

Mine Ethereum in a Pool

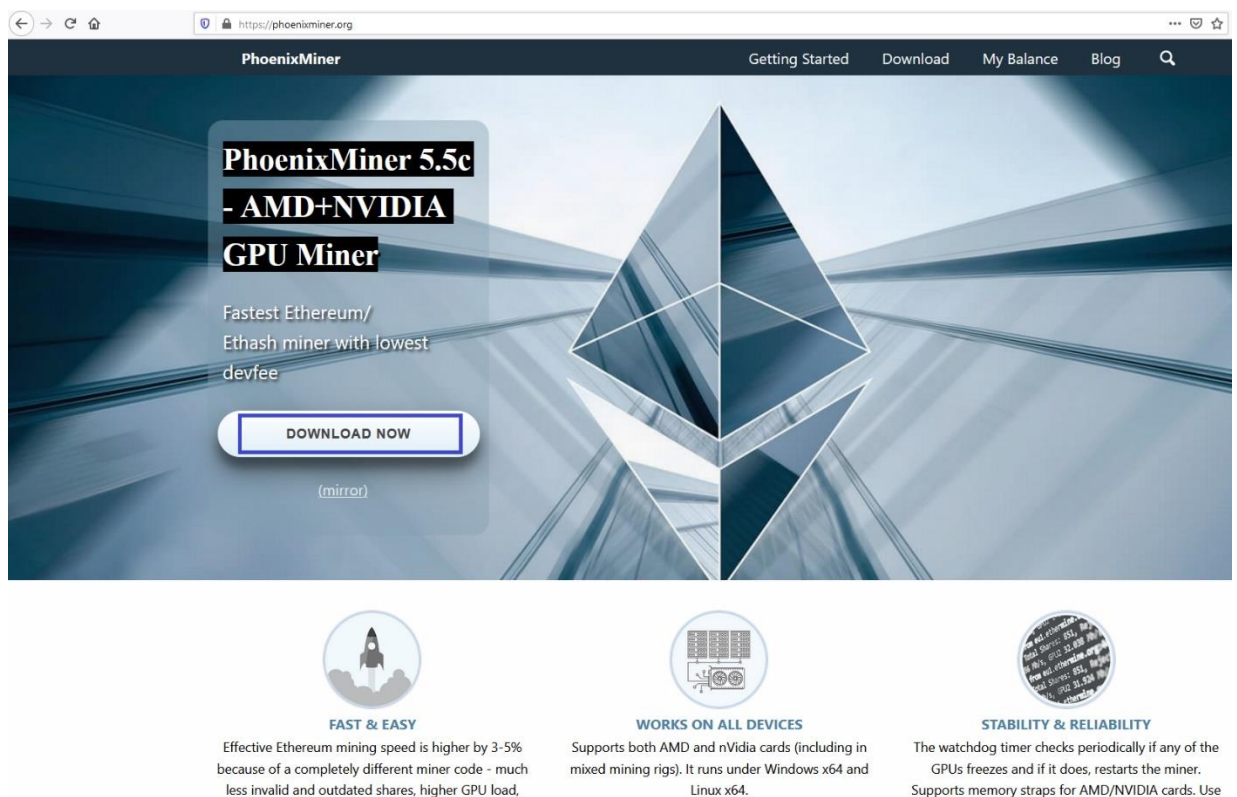
Exercise

In this exercise, you will learn how to mine Ethereum with PhoenixMiner. This is the one of most popular Ethereum miners and the successor of a Claymore miner. You will learn how to set up the miner and participate in the mining process.

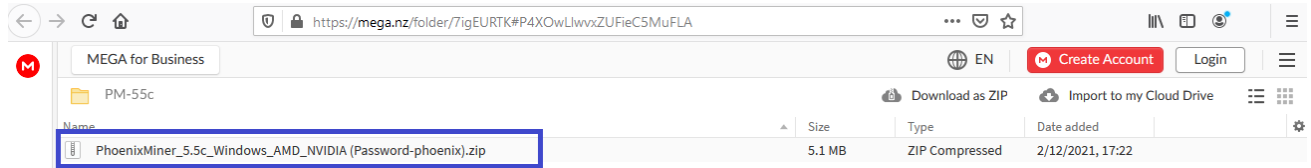
First, you will need **PhoenixMiner**. Also, you will need to install an appropriate **GPU driver** (AMD/NVIDIA) for your device.

