

Organization Mining Using Online Social Networks

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Information Systems Engineering
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<http://proj.ise.bgu.ac.il/sns/index.html>

Speaker: Dr. Rami Puzis

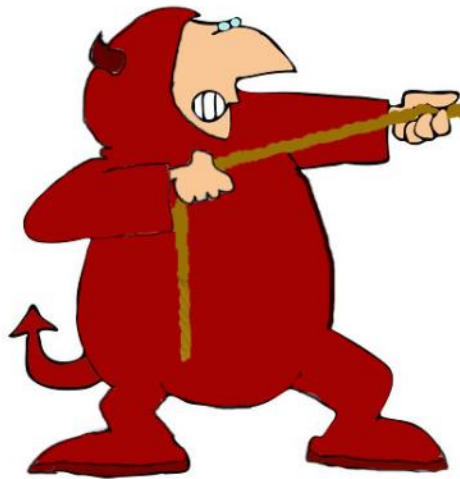
Joint work with: Prof. Ariel Felner, Dr. Asaf Shabtai,
Dr. Roni Stern, Dr. Michael Fire, Dr. Zahy Bnaya,
Mrs. Abigail Paradis, Mrs. Liron Sammama, Mr. Tal Beja

Abundance of

- People
 - Personal information
 - News
 - Opinions
 - Impressions
 - Offensive content
 - Distress signals
-
- Fewer barriers, limited awareness to privacy



Offenders and defenders often have similar



- Exploit personal information
- Hide within the crowd
- Divert public opinion



Problems
Tools
Algorithms



- Detect misusers
- Identify terrorists
- Protect national secrets

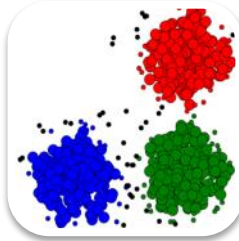
Organization Mining



Targeted Crawling



Centrality Analysis



Community Detection



Connecting Socialbots

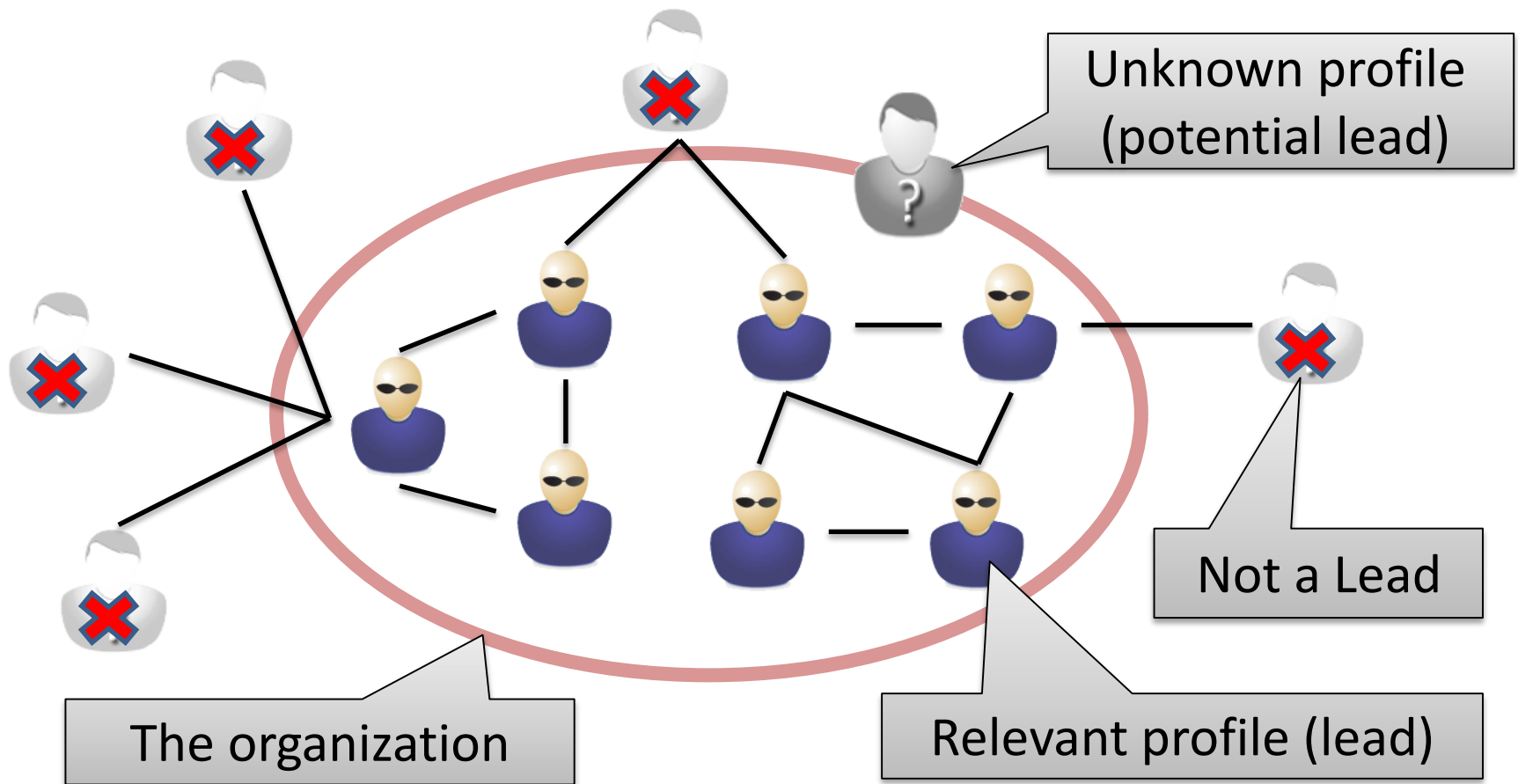
...One Ring to find them,...

- Find members of a specific organization
- Find all leads related to a given target
- ...
- Find profiles matching a given search criteria

Ethical/legal issues....



