UNIVERSITY OF JYVÄSKYLÄ

Chedar

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Cheese Factory Project, InBCT 3.2
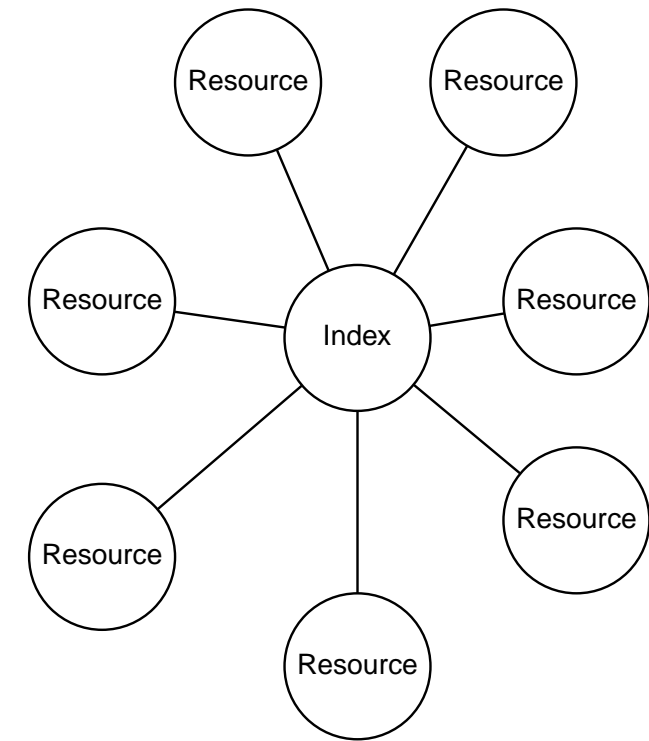Agora Center

