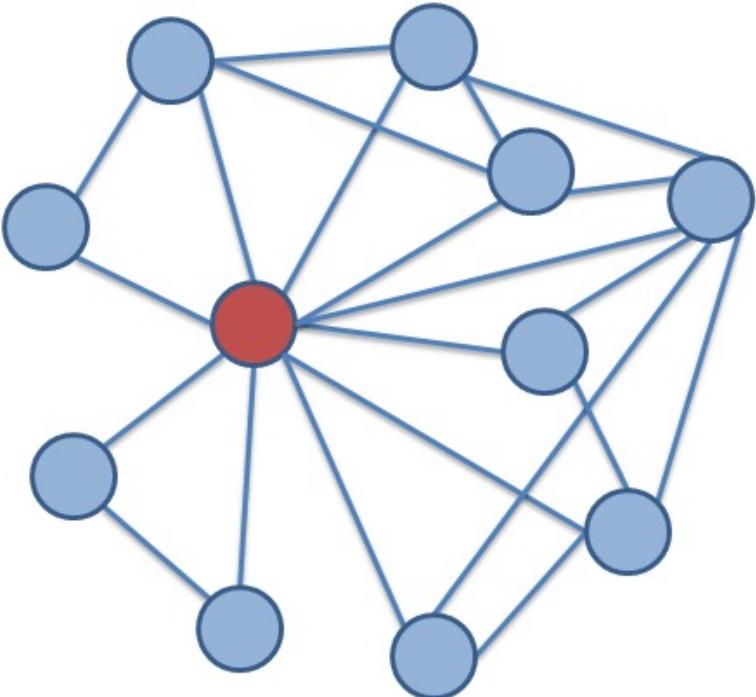




Networked Life

- # • Introduction 2022

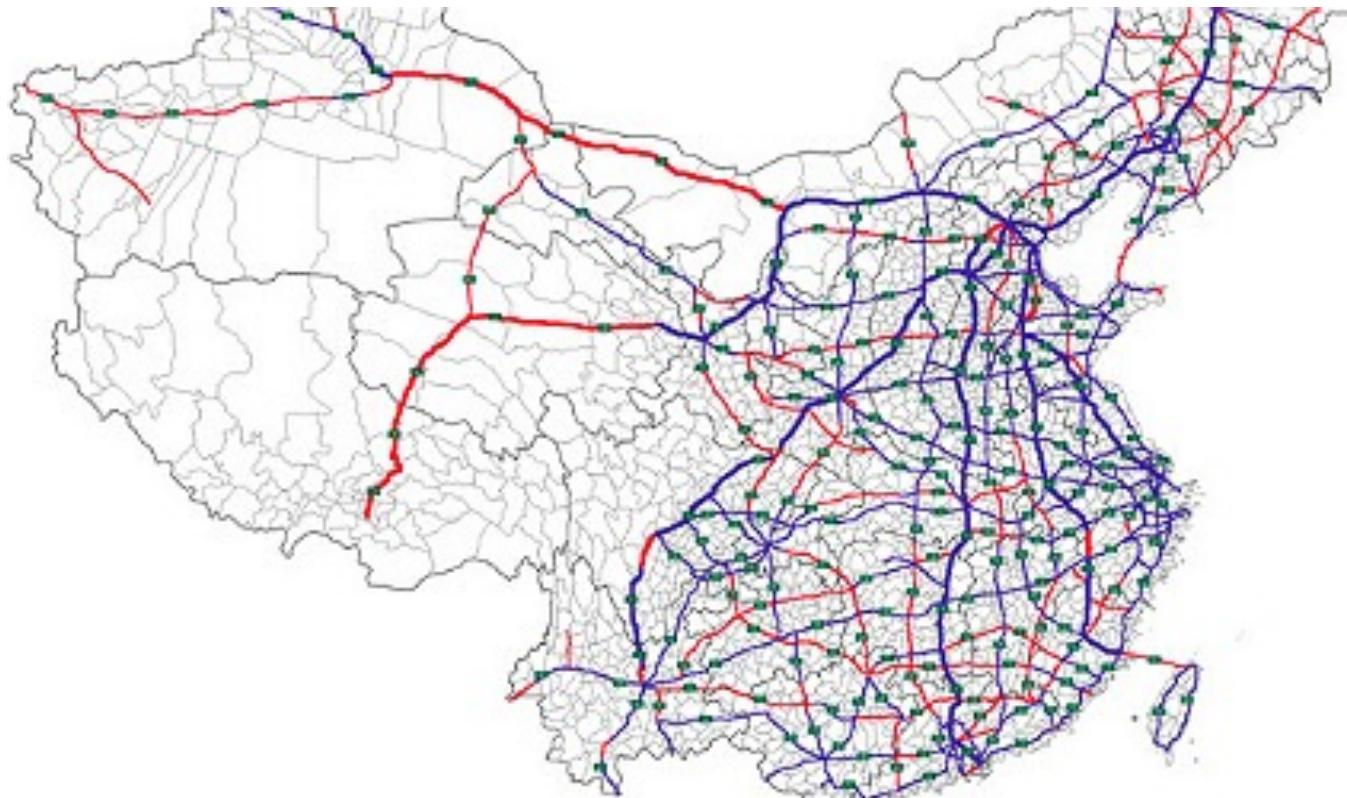
What is a network?



