
The Rated List
Mentor: Dankrad Feist
Chirag – Hopinheimer
Ethereum Protocol Fellowship

Overview

1. Formally specify the rated list
2. Build a simulator
3. Unit testing
4. Collect metrics against attacks

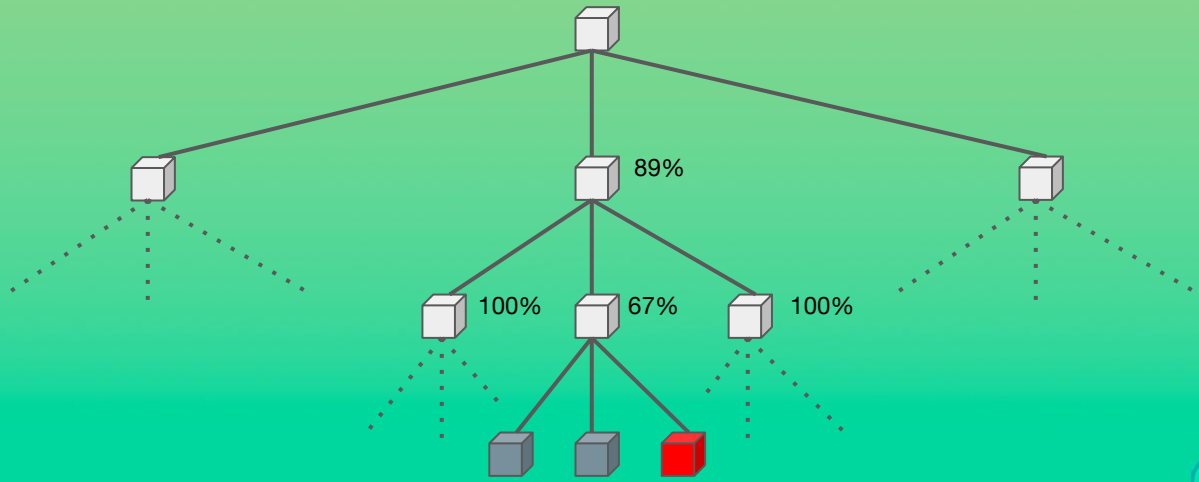
github: https://github.com/dankrad/rated-list-specs

