What is Mimblewimble?

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Mimblewimble outputs (and inputs) are inherently scriptless.
04:30 UTC, August 2nd, 2016: “Tom Elvis Jedusor” posts a .onion link to a text file on IRC and disappears

04:35 <majorplayer> hi, i have an idea for improving privacy in bitcoin. my friend who knows technology says this channel would have interest http://5pdcbondmprm4wud.onion/mimblewimble.txt

MIMBLEWIMBLE
Tom Elvis Jedusor
19 July, 2016

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Introduction
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Next morning: myself and Bryan Bishop verify it’s actually just text and rehost it.
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October 8th: paper shows Avi Kularni’s and my work extending/formalizing this; presented at Scaling Bitcoin Milan.
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A few minutes later, Bryan Bishop called me to tell me to join the conversation. I pointed out that aggregate signatures give space savings on top of the Voldemort scheme, even without new crypto.

Other Harry Potter characters arrived over the next few weeks; the project continues to move forward. Though I’ve been involved with the project, I have not contributed any code. I am certainly not Ignotus Peverell.

January 17th, 2017: I meet with Ethan Heilman of TumbleBit fame. We go back and forth on Lightning, ZKCP, etc., and discover a powerful new primitive to get all these things on MimbleWimble.

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- **Kernel**: algebraically, difference between outputs and inputs (group element); morally a multisignature key for all transacting parties.
- **Kernel signature**: the kernel must sign itself to prove that the transaction is honestly constructed; by signing other blockchain-enforced data we can add additional functionality (e.g. locktimes).
Mimblewimble Transactions
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Inputs

Outputs

Kernels
Mimblewimble Transactions

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- MimbleWimble gives us CT and requires storing: 15Gb of transaction kernels, headers etc.; 2Gb of unspent outputs, and 100Gb of UTXO rangeproofs.
- In pre-segwit Bitcoin, none of this is separable “witness data” which can be dropped in exchange for trust. In MW the rangeproofs are, leaving less than 20Gb of normative blockchain space.
Trust Model: Blockchain

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*The exact structure of each individual transaction does not need to be publicly verifiable.*
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- To do a hash-locktimed transaction, buying party sends coins to a 2-of-2 multisig output, conditioned on the seller signing a transaction to return the money at a later block.
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This primitive is the basis of: cross-chain atomic swaps, ZKCP’s, Lighting Channels, TumbleBit, and more.
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Since the locktimed transaction never touches the blockchain unless something goes wrong, the default case is that the atomic swap is indistinguishable from any other transaction.
Next Steps

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- ValueShuffle
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Open Problems

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- Peer-to-peer layer that avoids monitoring (ValueShuffle?)
- Quantum resistance
Thank You

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