P2P Networks & Consistency

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Life isn't fair

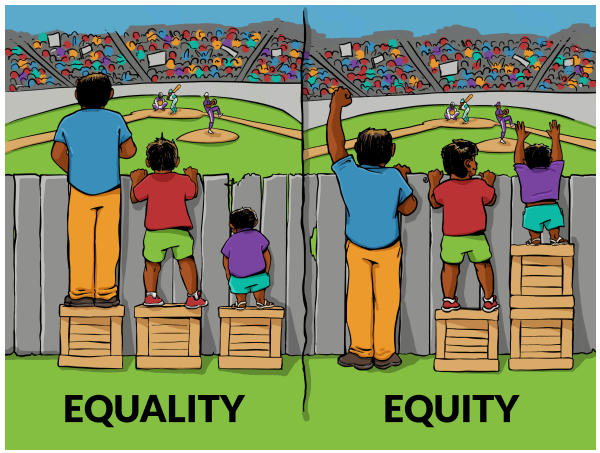
Fairness

From Wikipedia, the free encyclopedia

Fairness or **being fair** can refer to:

- Justice
- Equity (law), a legal principle allowing for the use of discretion and fairness when applying justice
- Social justice, equality and solidarity in a society
- Distributive justice, the perceived appropriateness of the distribution of goods, benefits, and other outcomes in a society, group, or organization (see also: teleology)
- Procedural justice, the perceived appropriateness of rules or procedures used to allocate goods, benefits, and other outcomes (see also: deontology)
- Interactional justice, the perceived appropriateness of interpersonal treatment
- Environmental justice, the perceived appropriateness of the use or treatment of the environment or people via the environment, typically as a function of interpersonal or international relations
- Fairness measure, metrics to quantify the fair distribution of resources

What do we mean by fairness?



- Capitalism? Kind of fair, I guess.
  - You get what you give– *quid pro quo*.
- BitTorrent? Also kind of fair.
- Is there any other kind of fairness?

FairTorrent

- Maintains deficit list for each peer: blocks downloaded from that given peer - blocks uploaded to a given peer.
- Uploads to the requester with the lowest deficit.
- Similar request process as BitTorrent.

BitMate & Clustering

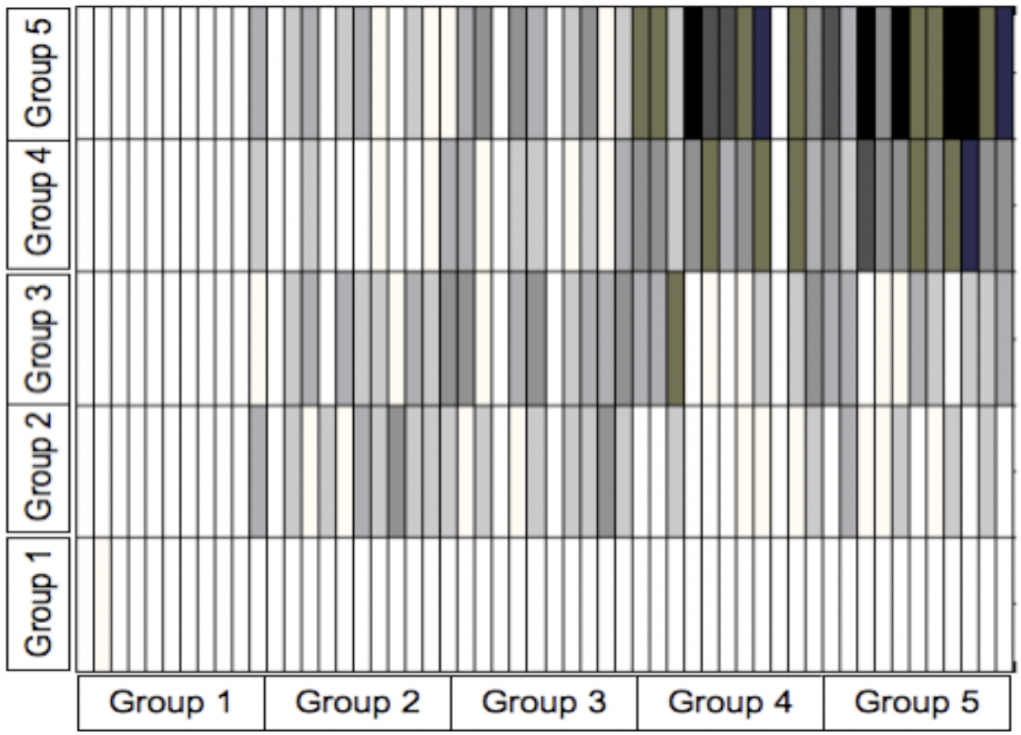


Figure 4: Number of times peers in each group unchoke each other, averaged over all runs. Darker regions represent higher number of mutual unchokes within a group. Low-bandwidth nodes (group 1, 2, 3) do not form mutually beneficial clusters.

