

Mining Difficulty

- The difficulty changes for every 2016 blocks
 - Desired rate – one block each 10 minutes
 - Two weeks to generate 2016 blocks



Setting the Difficulty

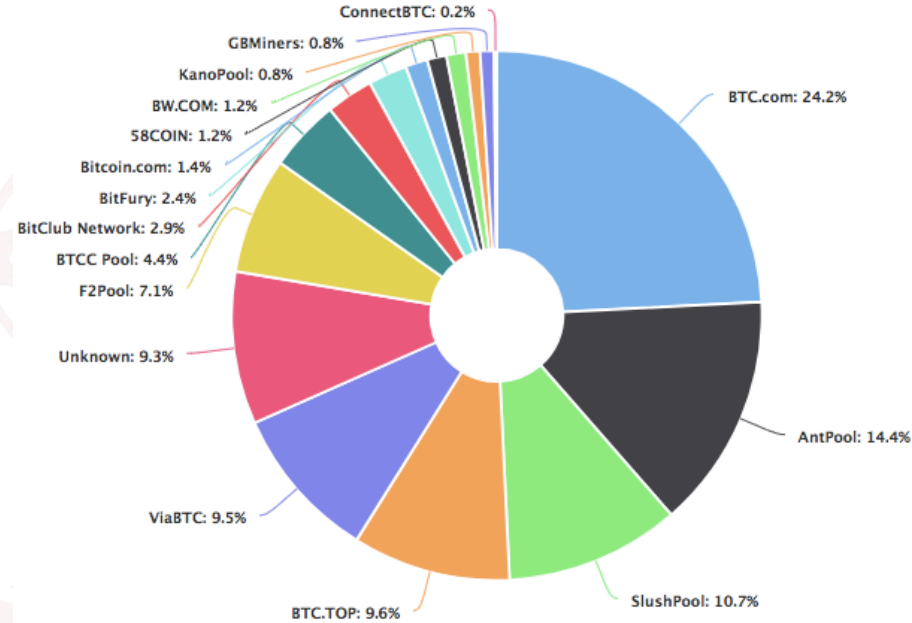
- Compute the following for every two weeks

**current_difficulty = previous_difficulty *
(2 weeks in milliseconds)/(milliseconds to
mine last 2016 blocks)**



Mining Pool

- Pooling of resources by the miners
 - Share the processing power over a network to mine a new block
 - Split the reward proportionally to the amount of work they contributed



Hash-rate Distribution: blockchain.info



Mining Pool Methods

- Contains hundreds or thousands of miners through special protocols
- B : Block reward minus pool fee
- p : Probability of finding a block in a share attempt ($p = 1/D$), D is the block difficulty



Mining Pool Methods

- Pay per Share (PPS)
 - Instant guaranteed payout to a miner
 - Miners are paid from pool's existing balance, share of a miner is
$$R = B \times p$$
 - Miners get almost equal payment, risk is at the pool operator



Mining Pool Methods

- **Proportional**
 - Miners earn share until the pool finds a block (end of mining round)
 - $R = B \times \frac{n}{N}$, where n is amount of his own share, and N is amount of all shares in the round
 - Payments are made once a pool finds out a block



Mining Pools – Pros and Cons

- Pros
 - Small miners can participate
 - Predictable mining
- Cons
 - Leads to centralization
 - Discourages miners for running complete mining procedure