Target Oriented Network Intelligence Collection (TONIC)



Joint work with Roni Stern, Liron Samama, Tal Beja, Zahy Bnaya, Ariel Felner,
AAAI 2013, SocialCom 2013, SoCS 2014

TONIC Problem



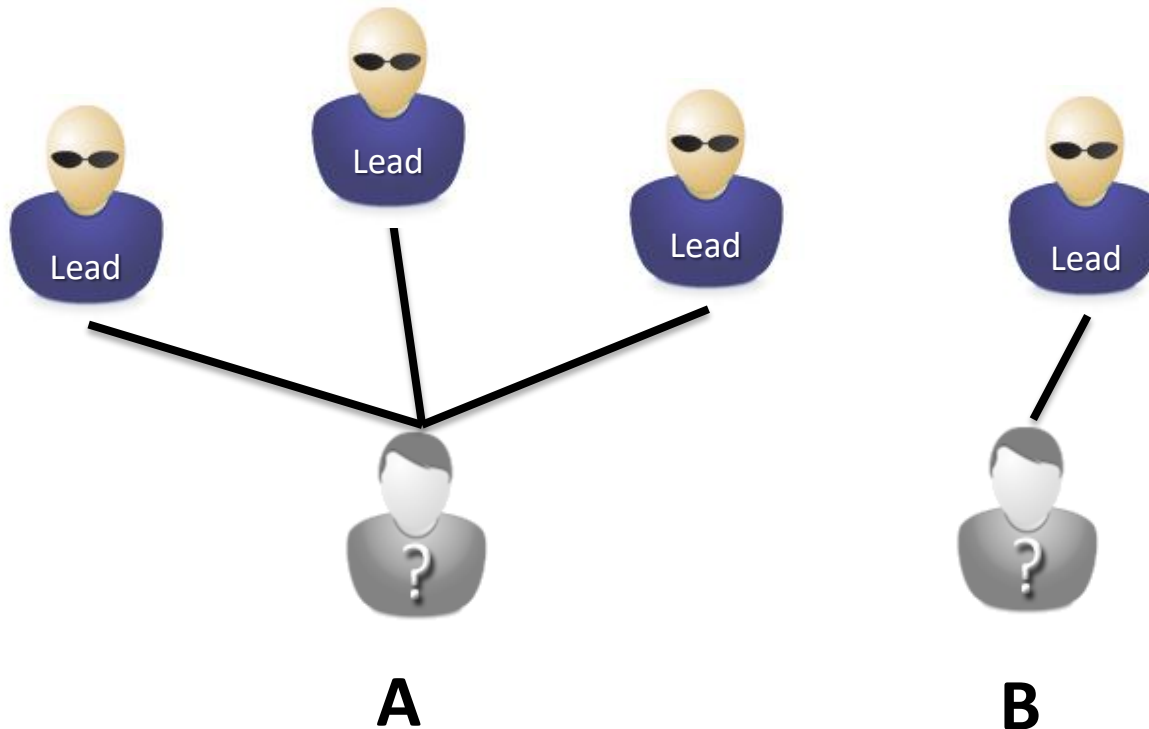
- Operations:
 - *Is lead?*: is the profile **associated with the organization?**
 - *Acquire*: **extract full information** about the profile from the social network.
- Objective:
 - Maximize the number of leads found
- Constraints:
 - Limited number of operations.
 - **1st ring**: only leads are acquired
 - **2nd ring**: non leads which are directly connected to leads can be acquired

The Homophily Principle



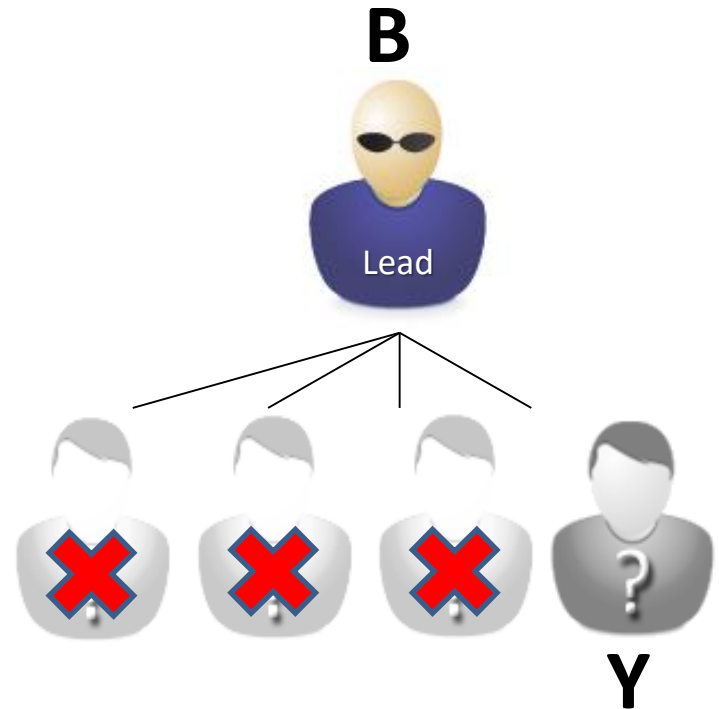
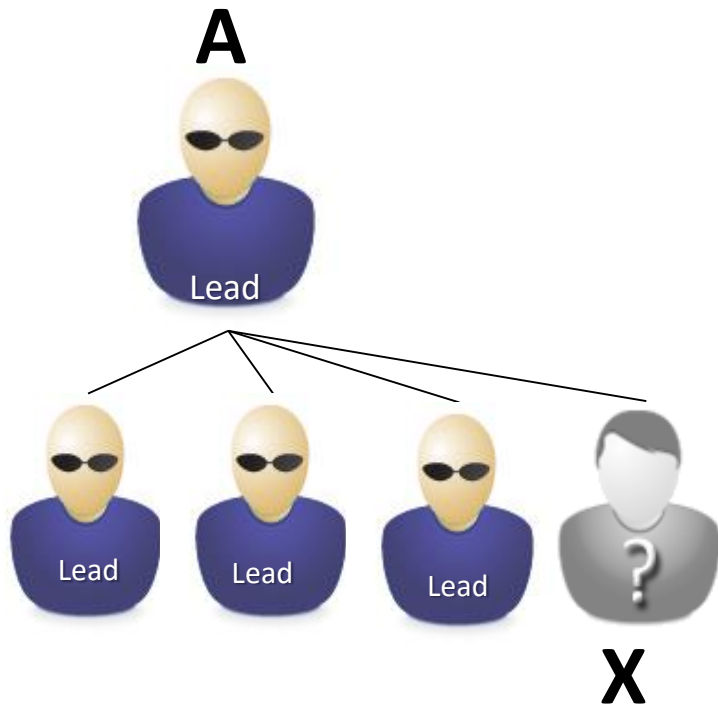
People “love those who are like themselves” (Aristotle)