BitTorrent: Tit-For-Tat

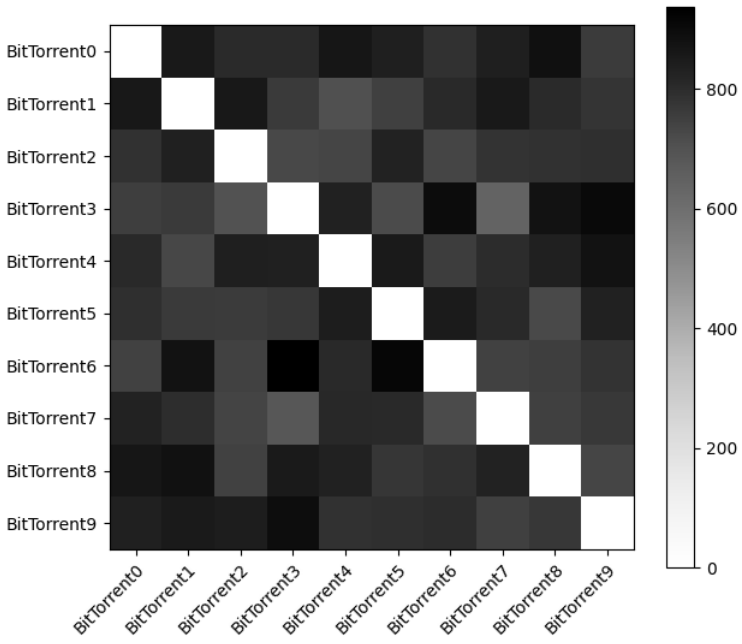


Figure: Sorted Alphabetically

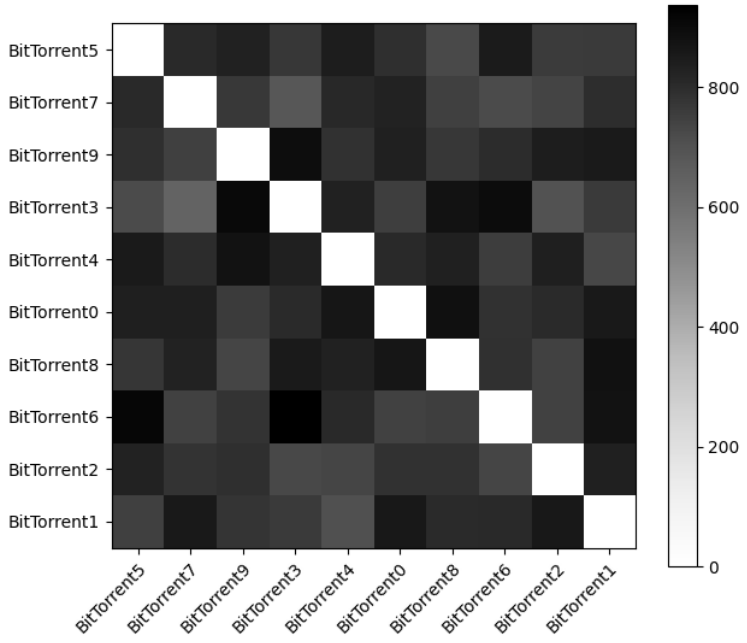
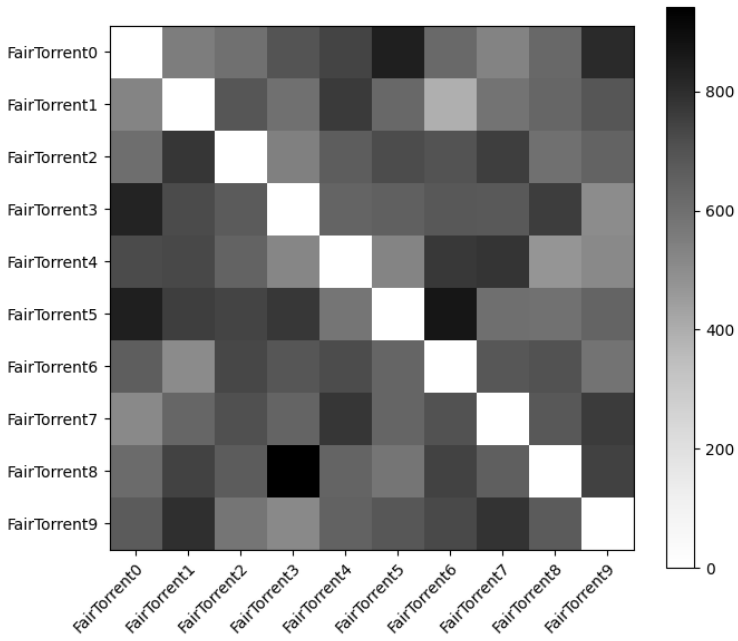


