Arhitecturi Paralele
Extreme Distributed Systems

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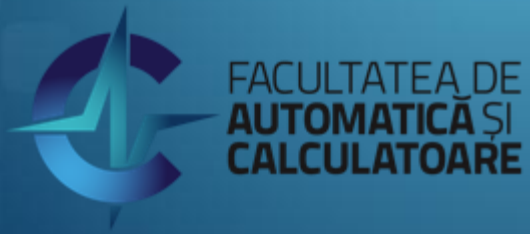
Elemente preluate din cursul Prof. Ciprian Dobre

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Când discutăm de sisteme distribuite?

Când discutăm de sisteme distribuite?

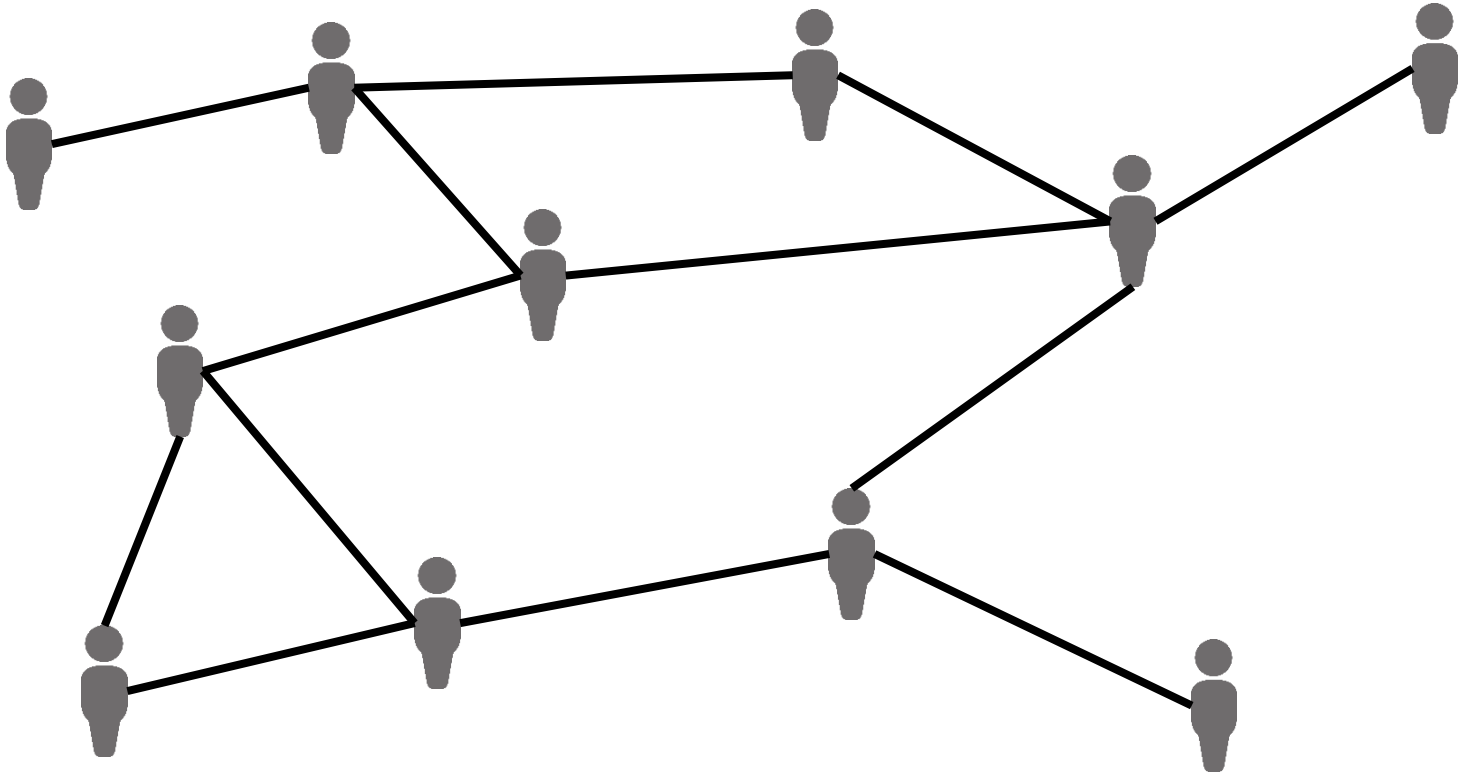
- P2P
- Internet
- Server-Client
- Clustere
- Cloud
- Calcule intensive multi-sistem
- Rețele ad-hoc

Când discutăm de sisteme distribuite?

