```
BIP: 90
Title: Buried Deployments
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Comments-Summary: Mostly Recommended for implementation, with some Discouragement
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```

Abstract

Prior soft forks (BIP 34, BIP 65, and BIP 66) were activated via miner signaling in block version numbers. Now that the chain has long since passed the blocks at which those consensus rules have triggered, we can (as a simplification) replace the trigger mechanism by caching the block heights at which those consensus rules became enforced.

Motivation

BIPs 34, 65 and 66 were deployed on mainnet using miner signaling using block version numbers. In short, new consensus rules were proposed for use in blocks with a higher version number (N+1) than the prevailing block version (N) in use on the network, and those rules became enforced under the following conditions:

1. 75% rule: If 750 of the prior 1000 blocks are version N+1 or higher, then blocks with version N+1 or higher must correctly enforce the new consensus rule.
2. 95% rule: If 950 of the prior 1000 blocks are version N+1 or higher, then blocks with version less than N+1 are invalid.

Please see those BIPs for more details.

Note that this trigger mechanism is dependent on the chain history. To validate a block, we must test whether the trigger was met by looking at the previous 1000 blocks in the chain before it, which can be inefficient.

In addition, this mechanism for code deployments have been deprecated in favor of BIP 9 deployments, which offer several advantages (please see BIP 9).

Thus we propose elimination of the logic implementing these kinds of deployments, by replacing the test which governs enforcement of BIP 34, BIP 65, and BIP 66 with simple height checks, which we choose to be the block height triggering the 95% activation rule on mainnet for each of those deployments. This simplification of the consensus rules would reduce the technical debt associated with deployment of those consensus changes.

Considerations

It is technically possible for this to be a non-backwards compatible change. For example, if an alternate chain were created in which BIP 34's 95% activation triggered at a lower height (H') than it did on the current mainnet chain (H), then older software would enforce that version 1 blocks were invalid at heights between H' and H, while newer software implementing this change would not. Similarly, this BIP proposes doing away with the 75% threshold check altogether, which means, for example, that a version 2 block forking off of mainnet at height H-1 which omitted the height in coinbase would be invalid to older software, while accepted by newer software.

However, while newer software and older software might validate old blocks differently, that could only cause a consensus split if there were an extremely large blockchain reorganization onto a chain built off such a block. As of November 2016, the most recent of these changes (BIP 65, enforced since December 2015) has nearly 50,000 blocks built on top of it. The occurrence of such a reorg that would cause the activating block to be disconnected would raise fundamental concerns about the security assumptions of Bitcoin, a far bigger issue than any non-backwards compatible change.

So while this proposal could theoretically result in a consensus split, it is extremely unlikely, and in particular any such circumstances would be sufficiently damaging to the Bitcoin network to dwarf any concerns about the effects of this proposed change.

Specification

The BIP 34, 66, and 65 activation heights are set to 227931, 363725, and 388381, respectively.

The 1000-block lookback test, first described in BIP 34, is no longer performed during validation of any blocks. Instead, a new check is added:

```
   if((block.nVersion < 2 && nHeight >= consensusParams.BIP34Height) ||
(block.nVersion < 3 && nHeight >= consensusParams.BIP66Height) ||
(block.nVersion < 4 && nHeight >= consensusParams.BIP65Height))
return state.Invalid(false, REJECT_OBSOLETE, strprintf("bad-version(0x%08x)", block.nVersion
strprintf("rejected nVersion=0x%08x block", block.nVersion));
```

Furthermore, rather than consider the block versions of the prior 1000 blocks to determine whether to enforce BIP 34, BIP 65, or BIP 66 on a given block, we instead just compare the height of the block being validated with the stored activation heights:

```
   // Enforce rule that the coinbase starts with serialized block height
if (nHeight >= consensusParams.BIP34Height)
{
CScript expect = CScript() << nHeight;
```

```
if (block.vtx[0].vin[0].scriptSig.size() < expect.size() ||
!std::equal(expect.begin(), expect.end(), block.vtx[0].vin[0].scriptSig.begin())) {
return state.DoS(100, false, REJECT_INVALID, "bad-cb-height", false, "block height mismatch
}
}
```

and

```
   // Start enforcing the DERSIG (BIP66) rule
if (pindex->nHeight >= chainparams.GetConsensus().BIP66Height) {
flags |= SCRIPT_VERIFY_DERSIG;
}
```

```
   // Start enforcing CHECKLOCKTIMEVERIFY (BIP65) rule
if (pindex->nHeight >= chainparams.GetConsensus().BIP65Height) {
flags |= SCRIPT_VERIFY_CHECKLOCKTIMEVERIFY;
}
```

Please see the implementation for additional details.

Implementation

https://github.com/bitcoin/bitcoin/pull/8391.

References

BIP34 Block v2, Height in Coinbase

BIP66 Strict DER signatures

BIP65 OP_CHECKLOCKTIMEVERIFY

BIP9 Version bits with timeout and delay

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