1. Download PhoenixMiner

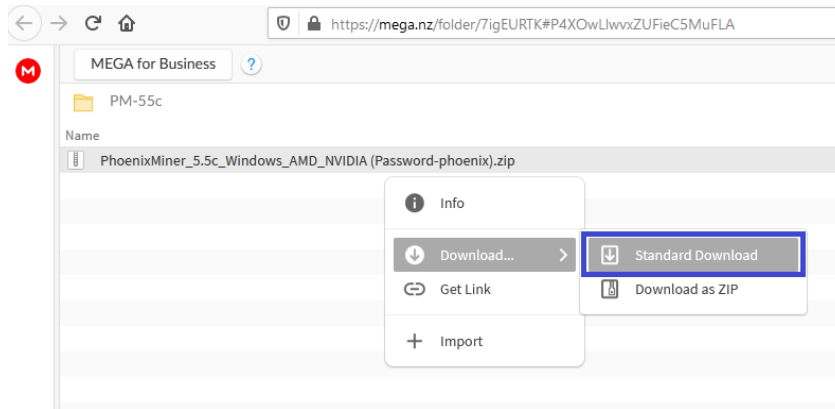
1. Go to PhoenixMiner's website: <https://phoenixminer.org/> and download **"PhoenixMiner 5.5c - AMD+NVIDIA GPU Miner"**. Click on the "Download Now" button.



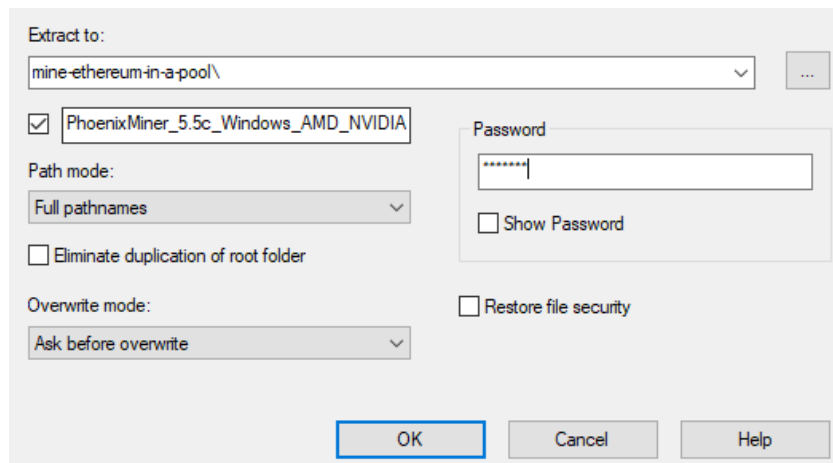
2. You will be redirected to the internet file storage.



3. Right click on the file to download.



4. **Unzip** the downloaded file. To unzip use a password: “**phoenix**”. You can find it in the name of the file.



2. Setup the Miner

1. Create a **bat** file for example mine_eth.bat and there write the parameters to set up the mining process.
2. Determine your graphics card. If you have **NVIDIA**, proceed to the next step.

Otherwise, if you have **AMD**, you need to issue these commands on a terminal first or put the commands in your .bat file to unlock non-default settings for the AMD video card:

```
setx GPU_FORCE_64BIT_PTR 0
setx GPU_MAX_HEAP_SIZE 100
setx GPU_USE_SYNC_OBJECTS 1
setx GPU_MAX_ALLOC_PERCENT 100
setx GPU_SINGLE_ALLOC_PERCENT 100
setx GPU_IMAGE_DMA 1
setx GPU_ENABLE_LARGE_ALLOCATION 1
```

3. Setup the command. Type **each command with only a single space in between the parameters**; otherwise, the regex function of the miner can cause problems during launch.
 - First, type the name of the start executable file
 - PhoenixMiner.exe (or use the full path)
 - Then set the name and address of the Ethereum mining pool
 - -pool eth-eu1.nanopool.org:9999
 - Then write your wallet address and miner name after “-wal”.
 - -wal {Your Ethereum Address}/CryptoMiner
 - Add the password for the Ethereum pool (default: x)
 - -pass x

Putting it all together:

```
PhoenixMiner.exe -pool eth-eu1.nanopool.org:9999 -wal
YOUR_WALLET/YOUR_WORKER -pass x
```

