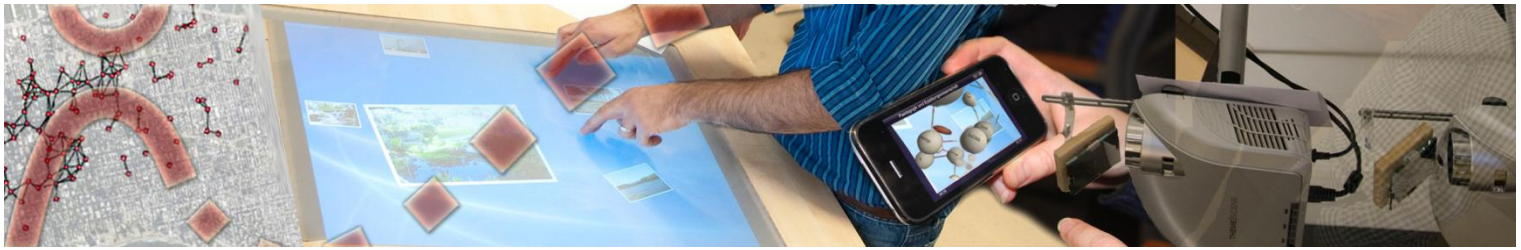
Telecooperation Lab
Prof. Dr. Max Mühlhäuser

Telekooperation 1: Exercise WS15/16

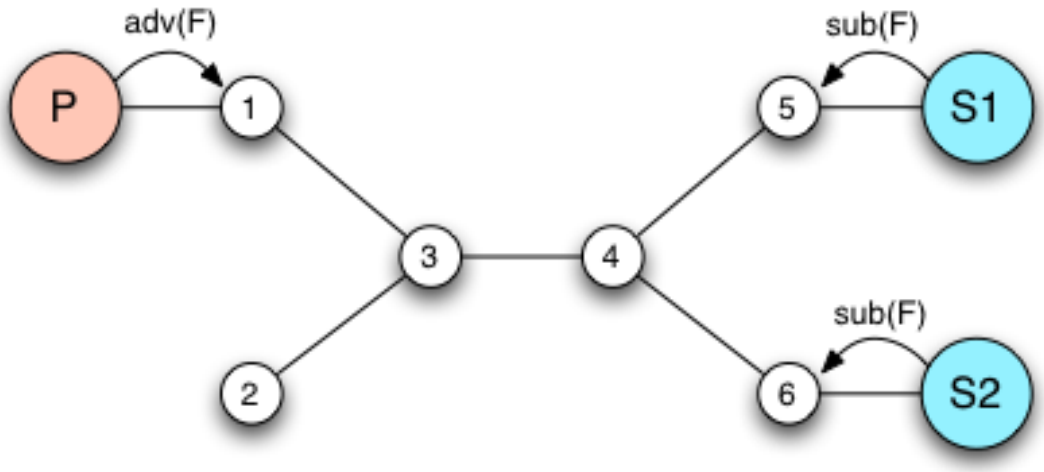
Michael Stein, MSc.
michael.stein@tk.informatik.tu-darmstadt.de
Jens Heuschkel, MSc.
jens.heuschkel@tk.informatik.tu-darmstadt.de