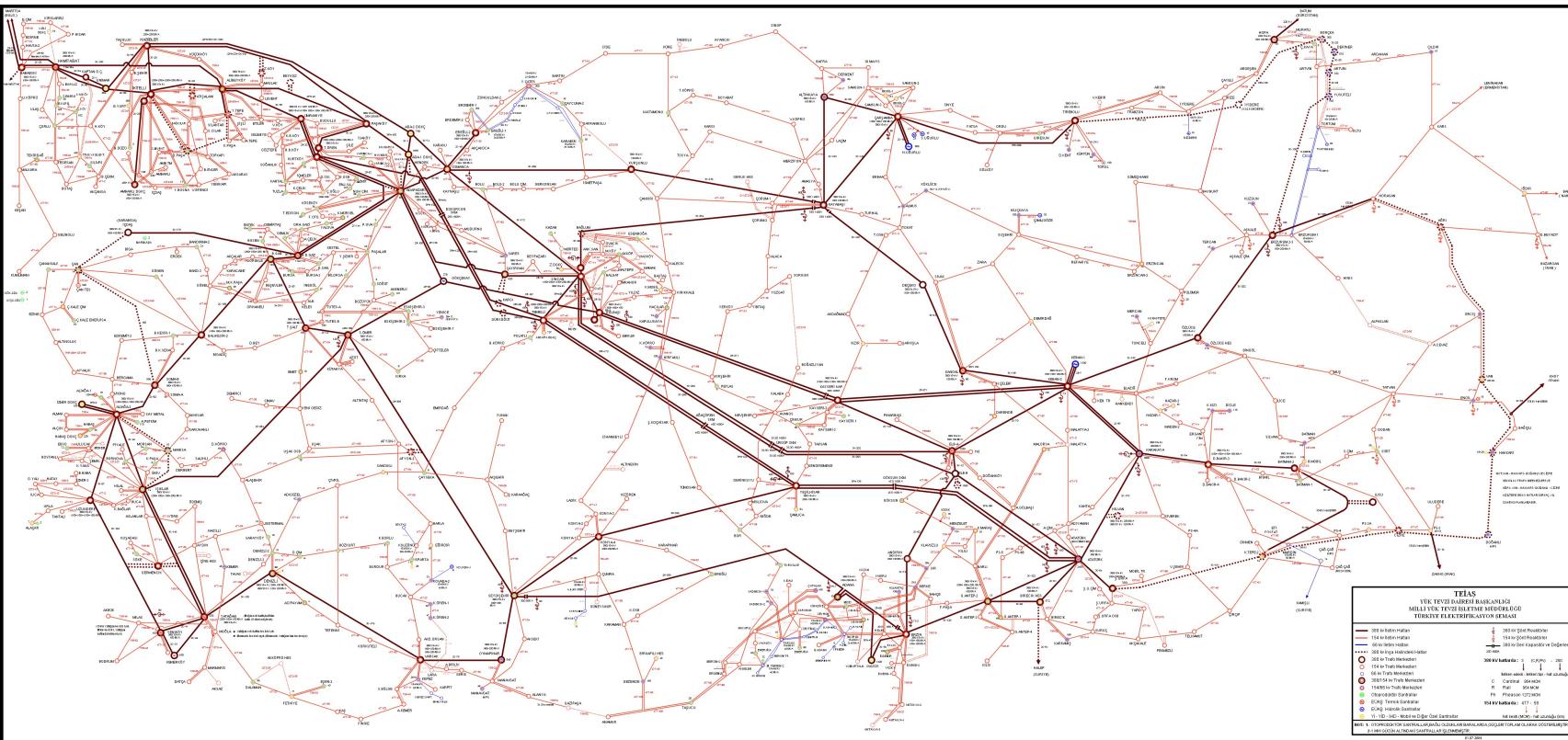
Networks are everywhere...

- Transportation
- Energy
- Communications (Cellular, Internet, telephone,...)
- Social
- Economic
- Application specific (www, p2p,...)
- ...