4. Then set the “**-proto**” value – it selects the kind of stratum protocol for the ethash pool. We will mine in Nanopool, so the value we need is “**-proto 2**”.
5. Then we have to set the ethash coin to use for devfee to avoid switching DAGs. In our case it is Ethereum: “**-coin eth**”
6. You can set the “**-gser**” value. It controls the serializing of the DAG creation on multiple GPUs (0 - no serializing, all GPUs generate the DAG simultaneously, this is the default; 1 - partial overlap of DAG generation on each GPU; 2 - no overlap (each GPU waits until the previous one has finished generating the DAG); 3-10 - from 1 to 8 seconds delay after each GPU DAG generation before the next one). For better stability, you can choose option 2: “**-gser 2**”.
7. Now we will set the “**-gt**” value. This is the GPU tuning parameter (6 to 400). The default is 15. You can change the tuning parameter interactively with the “+” and “-” keys in the miner’s console window. You may **specify** this option per-GPU. If you don’t specify “-gt” or you specify value 0, the miner will use auto-tuning to determine the best GT value. In our example we use “**-gt 55**”. You have to **experiment** with the different values to find the best option for your exact configuration.
8. One of the most important things in mining is stability and automation of the process. The next command helps you to keep the system running if something goes wrong. Set “**-rmode 2**”. It selects the restart mode when a GPU crashes or freezes: **0** -disabled - miner will shut down instead of restarting. **1** – restart with the same command line options - this is the default, **2 – reboot** (shut down miner and execute “**reboot.bat**”).

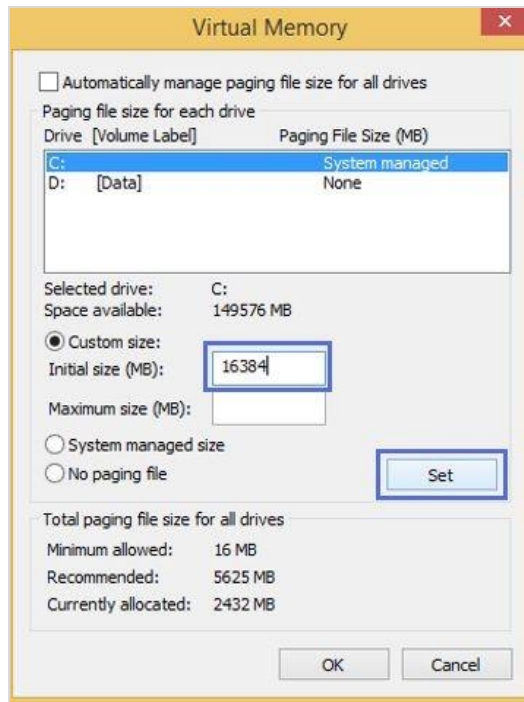
Choose option 2 “**-rmode 2**” it will close the miner and execute “**reboot.bat**” file (see further down) if something went wrong with the GPU.
9. By default, the PhoenixMiner is coming with an already setup reboot.bat file. There is a command “**shutdown /r /t 10 /f**” which means the computer will reboot after 10 seconds. The parameter “/f” forces running applications to close without warning users.
Caution: Using the “/f” option might result in loss of unsaved data.
10. Heat and cooling are very important things in the world of crypto mining, so let’s take care of your GPU’s fans.
First set “**-tt 69**”. This is the **target GPU temperature** and your computer will try to keep it for this card.
11. Set the fan control max temperature (0 for default) with “**-tmax**” value. Set “**-tmax 69**”. If this feature is not supported by the driver, “-tlli” is set to the same temperature instead.

12. The “**-ttli <n>**” value lower GPU usage when GPU temperature is above n deg C. The default value is 0, which means do not lower the usage regardless of the GPU temperature. This option is useful whenever -tmax is not working. If you are using both "-tt" and "-ttli" options, the temperature in "-tt" should be **lower** than the "-ttli" to avoid throttling the GPUs without using the fans to properly cool them first. Set “**-ttli 87**”.
13. Now set the “**-tstop <n>**” value. It pause a GPU when temp is >= n deg C (0 for default; i.e. off). Set “**-tstop 91**”.
14. Then set “**-tstart <n>**”. It says when to resume a GPU when temp is <= n deg C (0 for default; i.e. off). Set it to “**-tstart 85**”.
15. Then let’s set the monitoring option “**-hstats <n>**”. It controls the level of hardware monitoring: 0 - temperature and fan speed only; 1 - temperature, fan speed, and power (the default); 2 - full (include core/memory clocks, voltages, P-states). Choose option 2 “**-hstats 2**”.