TK1 – EXERCISE

- Solution 6th Exercise

Task 1: Routing with Advertisements



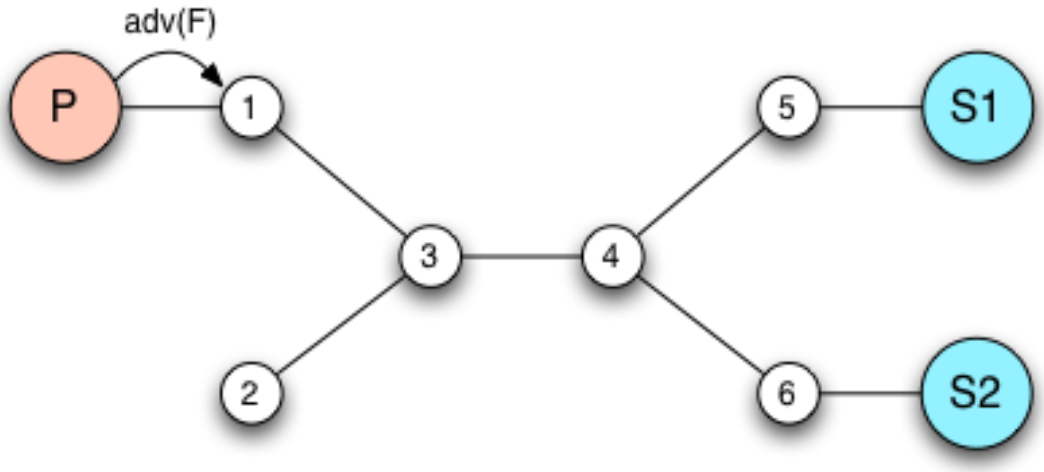
Apply the algorithm “Routing with Advertisements” on the router network in illustration 1. Write down which messages are flowing step-by-step (similar to the presented method in the lecture).

1) Publisher P sends an advertisement to router 1.

Task 1: Routing with Advertisements

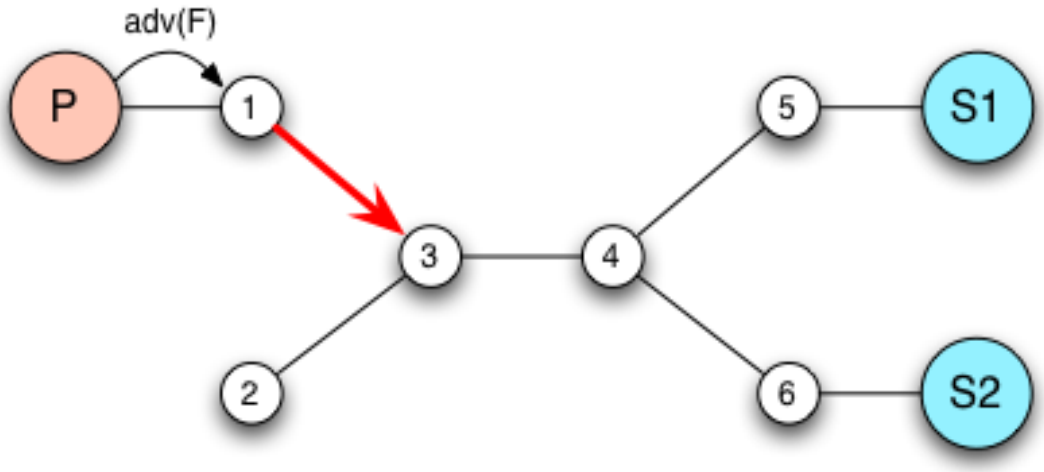
TECHNISCHE UNIVERSITÄT DARMSTADT

Initial state:



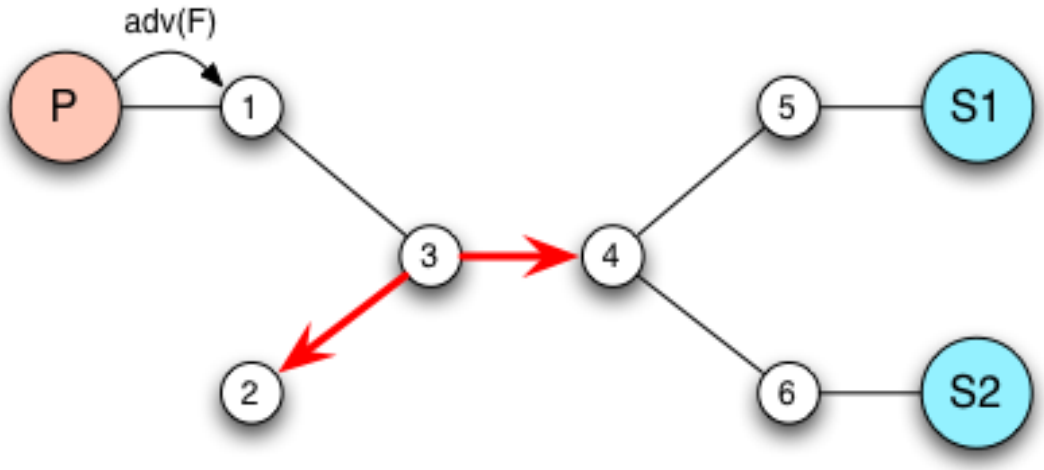
Source	Dest	Request	Filter

Task 1: Routing with Advertisements



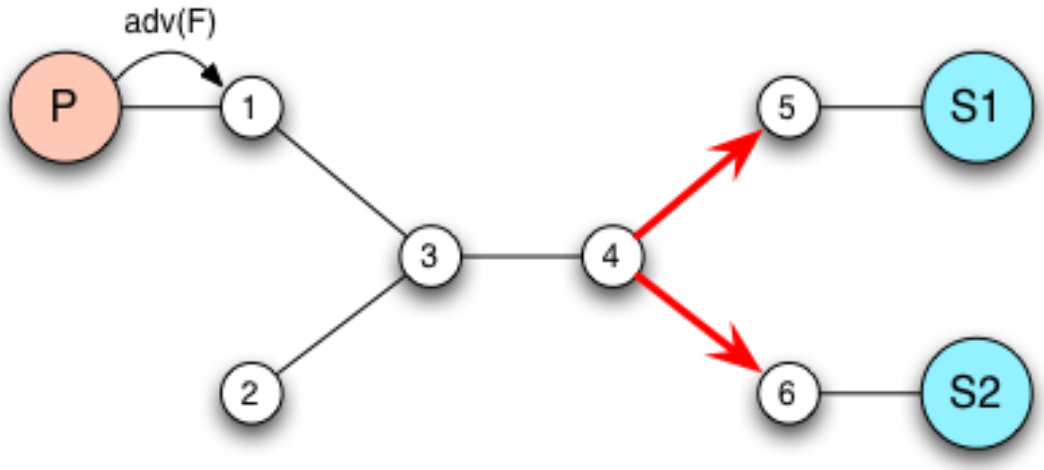
Source	Dest	Request	Filter
1	3	adv	F

Task 1: Routing with Advertisements



Source	Dest	Request	Filter
1	3	adv	F
3	4	adv	F
3	2	adv	F

Task 1: Routing with Advertisements

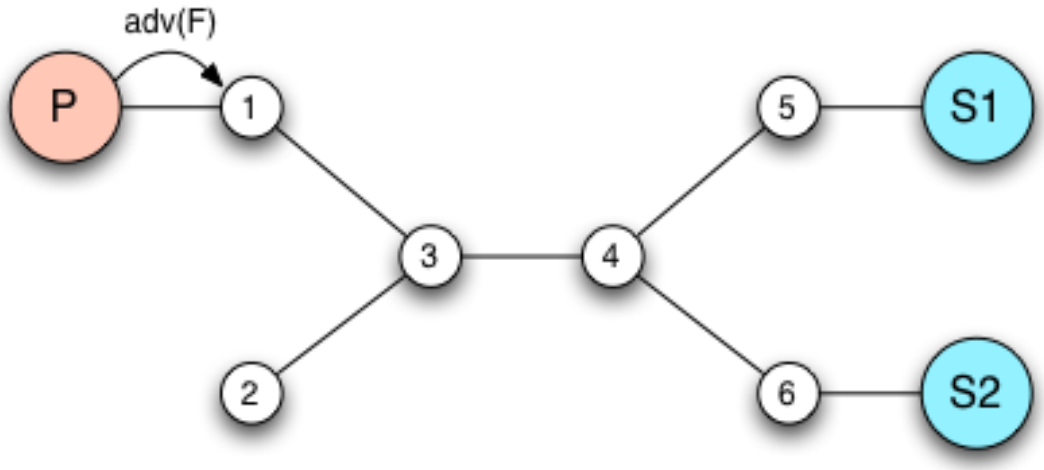


Source	Dest	Request	Filter
1	3	adv	F
3	4	adv	F
3	2	adv	F
4	5	adv	F
4	6	adv	F

Task 1: Routing with Advertisements

TECHNISCHE UNIVERSITÄT DARMSTADT

End state:

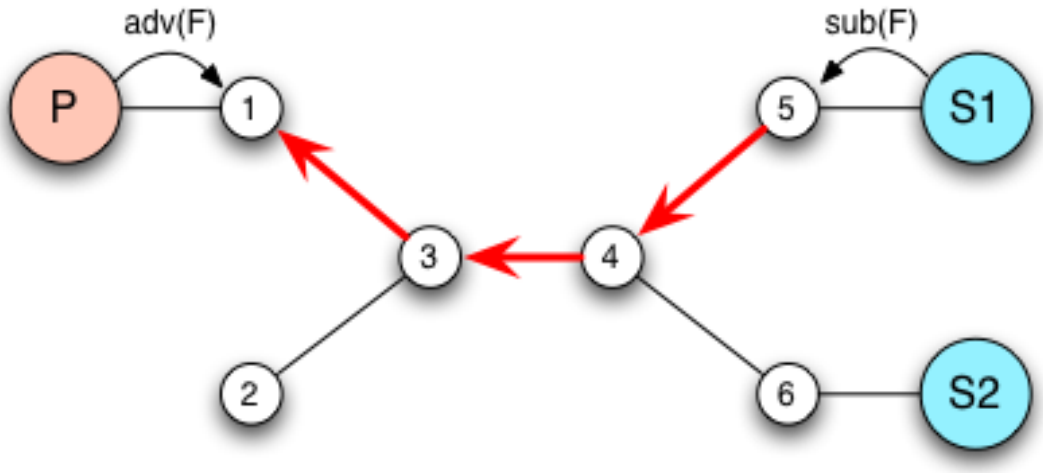


Source	Dest	Request	Filter
1	3	adv	F
3	4	adv	F
3	2	adv	F
4	5	adv	F
4	6	adv	F

Task 1: Routing with Advertisements

TECHNISCHE UNIVERSITÄT DARMSTADT

2) Subscriber S1 sends a subscription to router 5.



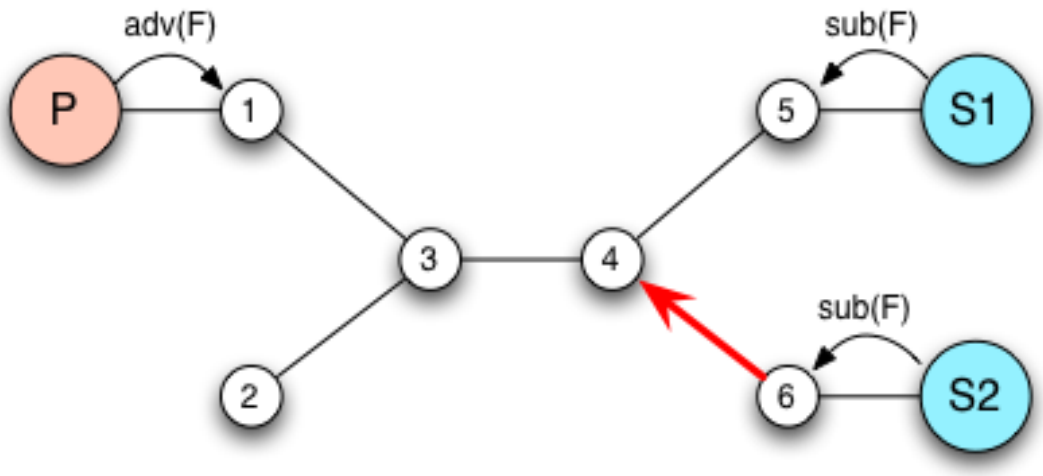
Source	Dest	Request	Filter
5	4	sub	F
4	3	sub	F
3	1	sub	F

Note: If router 5 receives sub(F) from S1 before it receives adv(F) from P, it has to store the subscription. When adv(F) is received later, the subscription is forwarded.