Transportation



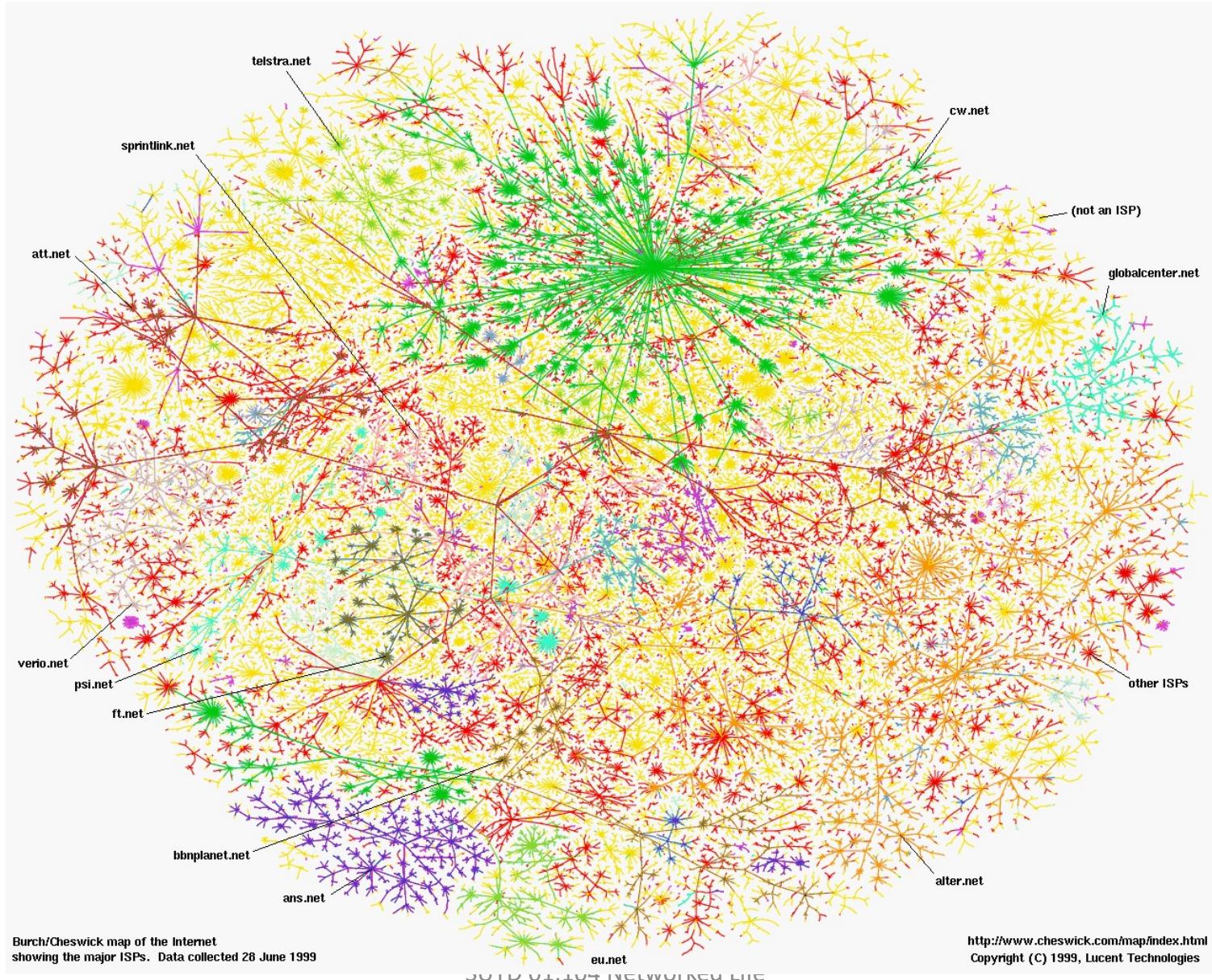
Energy



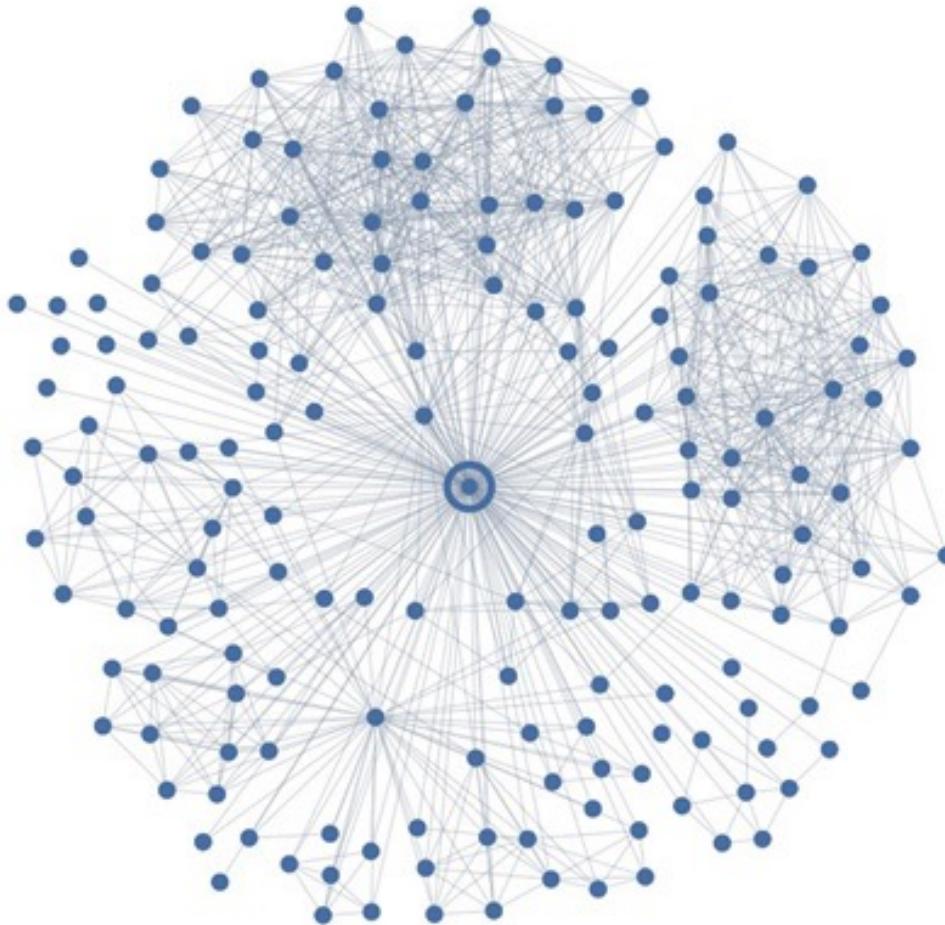
Cellular



Internet

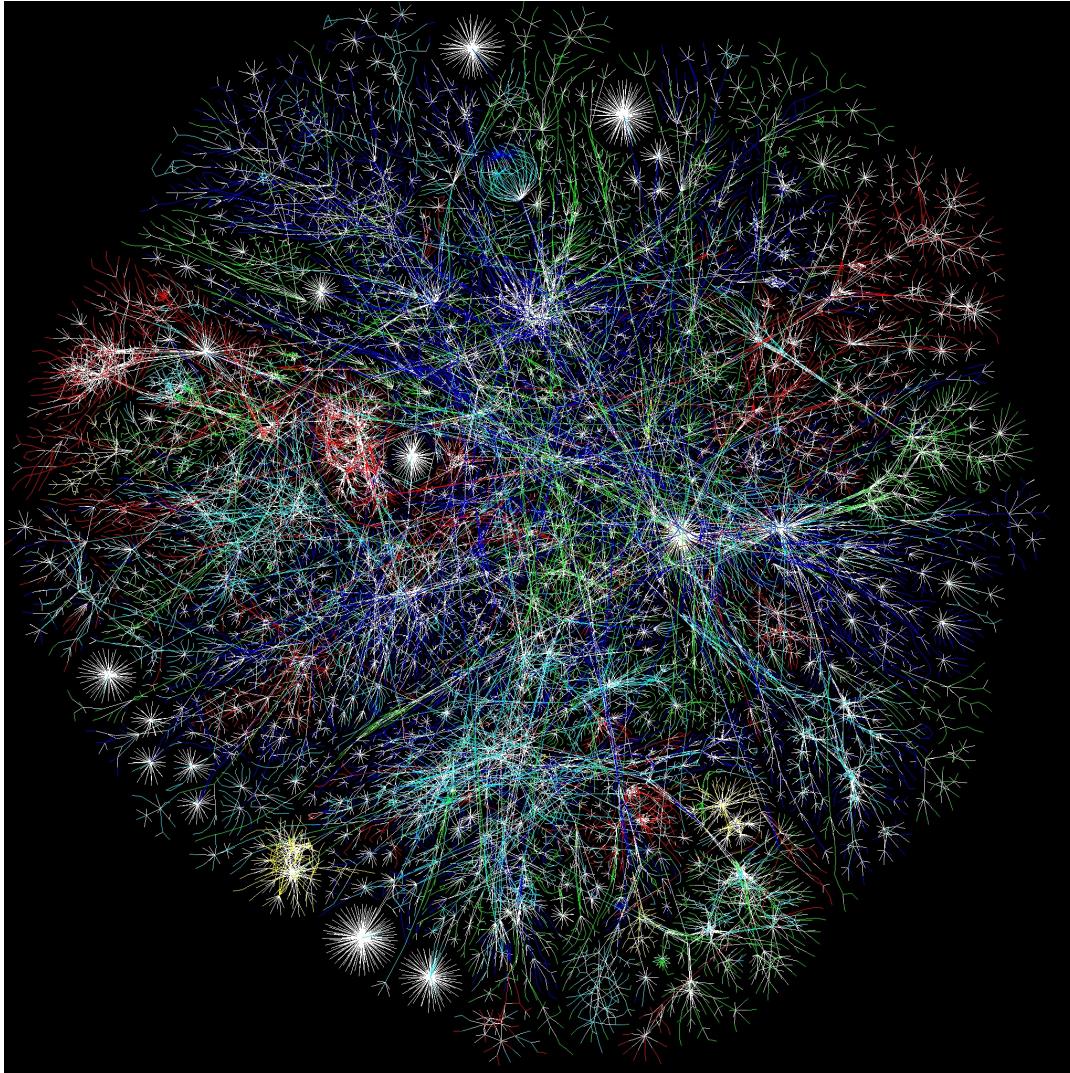


Facebook



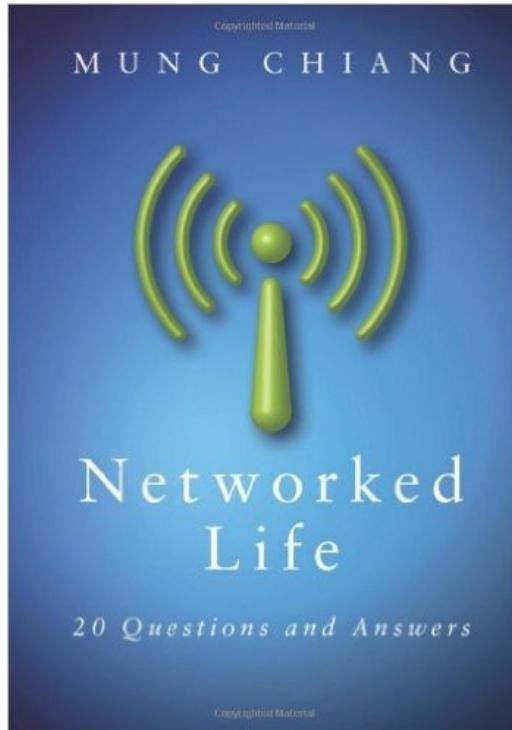
