Pegnet Proof of Work
Target & Difficulty Equations

1 Definitions

Hash-rate

An amount of lxr hashing operations per second

Target

8 byte hexadecimal value that comes from the top 8 bytes of the lxr(oprhash+nonce). The higher the target, the more difficult that target is.

Difficulty

Difficulty is a floating point number that can describe the amount of work needed to generate a given target. The difficulty is proportional to the hashrate, meaning a target with difficulty 2 requires twice as many hashes (on average) as a target with difficulty 1. All difficulty numbers are related to a base difficulty 1, which is arbitrarily chosen.

pDiff

pDiff is the base difficulty for determining the difficulty of work submitted to a mining pool. pDiff is currently set at `0xfffe000000000000`, which is about 6.5K h/s for 5s of work. All difficulty reported by the pool is in relation to pDiff. Meaning a difficulty of 100 is 100x the work of pDiff.

2 Equations

2.1 Work

The amount of work for a given target should be denoted in **difficulty**, but difficulty is not necessarily universal if a different base is chosen. Miners are more familiar with hashrate.

2.1.1 Total-Hashes from Target

To get the total number of hashes that on average will obtain the given target:

$$TH = \frac{2^{64}}{2^{64} - target}$$

2.1.2 Difficulty from Target

To get the difficulty of a given target:

$$diff = \frac{\neg pDiff}{\neg target}$$

2.1.3 Estimate target from number of hashes

Given a total number of hashes, we can estimate the best target.
Where $TH = totalhashes$

$$target = \frac{2^{64} * (TH - 1)}{TH}$$

2.1.4 Target from Difficulty

To get the target of a given difficulty:

$$\neg target = \frac{\neg pDiff}{\neg diff}$$