14. Putting all the commands together, you'll end up with something like this. Don't forget to change the sections in **red** to your personal parameters (wallet address):

```
PhoenixMiner.exe -pool eth-eu1.nanopool.org:9999 -wal  
YOUR_WALLET/YOUR_WORKER -pass x -proto 2 -coin eth -gser 2  
-gt 55 -rmode 2 -tt 69 -tmax 69 -ttli 87 -tstop 91 -tstart  
85 -hstats 2
```

13. For multi-GPU systems, set **Virtual Memory** size in Windows at least **16 GB**.



3. Let's Mine Some ETH

1. Time to start the miner. Open a directory where you extracted the **zip** contents from **Step 1** and run the script (your .bat file). You will see something similar to this screen.

```
Phoenix Miner 5.5c Windows/msvc - Release build
-----

No CUDA driver found
OpenCL driver version: 17.8-BETA
Available GPUs for mining:
GPU1: Radeon (TM) RX 470 Graphics (pcie 1), OpenCL 2.0, 8 GB VRAM, 32 CUs
GPU2: Radeon (TM) RX 470 Graphics (pcie 2), OpenCL 2.0, 8 GB VRAM, 32 CUs
GPU3: Radeon (TM) RX 470 Graphics (pcie 3), OpenCL 2.0, 8 GB VRAM, 32 CUs
Eth: Loading pools from epools.txt
Eth: the pool list contains 9 pools (1 from command-line)
Eth: primary pool: eth-eu1.nanopool.org:9999
Starting GPU mining
GPU1: AMD driver BETA
GPU2: AMD driver BETA
GPU3: AMD driver BETA
GPU1: set auto fan: 69C target temp (min fan 480, max fan 2200, fcm 0)
GPU1: set power limit 0% (69C max temp)
GPU2: set auto fan: 69C target temp (min fan 480, max fan 2200, fcm 0)
GPU2: set power limit 0% (69C max temp)
GPU3: set auto fan: 69C target temp (min fan 480, max fan 2200, fcm 0)
```

2. These are your GPUs available for mining.

```
Phoenix Miner 5.5c Windows/msvc - Release build
-----

No CUDA driver found
OpenCL driver version: 17.8-BETA
Available GPUs for mining:
GPU1: Radeon (TM) RX 470 Graphics (pcie 1), OpenCL 2.0, 8 GB VRAM, 32 CUs
GPU2: Radeon (TM) RX 470 Graphics (pcie 2), OpenCL 2.0, 8 GB VRAM, 32 CUs
GPU3: Radeon (TM) RX 470 Graphics (pcie 3), OpenCL 2.0, 8 GB VRAM, 32 CUs
Eth: Loading pools from epools.txt
Eth: the pool list contains 9 pools (1 from command-line)
Eth: primary pool: eth-eu1.nanopool.org:9999
Starting GPU mining
GPU1: AMD driver BETA
GPU2: AMD driver BETA
GPU3: AMD driver BETA
GPU1: set auto fan: 69C target temp (min fan 480, max fan 2200, fcm 0)
GPU1: set power limit 0% (69C max temp)
GPU2: set auto fan: 69C target temp (min fan 480, max fan 2200, fcm 0)
GPU2: set power limit 0% (69C max temp)
GPU3: set auto fan: 69C target temp (min fan 480, max fan 2200, fcm 0)
```

