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Impact of Dynamic Social Relationship in a File Sharing System.

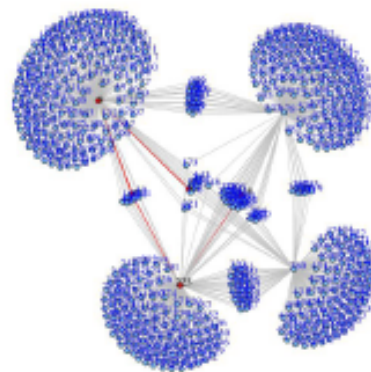
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November, 2013

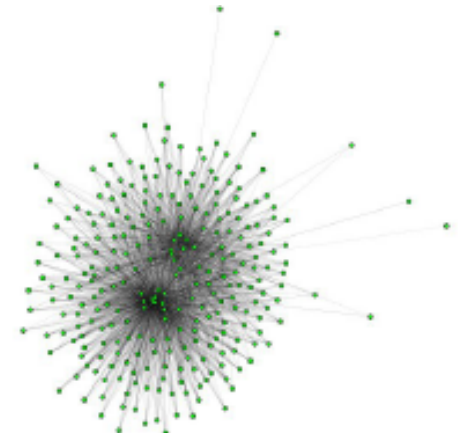
- *Bittorrent is a killer application!*
- BitTorrent == 36% of traffic all upstream in North America.

Torrent swarms are highly dynamic.

- Churn
- Groups formation (communities)



(a)



(b)

- Despite the success, Bittorrent depends on users behavior.
- Moreover, the impact of *ISP** depends on the swarm organization (topology).

Social torrents

We clearly note an increasing number of communities in social networks dedicated to torrent dissemination.

Social torrents

- In this case... Long term relationship increases.

[Wang et al. 2012] stable peers grows from 5% to 35% (*twitter torrents*);

[Wang and Liu 2012] 85% of peers behave to multiple swarms -> *bundling*

[Pietiläinen and Diot 2012] peers stability may be benefit groups -> temporal communities.

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It is not clear how social torrent impacts (or contributes) on topology formation. For example, will it benefit peers clustering? Can we explore this long term relationship and new topology?

Our goal

Investigate the differences between standard disseminated torrents and Facebook disseminated torrents (*social torrents*)

We focus on 3 aspects

- Regionalism (geo. locality and network AS)
- Torrent healthy
- Swarm topology

Crawling torrents

- 60 days crawling a random set of torrents
 - 15,086 are traditional torrents
 - 1,612 are social torrents (Facebook).

For each torrent, we join its swarm and repeatedly ask the tracker for partners. We repeat this process until we are not able to reach more peers.

Crawling torrents

Description	Traditional	social
Number of Countries	230	222
Number of IP's	1.280.688	358.463
Number of Peers	1.434.393	410.858
Number of AS's	11366	7567
Number of Trackers	3.602	821
Number of Files	962.997	23.398
Number of File-extensions	1.747	457

