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BIP: 104
Layer: Consensus (hard fork)
Title: 'Block75' - Max block size like difficulty
Author: t.khan <teekhan42@gmail.com>
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         GNU-All-Permissive
```

Abstract

Automatic adjustment of max block size with the target of keeping blocks 75%
full, based on the average block size of the previous 2016 blocks. This would be
done on the same schedule as difficulty.

Motivation

Blocks are already too full and cannot support further transaction growth. While
SegWit and Lightning (and other off-chain solutions) will help, they will not
solve this problem.

Bitcoin needs a reasonably effective and predictable way of managing the maxi-
mum block size which allows moderate growth, keeps max block size as small as
possible, and prevents wild swings in transaction fees.

The every two-week and automatic adjustment of difficulty has proven to be a
reasonably effective and predictable way of managing how quickly blocks are
mined. It works well because humans aren't involved (except for setting the
original target of a 10 minute per block average), and therefore it isn't political
or contentious. It's simply a response to changing network resources.

It's clear at this point that human beings should not be involved in the determi-
nation of max block size, just as they're not involved in deciding the difficulty.
Therefore, it is logical and consistent with Bitcoin's design to implement a per-
manent solution which, as with the difficulty adjustment, is simply an automatic
response to changing transaction volumes. With the target of keeping blocks
75% full on average, this is the goal of Block75.

Specification

The max block size will be recalculated every 2016 blocks, along with difficulty,
using Block75's simple algorithm:

```
new max block size = x + (x * (AVERAGE_CAPACITY - TARGET_CAPACITY))
```

- TARGET_CAPACITY = 0.75   //Block75's target of keeping blocks 75% full
- AVERAGE_CAPACITY = average percentage full of the last 2016 blocks, as a decimal
- x = current max block size

All code which generates/validates blocks or uses/references the current hard-coded limits will need to be changed to support Block75.

Rationale

The 75% full block target was selected because:

- it is the middle ground between blocks being too small (average 100% full) and blocks being unnecessarily large (average 50% full)
- it can handle short-term spikes in transaction volume of up to 33%
- it limits the growth of max block size to less than 25% over the previous period
- it will maintain average transaction fees at a stable level similar to that of May/June 2016

The 2016 block (~2 weeks) period was selected because:

- it has been shown to be reasonably adaptive to changing network resources (re: difficulty)
- the frequent and gradual adjustments that result will be relatively easy for miners and node operators to predict and adapt to, as any unforeseen consequences will be visible well in advance
- it minimizes any effect a malicious party could have in an attempt to manipulate max block size

The Block75 algorithm will adjust the max block size up and down in response to transaction volume, including changes brought on by SegWit and Lightning. This is important as it will keep average transaction fees stable, thereby allowing miners and businesses using Bitcoin more certainty regarding future income/expenses.

Other solutions considered

A hardcoded increase to max block size (2MB, 8MB, etc.), rejected because:

- only a temporary solution, whatever limit was chosen would inevitably become a problem again
- would cause transaction fees to vary wildly over time

Allow miners to vote for max block size, rejected because:

- overly complex and political
- human involvement makes this slow to respond to changing transaction volumes

- focuses power over max block size to a relatively small group of people
- unpredictable transaction fees caused by this would create uncertainty in the ecosystem

Backward Compatibility

This BIP is not backward compatible (hard fork). Any code which fully validates blocks must be upgraded prior to activation, as failure to do so will result in rejection of blocks over the current 1MB limit.

Activation

To help negate some of the risks associated with a hard fork and to prevent a single relatively small mining pool from preventing Block75's adoption, activation would occur at the next difficulty adjustment once 900 of the last 1,000 blocks mined signal support and a grace period of 4,032 blocks (~1 month) has elapsed.

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