Check the profile connected to the largest # of leads





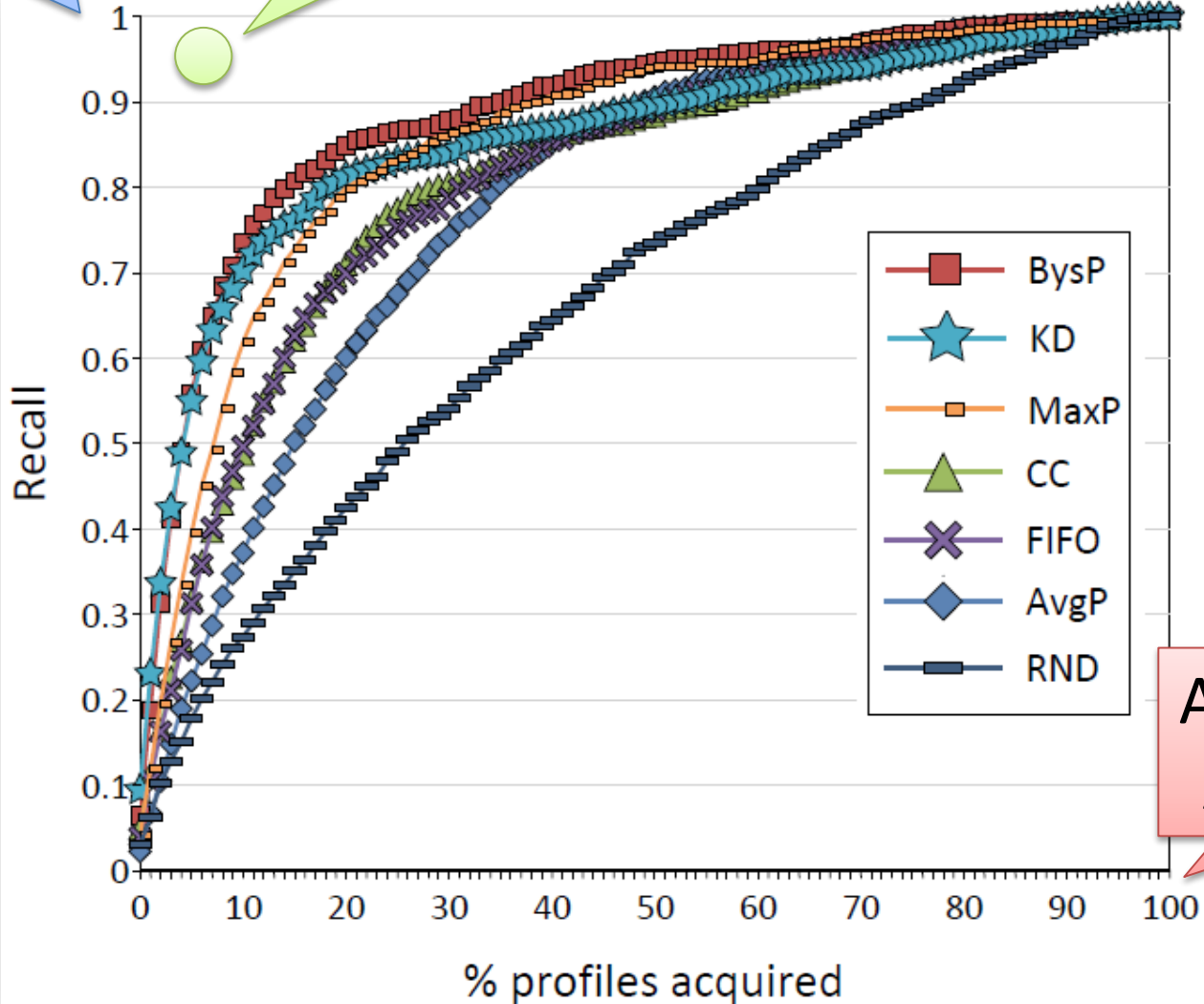
Leads are NOT the same



Which is more likely to be a lead – **X** or **Y**?

All Leads Found

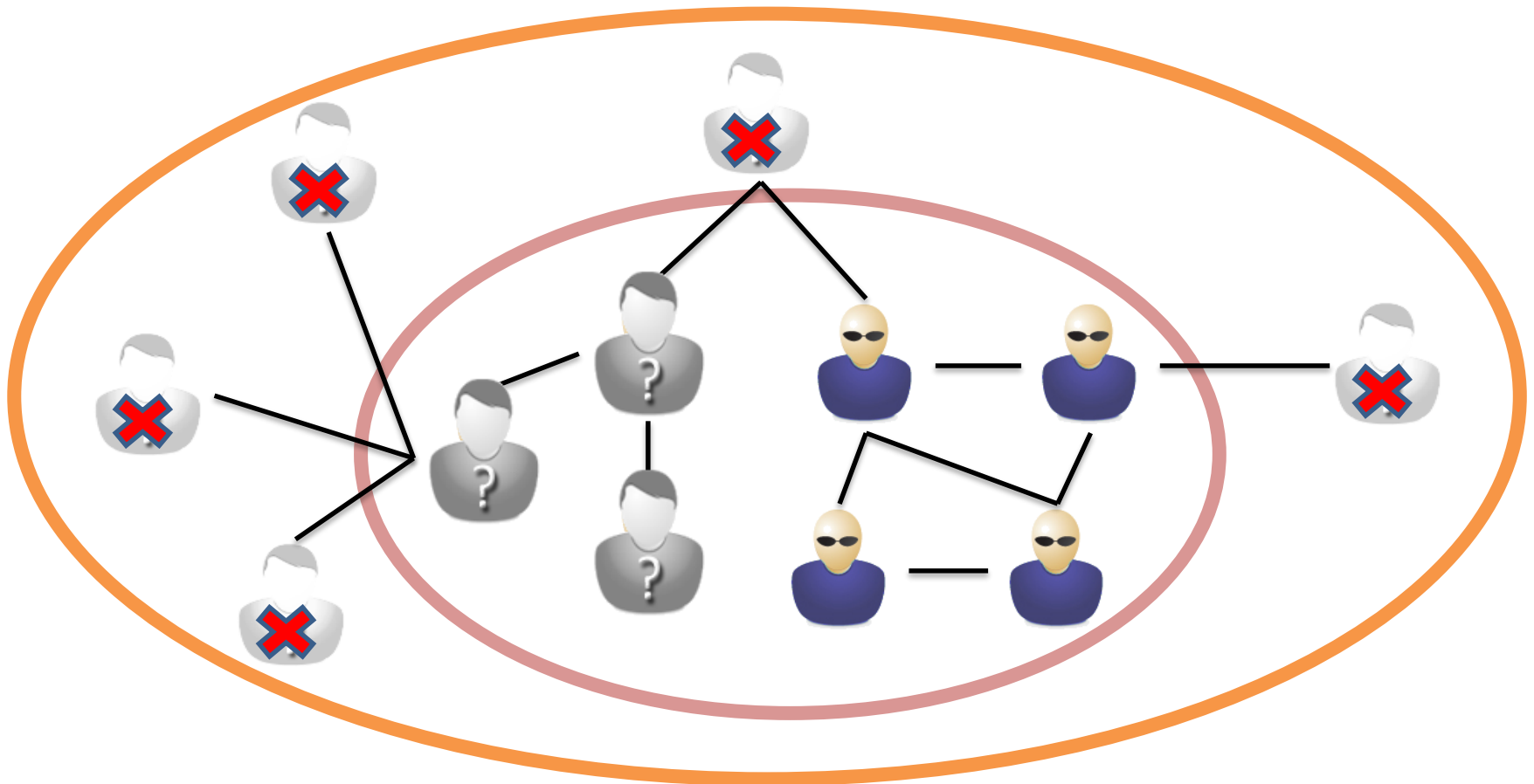
The "sweet spot"