MAIN SAMPLE DESCRIPTION

Overall Characterization

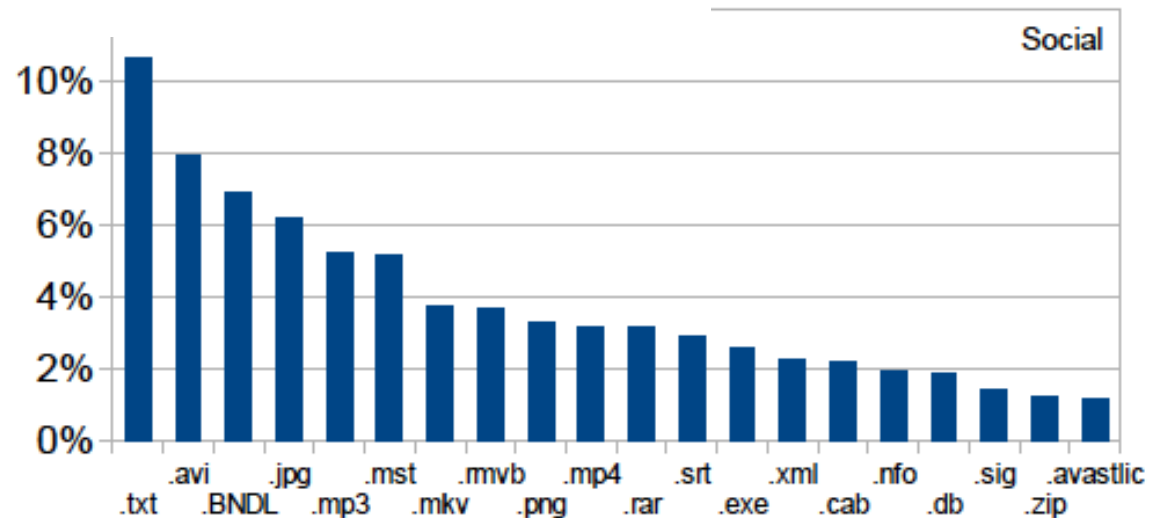
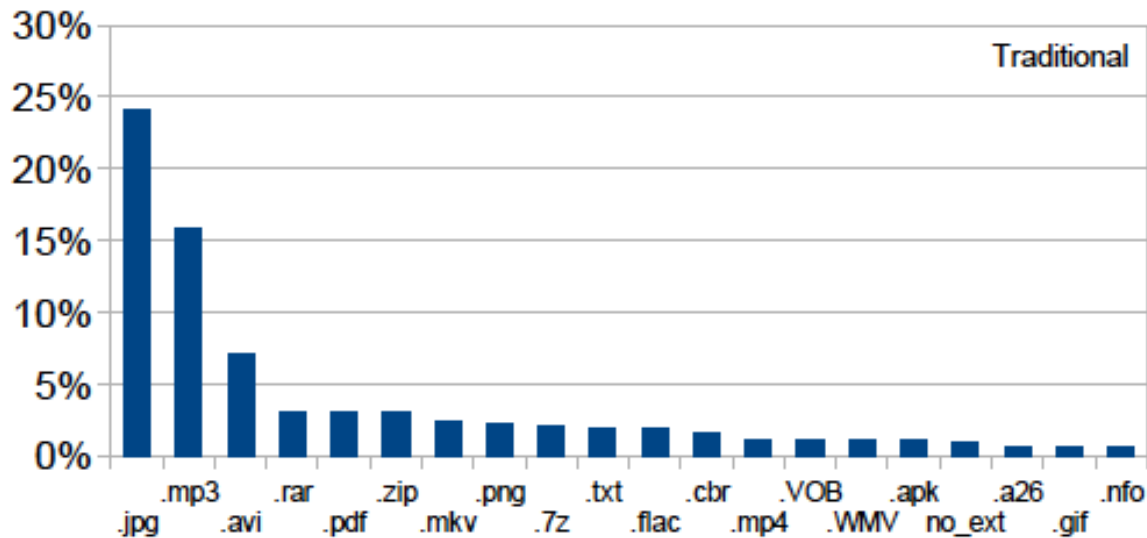
Overall Characterization

Regionalism

Global Social Swarm			
total	%	Id AS	Country
147	13,8%	75741	India
28	2,6%	76780	India
21	1,9%	17921	India
15	1,4%	77677	India
13	1,2%	63986	United Arab Emirates
11	1,0%	77690	India
11	1,0%	101639	India
10	0,9%	74893	India
10	0,9%	17728	India
10	0,9%	101554	Pakistan
25.6% of peers (24.4% around India)			
Global Non-Social Swarm			
total	%	Id AS	Country
74	12,5%	75741	India
18	3%	63986	United Arab Emirates
17	2,8%	498	United Arab Emirates
16	2,7%	76780	India
15	2,5%	17921	India
9	1,5%	101639	India
9	1,5%	101554	Pakistan
9	1,5%	53316	United Arab Emirates
6	1%	49906	United Kingdom
5	0,8%	188581	United Arab Emirates
29.8% of peers (20.7% around India)			