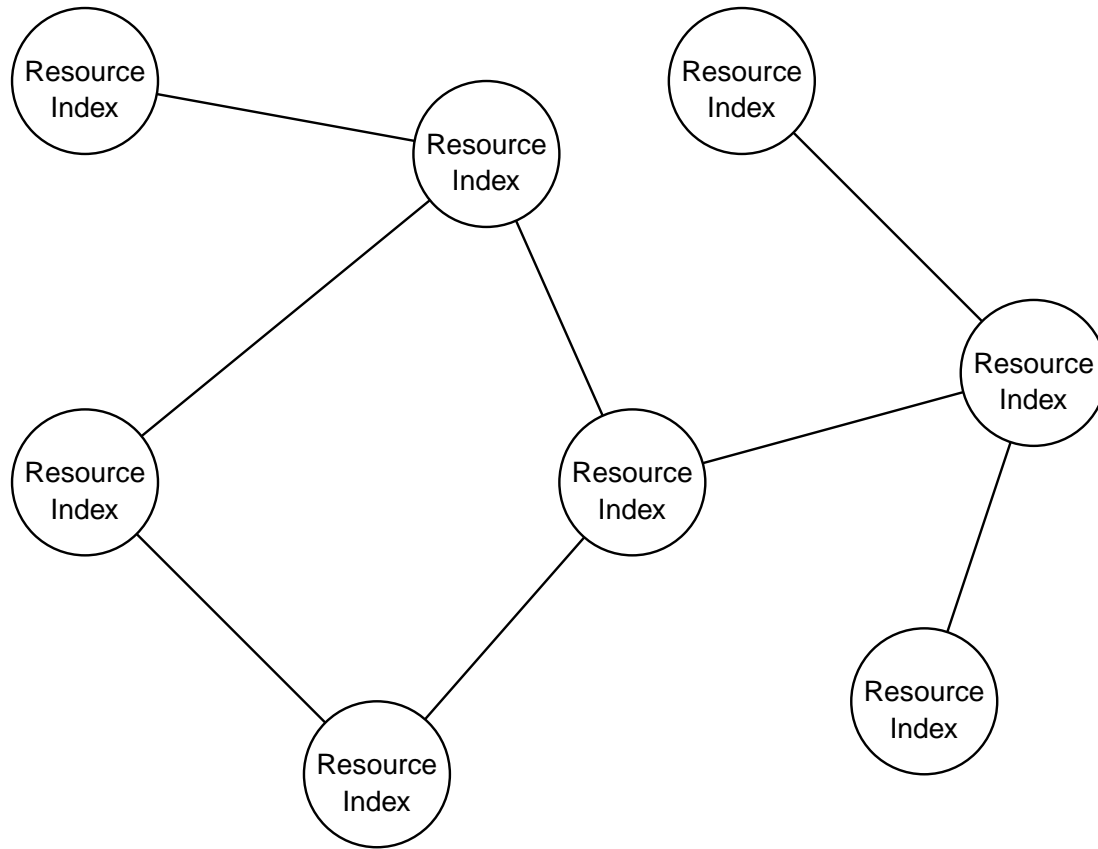# Introduction

Origins

- CheDAr: a CHEap Distributed ARchitecture

    – Completely distributed computing platform

- Globus: grid computing system, with centralized resource discovery

- Chedar refocused to be a fully distributed resource discovery system
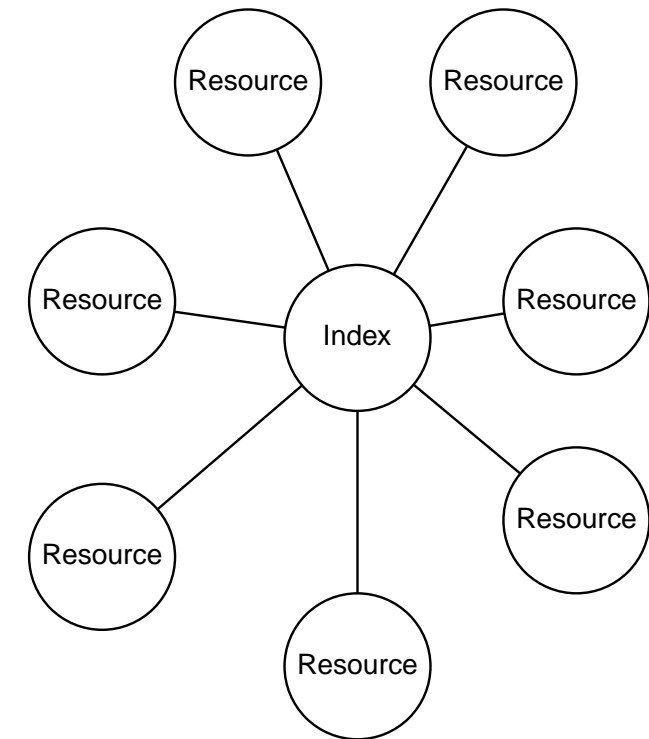
Centralized Vs. Distributed Systems

Centralized Resource Discovery

Centralized Vs. Distributed Systems

Distributed Resource Discovery

Centralized Resource Discovery

Resources

- Resource discovery, based on specific attributes

- Various types of resources:

  – Computing resource (available computing time)

  – File resource (a given file, free storage space)

  – Display resource (a screen)

  – Printing resource (a printer)

- Query/reply messages

Architecture

Chedar's Components

- ChedarClient

- Connection

- Connection Manager

- Topology Manager

- Propagation Engine

ChedarClient

- Control interface of a Chedar node

- Applications and user interfaces communicate with Chedar through the ChedarClient component

- Used by:

  - P2PStudio

  - Data fusion application

Connection

- Represents a connection with another node

- Based on JXTA's pipes

- Monitors the "health" of the connection

Connection Manager

- Keeps a track of former neighbors (connections)

- Establishes/drops connections based on:

  - the connection's health

  - the topology manager's decisions

Topology Manager

- Optimizes the network's topology locally

- Decides where to establish new connections (overtaking)

- Based on the quality of the relations with the neighbors (node rating)
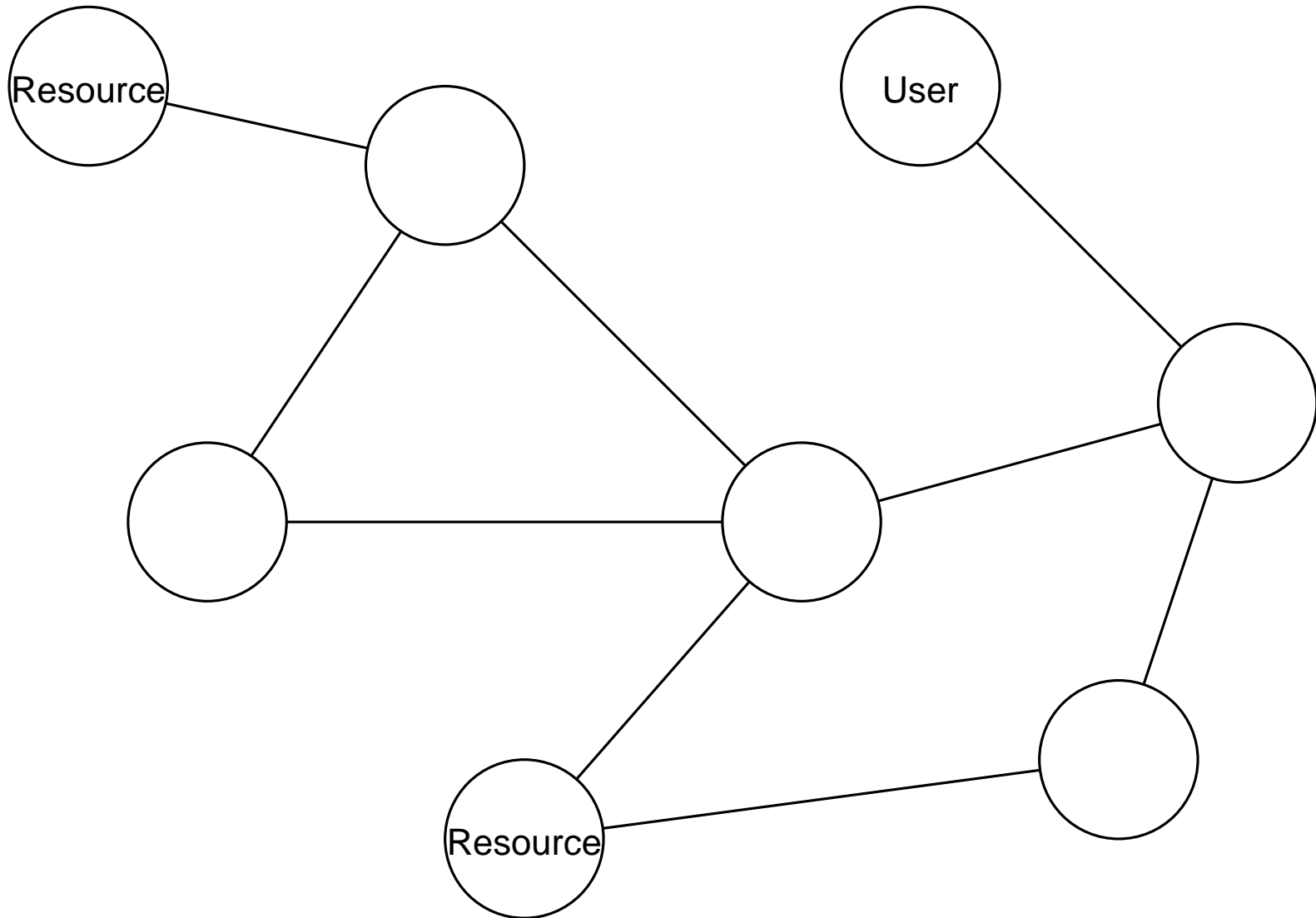
Propagation Engine