3. This data is about **temperature** and **fan speed** for each GPU. This is system dependent.


```

Eth speed: 74.585 MH/s, shares: 2/0/0, time: 0:07
GPUs: 1: 24.749 MH/s (1) 2: 24.913 MH/s (1) 3: 24.923 MH/s (0)
Eth: Accepted shares 2 (0 stales), rejected shares 0 (0 stales)
Eth: Incorrect shares 0 (0.00%), est. stales percentage 0.00%
Eth: Maximum difficulty of found share: 24.3 GH (!)
Eth: Average speed (5 min): 74.517 MH/s
Eth: Effective speed: 44.15 MH/s; at pool: 44.15 MH/s

Eth: GPU1: ETH share found!
Eth: Share actual difficulty: 27.5 GH (!)
Eth: Share accepted in 38 ms
Eth speed: 74.580 MH/s, shares: 3/0/0, time: 0:07
GPUs: 1: 24.745 MH/s (2) 2: 24.914 MH/s (1) 3: 24.922 MH/s (0)
Eth speed: 74.577 MH/s, shares: 3/0/0, time: 0:07
GPUs: 1: 24.744 MH/s (2) 2: 24.912 MH/s (1) 3: 24.921 MH/s (0)
Eth speed: 74.589 MH/s, shares: 3/0/0, time: 0:07
GPUs: 1: 24.751 MH/s (2) 2: 24.913 MH/s (1) 3: 24.925 MH/s (0)
Eth speed: 74.590 MH/s, shares: 3/0/0, time: 0:07
GPUs: 1: 24.752 MH/s (2) 2: 24.913 MH/s (1) 3: 24.924 MH/s (0)
Eth speed: 74.591 MH/s, shares: 3/0/0, time: 0:07
GPUs: 1: 24.752 MH/s (2) 2: 24.914 MH/s (1) 3: 24.924 MH/s (0)
GPU1: 68C 99% 101W, GPU2: 68C 77% 108W, GPU3: 66C 38% 113W
GPU1: cclock 1230 MHz, mclock 2000 MHz
GPU2: cclock 1229 MHz, mclock 2000 MHz
GPU3: cclock 1260 MHz, mclock 2000 MHz
GPUs power: 321.6 W
Eth: New job #7e70219d from eth-eu1.nanopool.org:9999; diff: 10000MH
Eth speed: 74.592 MH/s, shares: 3/0/0, time: 0:08
GPUs: 1: 24.753 MH/s (2) 2: 24.914 MH/s (1) 3: 24.925 MH/s (0)

```

4. Also, you can see the **total mining speed** and **speed for each card**.

```

GPU1: 68C 99% 101W, GPU2: 68C 77% 108W, GPU3: 66C 38% 113W
GPU1: cclock 1230 MHz, mclock 2000 MHz
GPU2: cclock 1229 MHz, mclock 2000 MHz
GPU3: cclock 1260 MHz, mclock 2000 MHz
GPUs power: 321.6 W
Eth: New job #7e70219d from eth-eu1.nanopool.org:9999; diff: 10000MH
Eth speed: 74.592 MH/s, shares: 3/0/0, time: 0:08
GPUs: 1: 24.753 MH/s (2) 2: 24.914 MH/s (1) 3: 24.925 MH/s (0)

```

5. Finally, we **found the shares** in “ETH”. Shares are **successfully accepted** by the pools.

```
Eth: Maximum difficulty of found share: 24.3 GH (!)
Eth: Average speed (5 min): 74.517 MH/s
Eth: Effective speed: 44.15 MH/s; at pool: 44.15 MH/s

Eth: GPU1: ETH share found!
Eth: Share actual difficulty: 27.5 GH (!)
Eth: Share accepted in 38 ms
Eth speed: 74.580 MH/s, shares: 3/0/0, time: 0:07
GPUs: 1: 24.745 MH/s (2) 2: 24.914 MH/s (1) 3: 24.922 MH/s (0)
Eth speed: 74.577 MH/s, shares: 3/0/0, time: 0:07
```