All Profiles Acquired

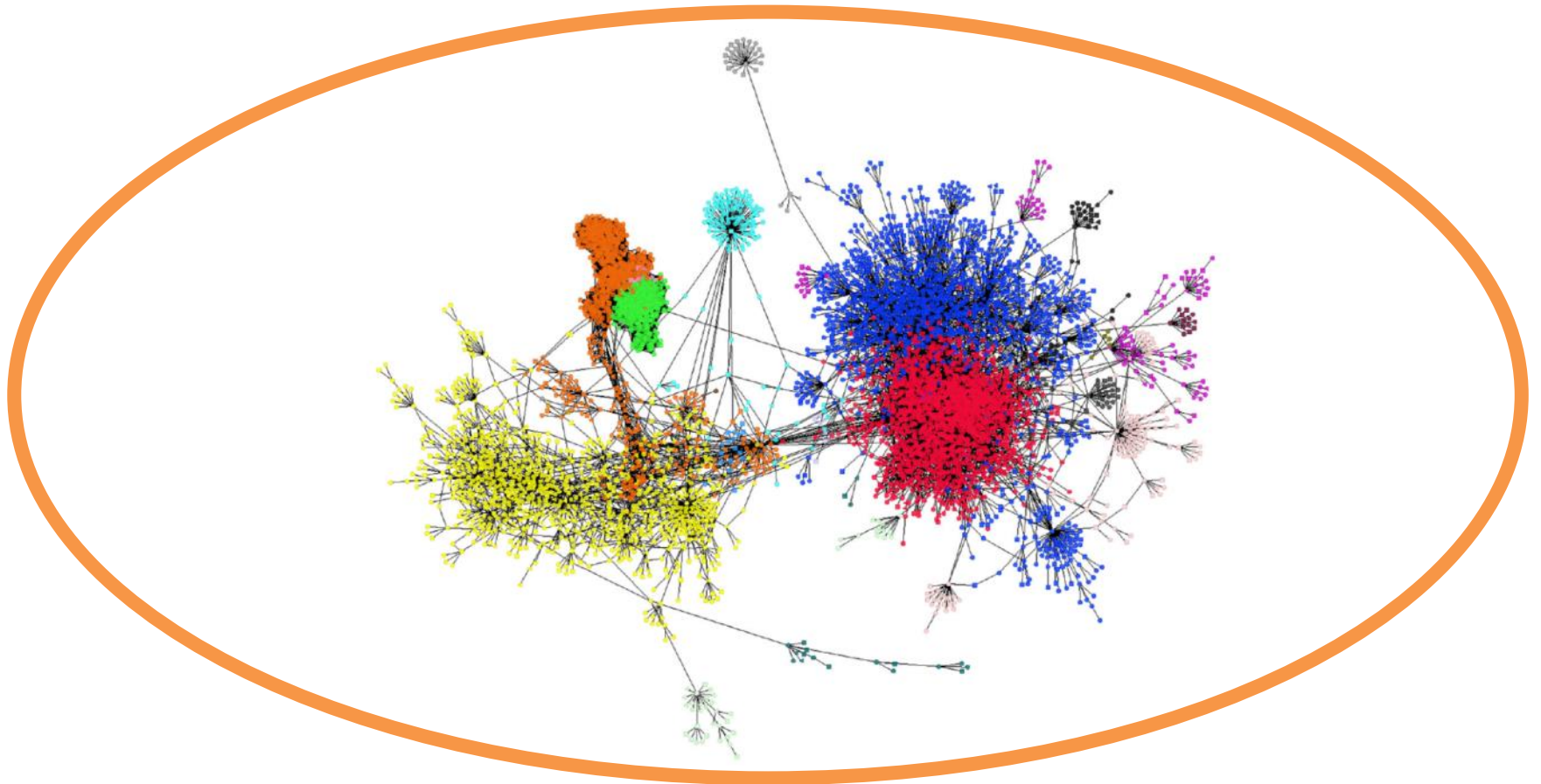
Which non-lead will lead to leads?