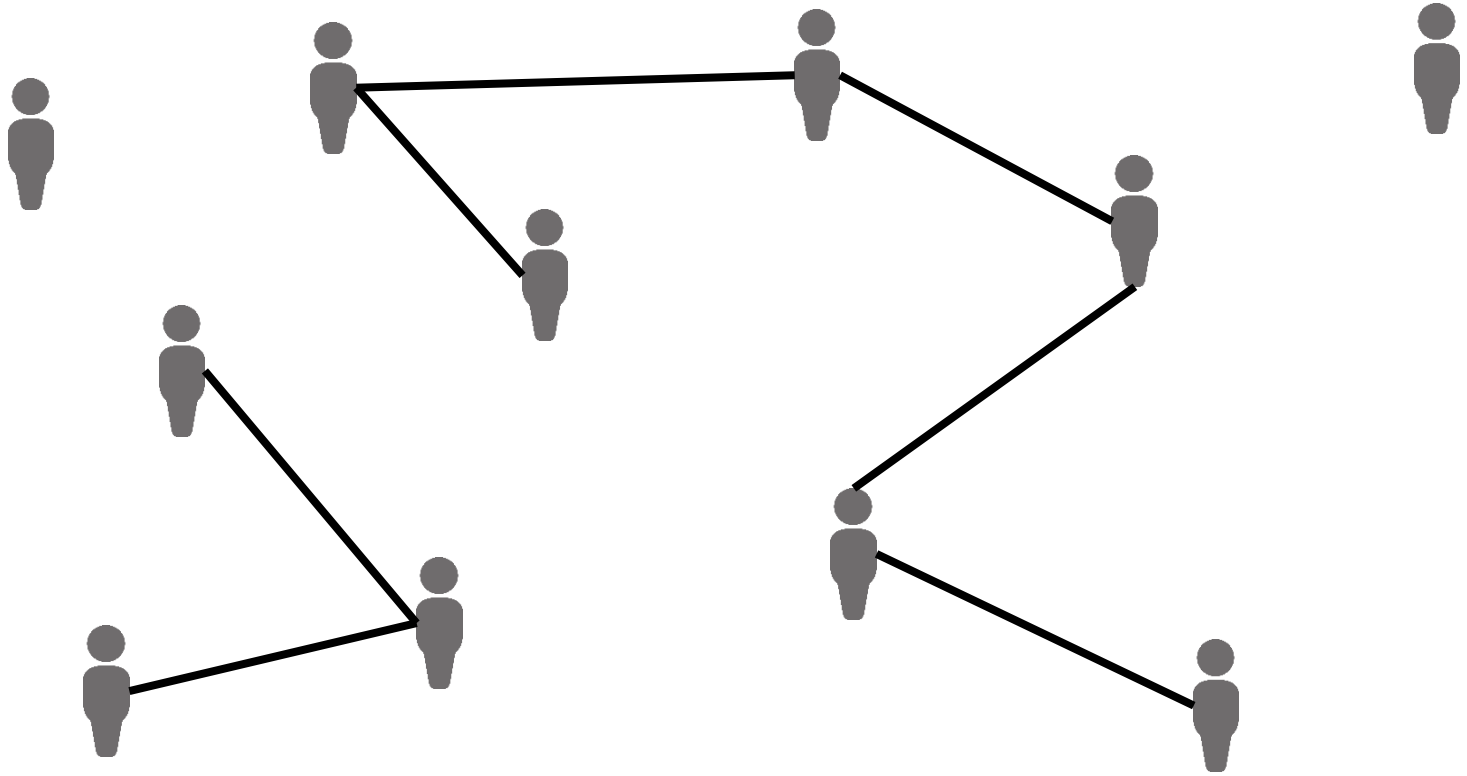
Oricând avem mai mult de un sistem

Epidemic

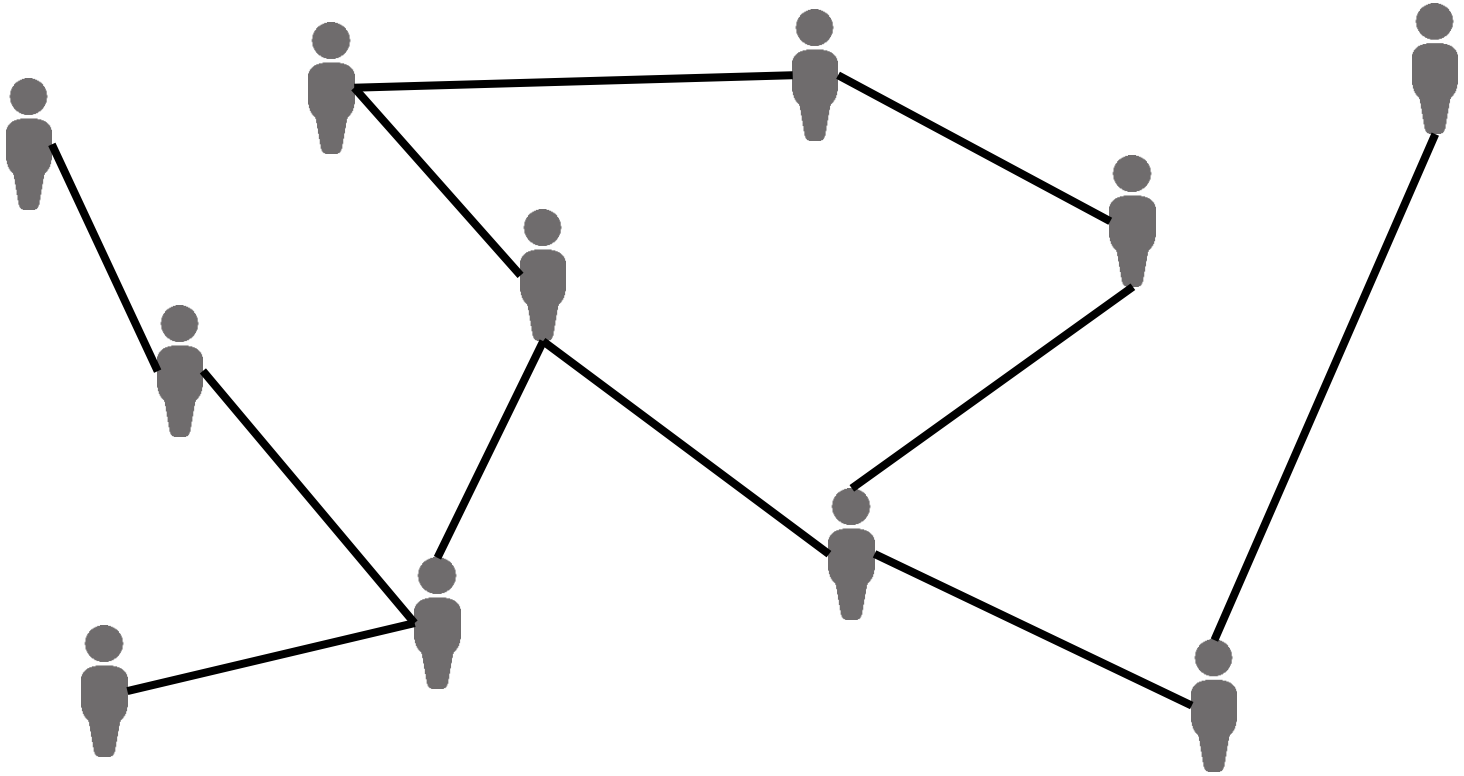
Epidemic



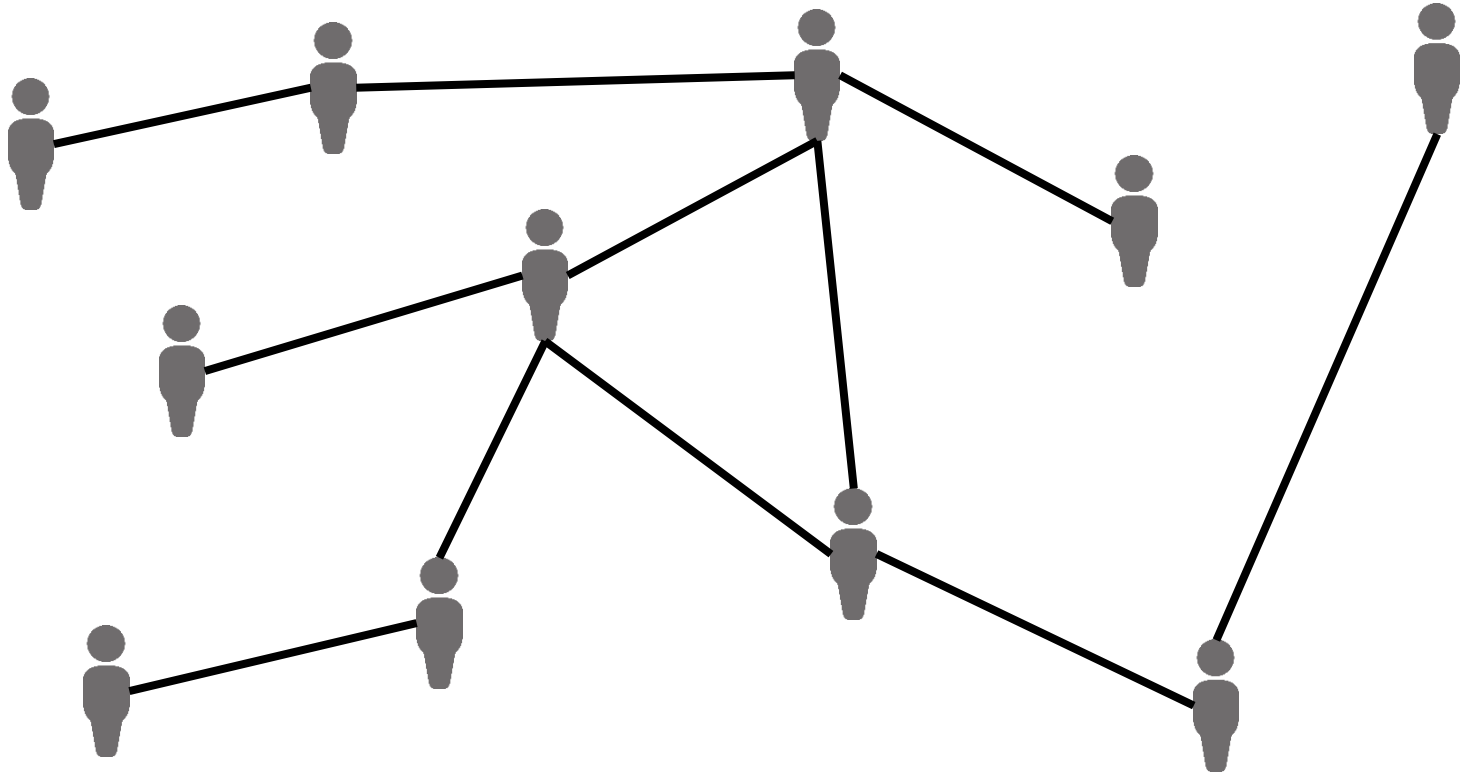
Epidemic – topology can change in time



Epidemic – topology can change in time

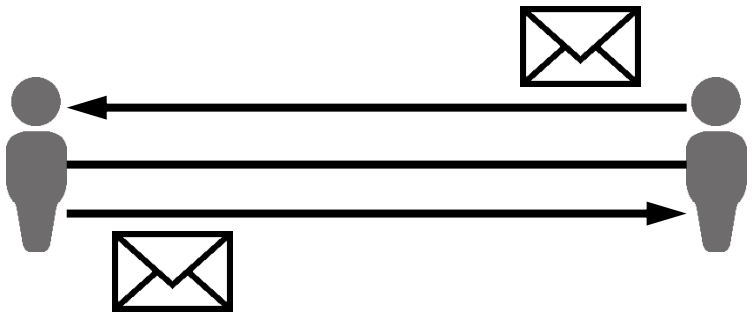


Epidemic – topology can change in time

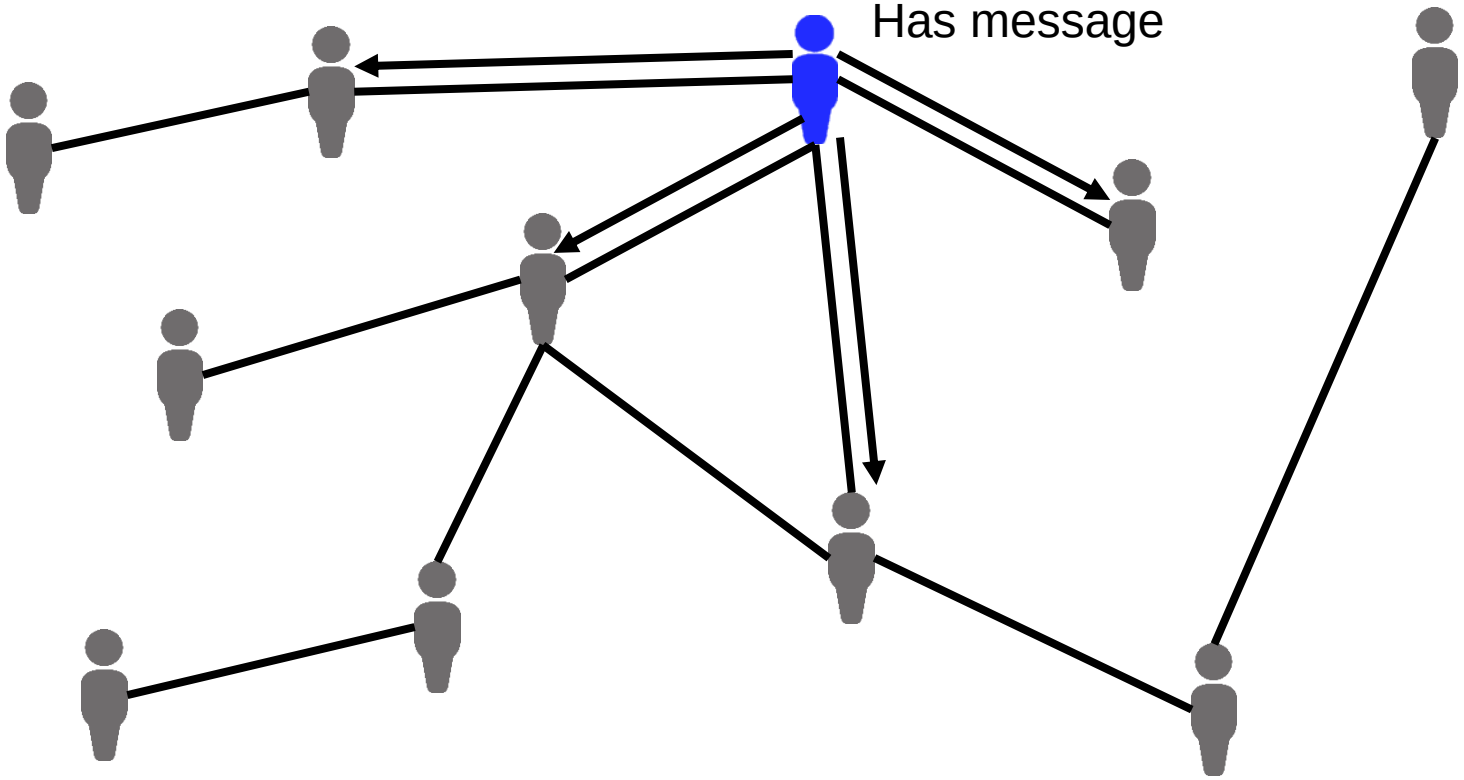


Epidemic

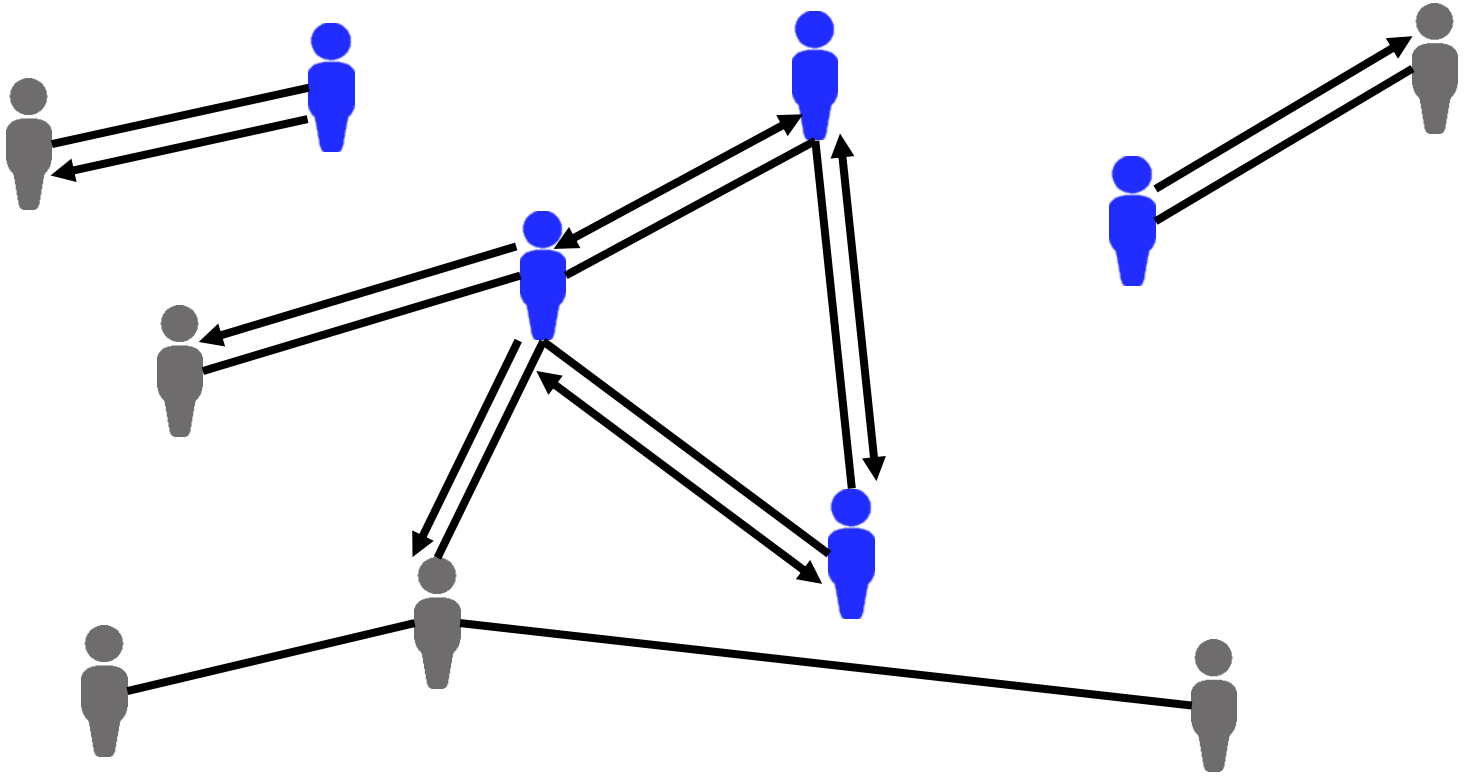
As long as they have a connection nodes exchange messages.