Figure: Sorted by Bandwidth (lowest to highest)

FairTorrent: Tit-For-Tat but Nicer



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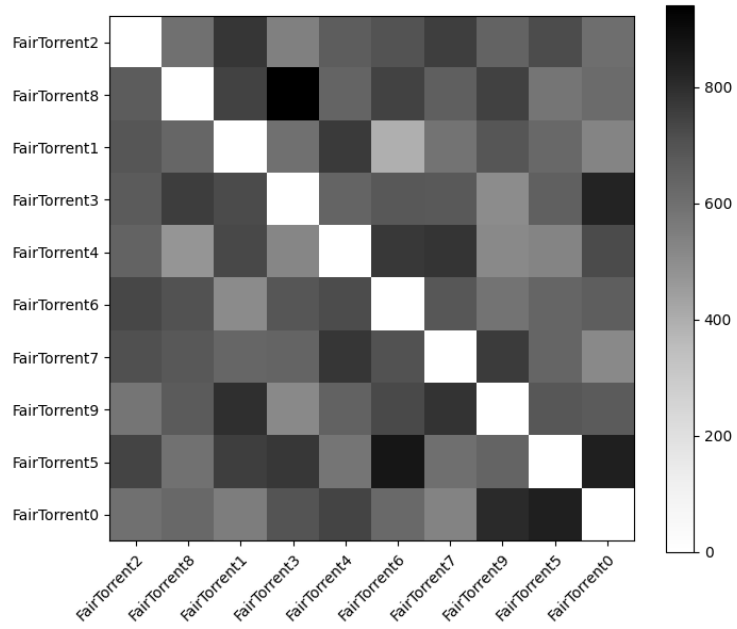
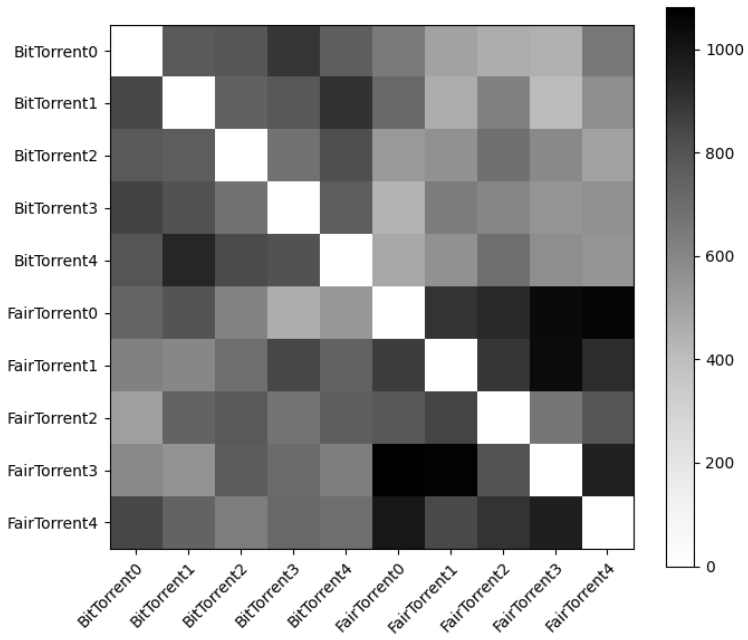