The second ring of TONIC

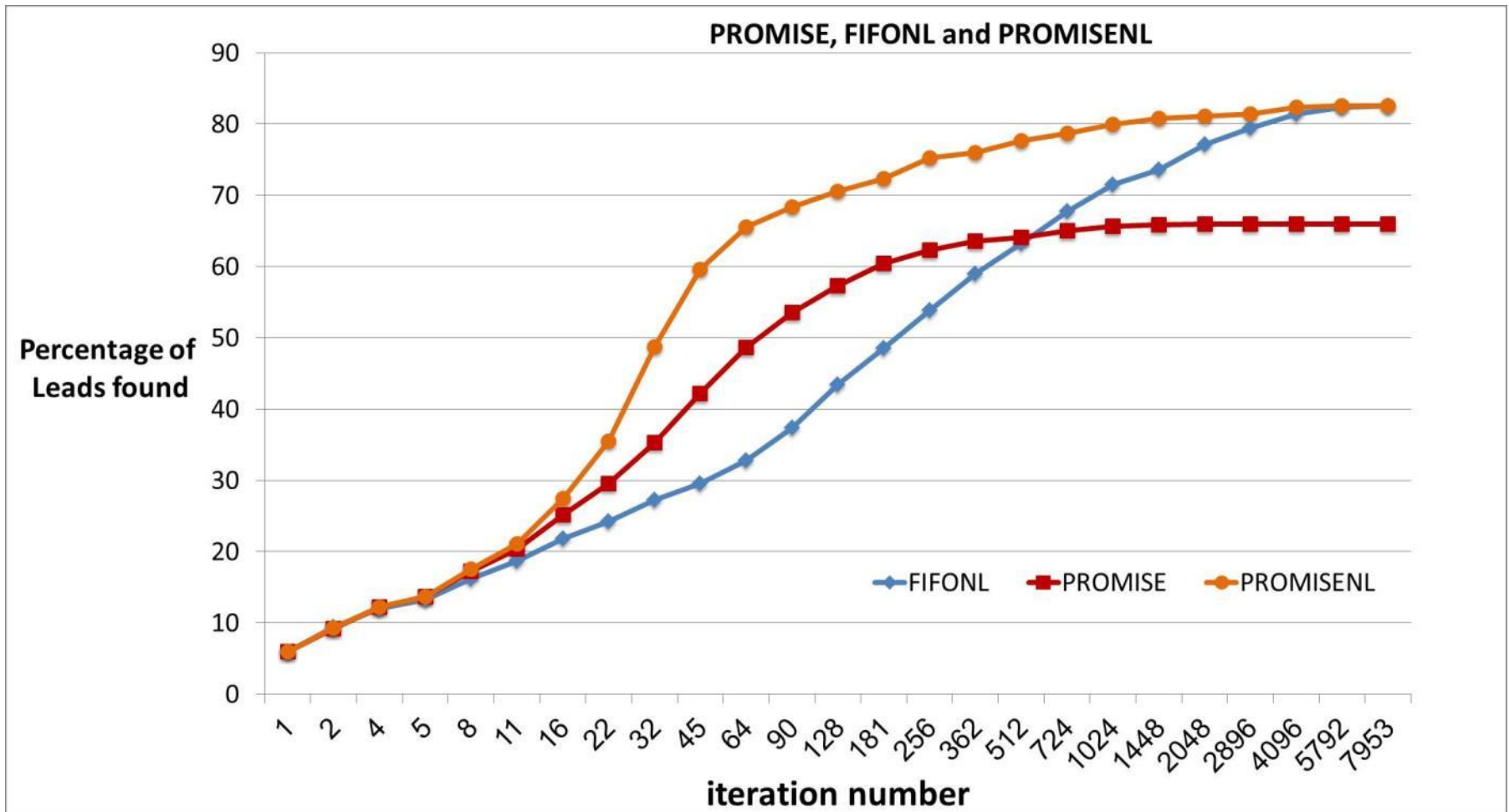


Which non-lead will lead to leads?

The second ring of TONIC



Which non-lead will lead to leads? The first ring vs the second ring





Organization Mining

Facebook graphs of 6 international organizations

| Org. | Size | Discovered Employees | Links | Employees Disclosing Positions on Facebook |
|------|---------|----------------------|---------------|--|
| S1 | 500-1K | 726 | 53(32.1 %) | |
| M1 | 2K-10K | 2,369 | 104(32.5 %) | |
| M2 | 10K-20K | 19,357 | 383(26.8 %) | |
| L2 | 50K+ | 87,324 | 1,529(39.6 %) | |
| Tot | | 30,753 | 1,599(27.6 %) | |
| | | 94,219 | 1,131(20.5 %) | |
| | | | | 4,799(28.1 %) |