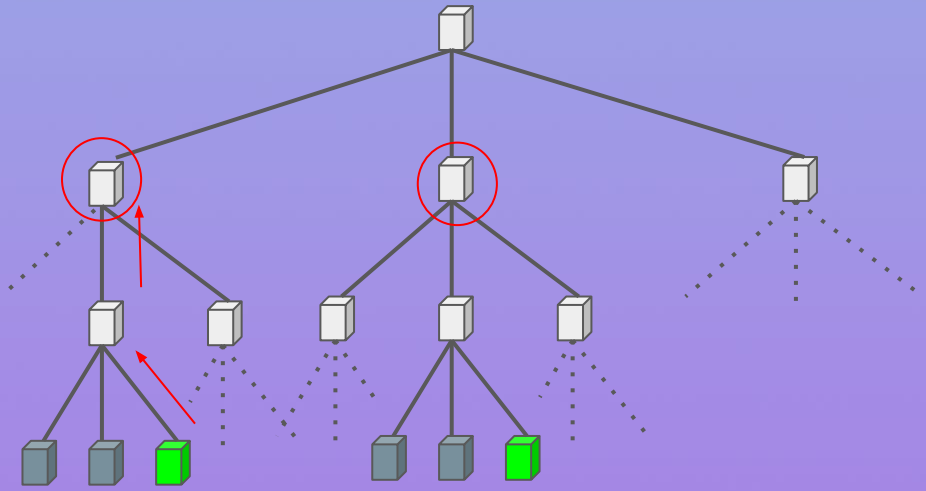
Level 0

Level 1

Level 2

Level 3 = T



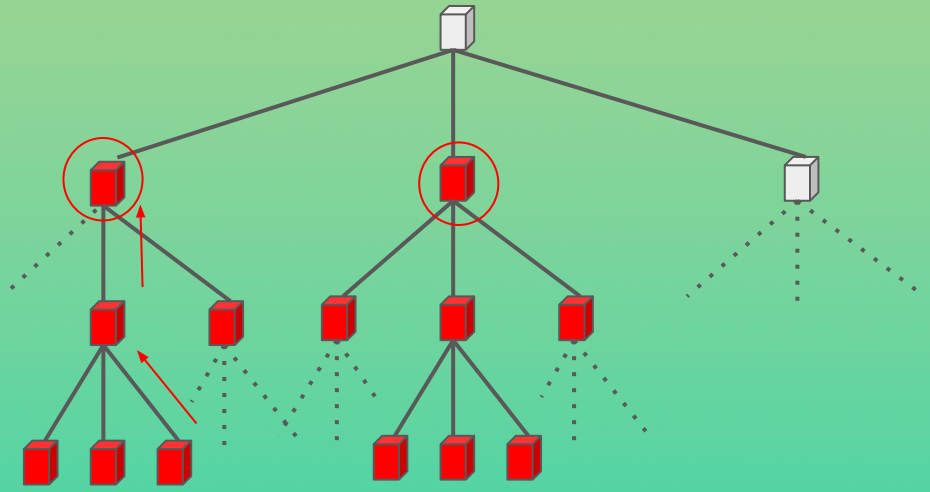


Scoring

1. Best ancestor score on different paths to the root
2. Filter nodes based on a threshold
3. If zero nodes are filtered out use the average score of nodes as the threshold
4. Use a querying strategy to query the filtered nodes - highest score first, average score first, random, all
5. Default score of every node is 1.0 (optimistic)

Why?

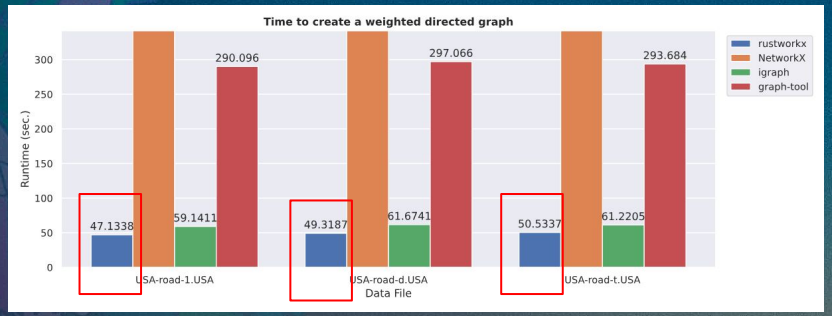
1. Add defence against sybil nodes flooding the local keyspace
2. Optimization on the number of requests sent out for samples
3. Per slot matches the tempo of sampling, ideally
4. Removes “dead sub-trees”