- Handles the resource queries and replies

- Answers queries when they match the local resources

- Forwards queries to other nodes when it cannot answer it
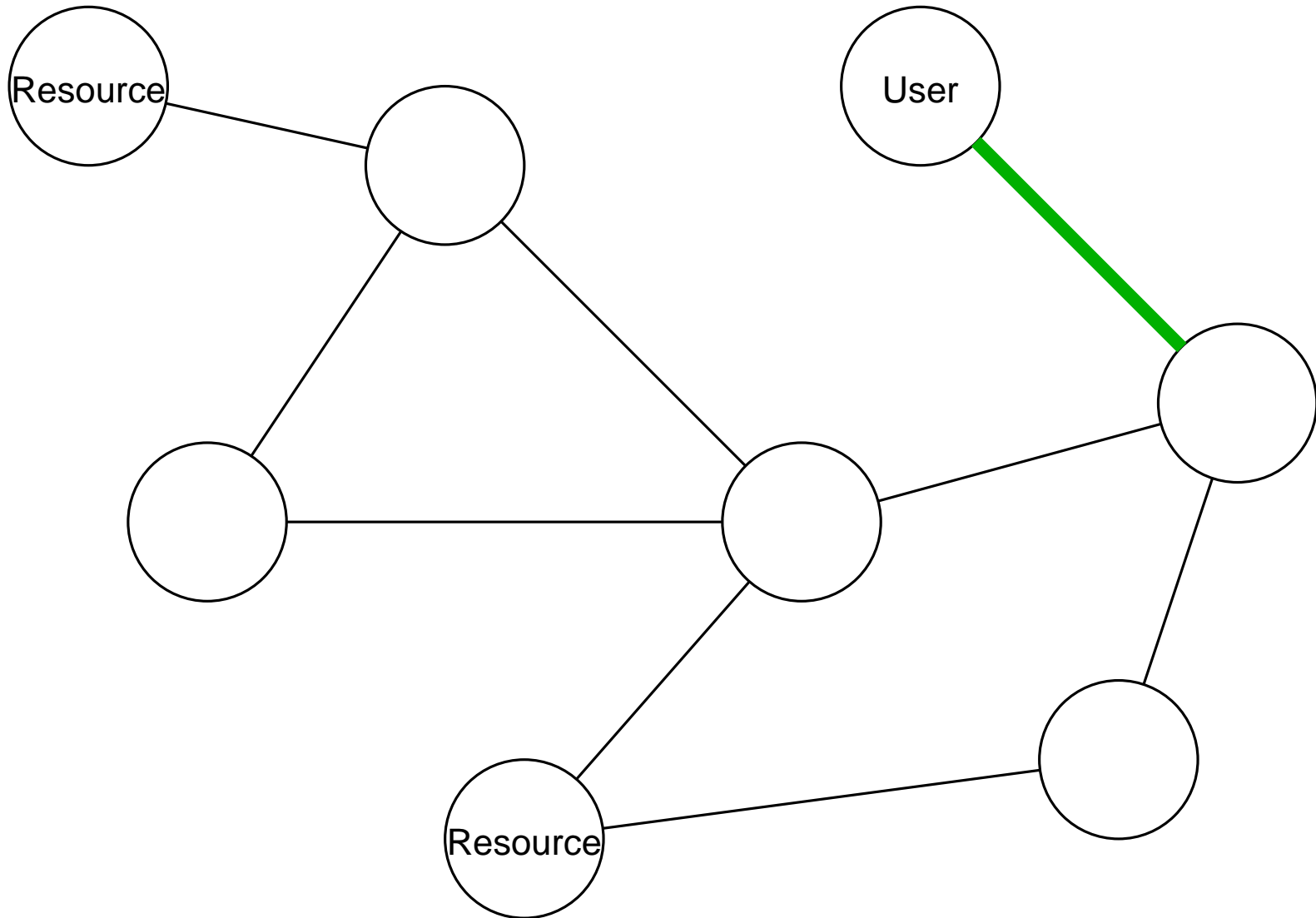
Algorithms