Has organization name in the employment field of Facebook profile



Some position names are useless

Facebook- LinkedIn

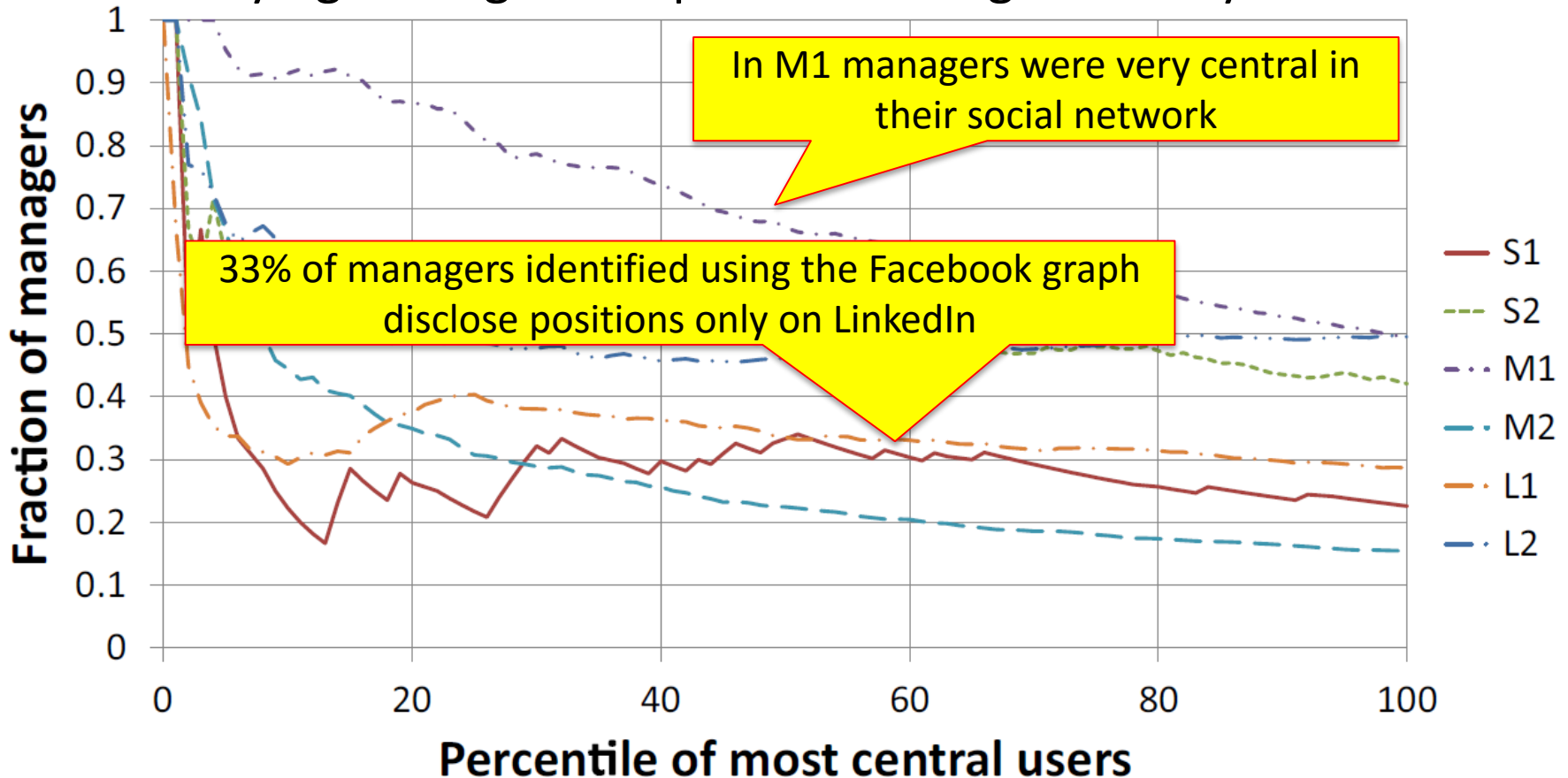
1,409 (30%) are managers

Joint work with Michel Fire, Netw Spat Econ, 2015, pp 1-32, DOI 10.1007/s11067-015-9288-4
 Data sets available at: <http://proj.ise.bgu.ac.il/sns/organizations.html>

Organization Mining



Identifying management positions using centrality measures

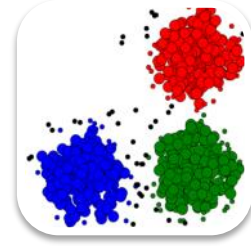


In M1 managers were very central in their social network

33% of managers identified using the Facebook graph disclose positions only on LinkedIn

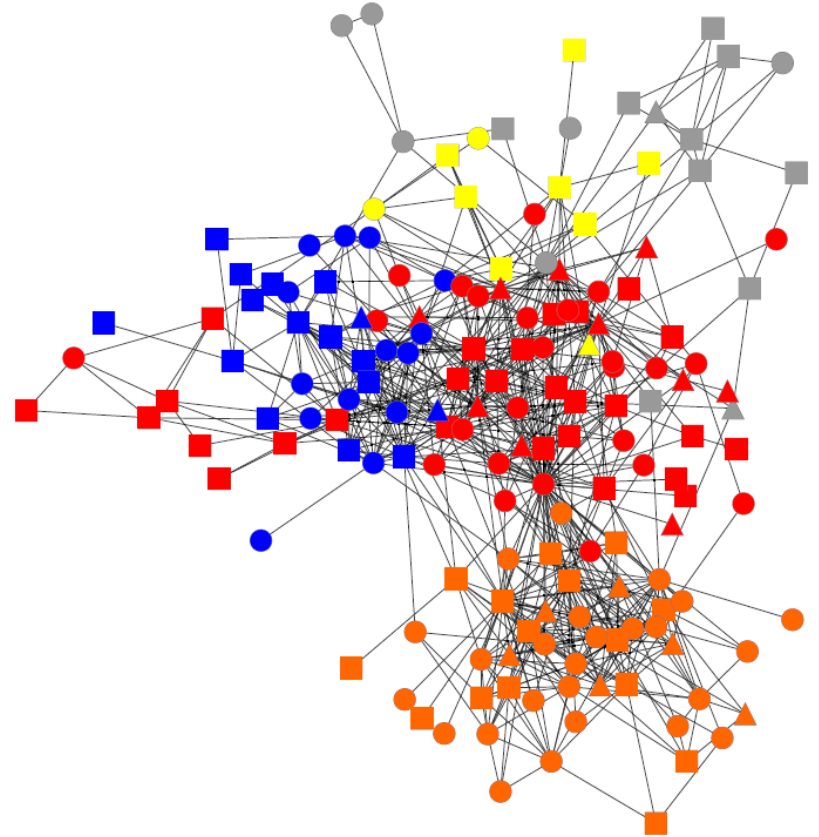
HITS had the best overall precision at identifying managers

Organization Mining Communities

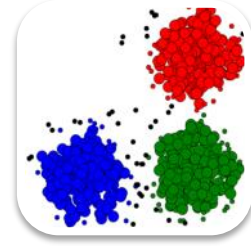


S1 Company:

- R&D and administration groups in Asia.
 - R&D in Asia
 - Primarily hardware verification engineers and chip designers in Asia.
 - Hardware R&D.
- Acquired startup company.

