

# Bitcoin Load Spike Simulation

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# Goal

How does a temporary “spike” in transaction rate affect confirmation delay distribution?

For a fixed “spike profile” how does varying block size affect this distribution?

Rationale: We predict “black swans” induce contemporaneous txn pressure.

eg: wallet vuln where easiest mitigation is transfer to new wallet, DoS attacks, holiday shopping rush, side-chain exodus panic

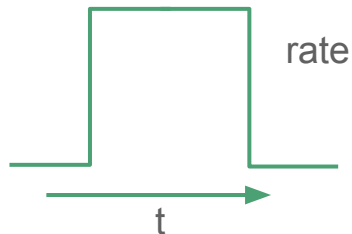
# Method

Stochastic simulation: *bitcoin\_load\_spike*<sup>†</sup>

- based on the *Bitcoin Traffic Bulletin #34* simulation<sup>‡</sup>

Assumptions:

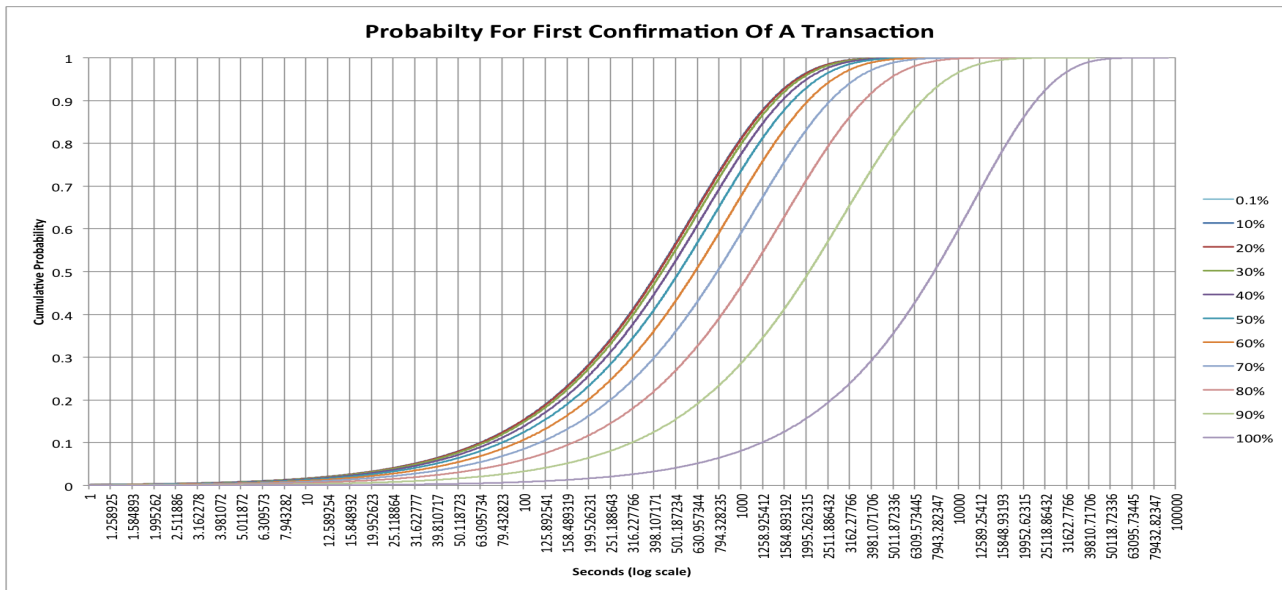
- mempool as infinite FIFO queue (no fees / priority)
- transactions 250b
- blocks arrive in poisson distribution
- txns arrive in poisson dist, though rate varies:



<sup>†</sup> [https://github.com/cfromknecht/bitcoin\\_load\\_spike](https://github.com/cfromknecht/bitcoin_load_spike)

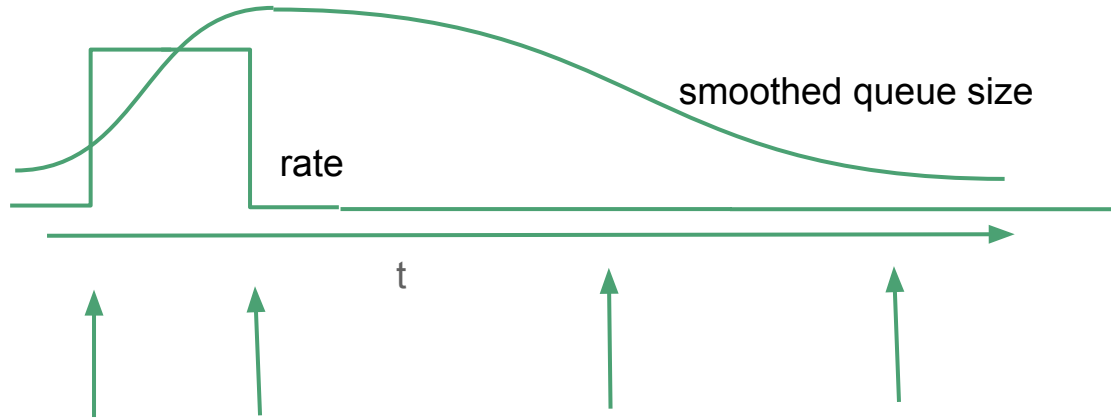
<sup>‡</sup> <http://hashingit.com/analysis/34-bitcoin-traffic-bulletin>

# Traffic Bulletin Results



<http://hashingit.com/analysis/34-bitcoin-traffic-bulletin> (not our work)

# Expected Results



latency distribution plots at different times

repeat with different block sizes

# Further Work

## Literature Search:

- queue theory, router evolution
- other work on bitcoin

## Further Work:

- compare to empirical data - best fit, predictive power
- explore transaction loss, resubmission, replace-by-fee

Feedback: find out if this approach is useful for Bitcoin