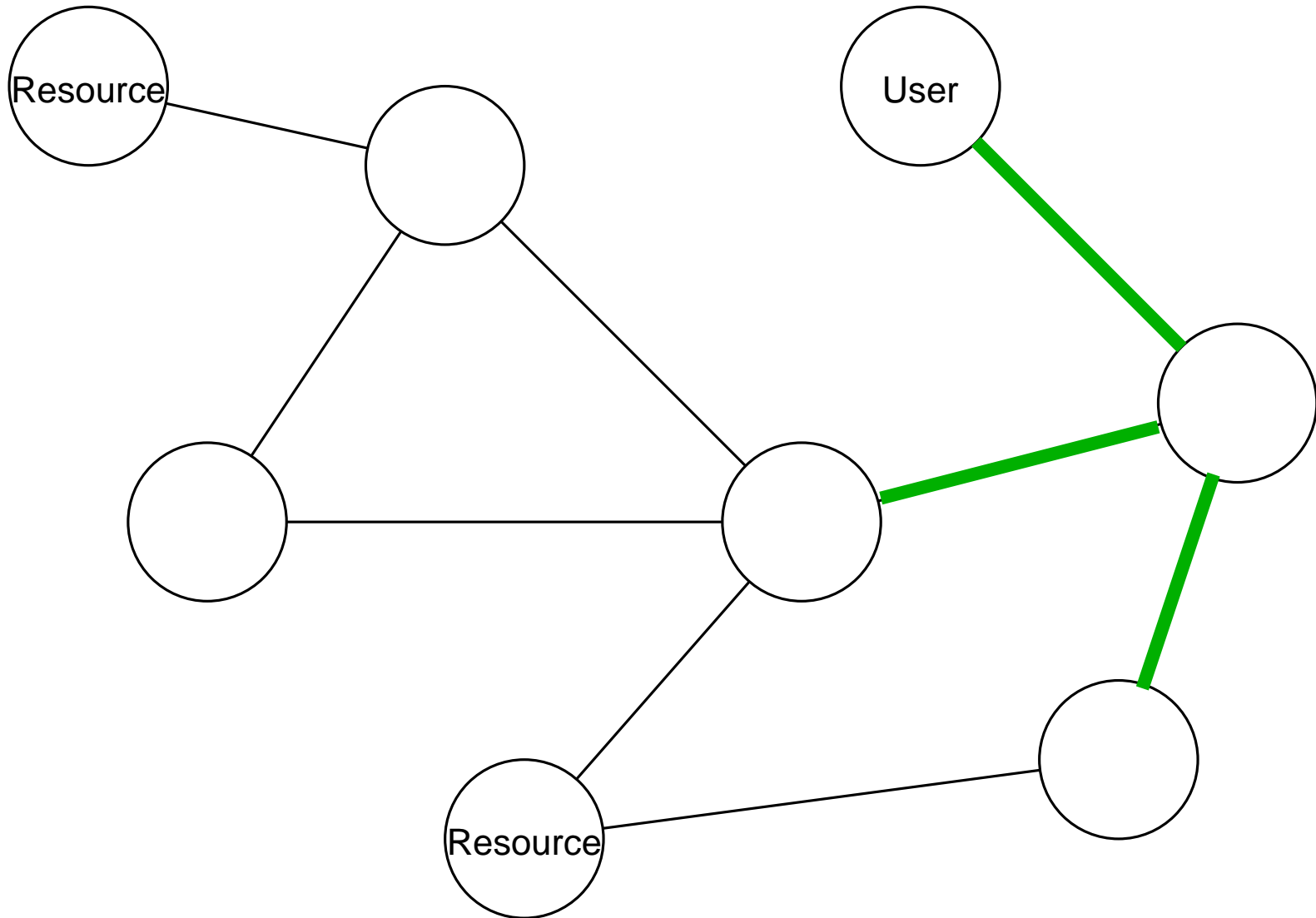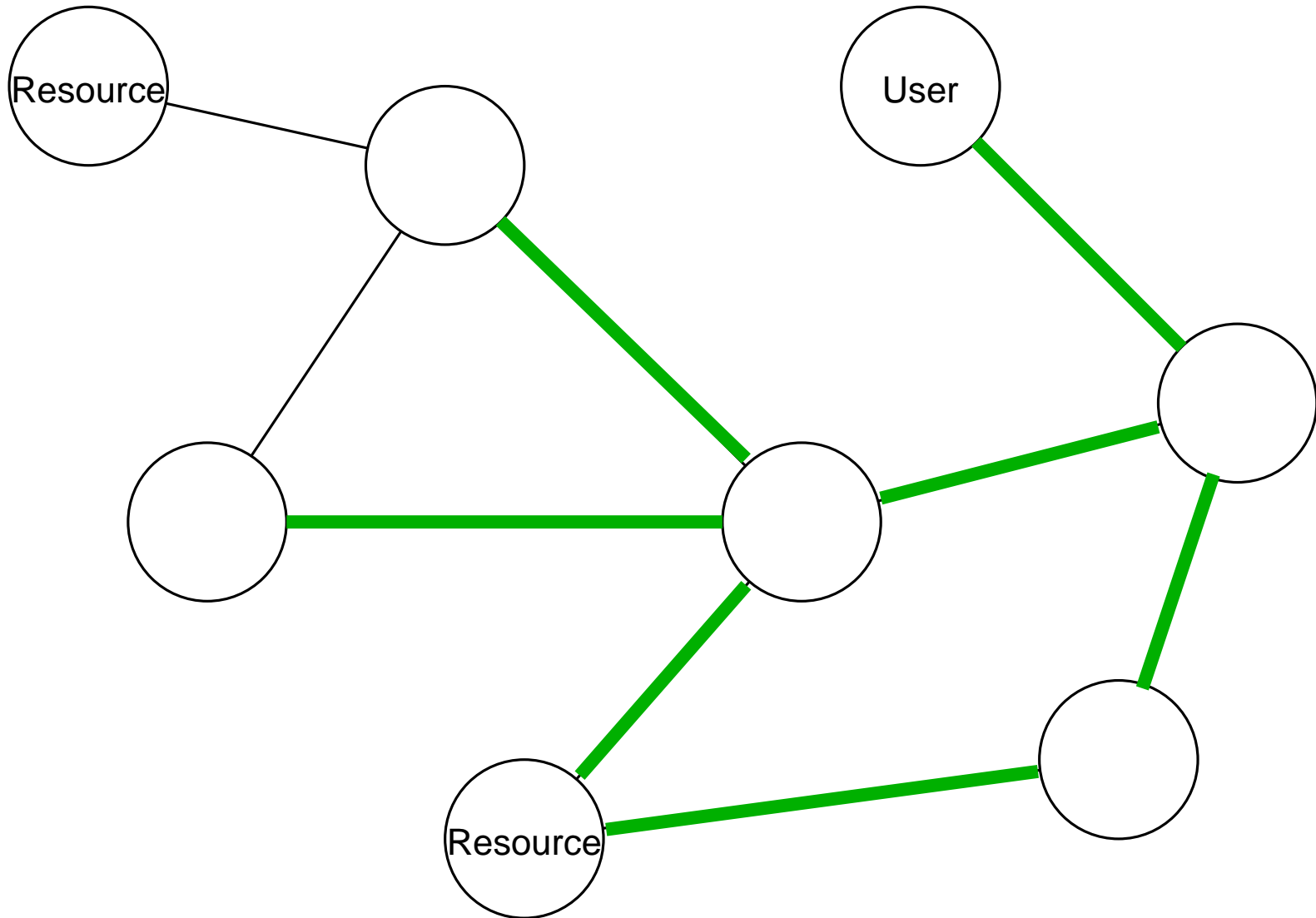# Basic Search