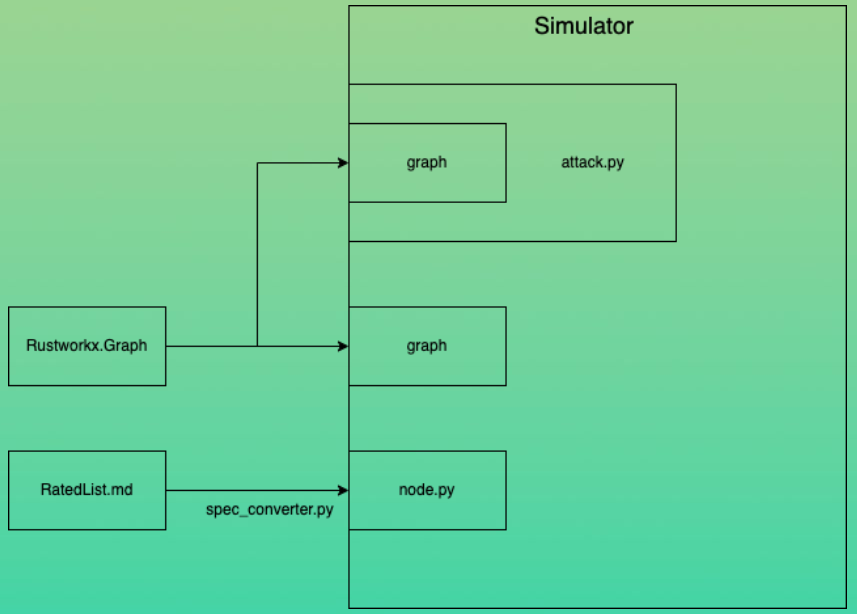


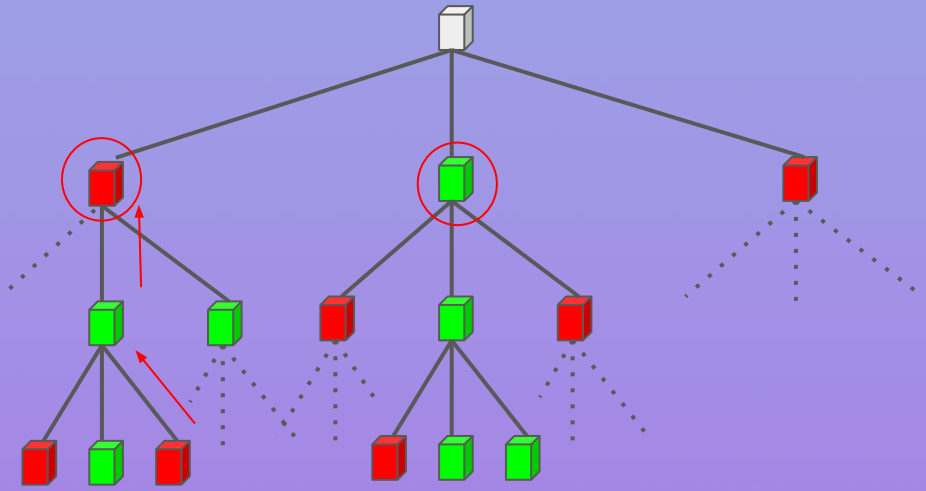
Simulator

Configuration

- Random graph with num_nodes = 10000 and degree = 50
- Max Depth of rated list = 3
- rustworkx - one of the fastest libraries for graphs
    - Has a python binding
- Querying Strategy: Use refiltering if needed but try to finish sampling using any strategy. Number of requests measured