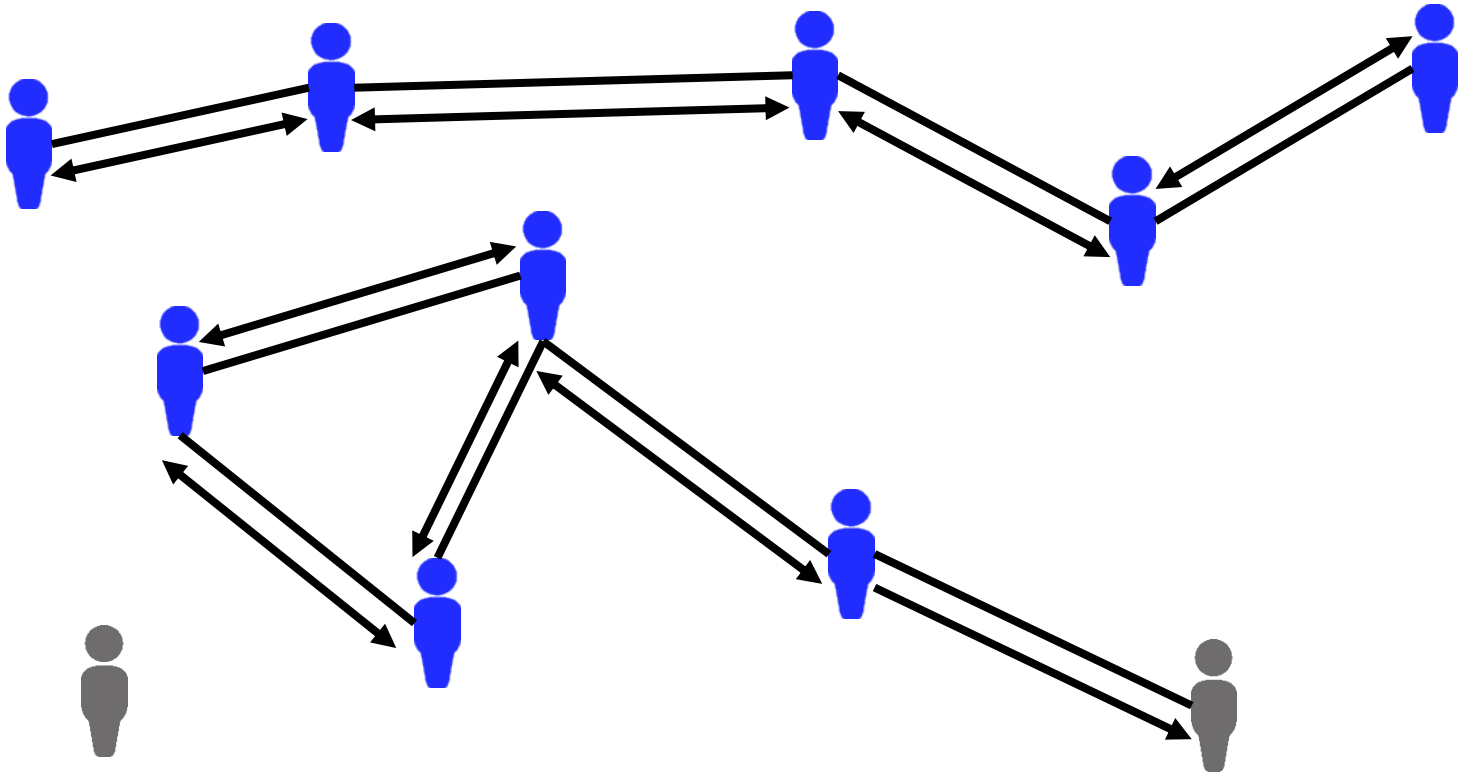
Epidemic – topology can change in time



Epidemic – topology can change in time



Epidemic – topology can change in time



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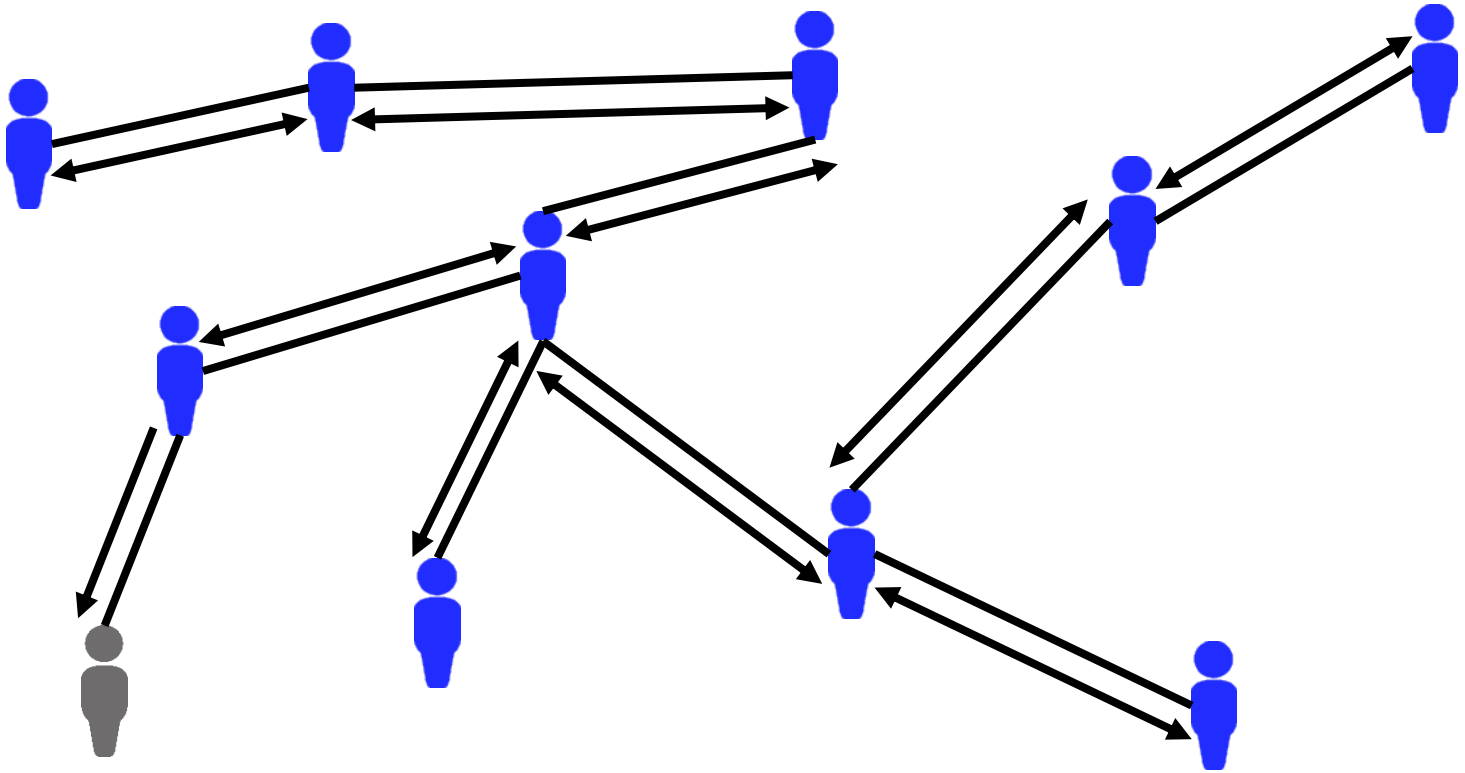
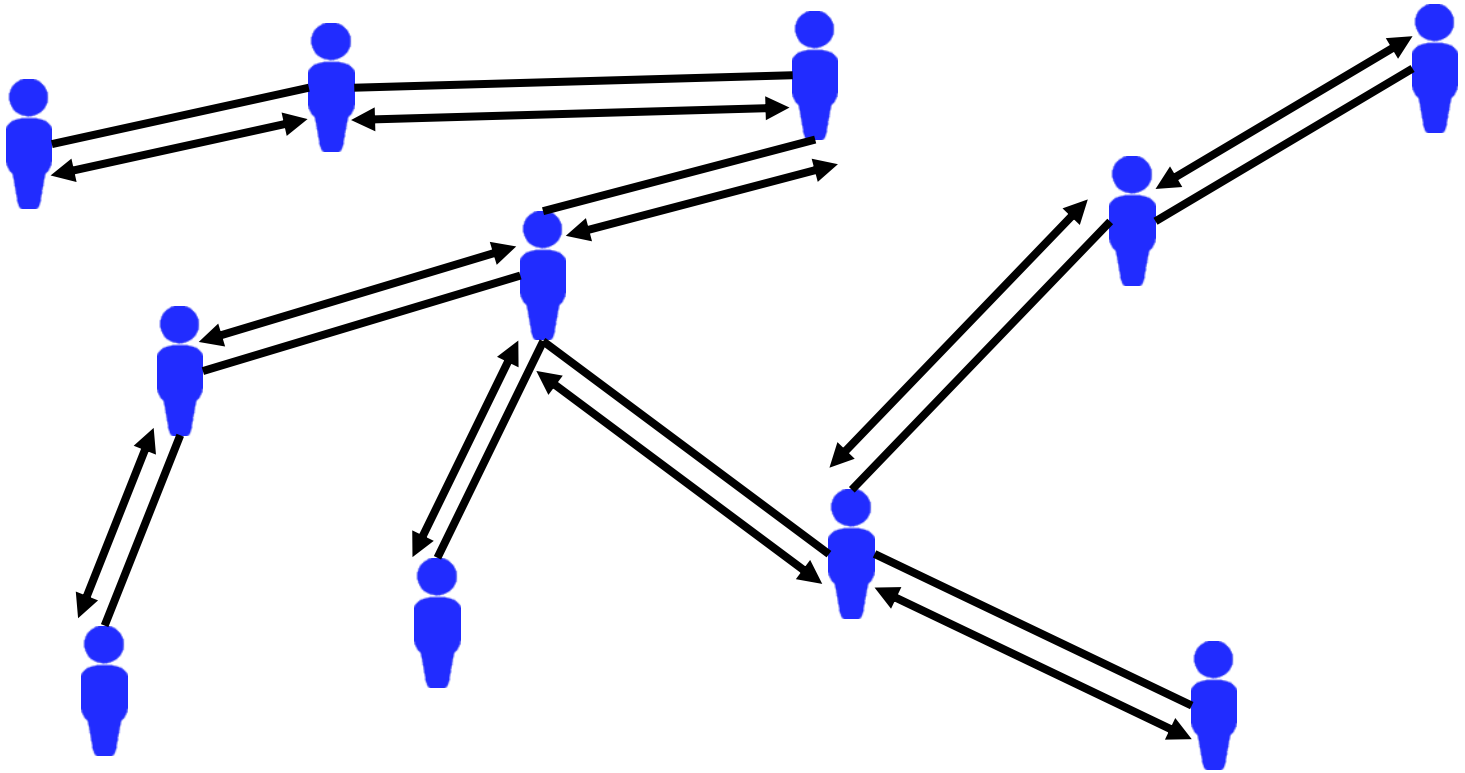


Epidemic – topology can change in time



Epidemic – Avantaje

Nu mai există entități centralizate gen ISP

Funcționează în cazuri extreme (cutremur/potop) când cablurile ar putea fi rupte

Epidemic – De ce nu e folosit în loc de IP?

Epidemic – De ce nu e folosit în loc de IP?