- Generates a lot of traffic

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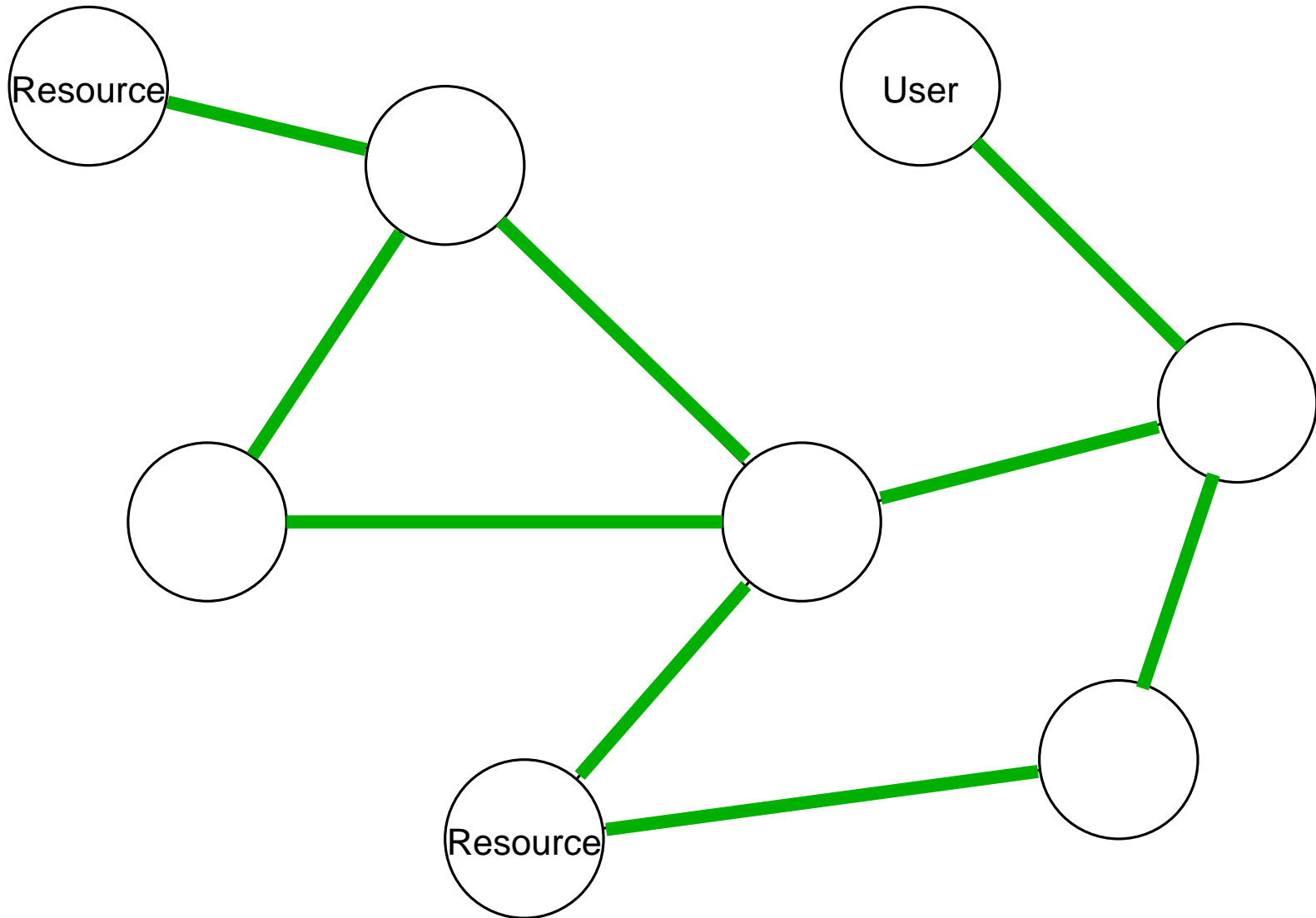