A graphical representation of one person's network neighborhood
on Facebook

Web

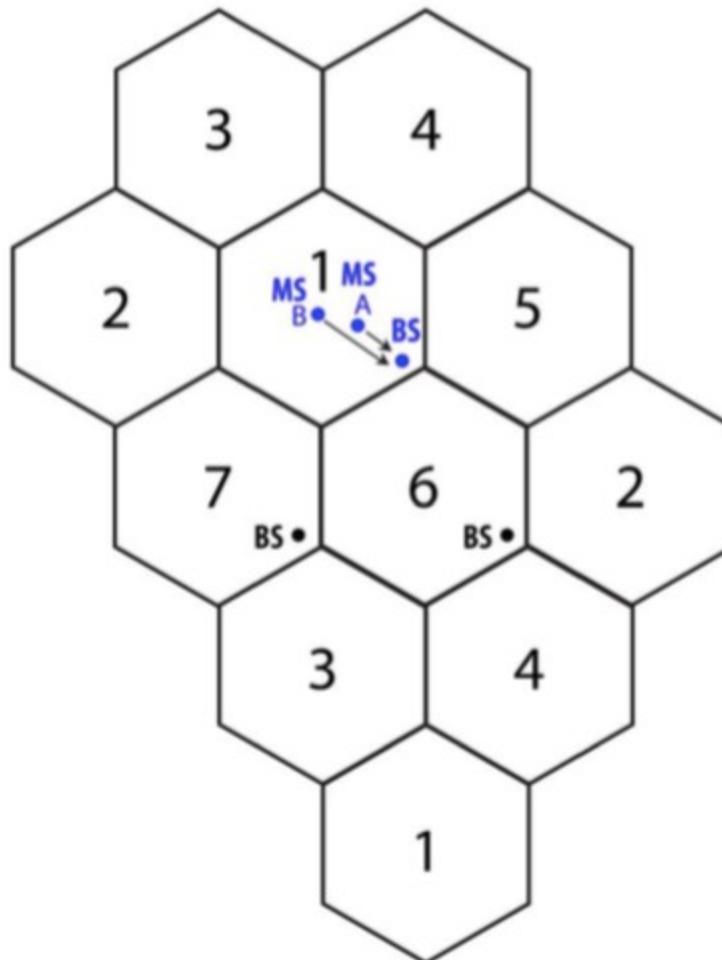


What we cover

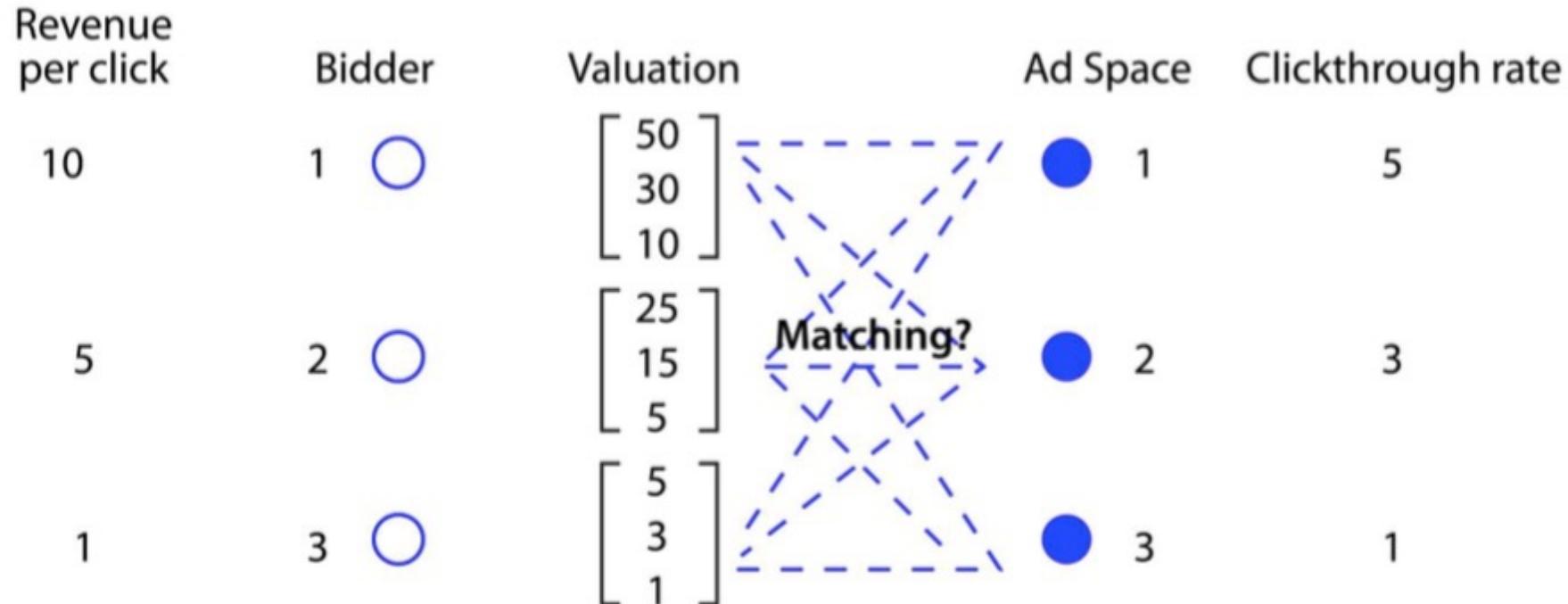
- We follow the chapters of our textbook
- We cover (roughly) 1 chapter / week