Task 1: Routing with Advertisements

TECHNISCHE UNIVERSITÄT DARMSTADT

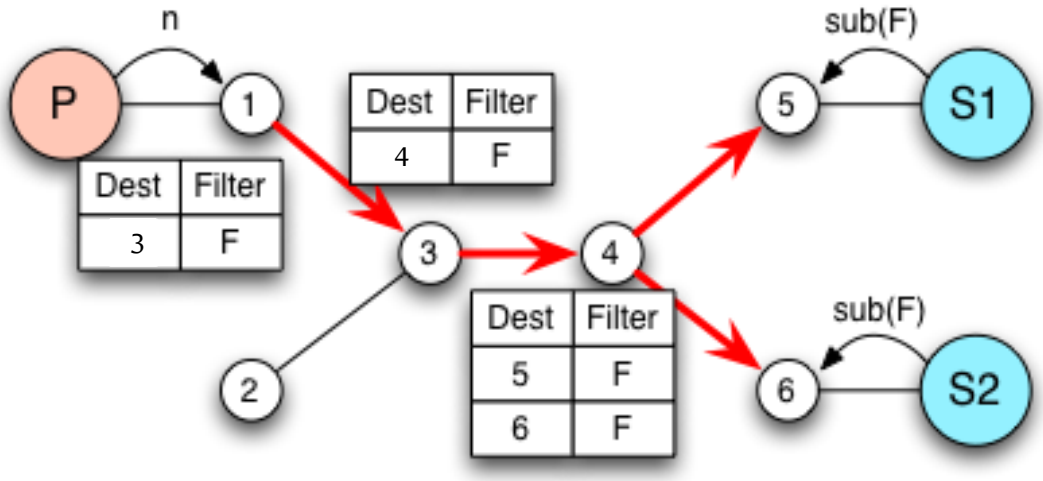
2) Later S2 sends a subscription to router 6.



Source	Dest	Request	Filter
5	4	sub	F
4	3	sub	F
3	1	sub	F
6	4	sub	F

Task 1: Routing with Advertisements

3) Publisher P sends a notification to router 1



Source	Dest	Message
1	3	notification n (n matches F)
3	4	notification n (n matches F)
4	5	notification n (n matches F)
4	6	notification n (n matches F)

Task 2: Routing in Pub/Sub Systems

TECHNISCHE UNIVERSITÄT DARMSTADT

1) Discuss the pros and cons about “Routing with Advertisements” and “Routing with Subscriptions” in the context of a matchmaking system of a video game (i.e., publishers provide information on currently running gaming sessions to the clients).

Task 2: Routing in Pub/Sub Systems

TECHNISCHE UNIVERSITÄT DARMSTADT

Requirements of a matchmaking application (other solutions are possible as well!)

- Background: Application that provides information on ongoing play sessions for connecting different players

- System characteristics
  - Possible complexity: one producer vs. many producers
    - Large amount of data because of frequent events (e.g., number of players in a game session changed) → Efficiency important
    - Number of producers constant? Depends on whether players are also publishers

  - Many subscribers
  - **Frequent (re)subscribing**

- Requirements, e.g.
  - **Quick notification** for all players

Task 2: Routing in Pub/Sub Systems

TECHNISCHE UNIVERSITÄT DARMSTADT

"Routing with Subscriptions"

- Subscriptions are forwarded to all neighbors except source

- Pros (suitable for):
  - Few "unstable" Subscriber (rare (un)subscribing)
  - No advertisements → no dropped notifications (i.e., no advertisements required)

- Cons:
  - Inefficient routing

Task 2: Routing in Pub/Sub Systems

TECHNISCHE UNIVERSITÄT DARMSTADT

"Routing with Advertisements"

- What means suitable in case of "Routing with Advertisements"?
  - Minimize routing of advertisements
  - Constant number of Publisher and "stable" publishing is required

- Pros:
  - Efficient in frequently (re)subscribing
  - Subscriptions only flow along the path to the Publisher

- Cons:
  - Advertisement might not be possible

Task 2: Routing in Pub/Sub Systems

TECHNISCHE UNIVERSITÄT DARMSTADT

"Routing with Advertisements" probably makes more sense in the considered scenario

Task 2: Routing in Pub/Sub Systems

TECHNISCHE UNIVERSITÄT DARMSTADT

2) Which routing is more suitable for which application? Explain your decision.

- "Routing with Subscriptions"
  - Small network, few subscriptions
- "Routing with Advertisements"
  - Efficient in frequently (re)subscribing
  - Constant number of publishers
  - Routing efficiency in large networks