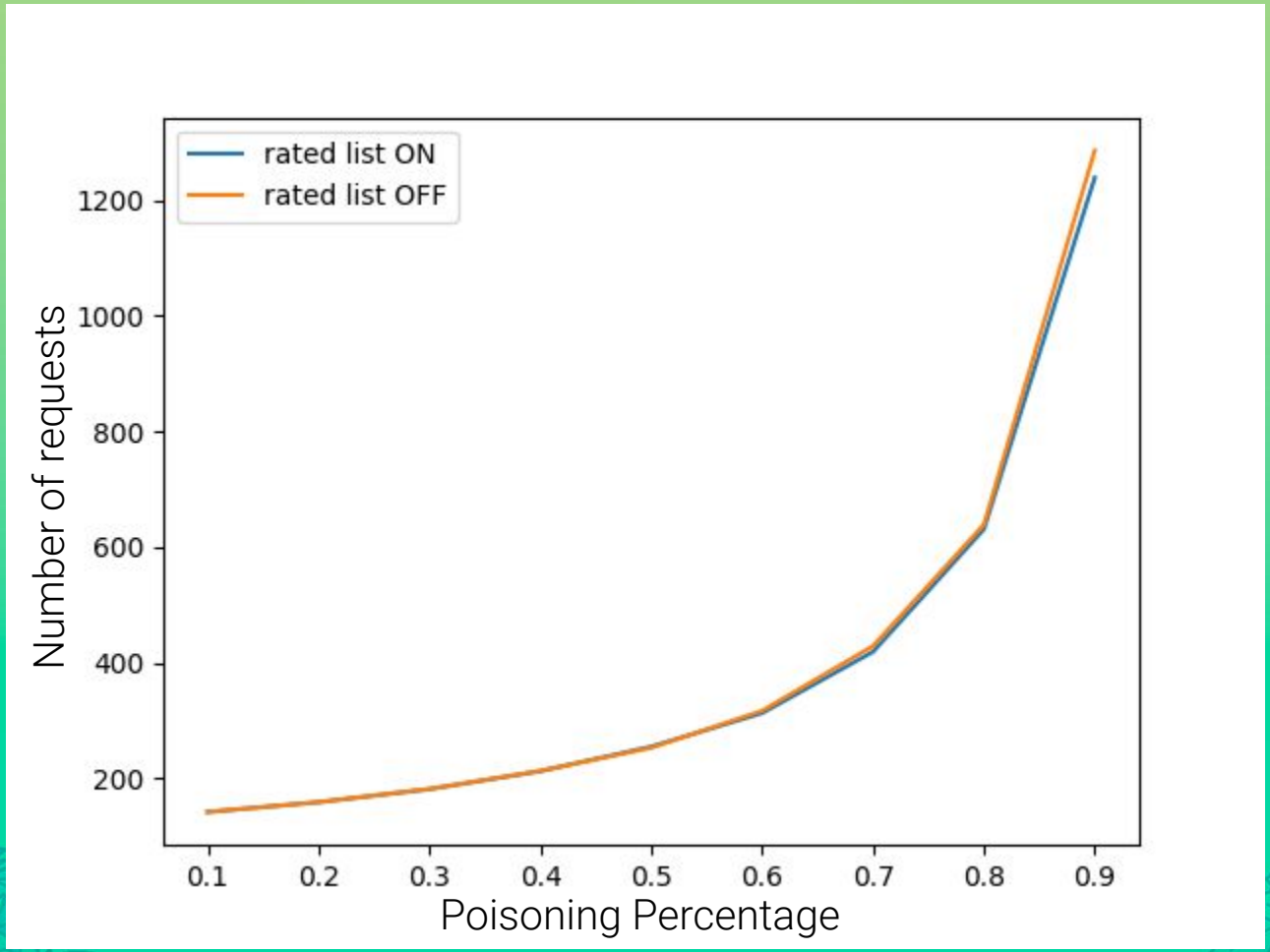


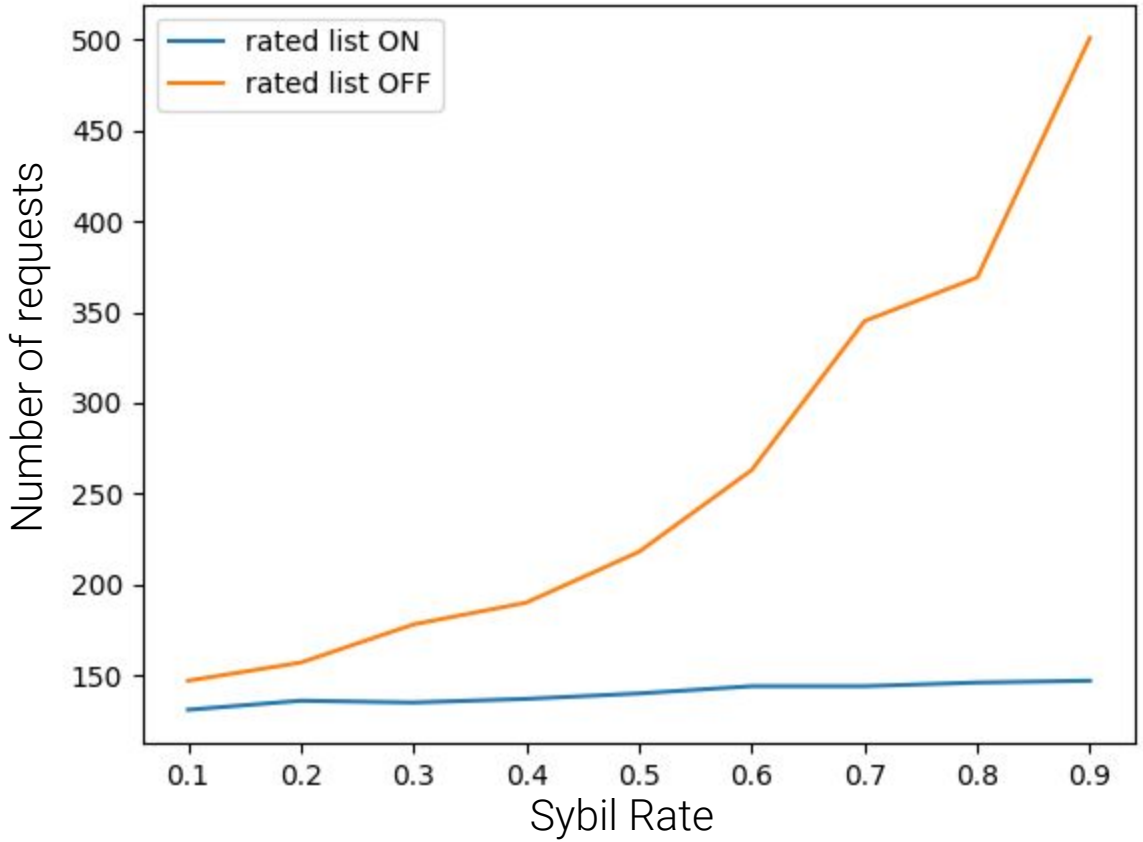


Attacks

1. Random poisoning from 10% to 90% of the network
2. Flooding the local keyspace using sybil nodes at sybil rates from 0.1 to 0.9
3. Corrupting scores of other nodes to balance malicious scores
4. Corrupting own node for avoiding bandwidth usage

Results


rated list ON
rated list OFF
Number of requests
1200
1000
800
600
400
200
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Poisoning Percentage


rated list ON
rated list OFF
500
450
400
350
300
250
200
150
Number of requests
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Sybil Rate

Future Work

1. Optimize the base implementation for greater experimentation surface area
2. Modularize the querying strategy - extend the simulator for other constructions like the rated list
3. Simulate and measure global safety metrics and other robustness properties
4. Probabilistic scoring as oppose to a deterministic scoring that is currently employed in the rated list


CAN I GET SAMPLES
117-134? WITH PROOFS PLEASE!
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Appendix

Size estimate of routing table

300 * 1000000 ~ 300MB