Figure: Sorted by Bandwidth (lowest to highest)

BitTorrent vs. FairTorrent (unchokes)



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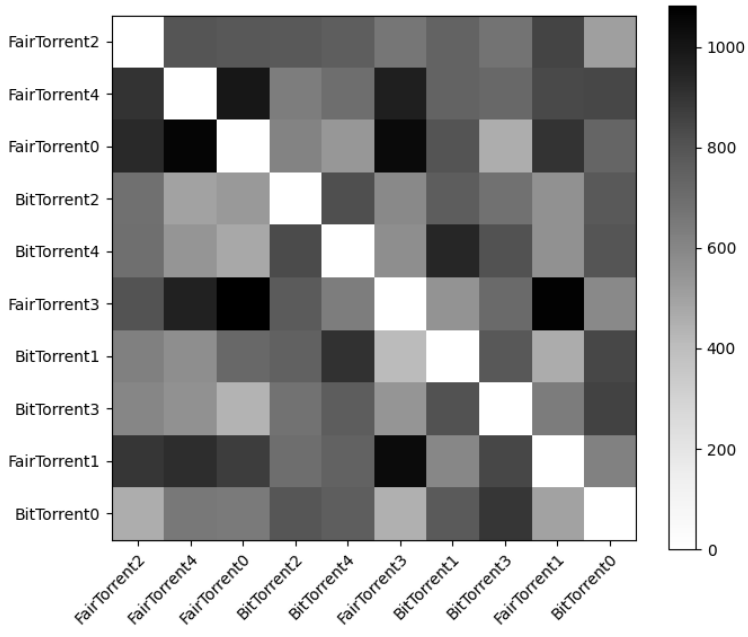
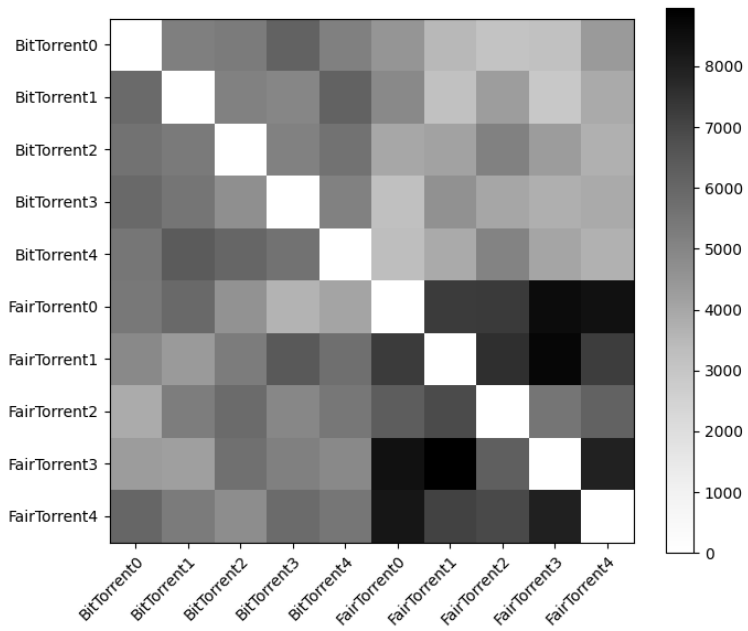


Figure: Sorted by Bandwidth (lowest to highest)

BitTorrent vs. FairTorrent (blocks exchanged)