Necesită multe transmisii inutile pentru orice mesaj

Necesită spațiu de stocare mare pe fiecare dispozitiv pentru a evita cicluri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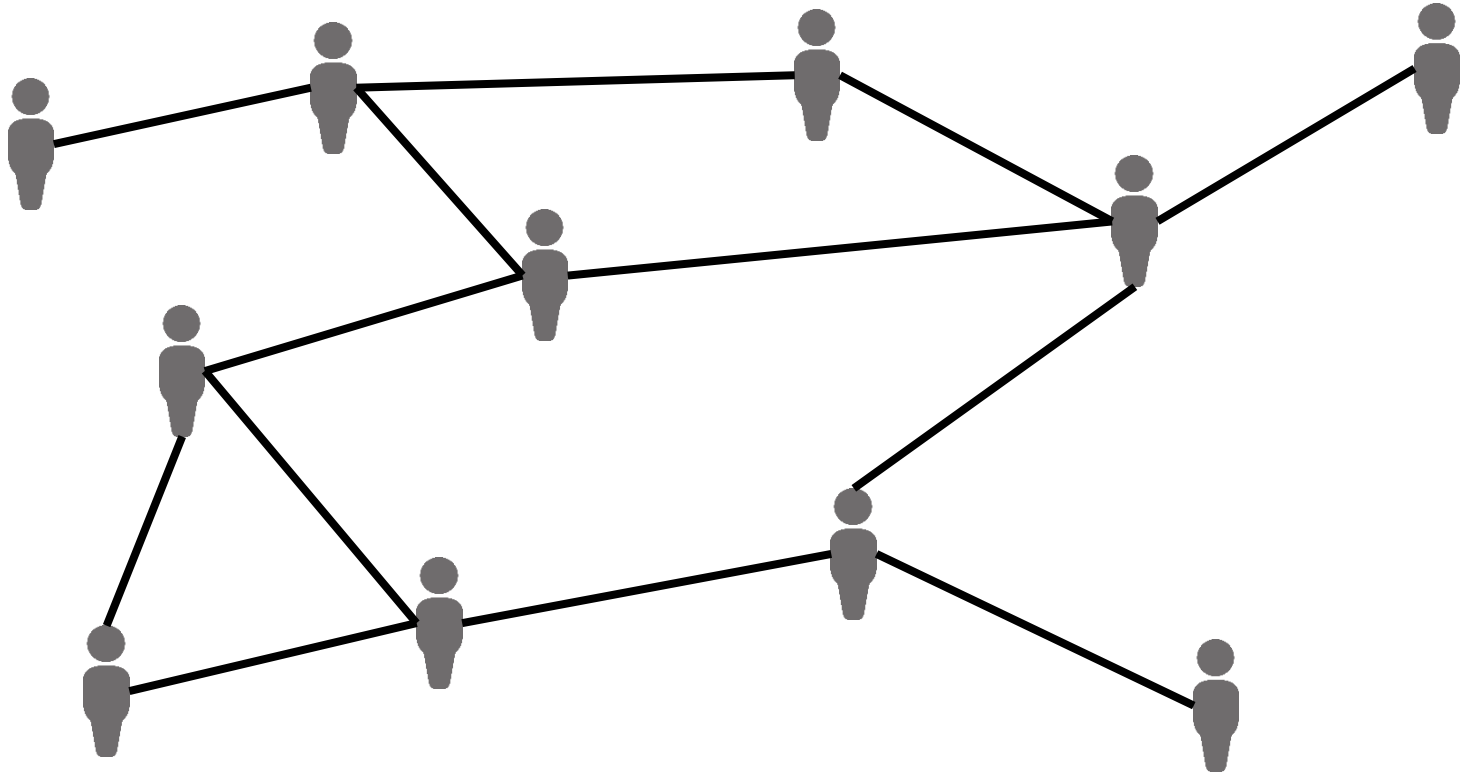
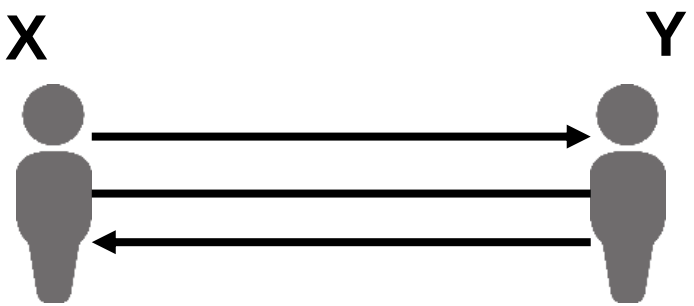
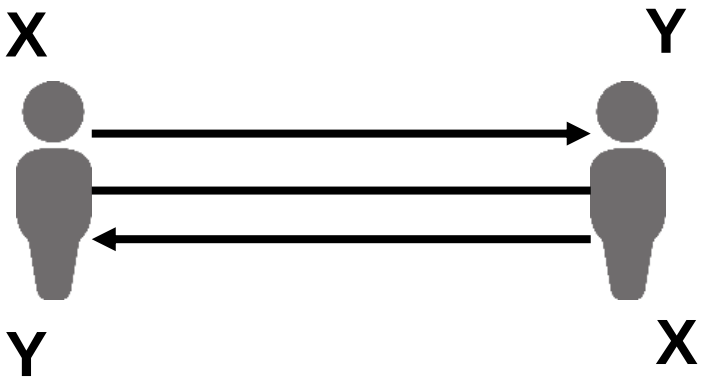
Epidemic – counting nodes



Epidemic – counting nodes



Epidemic – counting nodes



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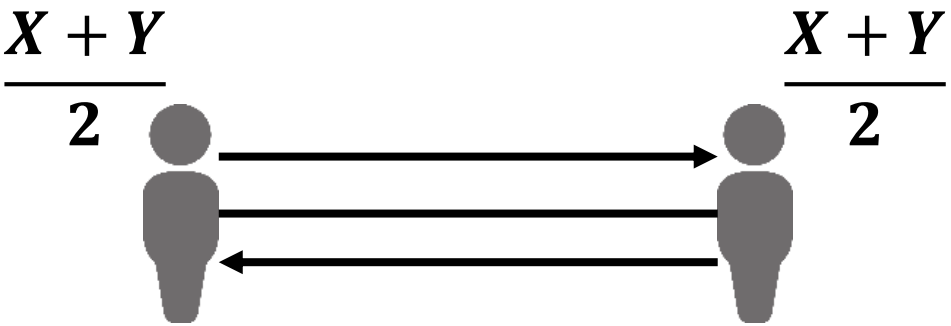
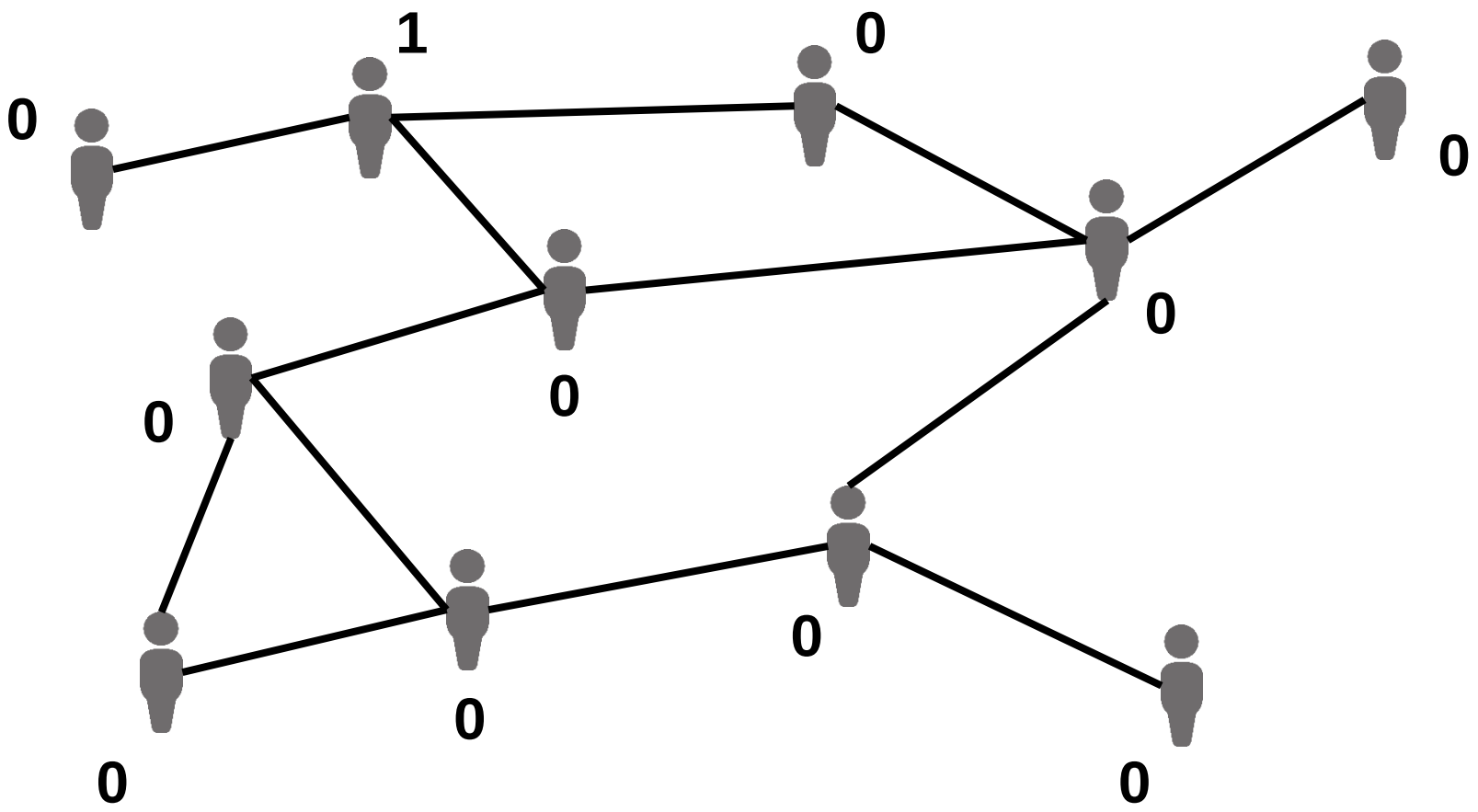
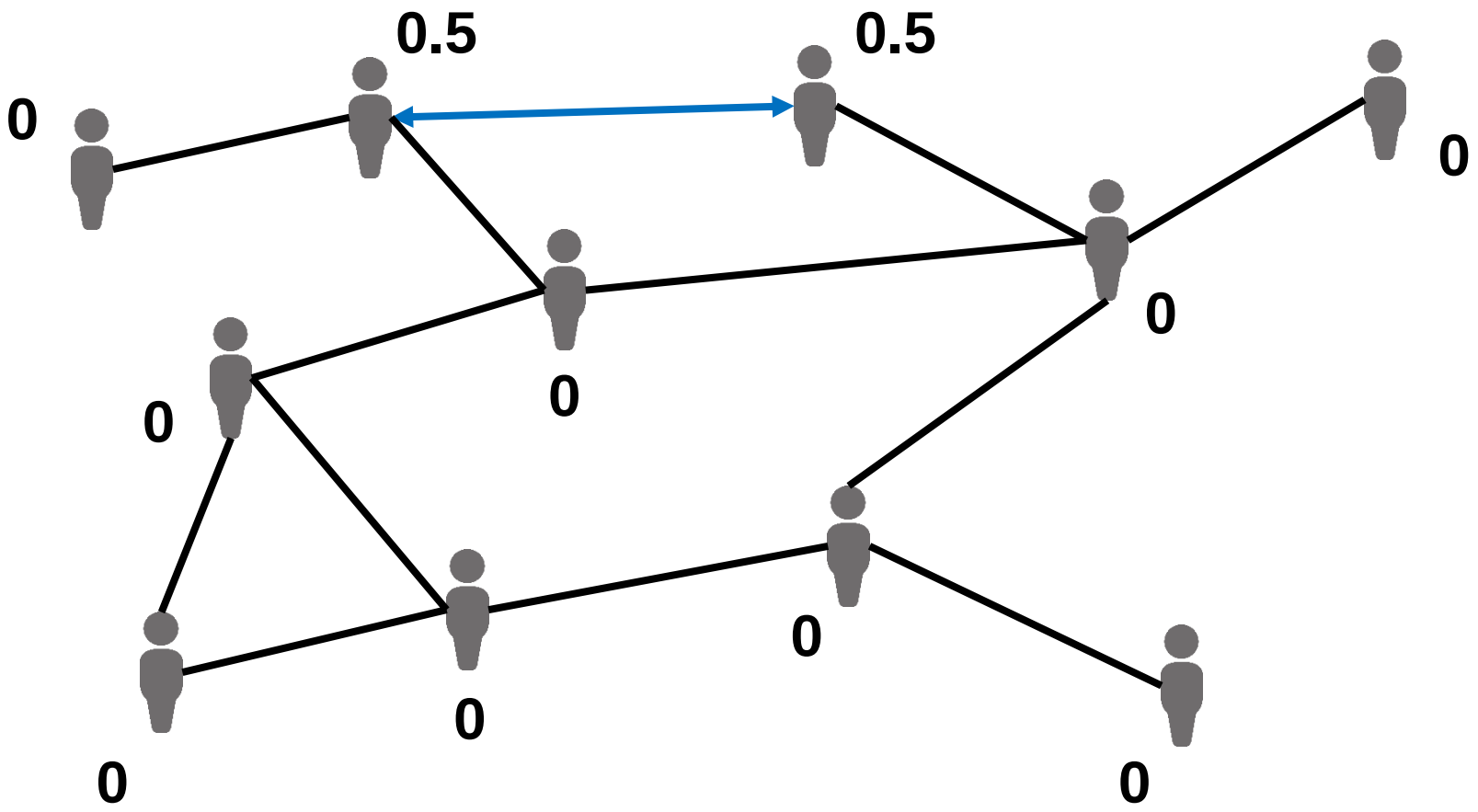