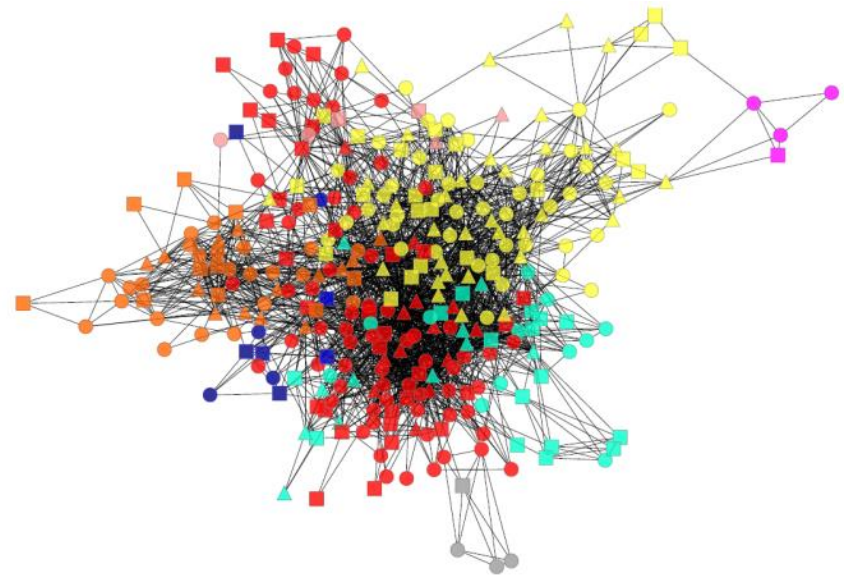


Organization Mining Communities

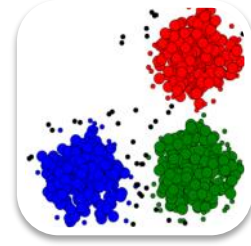


S2 Company:

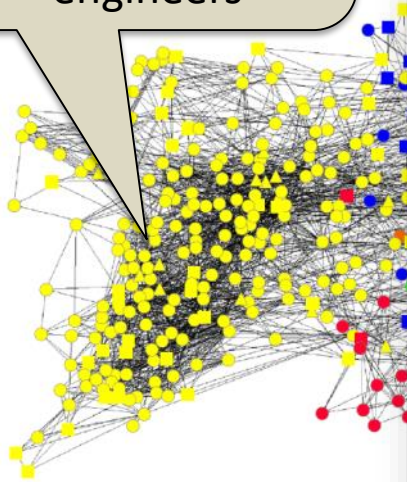
- IT group in the Middle East.
- R&D groups in the Middle East
- North American group
- R&D teams in Australia and the Middle East
- European group
- Acquired startup company.
- **Managers and international project managers.**



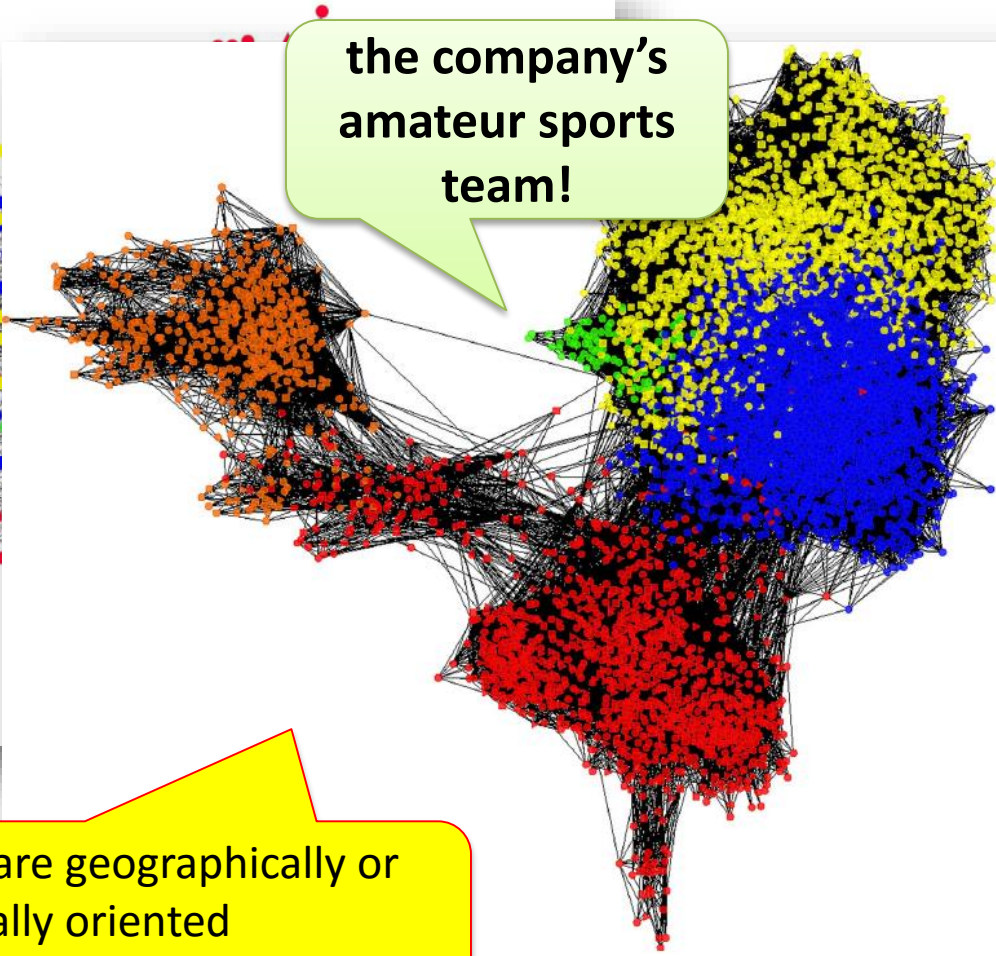
Organization Mining Communities



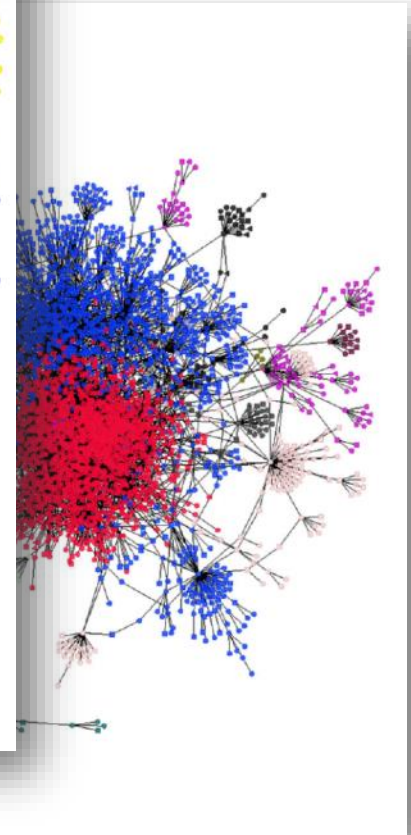
international
consultants and
support
engineers



the company's
amateur sports
team!



