



BA/SA/Group/Lab:

## Practical Dynamic Directories

Imagine that a single mobile resource is to be shared among the nodes of a network. The nodes can request the shared resource concurrently and at different times. Our task is to design a protocol to satisfy all the requests, as quickly as possible. This protocol is often known as a *Distributed Directory* service as the nodes can use the service to locate a mobile object.

The problem has numerous applications other than using it to coordinate access to a shared resource. For example, one can use the service to globally order transactions as in a blockchain, where a transaction request can be issued by an arbitrary node at an arbitrary time.

Arrow is a practical and classic protocol to solve this problem. However, it only works well on trees but not on general networks. Other state of the art protocols that work well on general networks are not so practical as they require costly global initialization and local storage that is proportional to the size of the network. On the other hand, the Arrow protocol is cheaply initialized and only uses constant space per node.



Figure 1: Concurrent requests that must be ordered to satisfy them.

The goal of this thesis is to implement a simple distributed directory protocol for a general network that works well in practice. We will be exploring different algorithms and heuristics for various families of graphs. We already have some ideas that work well in few cases. But, we are also open to your ideas!

**Requirements:** Interest in designing and implementing graph algorithms in the programming language of your choice.

**Interested? Please contact us for more details!**

### Contacts

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