4. Let's See the Pool Statistics

1. Go to <https://nanopool.org/> and choose Ethereum. Click on the **Ethereum** header name.

https://nanopool.org

Welcome To Nanopool

Ethereum

Pool Hashrate	20,524.1 Gh/s
Miners Count	43,035
Price	32.19mB \$1,696.43

- Payouts 0.05 - 20 ETH
- Algorithm DaggerHashimoto

Quick StartOverview

Ethereum Classic

Pool Hashrate	463.1 Gh/s
Miners Count	1,616
Price	0.24mB \$12.96

- Payouts 0.1 - 100 ETC
- Algorithm DaggerHashimoto

Quick StartOverview

ZCash

Pool Hashrate	63,870.0 KSol/s
Miners Count	273
Price	2.61mB \$137.70

- Payouts 0.01 - 10 ZEC
- Algorithm Equihash

Quick StartOverview

Monero

Pool Hashrate	229,675.2 kH/s
Miners Count	3,546
Price	4.09mB \$215.68

- Payouts 0.1 - 10 XMR
- Algorithm RandomX

Quick StartOverview

Raven

Pool Hashrate	447.9 Gh/s
Miners Count	3,531
Price	0.00mB \$0.17

- Payouts 50 - 50000 RVN
- Algorithm KAWPOW

Quick StartOverview

Conflux

Pool Hashrate	375.6 Gh/s
Miners Count	188
Price	0.00mB \$0.47

- Payouts 1 - 100 CFX
- Algorithm Octopus

Quick StartOverview

Ergo

Pool Hashrate	895.7 Gh/s
Miners Count	704
Price	0.04mB \$2.46

- Payouts 1 - 500 ERGO
- Algorithm Autolykos v2

Quick StartOverview

2. You will see mining statistics here.

Ethereum Mining Pool

Pool Hashrate	Blocks mined (last 24 hours)	Miners	Workers	ETH Price
20,524.1 Gh/s	303+29	42,961	124,418	\$1,696.4 32.19mB

Features

- World-wide mining pool
- Regular payouts
- Nicehash compatible
- Friendly support
- Optimized infrastructure
- Email notifications
- Adjustable payout limit
- 3rd party apps: iOS/Android

Recent Blocks

Date	Number	Reward	Miner
4 minutes ago	11908391	9.73	0x8512051be868b22d73e90e0bdb699726306432a8
13 minutes ago	11908352	1.75	-
17 minutes ago	11908333	6.05	0xf3f72cce1f924c0dce288fd965abfd6d07f27450
18 minutes ago	11908320	8.69	0xb4e081de77cdee525994af43a645830834ab3b9
20 minutes ago	11908311	8.70	0x9016becfb7211a82b80a087642de283c88f33b0d
21 minutes ago	11908308	7.73	0xe610ee152ddd7df1d5d5d06b8e8cedb52d666238
28 minutes ago	11908278	6.48	0x18283a1aba6b8dbbd21abe4b195d292fb49d09c1

Connection Settings

Region	Europe	USA	Other
Host	eth-eu1.nanopool.org eth-eu2.nanopool.org	eth-us-east1.nanopool.org eth-us-west1.nanopool.org	eth-asia1.nanopool.org eth-jp1.nanopool.org eth-au1.nanopool.org
SSL Stratum Port	9433		
Stratum Port	9999		
Getwork Port	8888		

- Copy and paste your **ETH address**. The mined Ethereum coins will be transferred here. The default minimum payout is 0.1 ETH. Then click **“Search”**.

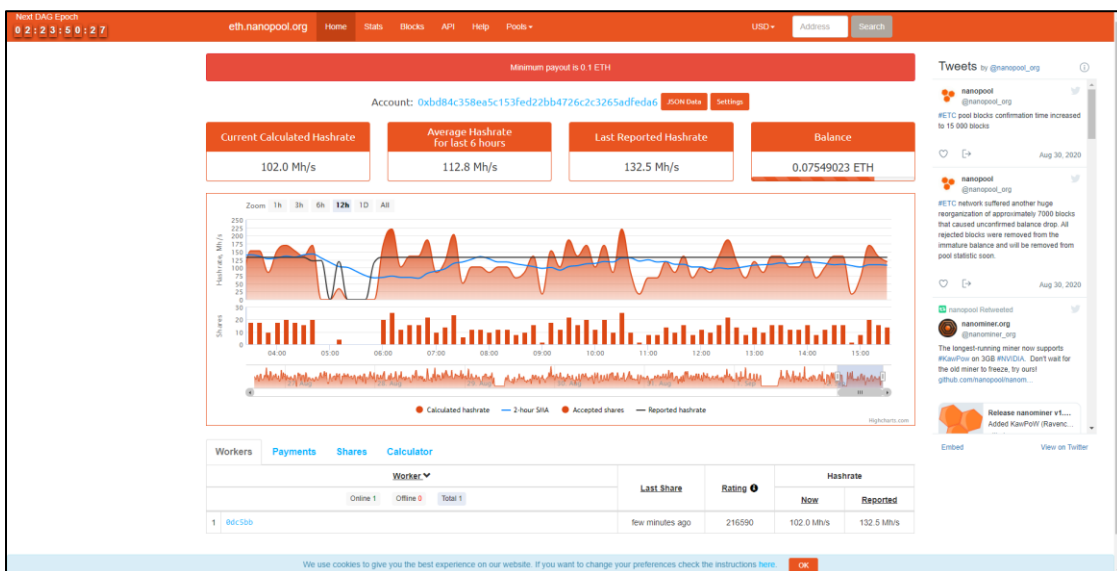
The screenshot shows the eth.nanopool.org website. The navigation bar includes links for Home, Stats, Blocks, API, Help, and Pools. A search bar is located on the right with a dropdown for USD, an input field for the address, and a Search button. Below the navigation bar, the 'Ethereum Mining Pool' section displays five statistics in orange boxes:

