.  
Run 'do-release-upgrade' to upgrade to it.  
  
Your Hardware Enablement Stack (HWE) is supported until April 2019.  
Last login: Tue Dec 26 13:38:11 2017 from 49.206.126.246
```

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

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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](http://eth-eu.dwarfpool.com) (France)
- US-Server: [eth-us.dwarfpool.com](http://eth-us.dwarfpool.com) (Montreal, Canada)
- US-Server2: [eth-us2.dwarfpool.com](http://eth-us2.dwarfpool.com) (Las Vegas)
- RU-Server: [eth-ru.dwarfpool.com](http://eth-ru.dwarfpool.com) (Moscow)
- HK-Server: [eth-hk.dwarfpool.com](http://eth-hk.dwarfpool.com) (Hong-Kong)
- ASIA-Server: [eth-asia.dwarfpool.com](http://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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```
wpadmin@karthik:~$ ethminer -F http://eth-eu.dwarfpool.com:80/ [redacted] 1
99c06e276ba [redacted] &
[1] 25655
wpadmin@karthik:~$ miner 13:41:34.007 ethminer Getting work package...
miner 13:41:34.490 ethminer Grabbing DAG for #10fc9a2e...
miner 13:41:47.278 ethminer Got work package:
miner 13:41:47.278 ethminer Header-hash: 4844327fb0ace668c2b5af66176153bcfae
8ee00d0997d0bd0598a0ece678043
miner 13:41:47.278 ethminer Seedhash: 10fc9a2e5b65ea3f990c50787c055ec381519a
57803a159640ee6ceac8ea4f5d
miner 13:41:47.278 ethminer Target: 0000000225c17d04dad2965cc5a02a23e254c0c3
f75d9178046aeb27ce1ca574
  □ 13:41:47.282 ethminer Loading full DAG of seedhash: #54b9a934...
miner 13:41:47.778 ethminer Mining on PoWhash #4844327f... : 14800 H/s = 7400 ha
shes / 0.5 s
```

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.

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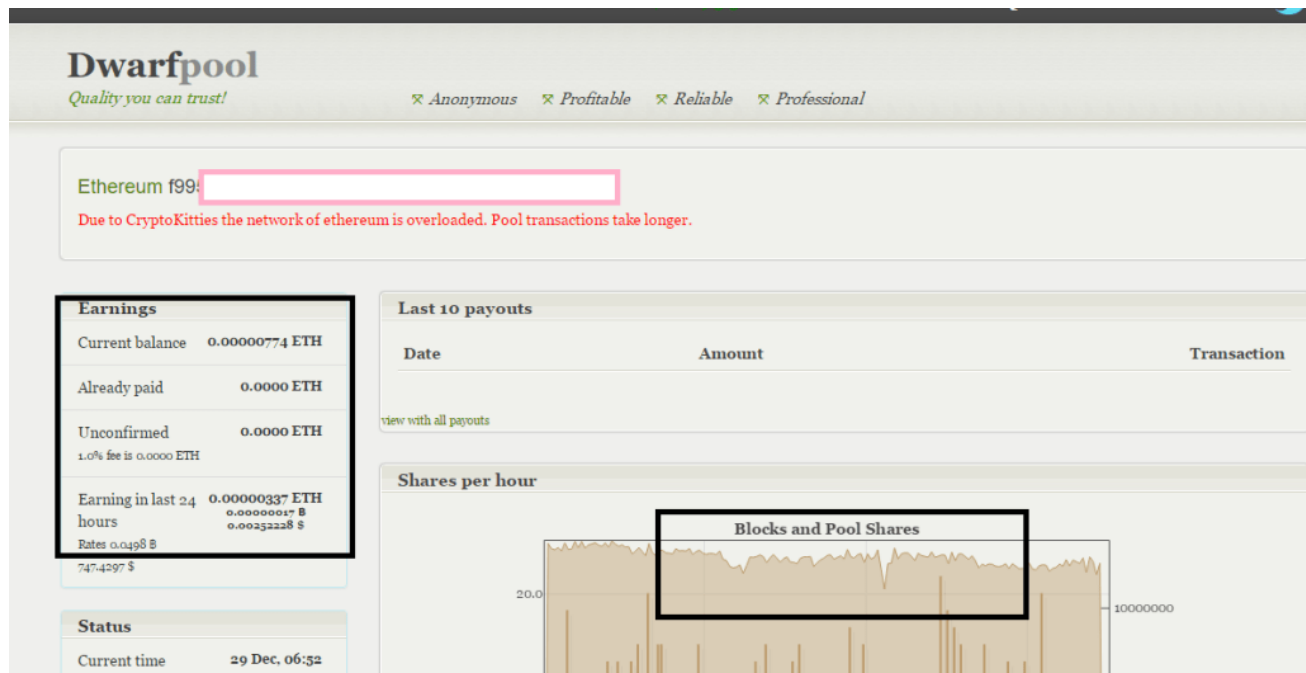


Image – Dwarfpool stats

## 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

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