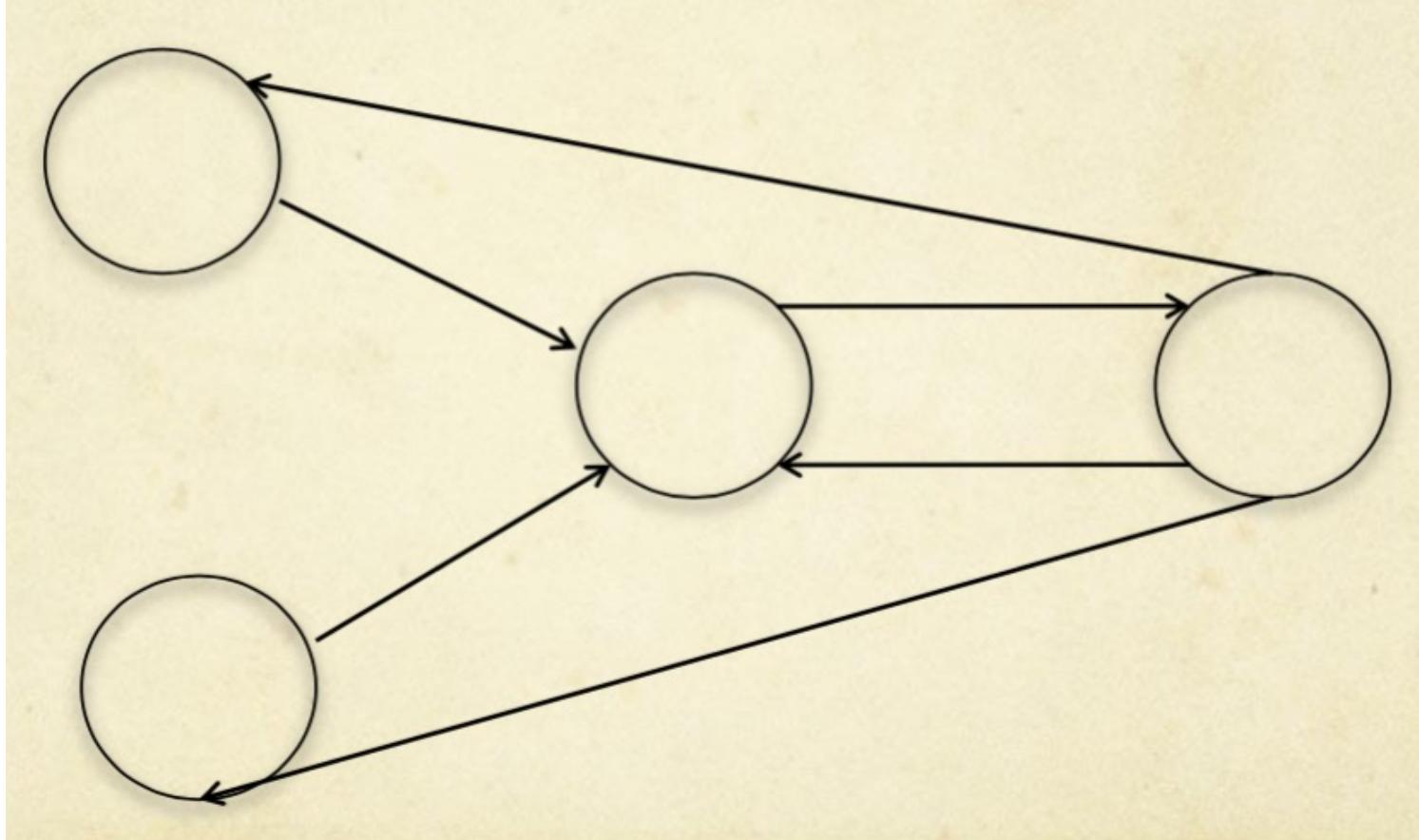
Q1: What makes CDMA work for my smartphone?



Q2: How Google sells ad spaces?



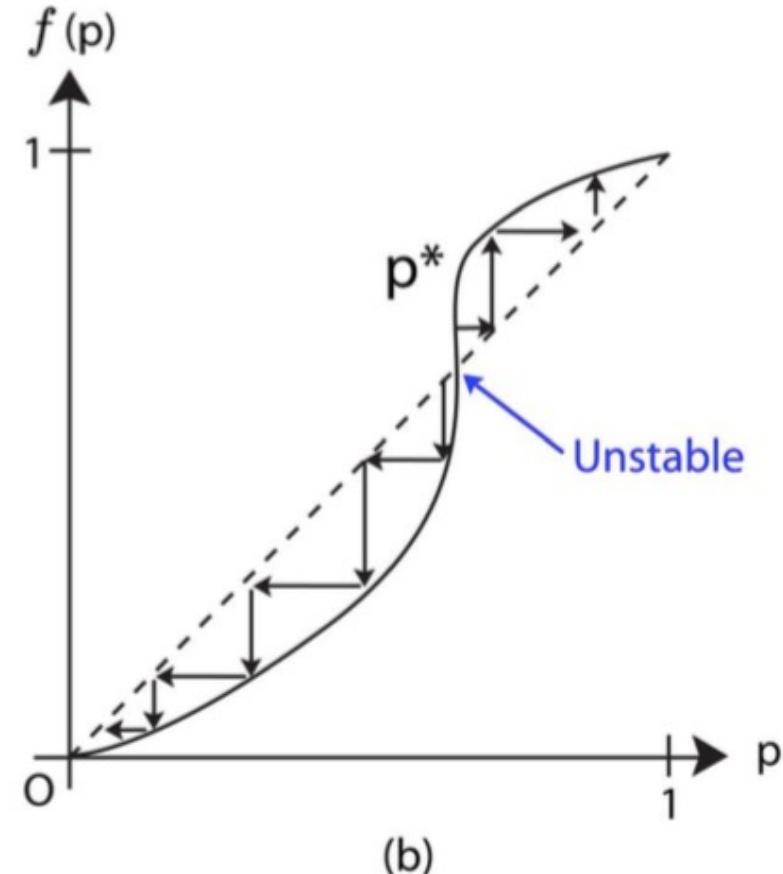
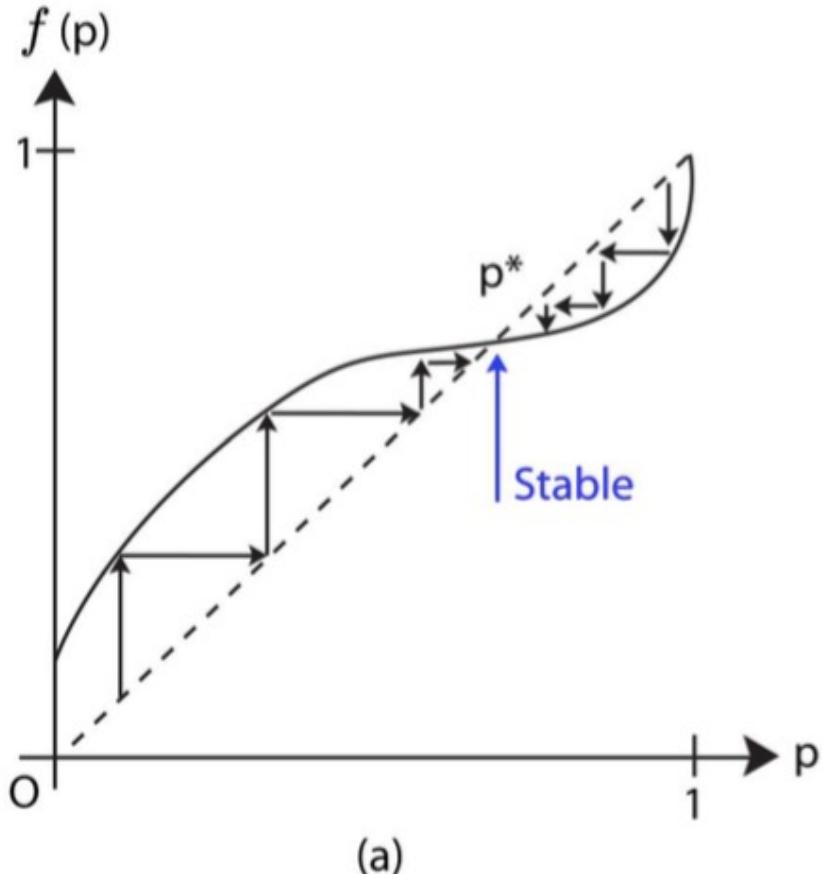
Q3: How Google ranks webpages?