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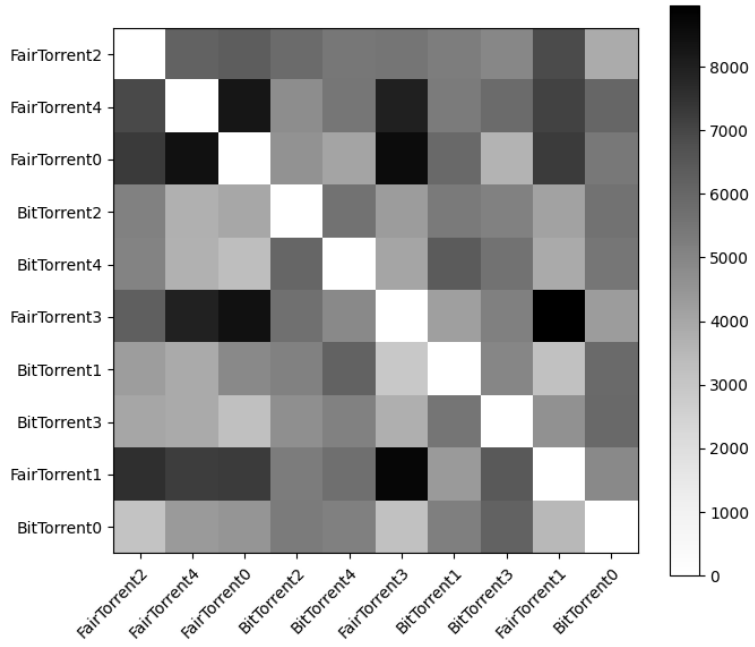
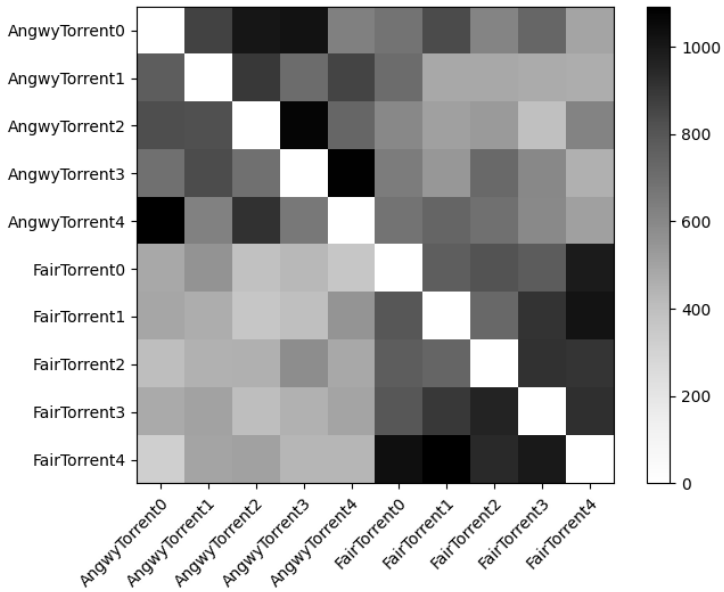


Figure: Sorted by Bandwidth (lowest to highest)

AngwyTorrent

- Like FairTorrent, but consistently choosing the peer with the highest deficit to send blocks to.
  - Probably out of spite.
  - Kill them with kindness?
- In actuality, hoping to fill the missing transactions.

AngwyTorrent vs. FairTorrent



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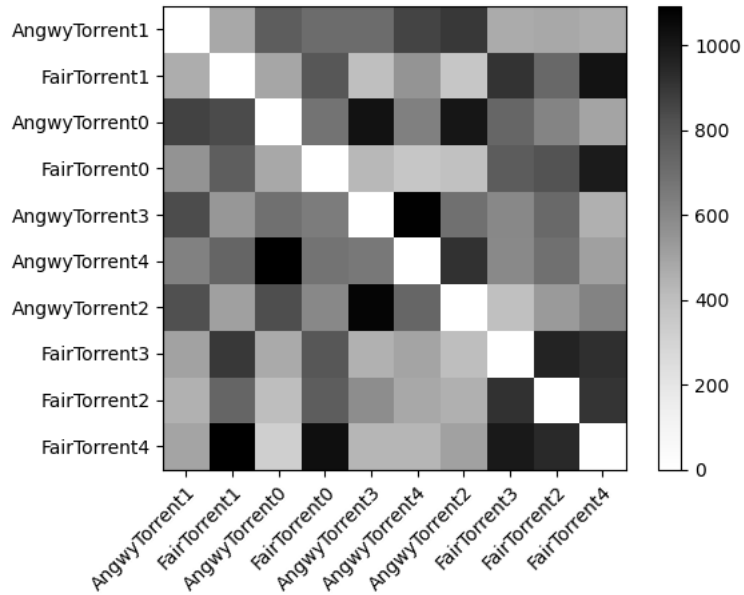
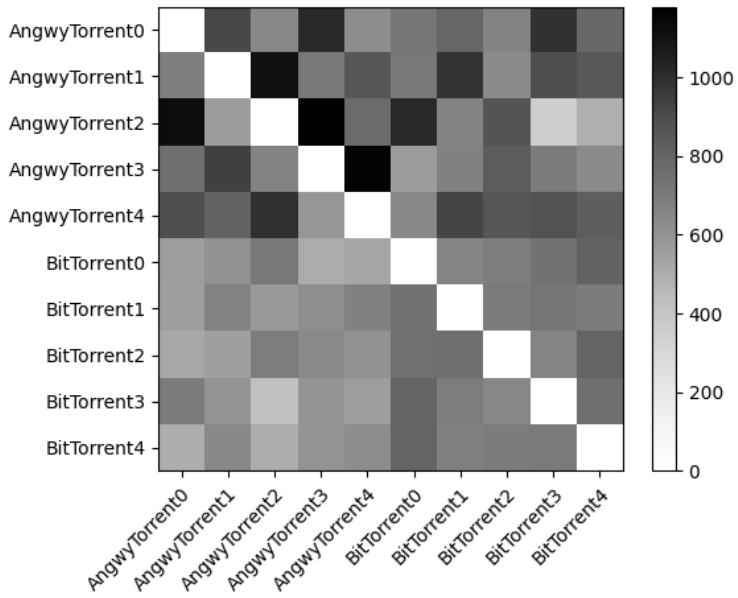