Epidemic – counting nodes



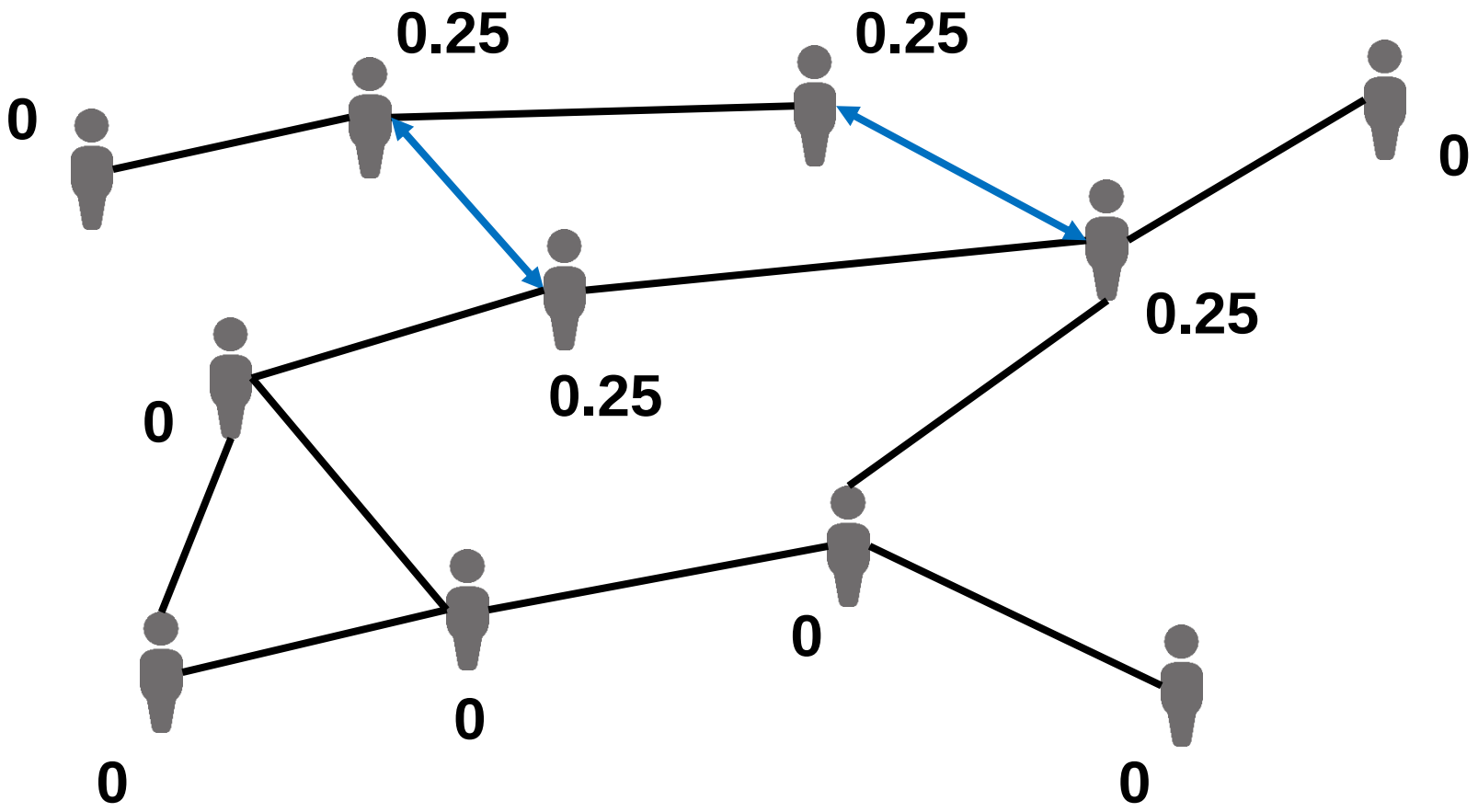
Sum of all = 1

Epidemic – counting nodes



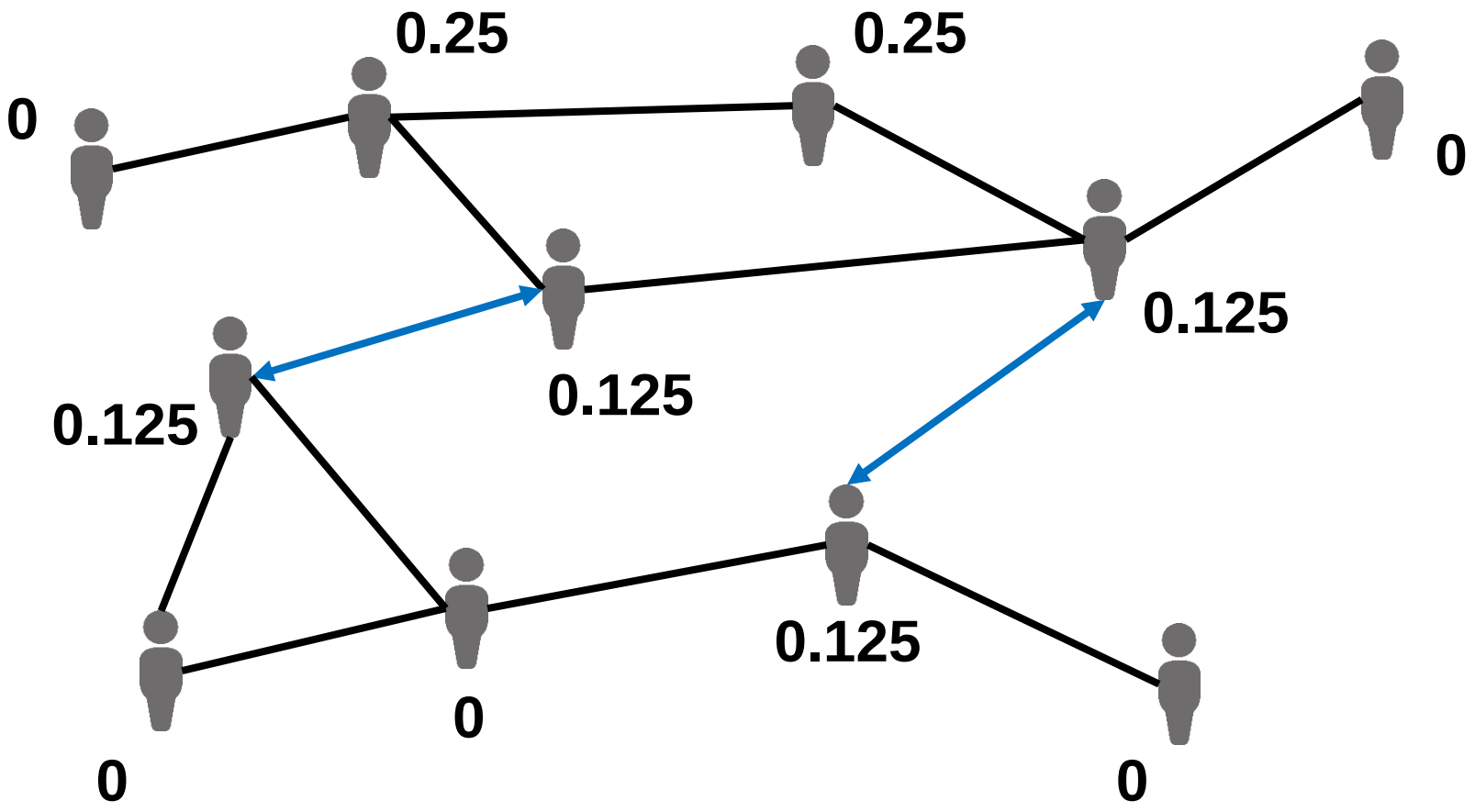
Sum of all = 1

Epidemic – counting nodes



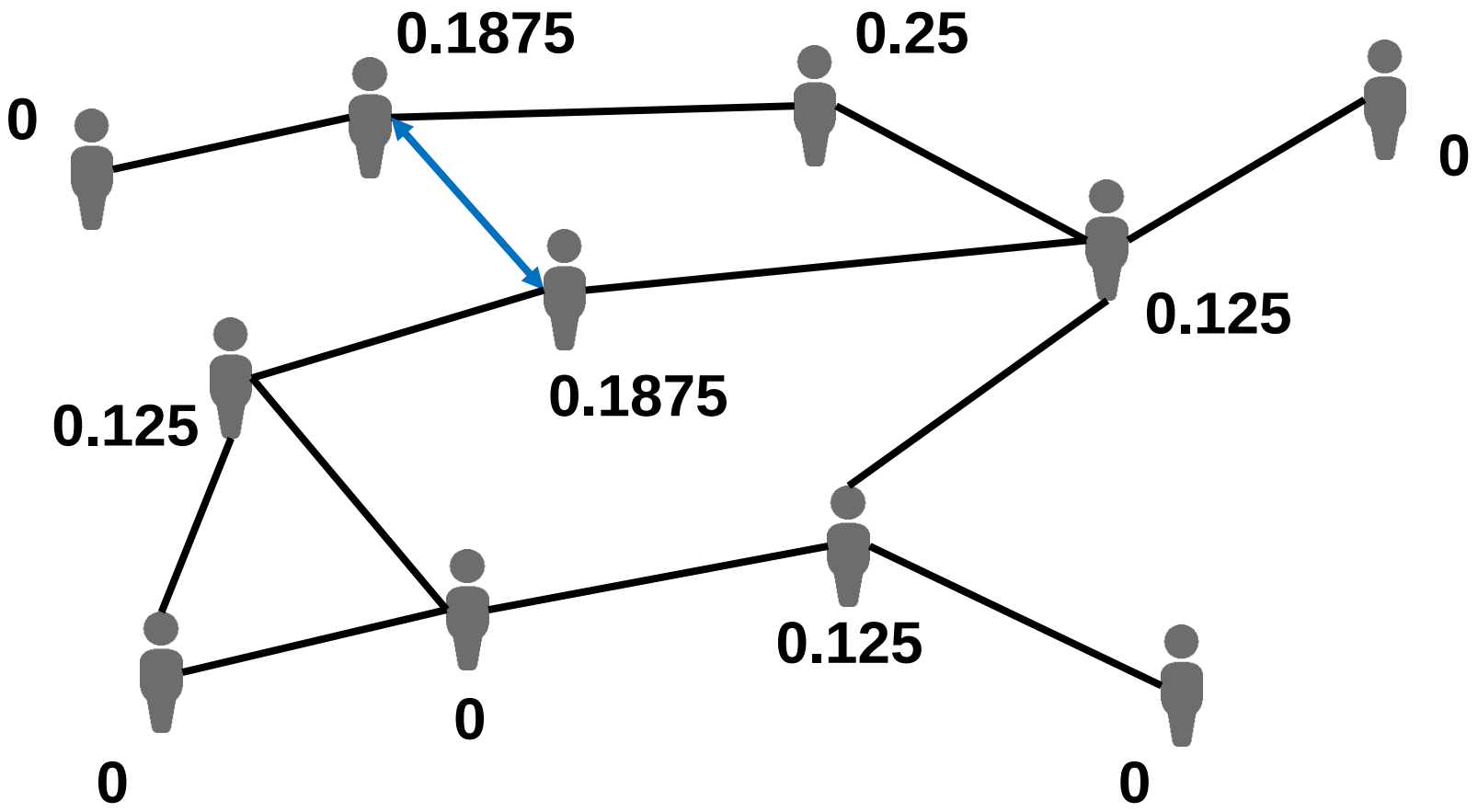
Sum of all = 1

Epidemic – counting nodes



Sum of all = 1

Epidemic – counting nodes

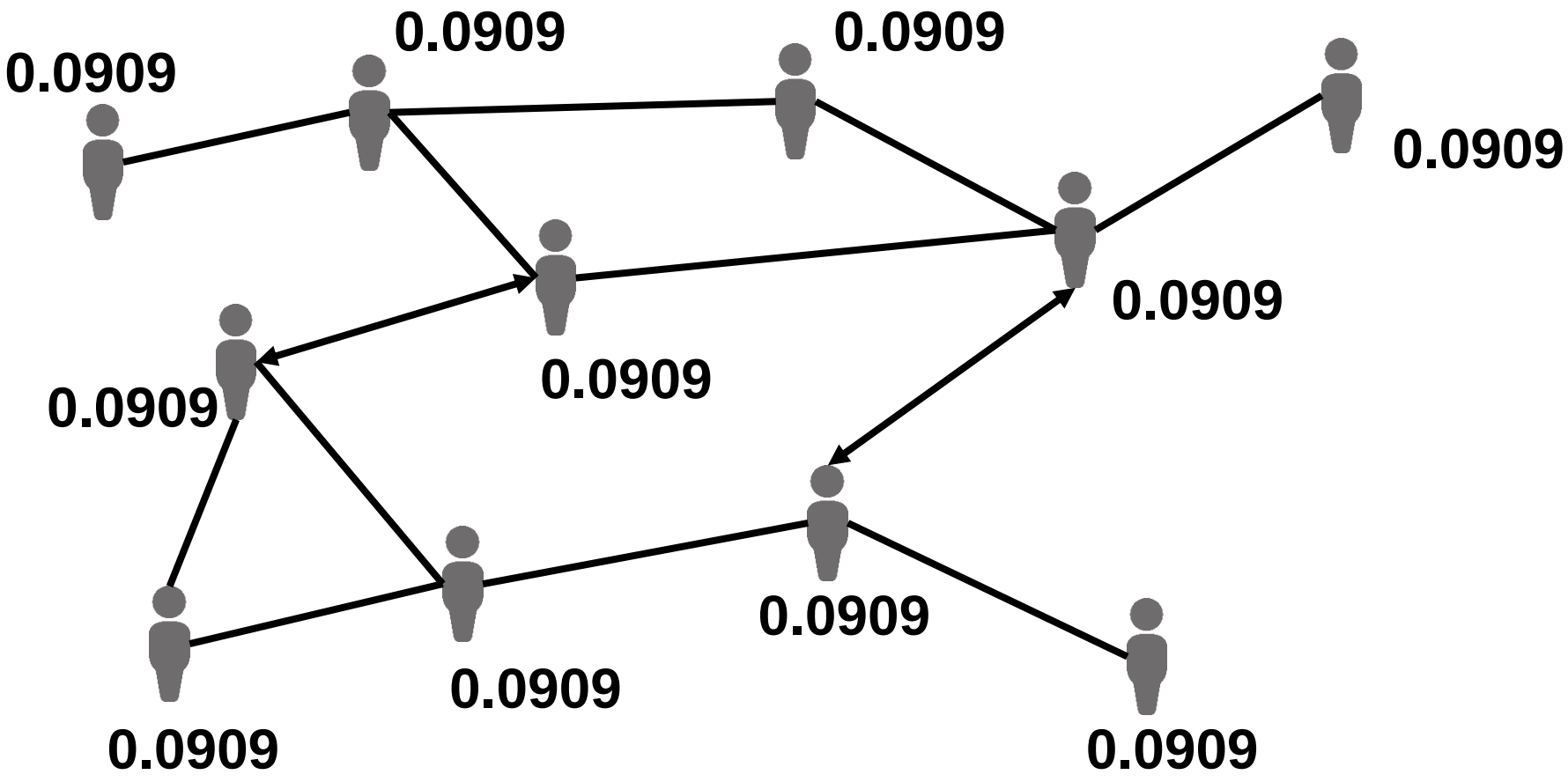


Sum of all = 1

Epidemic – counting nodes

And so on…

Epidemic – counting nodes



Sum of all = 1

Epidemic – counting nodes

$$\frac{1}{0.0909} = 11(\text{the number of nodes})$$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Choosing a Leader

Choosing a Leader

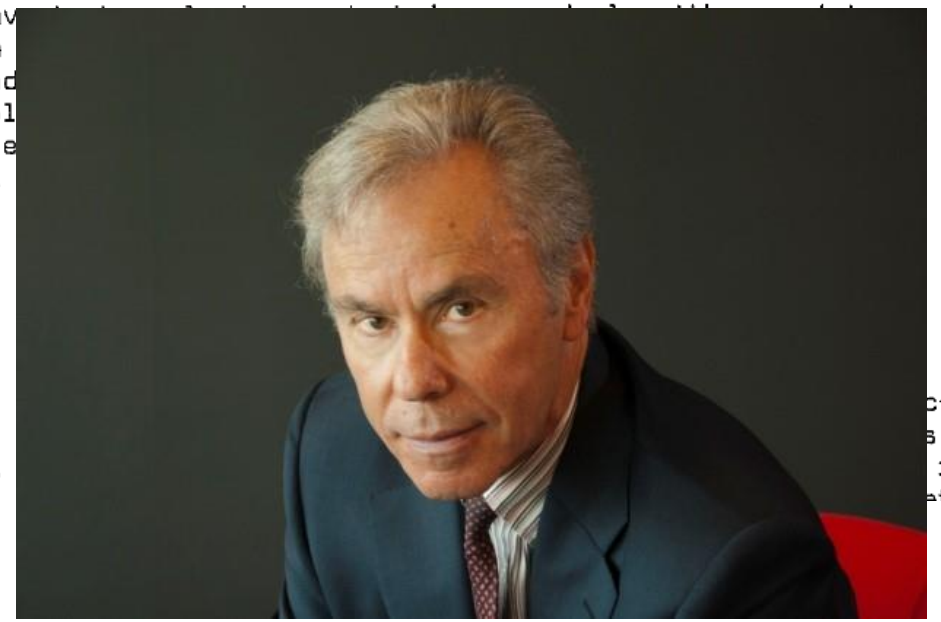
- Scopul este transformarea automată a unui sistem distribuit, decentralizat, într-un sistem cu topologie client-server;
- Mai mult, dacă serverul moare, poate fi ales un nou ”lider”.

Alegere lider Le Lann

DISTRIBUTED SYSTEMS—TOWARDS A FORMAL APPROACH

GÉRARD LE LANN
IRISA—Université de Rennes—BP 25 A
