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# Technico-Economic Design of Network Protocols and Algorithms

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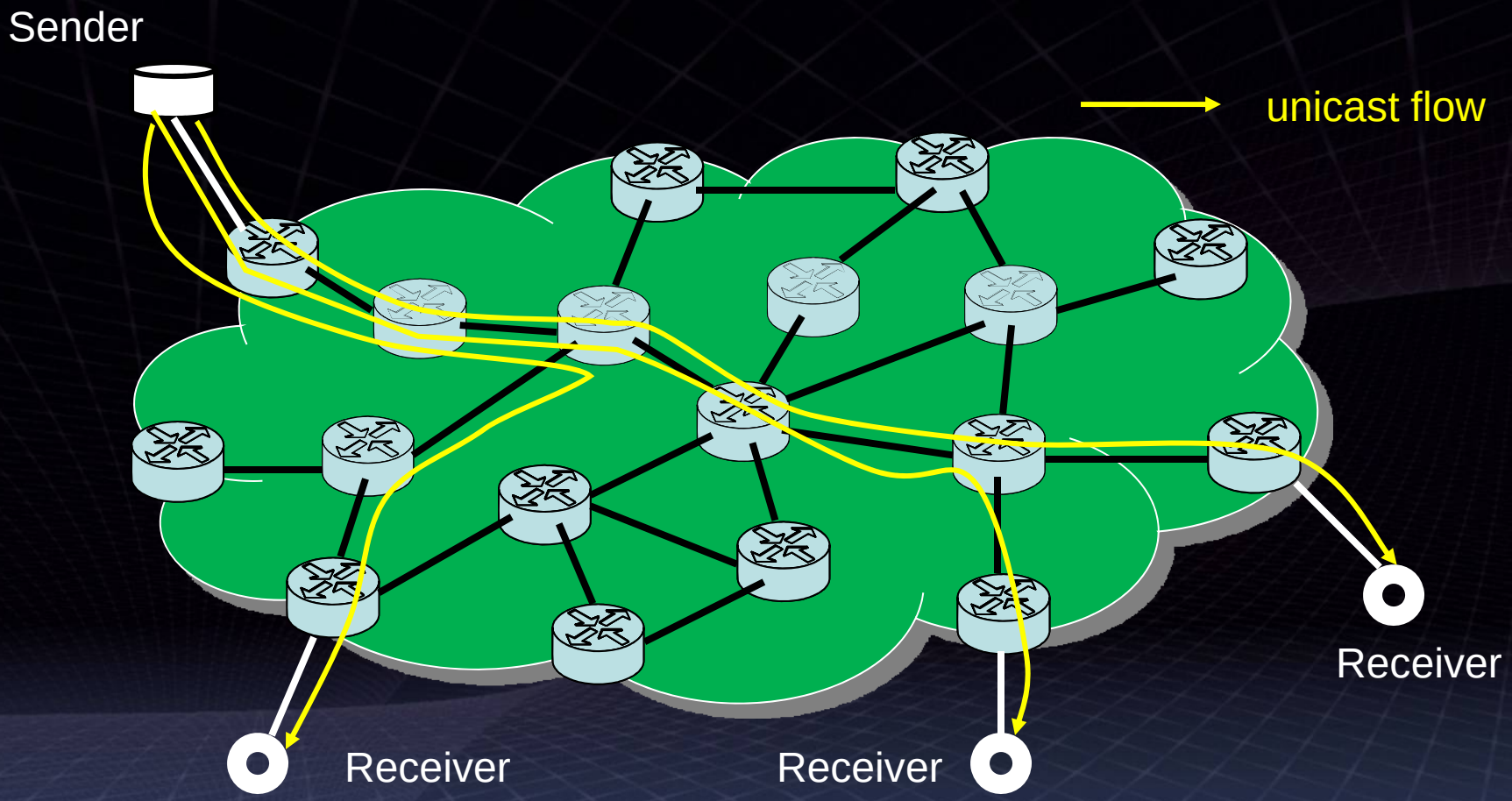
# Networking Research Trends