Figure: Sorted by Bandwidth (lowest to highest)

AngwyTorrent vs. BitTorrent



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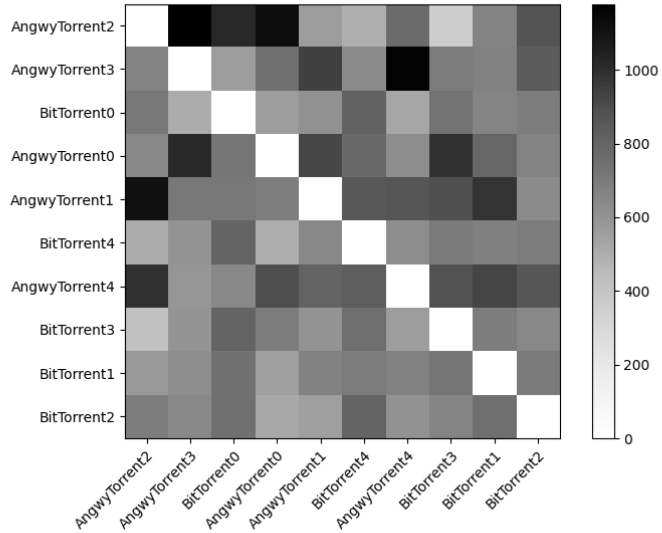

Figure: Sorted by Bandwidth (lowest to highest)

Rounds to Completion

```
Completion rounds: avg (stddev)
Seed0: 0.0  (0.0)
AngwyTorrent1: 77.3  (5.2)
AngwyTorrent0: 77.5  (4.0)
AngwyTorrent4: 77.5  (4.3)
AngwyTorrent3: 78.5  (5.0)
AngwyTorrent2: 78.9  (5.5)
BitTorrent0: 79.8  (6.5)
BitTorrent3: 80.4  (5.7)
BitTorrent4: 80.5  (7.4)
BitTorrent1: 80.8  (5.7)
BitTorrent2: 81.4  (5.4)
```

```
Completion rounds: avg (stddev)
Seed0: 0.0  (0.0)
AngwyTorrent3: 76.9  (4.8)
AngwyTorrent1: 77.2  (4.8)
AngwyTorrent2: 78.0  (4.5)
AngwyTorrent0: 78.1  (5.1)
AngwyTorrent4: 78.7  (5.5)
FairTorrent4: 78.8  (4.8)
FairTorrent3: 78.8  (5.5)
FairTorrent1: 78.9  (5.2)
FairTorrent0: 79.2  (5.1)
FairTorrent2: 79.3  (4.9)
```

Next Steps

- Consider the difference in the counts of unchokes, i.e. what is the difference in the number of unchokes from A to B versus B to A?
- Continue playing with the creation of bandwidth-based clusters.
- Look into the details of BitMate's implementation.

Bibliography

Umair Waheed Khan and Umar Saif. Bittorrent for the less privileged. In *Proceedings of the 10th ACM Workshop on Hot Topics in Networks, HotNets-X*, New York, NY, USA, 2011. Association for Computing Machinery.