Pool Hashrate	Blocks mined (last 24 hours)	Miners	Workers	ETH Price
20,524.1 Gh/s	303+29	42,961	124,418	\$1,696.4 32.19mB

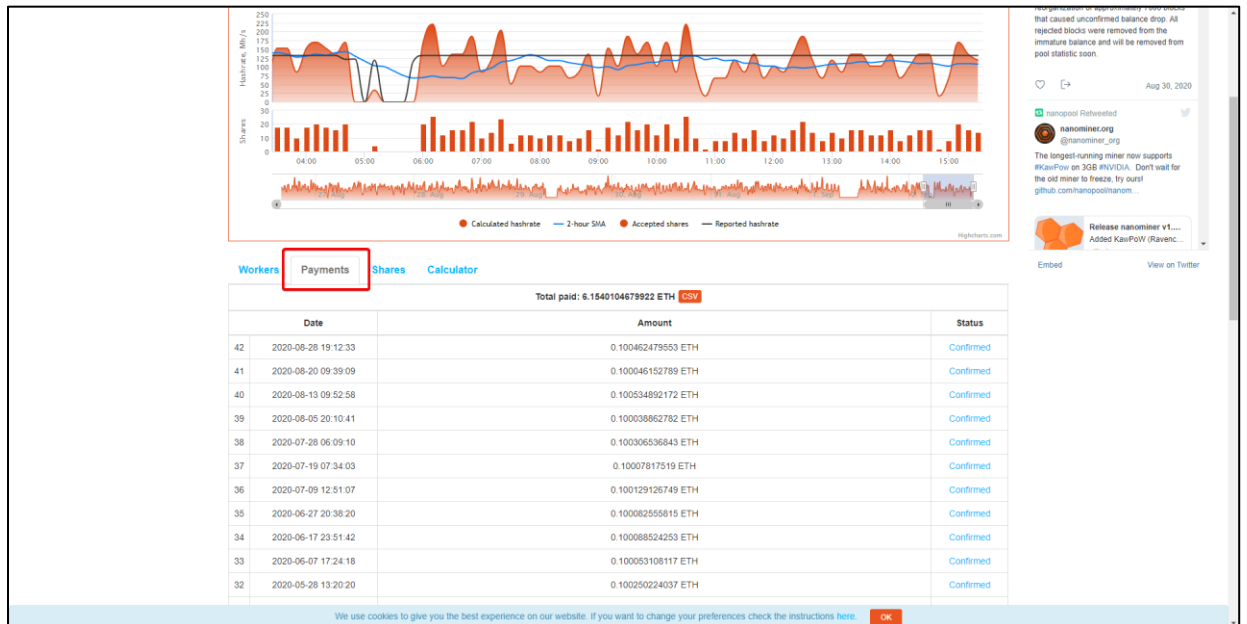
- You can see the pool address and stratum port we have used in the bat file.
Connection Settings

Region	Europe	USA	Other
Host	eth-eu1.nanopool.org eth-eu2.nanopool.org	eth-us-east1.nanopool.org eth-us-west1.nanopool.org	eth-asia1.nanopool.org eth-jp1.nanopool.org eth-au1.nanopool.org
SSL Stratum Port	9433		
Stratum Port	9999		
Getwork Port	8888		

- Here is the statistic for your mining activity. The info of your Workers, Payments, Shares and Calculator for mined coins. In **Workers** section you can see the Online and Offline miners. Furthermore, the most important things are the time of your **Last Accepted Share**, and **Hashrate**.



6. Here is the payment history.



5. Your Task is to do Experiments with the Miner.

1. Try different arguments for the commands. Experiment with “-gt” value or runtime press “+/-” keys. What has changed? What is the optimal value for your configuration?
2. Experiment with temperature options “-tt”, “-tstop”, “-ttli”, “-tstart”. What are your observations?

What to Submit?

Create a **zip file** (e.g. **your-name-eth-mining-exercise.zip**) holding the following:

1. A “**txt**” file with your answers to section 5.
2. A screenshot of your ETH mining statistics page.

Submit your zip file as **homework** at the course platform.