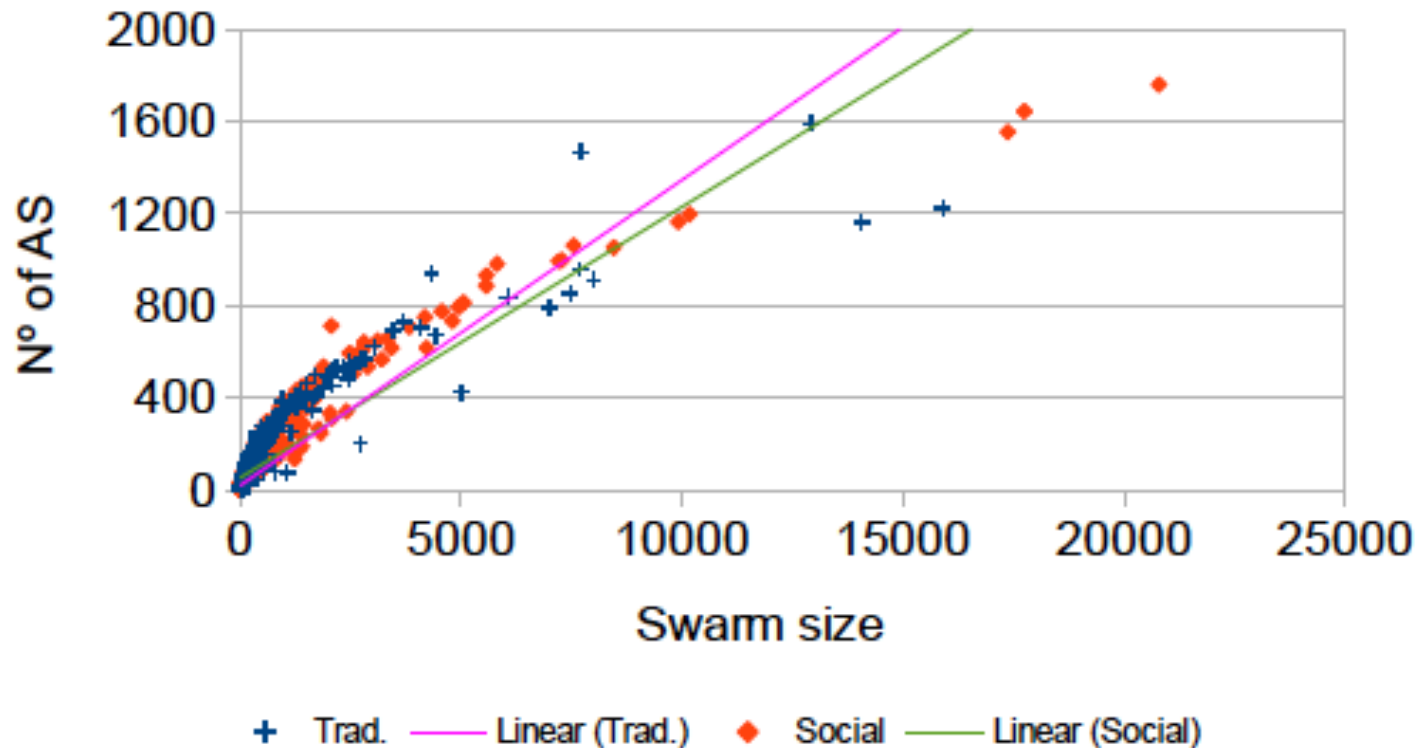
Overall Characterization

File type distribution



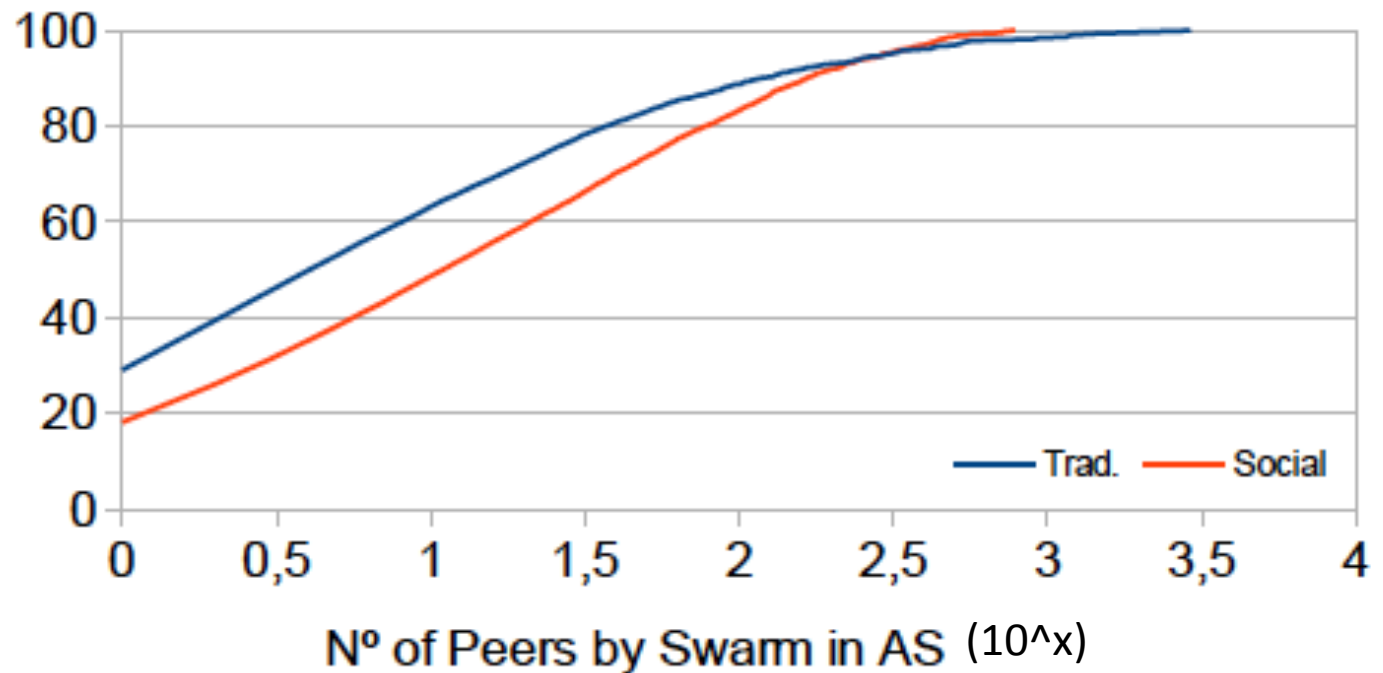
Overall Characterization

AS's involved



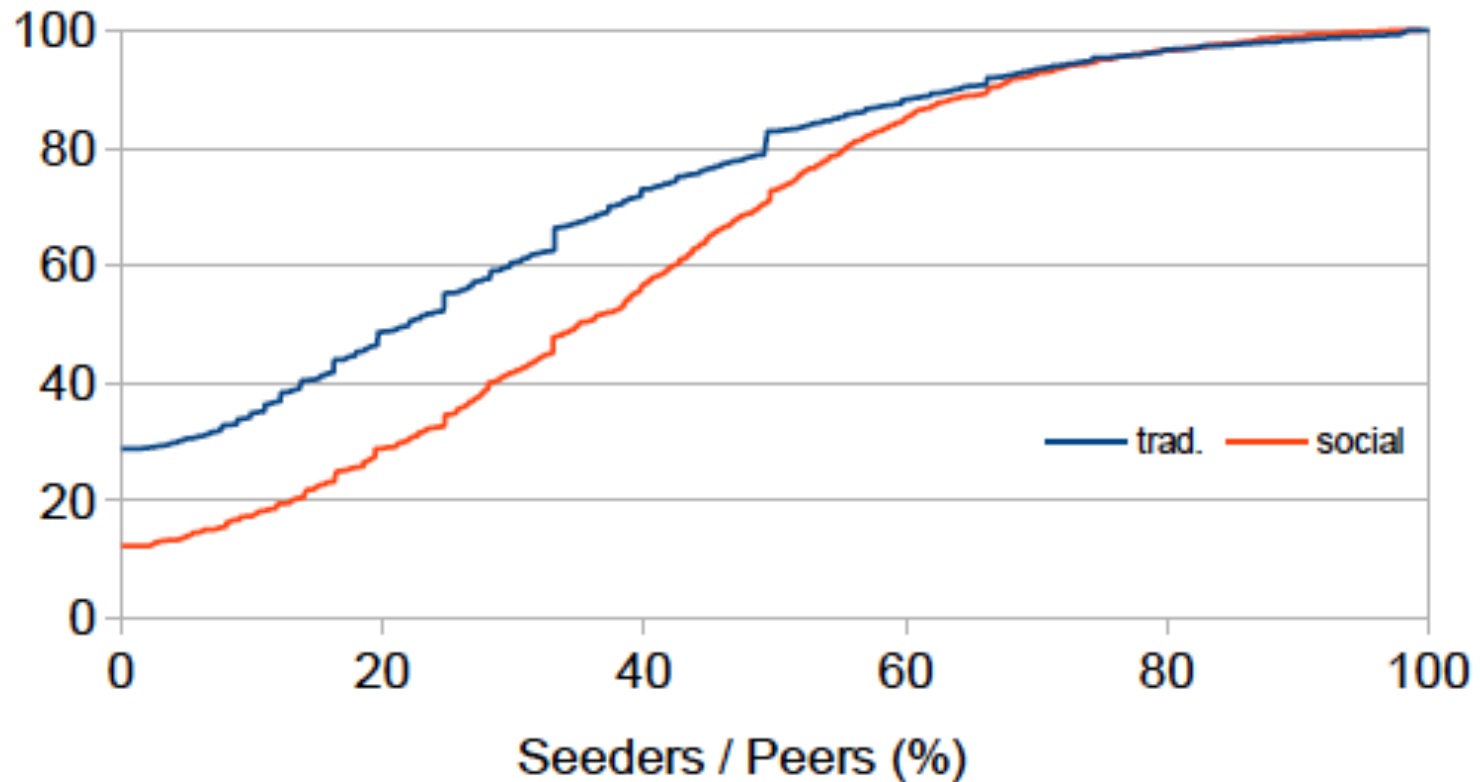
Number of AS's by swarm Size

Torrent Health



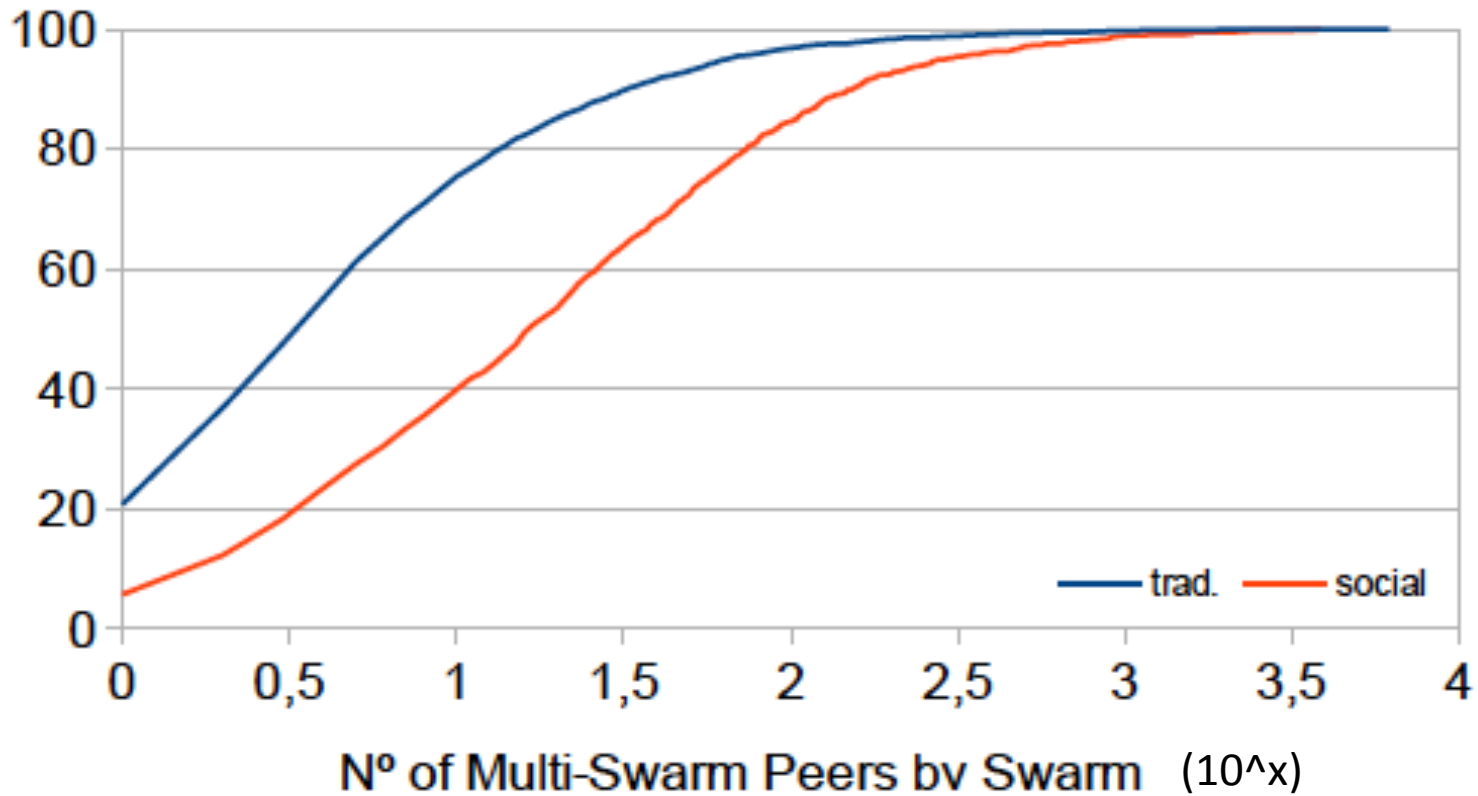