35 031 Rennes Cedex, France

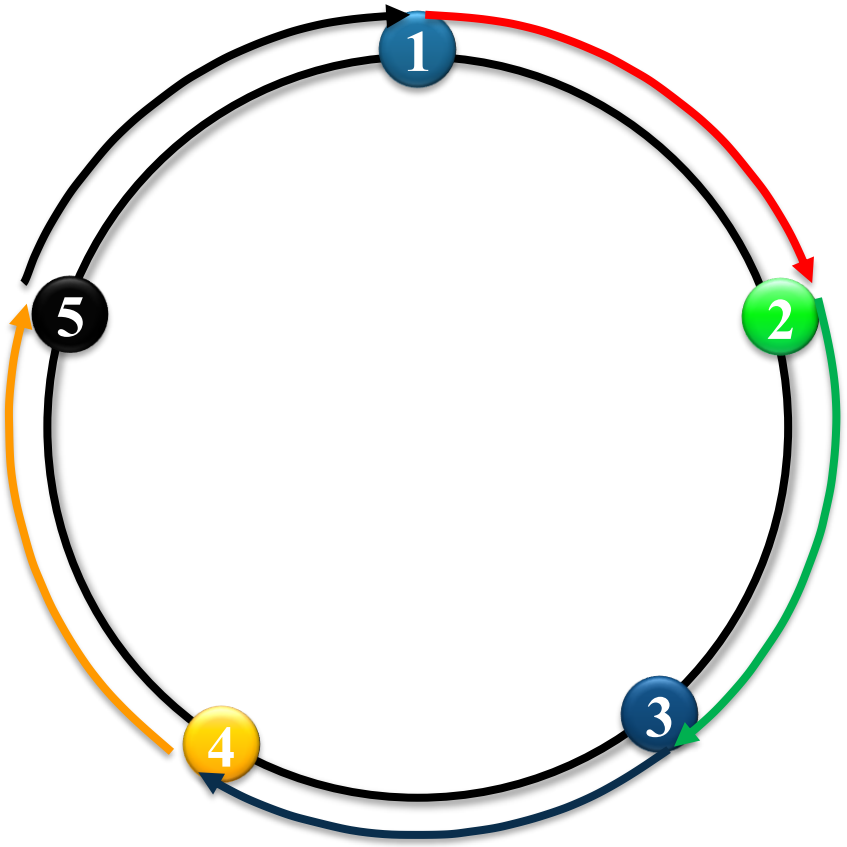
Packet-switching computer communication networks are examples of distributed systems. With the large scale emergence of mini and micro-computers, it is now possible to design special or general purpose distributed systems. However, as new problems hav
devised to operate such distributed systems in a
tics of distributed systems are analysed and fund
shown that distributed systems are not just simpl
techniques used in some planned or existing syste
problems is illustrated by the study of a mutual
ronment.



1. INTRODUCTION

Computer communication networks using packet-swit-
ching technology provide for the interconnection of
data-processing equipments of any kind. Such systems,

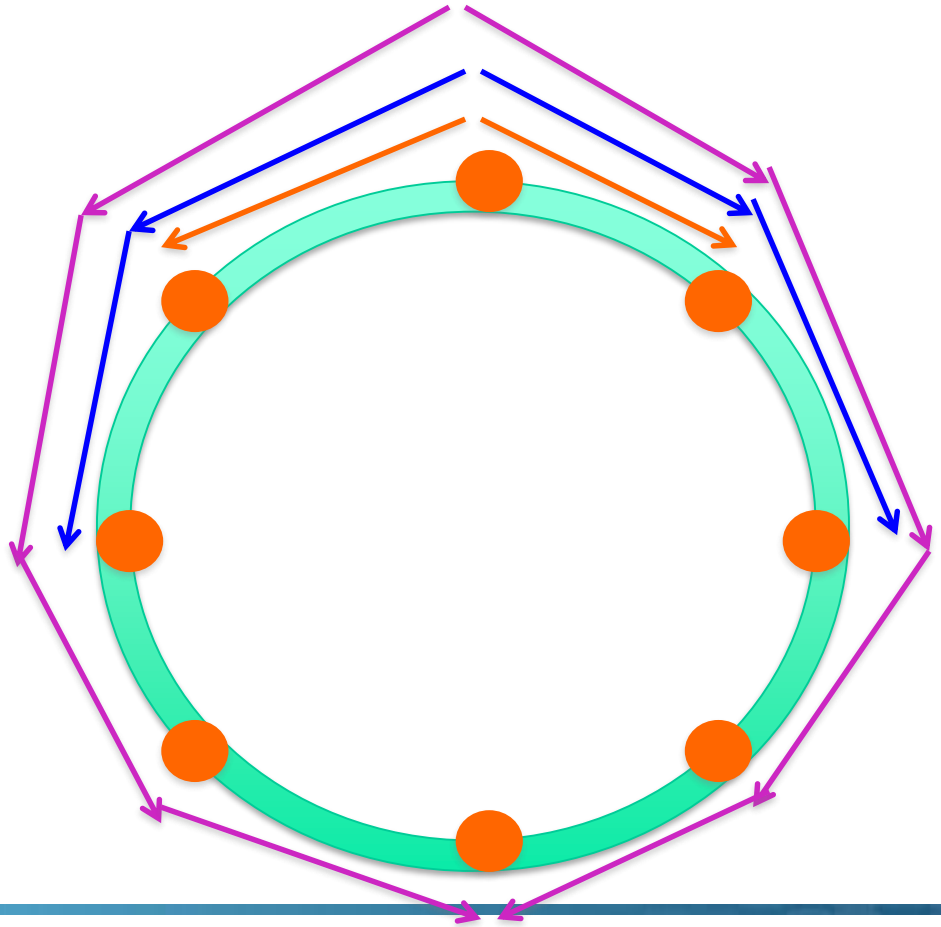
Algoritmul Le Lann



Nod	ID-uri cc	Status	
1	{5} 4} 3} 2} 1}	Lost	5
2	{1} 5} 4} 3} 2}	Lost	5
3	{2} 1} 5} 4} 3}	Lost	5
4	{3} 2} 1} 5} 4}	Lost	5
5	{4} 3} 2} 1} 5}	Leader	5