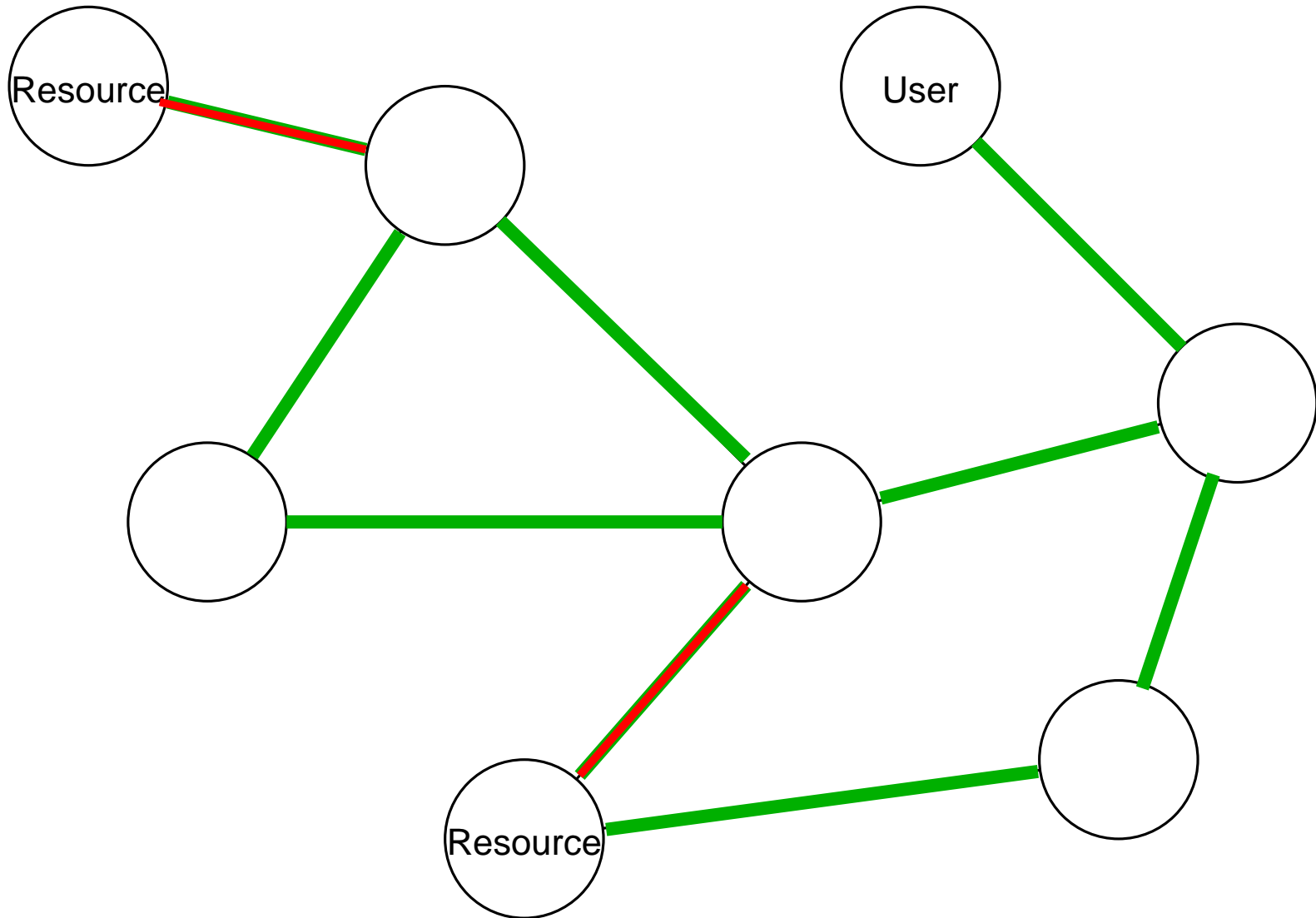
Basic Search
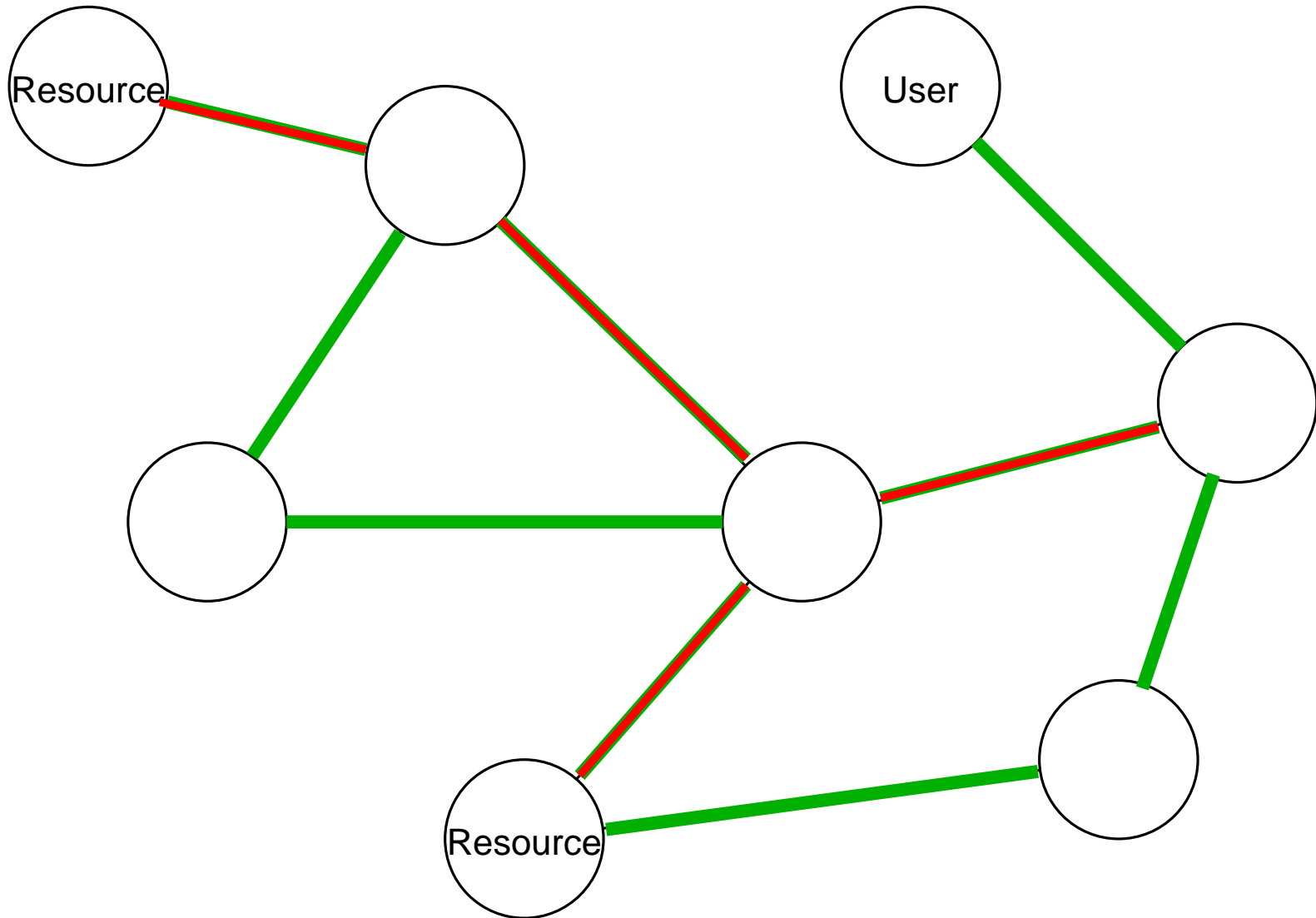
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