Number of peers by swarm in AS's

Torrent Health



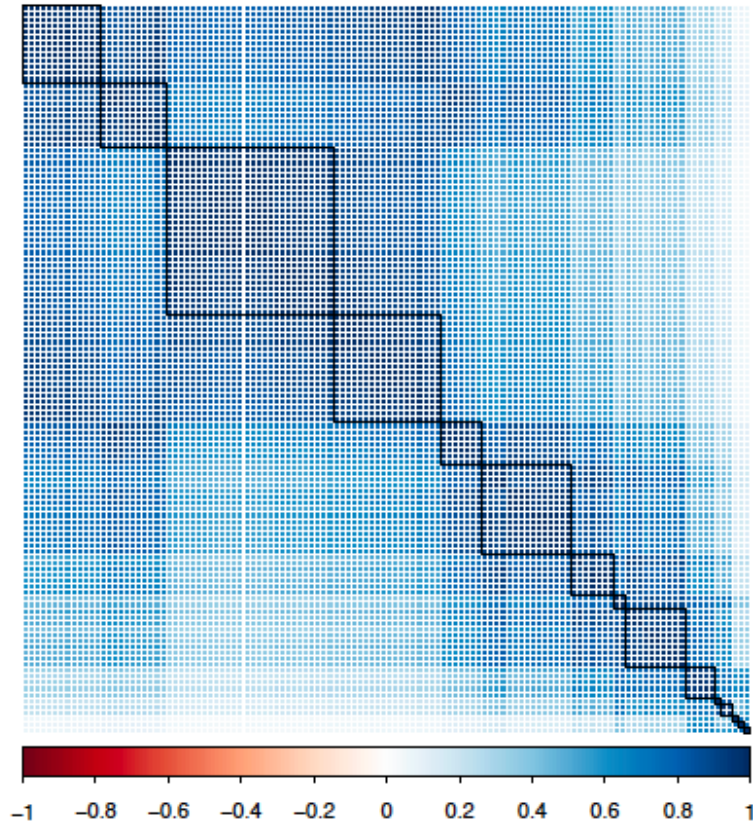
Proportion of seeders by peers cdf

Torrent Health

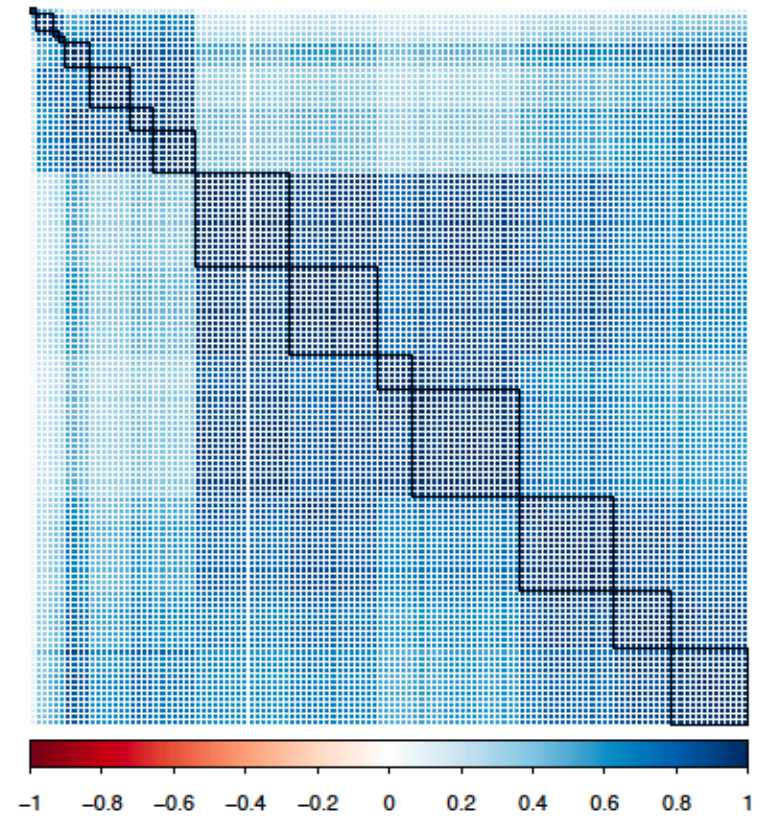


Number of multi-swarm peers by swarm

“Peers similarity”



Swarm similarity matrix of social dissemination