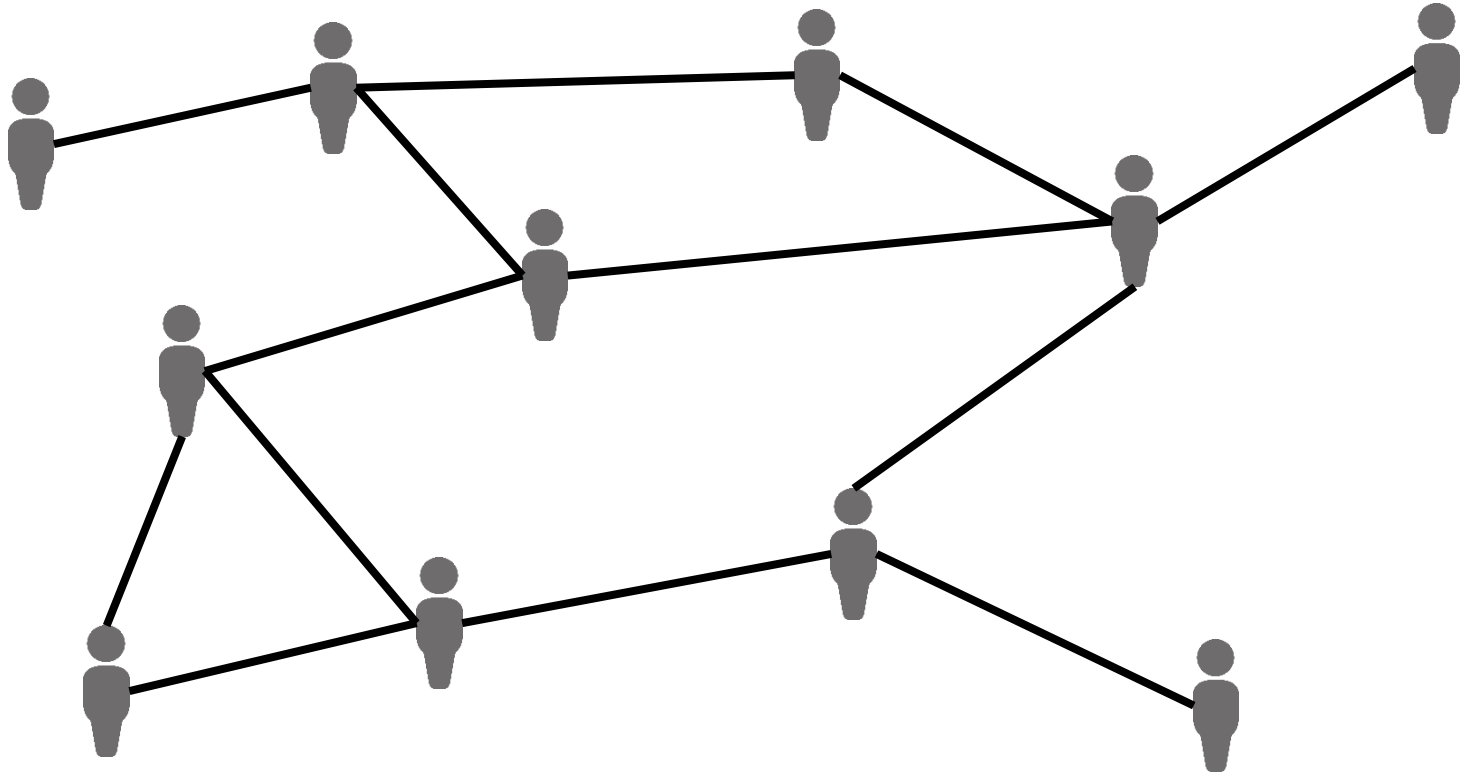
Algoritm Le Lann optimizat LeLann-Chang-Robert

- Algoritmul opereaza in faze.
- In **faza k**, un proces initiaza mesaje care sunt transmise in ambele directii pe cai de lungime 2^k (1, 2, 4, 8 …)

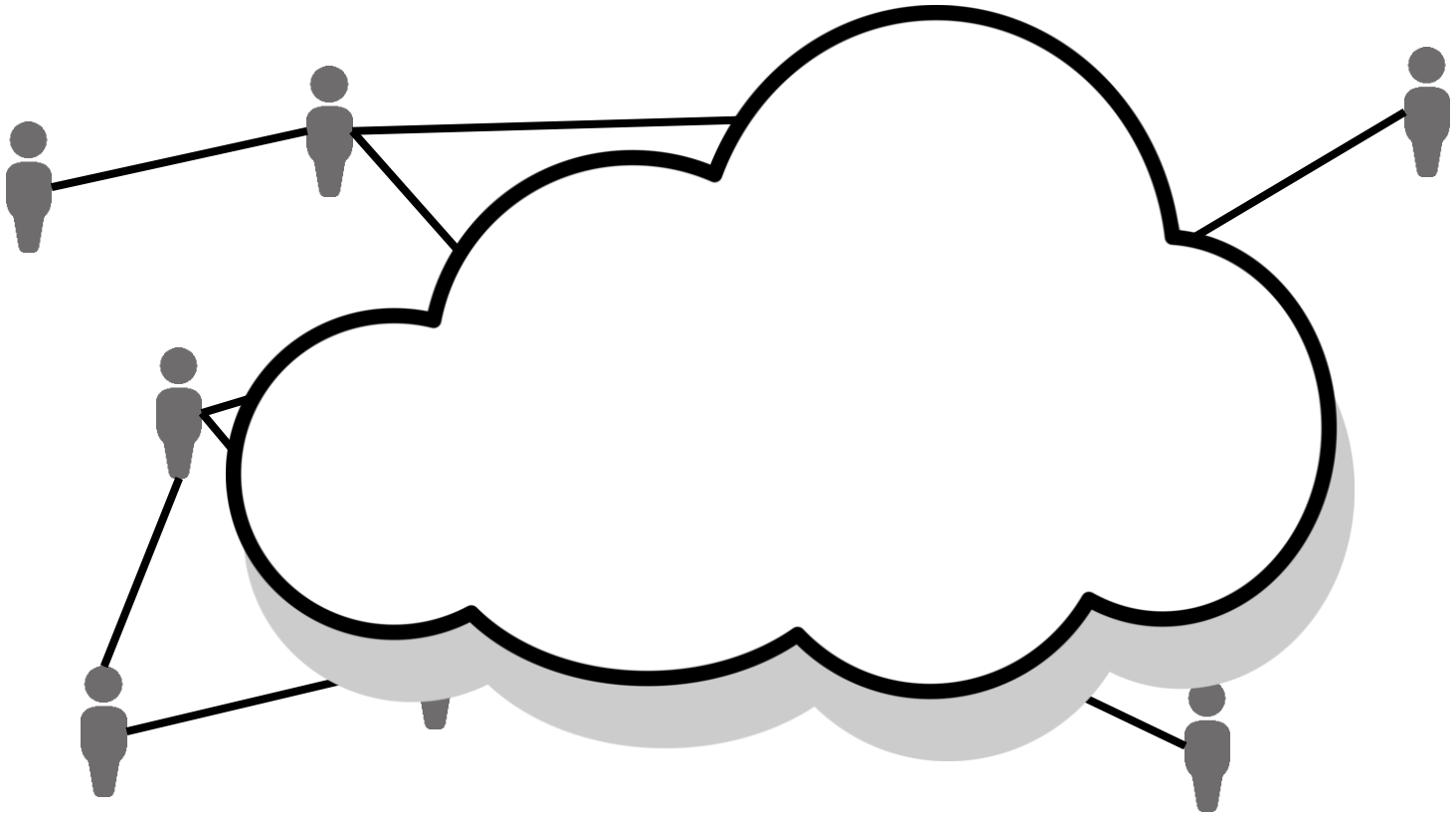


De ce mai discutăm despre topologii inel?