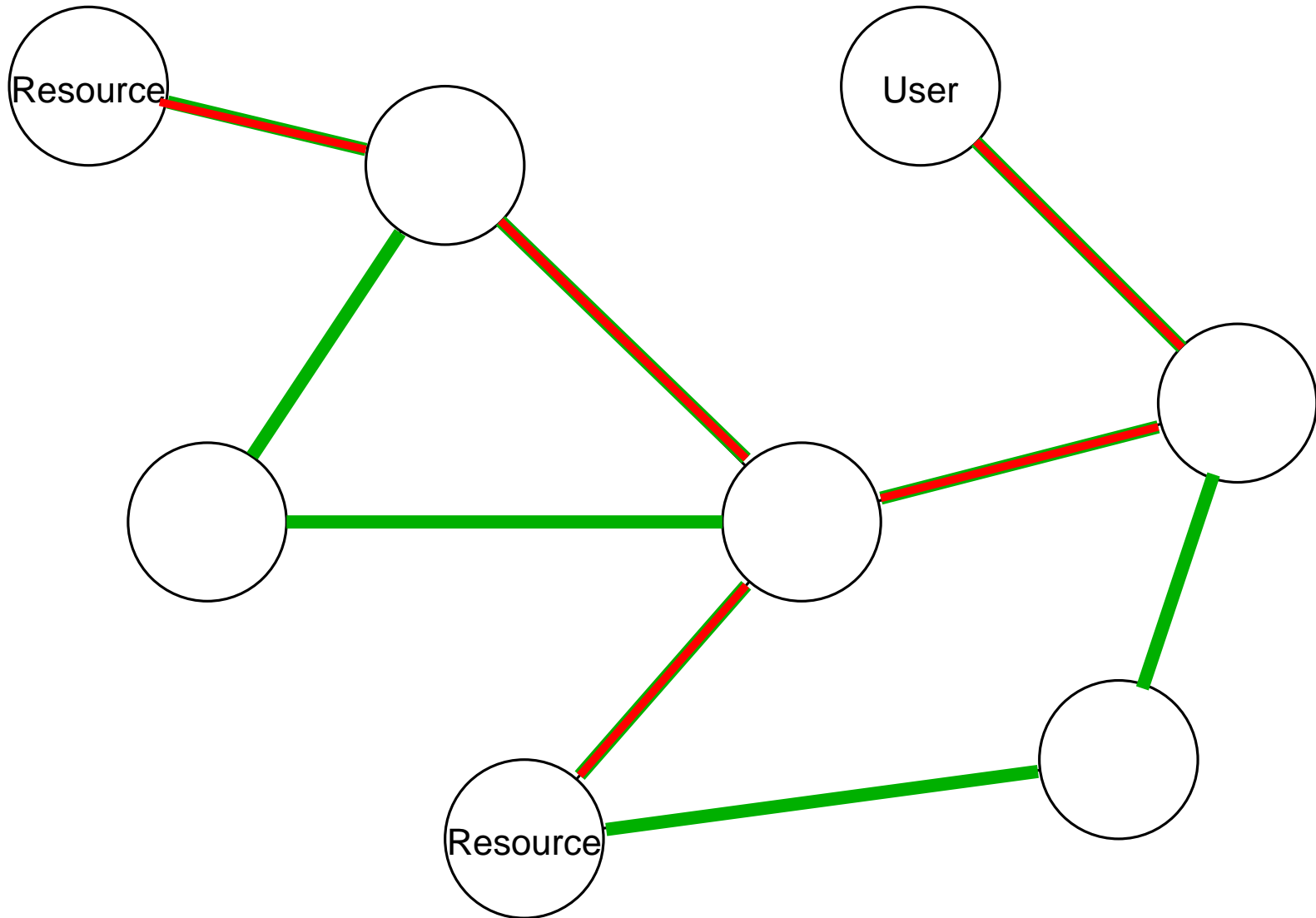
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Basic Search