Swarm similarity matrix of traditional dissemination

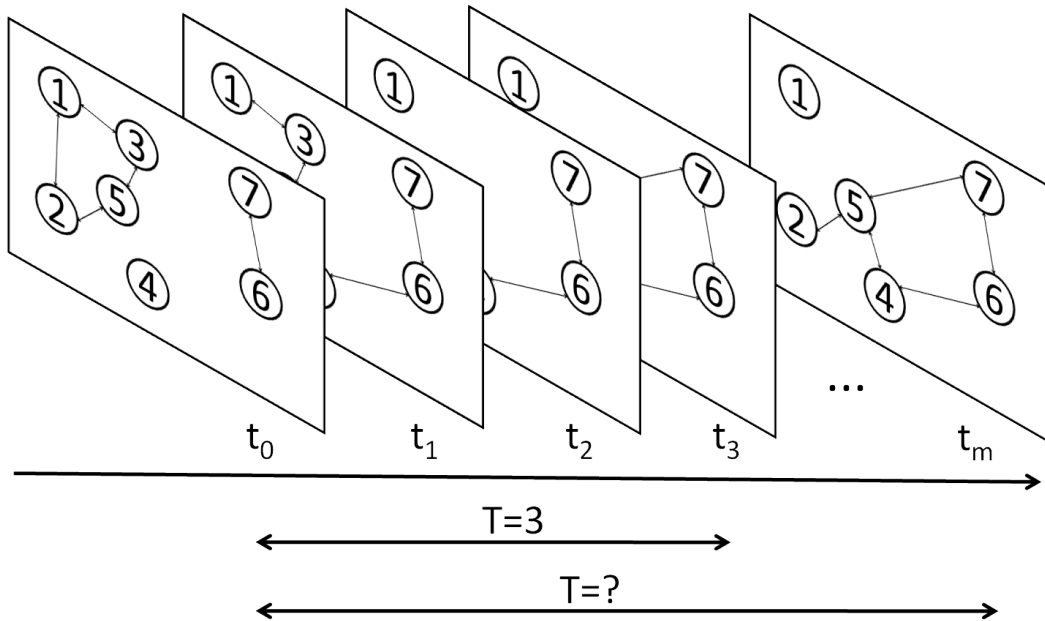
Ongoing work

- Crawling torrent topology
 - Use of DHT/PEX to discover peers relationships

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 - Use of DHT/PEX to discover peers relationships
- Model/differ the evolving topology of a *social torrent*.
 - Focus on “0-dayz” and *television drama series*.

Ongoing work



$$\mathcal{G}_t(\mathcal{V}_t, \mathcal{E}_t)$$

$$(t = 0 \text{ a } t = T_N)$$

$$\Delta = T_i - T_{i-1}, \text{ com } 0 \leq i \leq N.$$



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In sum...

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In sum...

- The social dissemination of a torrent impacts on the swarm...
 - + Peers Long-term relationship
 - + Locality
 - + Torrent Health
- To do: study the evolving topology