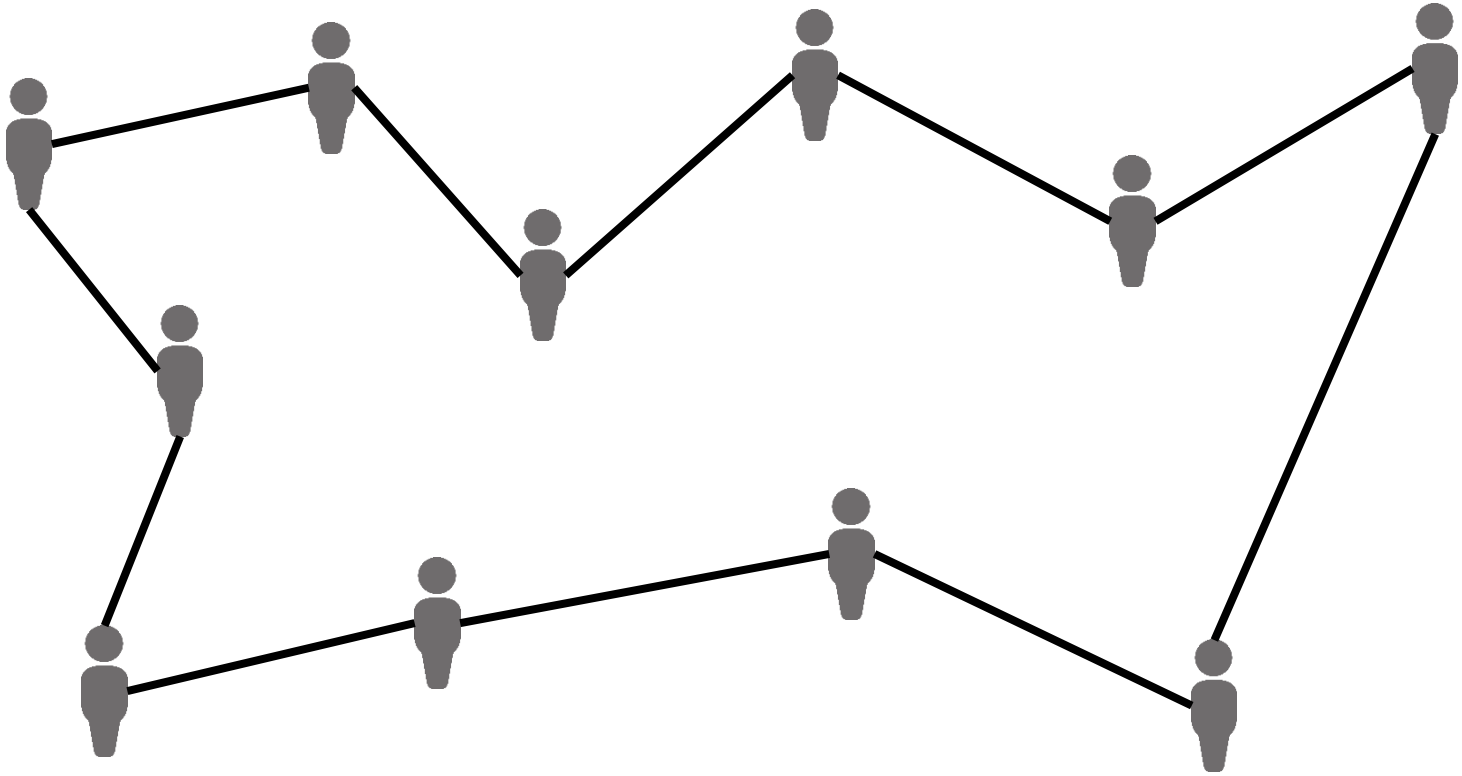
Una e topologia fizică



Una e topologia fizică

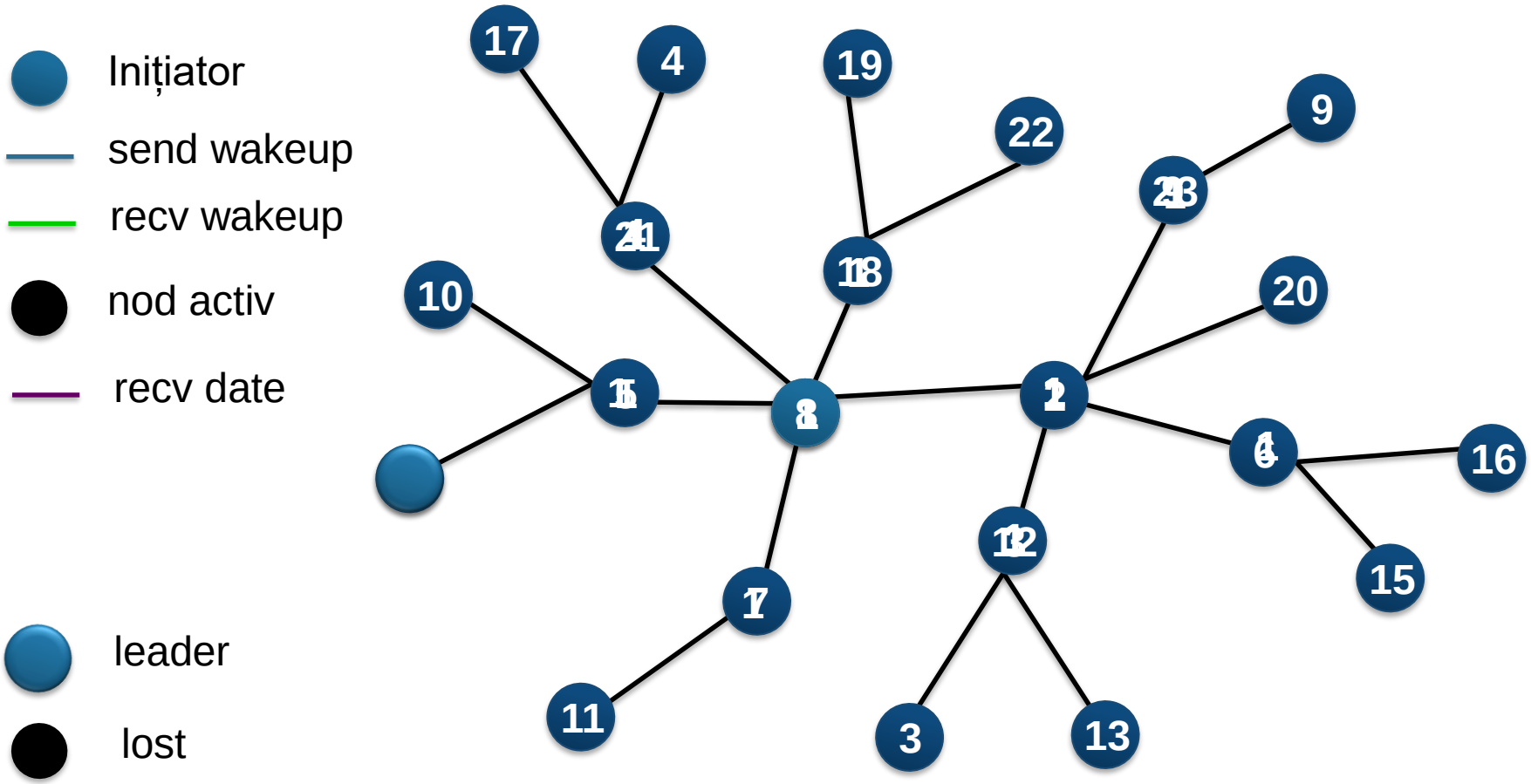


Alta e topologia software



Alegere lider în arbore

Algoritmul tree

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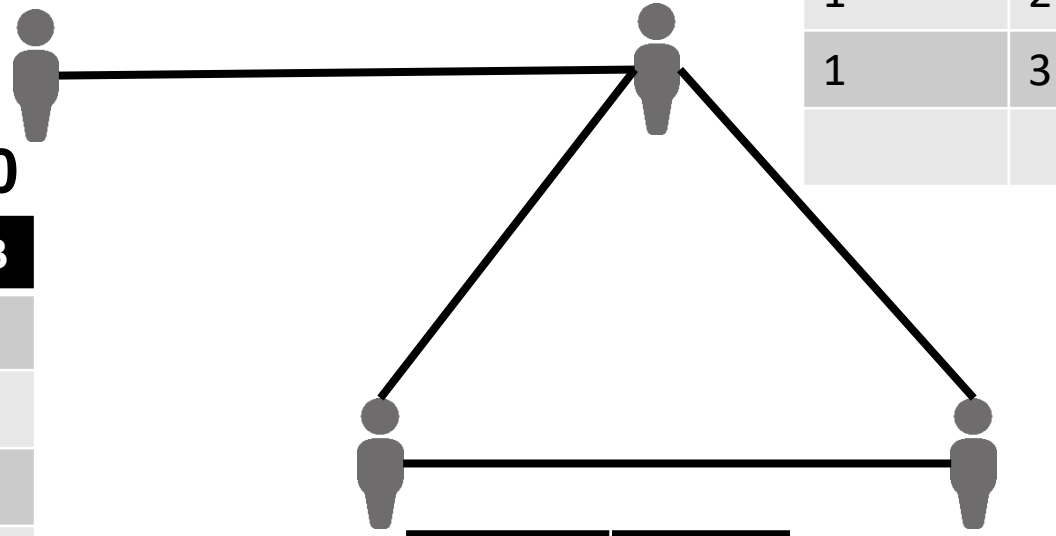
Alegere lider în graf



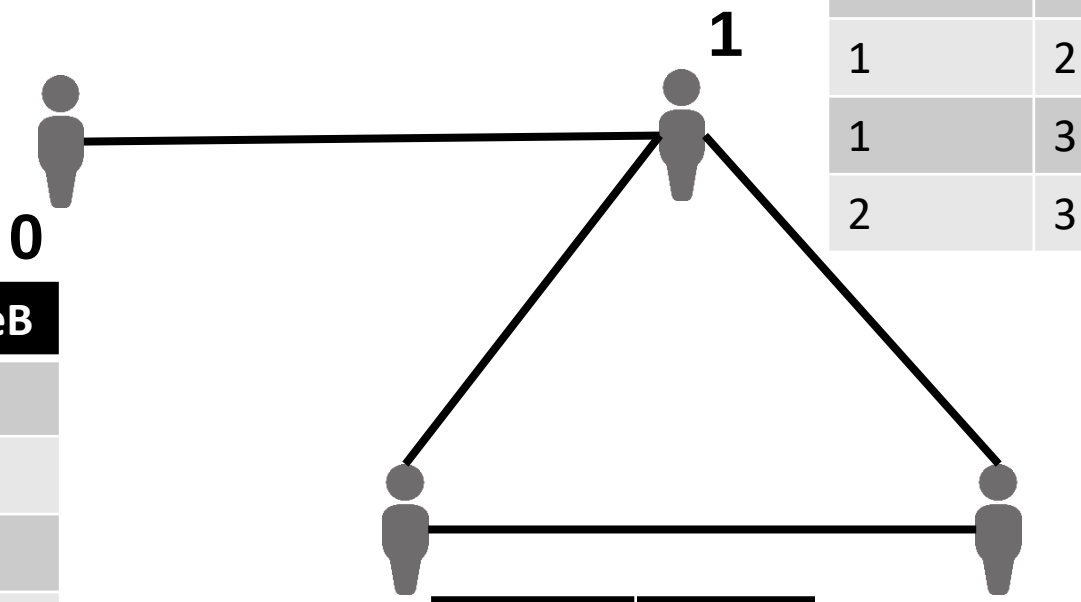
NodeA	NodeB
1	0
1	2
1	3

NodeA	NodeB
0	1

NodeA	NodeB
2	1
2	3

NodeA	NodeB
3	1
3	2

Alegere lider în graf



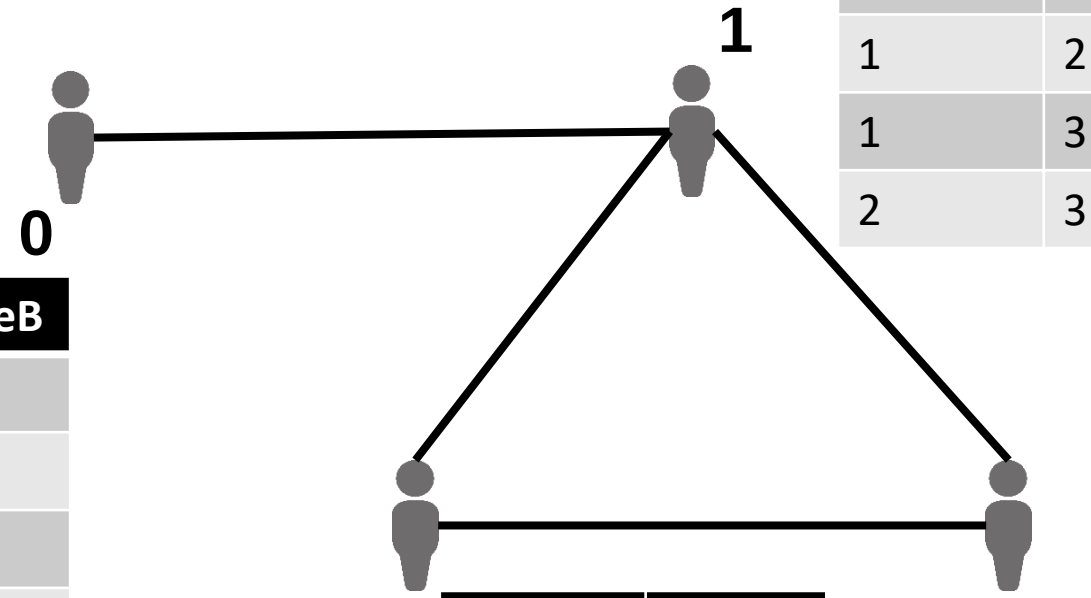
NodeA	NodeB
1	0
1	2
1	3
2	3

NodeA	NodeB
0	1
1	2
1	3

NodeA	NodeB
2	1
2	3
1	0
1	3

NodeA	NodeB
3	1
3	2
1	0
1	2

Alegere lider în graf



NodeA	NodeB
1	0
1	2
1	3
2	3

NodeA	NodeB
0	1
1	2
1	3
2	3

NodeA	NodeB
2	1
2	3
1	0
1	3

NodeA	NodeB
3	1
3	2
1	0
1	2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Dar nu știm deja ID-urile?

UUID sau GUID (Global Unique Identifier)

Network Working Group
Request for Comments: 4122
Category: Standards Track

P. Leach
Microsoft
M. Mealling
Refactored Networks, LLC
R. Salz
DataPower Technology, Inc.
July 2005

A Universally Unique IDentifier (UUID) URN Namespace

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Abstract

This specification defines a Uniform Resource Name namespace for UUIDs (Universally Unique IDentifier), also known as GUIDs (Globally Unique IDentifier). A UUID is 128 bits long, and can guarantee uniqueness across space and time. UUIDs were originally used in the Apollo Network Computing System and later in the Open Software