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Node Rating

- Ratings are given to the neighbors:

    - amount of replies

    - number of neighbors

    - reply speed

- Node selection based on those ratings

- Improves the search's efficiency
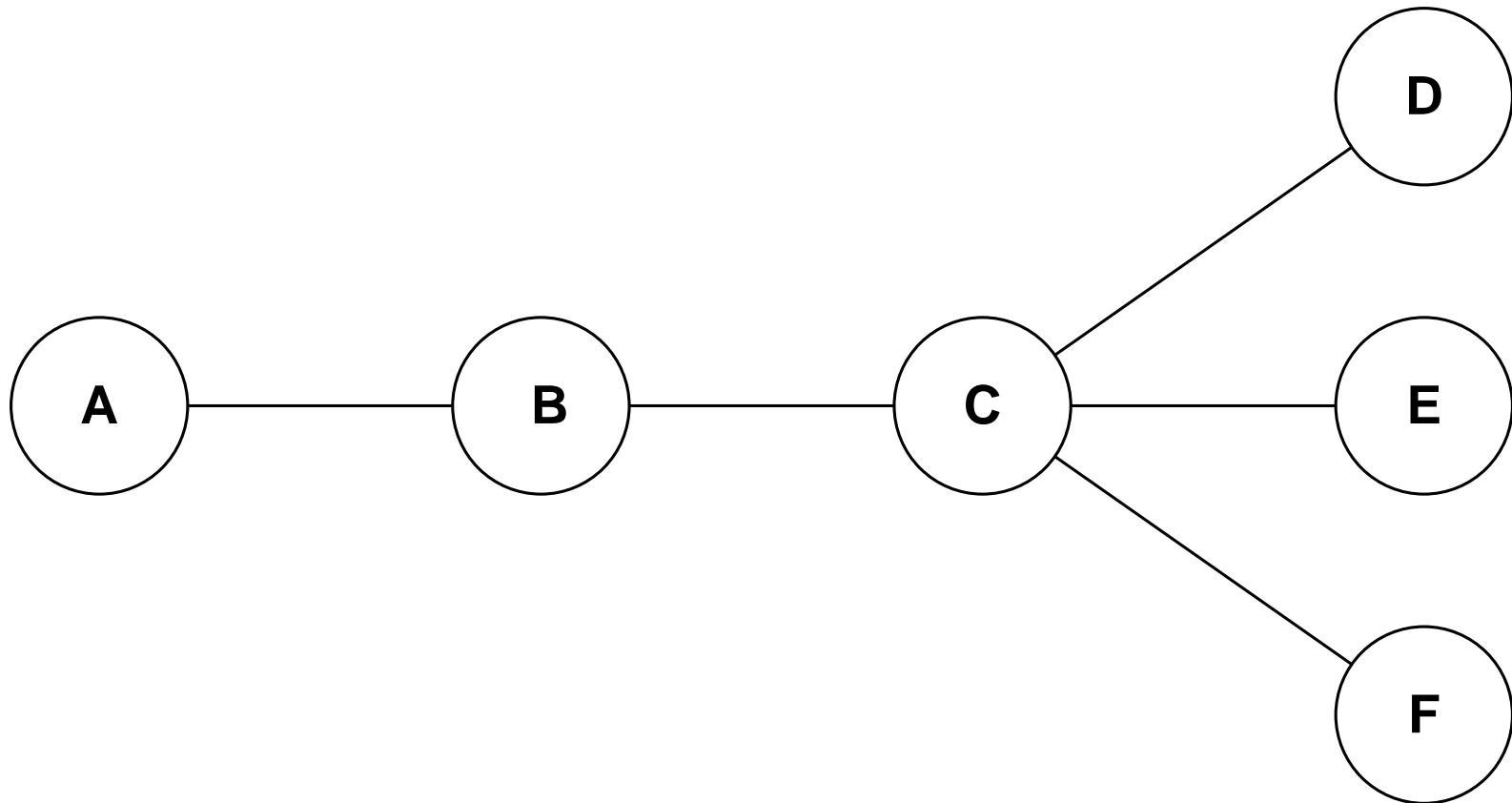
Overload Limitation

- Limits the propagation of messages

- More adaptive than time-to-live

  - Each message contains a hop count

  - Each node accepts messages whose hop count is below a given limit

  - That limit is broadcast to the neighbors, which must respect it

Return Path

- 3 ways to reply to a query:

  - reverse the query's path

  - reverse path with "jumping" over unavailable nodes

  - direct connection to the requester

- Increases the fault-tolerance

Overtaking Algorithm

- The nodes that are not valuable are overtaken

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