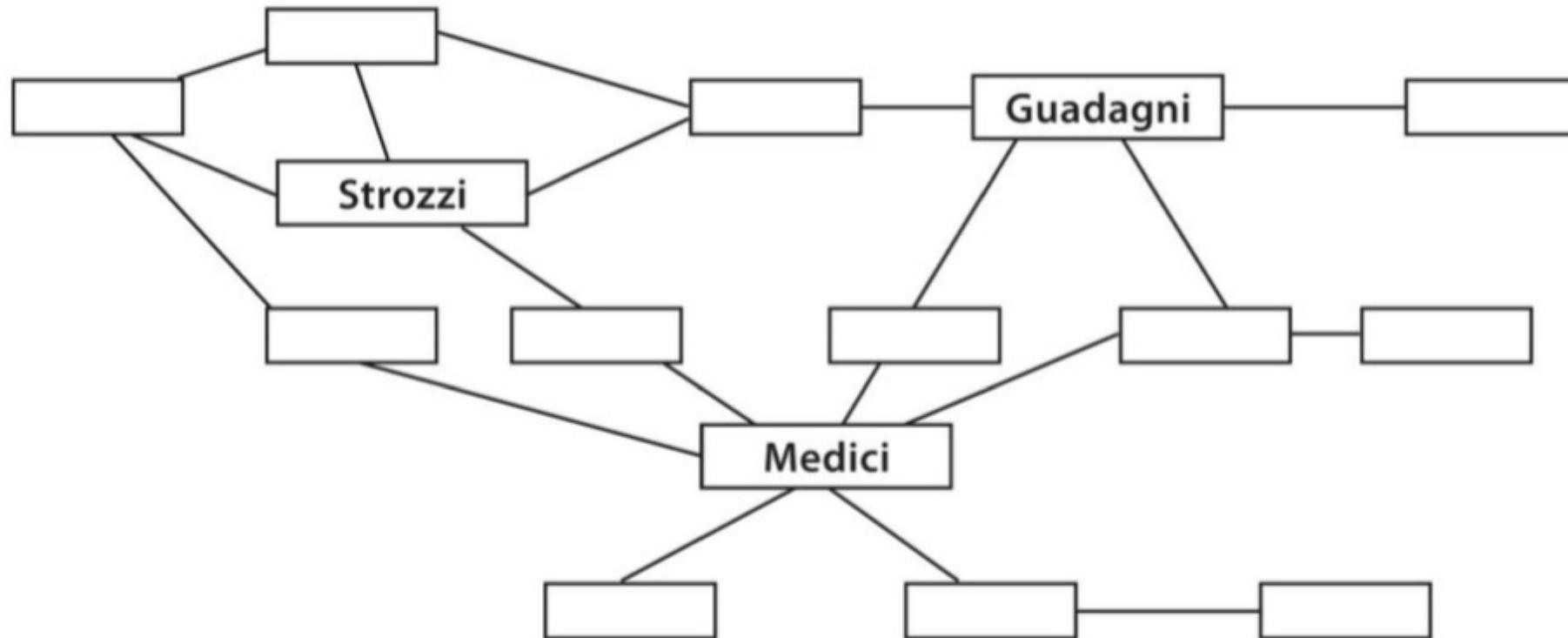
Q4: How does Netflix recommends movies?

		Movies							
		1	2	3	4	5	6	7	8
Users		1		5		2	4		
		2	4		3	1			3
Users		3		5	4		5		4
		4						1	1
Users		5	3		?		?	3	
		6		?	2		4		?