Most communities are geographically or
professionally oriented
(e.g. R&D in Asia, IT in South America, etc.)



Socialbots and fake profiles



- Create several fake accounts.
- Connect them to fan pages of famous football players.
- Connect them to a few highly connected personal accounts.
- Send friend request top the most connected members of the company's amateur football team.
- Continue connecting the profiles with organization members having most common friends with the fake profile.
- Chat and comment.
- Share an infected resource with target the employees.

Socialbots and fake profiles



Fake LinkedIn profile gathering info for targeted attacks

Posted on
Social
great



"Clandestine Fox" Attackers Target Energy Firms via Social Media: FireEye

By [Eduard Kovacs](#) on June 11, 2014

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An advanced persistent threat (APT) group whose activities have been monitored by FireEye has started using social networks to trick the employees of targeted organizations into installing malware, the company said Tuesday.

The activities of the actors involved in what FireEye calls "Operation Clandestine Fox" were first brought to light by the security firm back in April when the group leveraged an Internet Explorer zero-day exploit in targeted attacks. In May, researchers spotted a new version of the [attack](#) specifically targeting Windows XP machines running Internet Explorer 8.

Iranian hackers said to use Facebook to spy on Israelis

Over 2,000 executives and officials fall victims to brazen, complex 3-year 'Newscaster' scam run by social network 'friends,' report says

BY DAVID SHAMAH | May 29, 2014, 9:56 am | [2](#)

facebook **FAKES**

8.7% of Facebook's

955 million users are

FAKE

including...



Over 45 million

duplicate accounts (users who forgot their old login details and created another account, users who maintain private profiles to hide information from others..)

Almost 23 million

misclassified accounts (businesses, pet dogs..) which should really be set up as Facebook pages



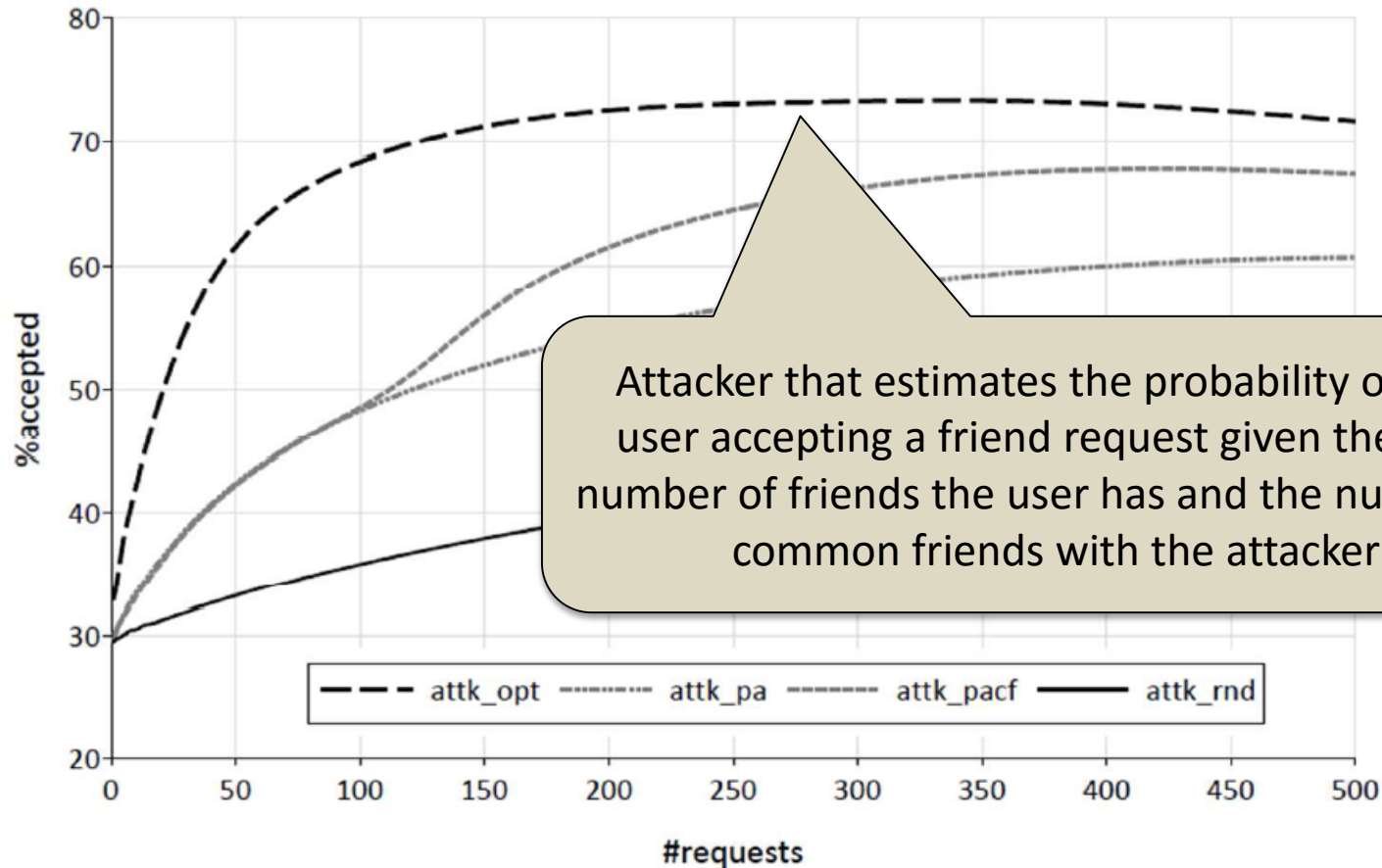
Over 14 million

Facebook accounts, that's 1.5% of the total, are used to deliberately spread undesirable content such as spam and malicious links.

nakedsecurity.sophos.com

Source: Facebook SEC filing, July 2012; www.sec.gov/Archives/edgar/data/1326801/000119012512025997/000119012512025997.pdf

Socialbots and fake profiles



Abigail Paradise, Rami Puzis, Asaf Shabtai, Anti-Reconnaissance Tools: Detecting Targeted Socialbots, IEEE Internet Computing , 18(5), 11-19 (2014)

Questions ?

Thank you!