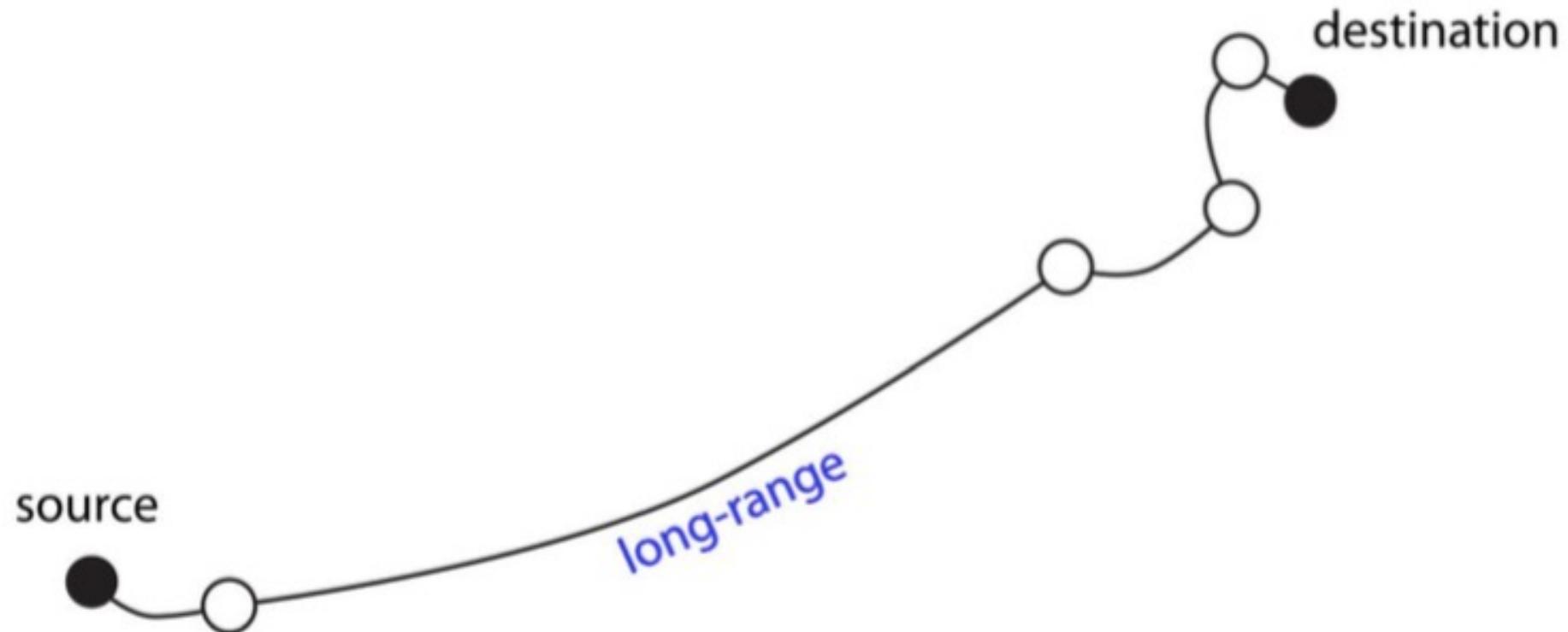
Q7: How do I viralize a YouTube video



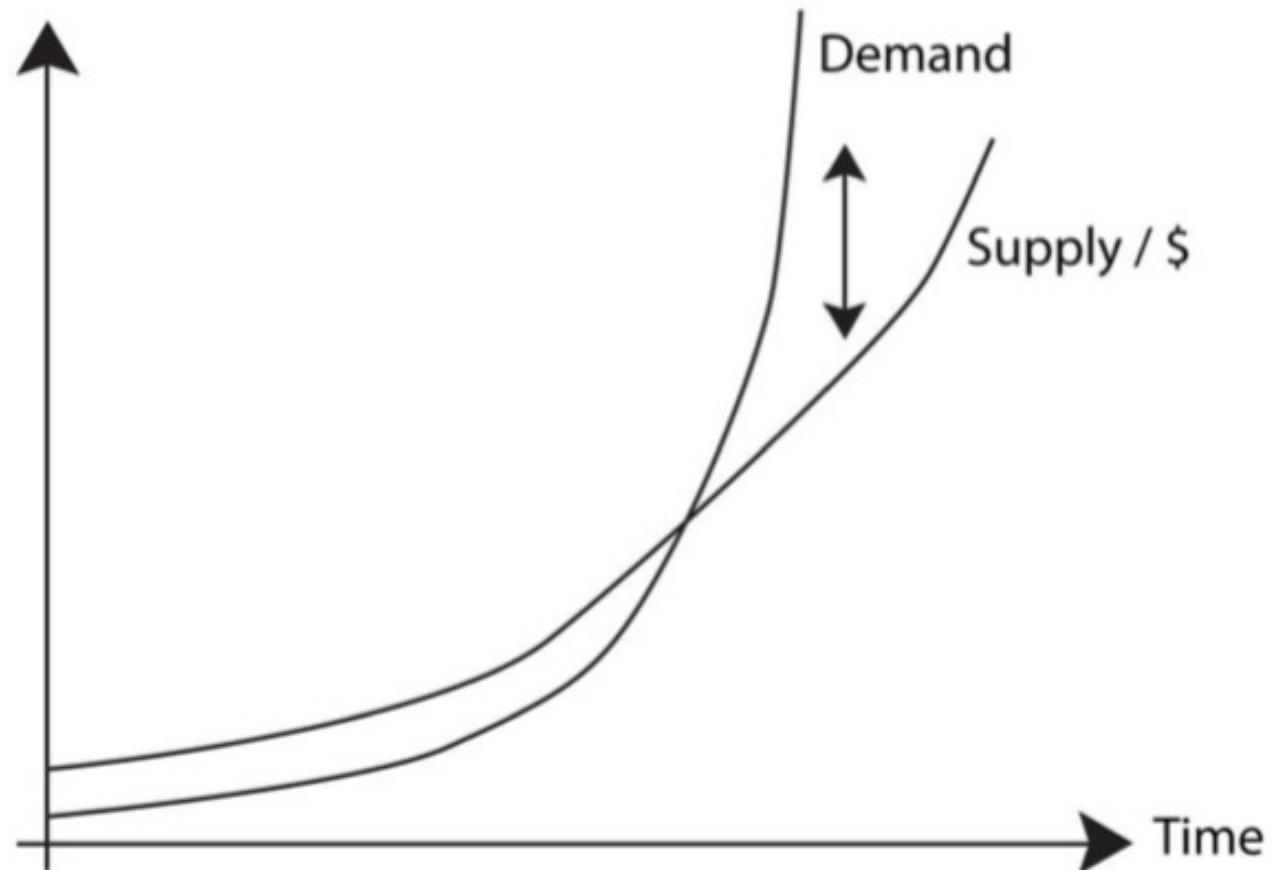
Q8: How do I influence people on Facebook and Twitter?



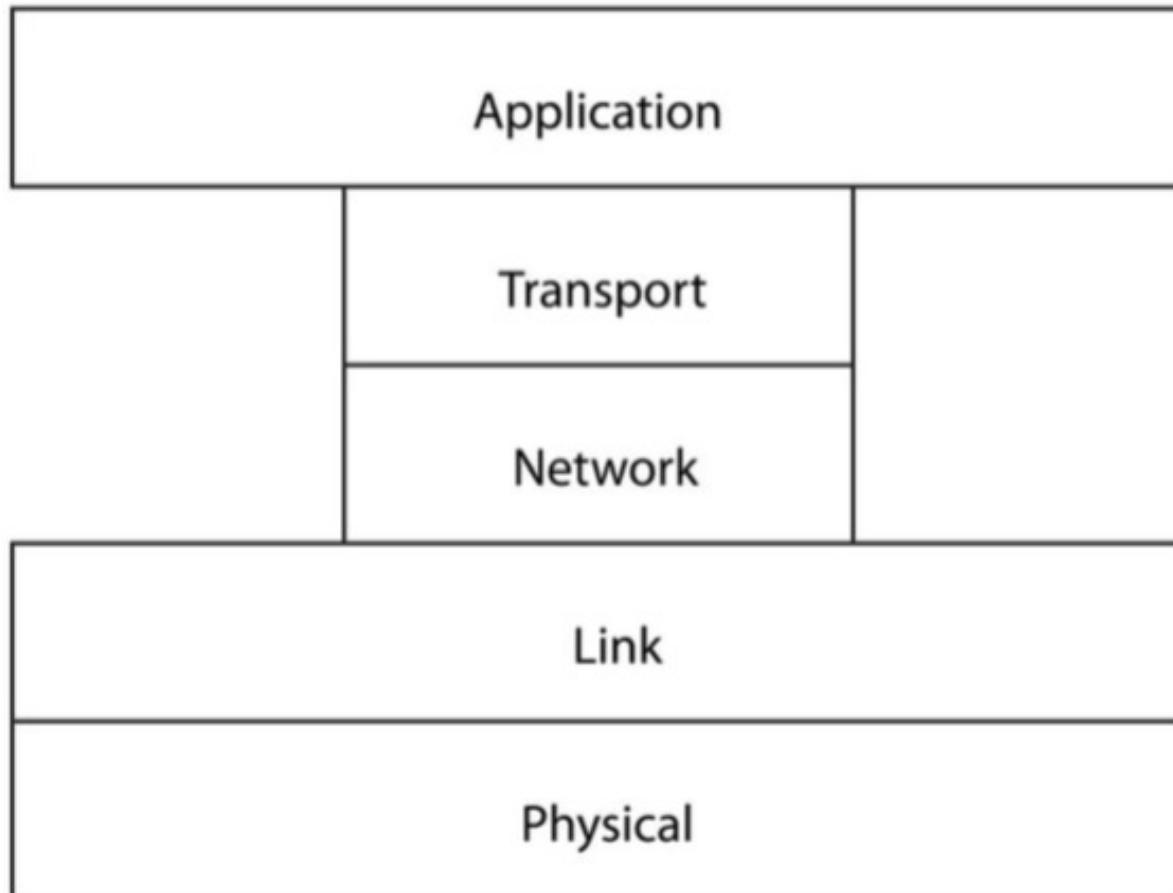
Q9: Can I really reach anyone in 6 steps?



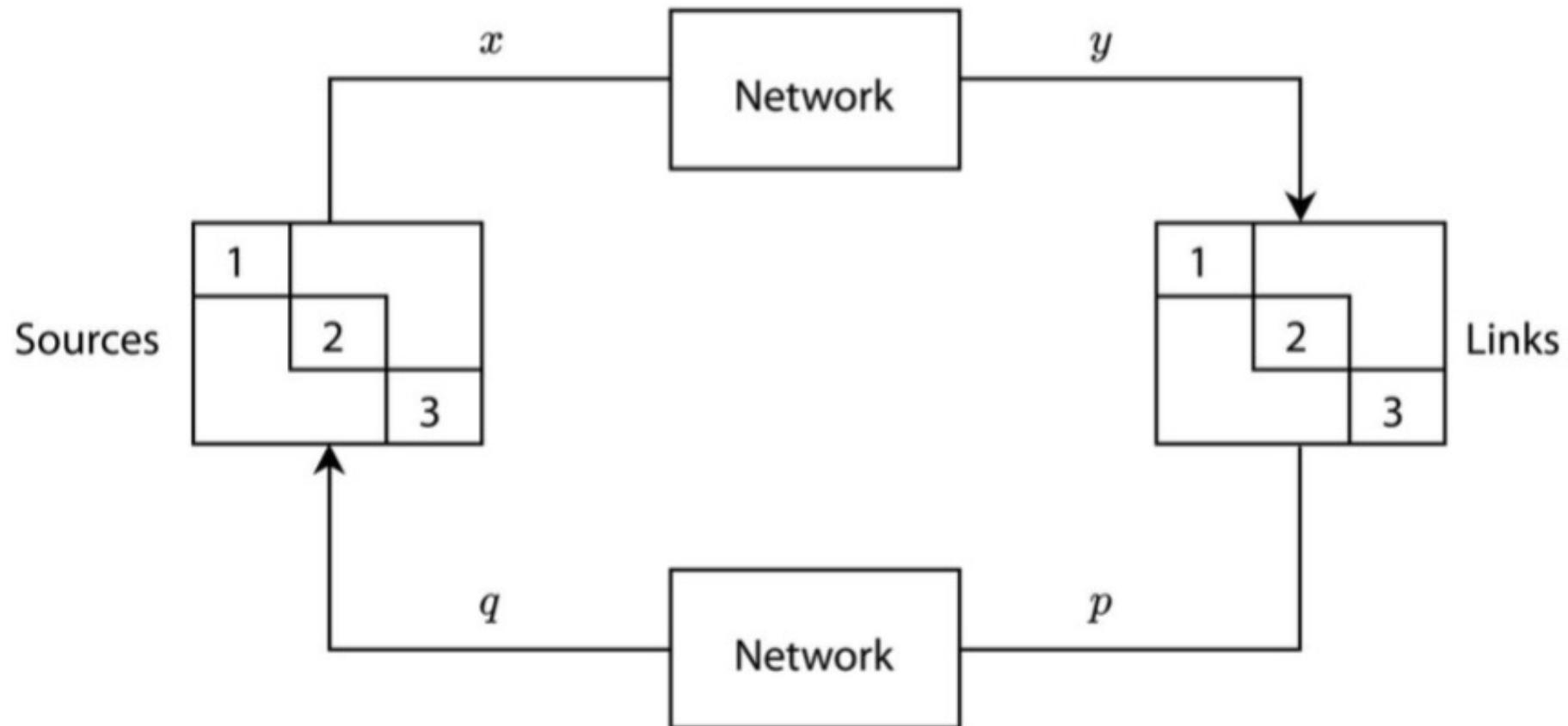
Q11: Why China mobile charge me \$10 a GB?



Q13: How does traffic get through the Internet?



Q14: Why doesn't the Internet collapse under congestion?



Methodologies

	Graph Theory	Optimization Theory	Game Theory	Learning Theory
Wireless		18, 19	1	
Internet	10	13, 14, 16		
Content		15, 17		
Web	3		2	4, 5
Online social	7, 8, 9		6	
Economics		11	20	12

Concepts

	Aggregation Influence	Distributed Coordination	Feedback Control	Strategic Equilibrium
Wireless		1	18, 19	
Internet		10, 13, 16,	14	
Content		15, 17		
Web	3, 4, 5			2
Online social	6, 8	9	7	
Economics		20		11, 12

Course details

- Course assessment:
 - Homework 20%
 - Midterm Exam 25%
 - Project 20%
 - Final Exam 35%
- Homework
 - Groups of 3 (less than 4) students
- My office hours: Monday 4-5pm, Dao Yuan 516
- TA: Jie Liu