- Traditional research
  - Exclusive focus on technical problems
  - Early solutions as a basis for the great Internet success
  - Two latest decades of brilliant ideas with limited deployment
- New approach
  - Accounting for economic, legal, social, political and other aspects of the Internet
  - Bridging the gap between technical networking and network economics
    - From performance to security to economics

# Example: Delivery of Data to Multiple Receivers

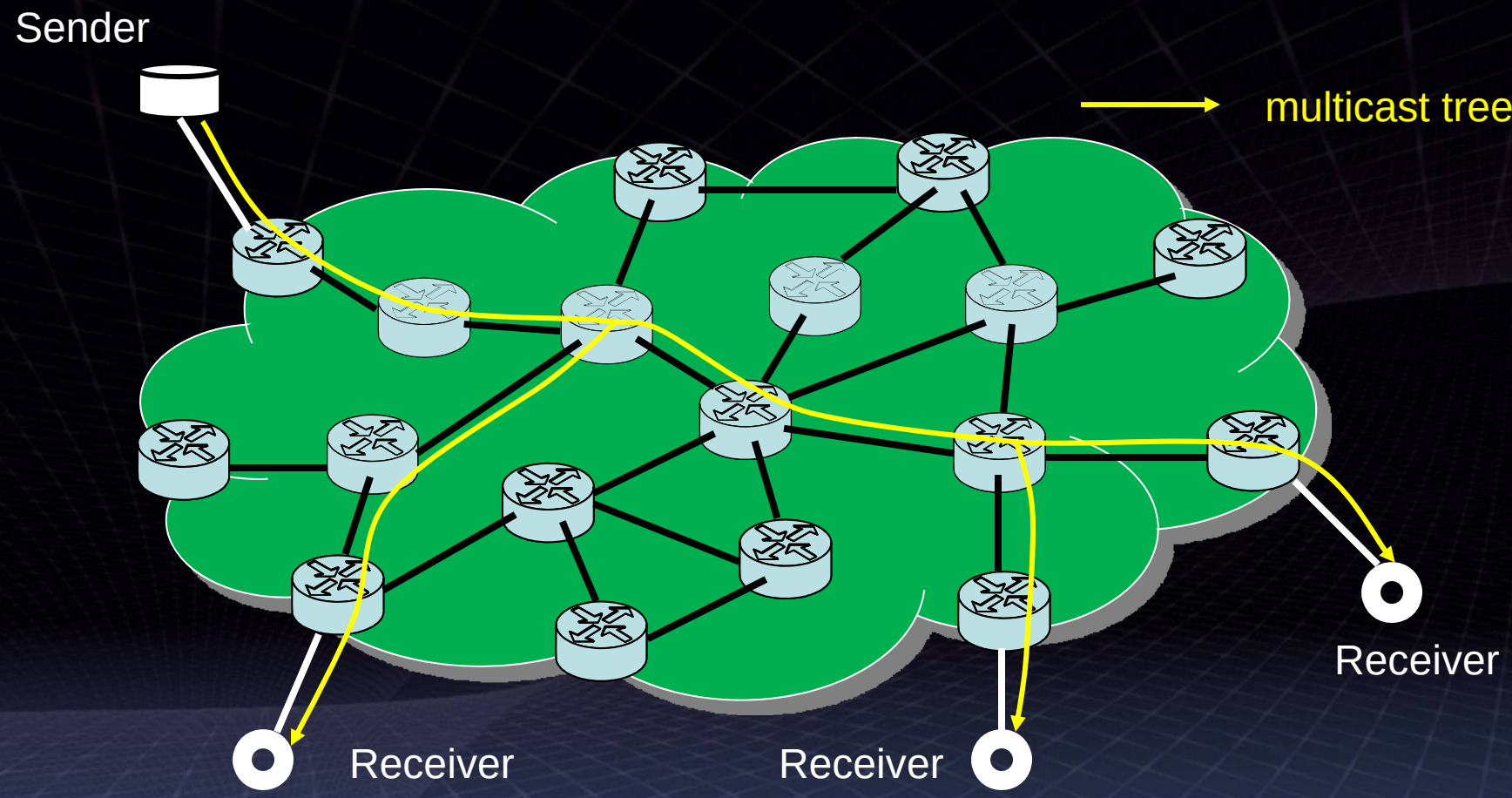





Original Internet unicasts overload the sender and waste the network capacity

# Multicast: Innovation Not Adopted

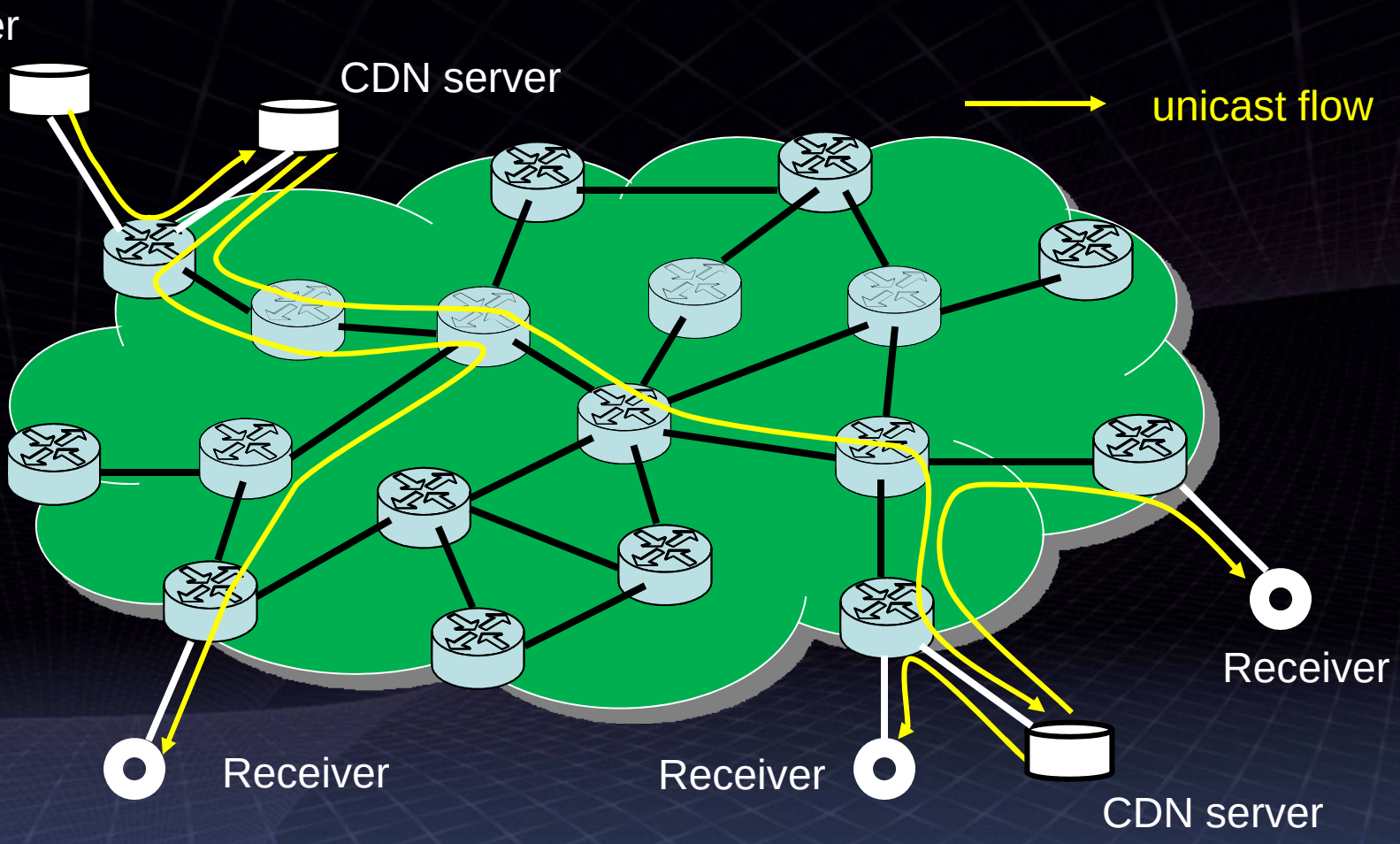





Technically optimal but not deployed

# Content Distribution Networks (CDNs)

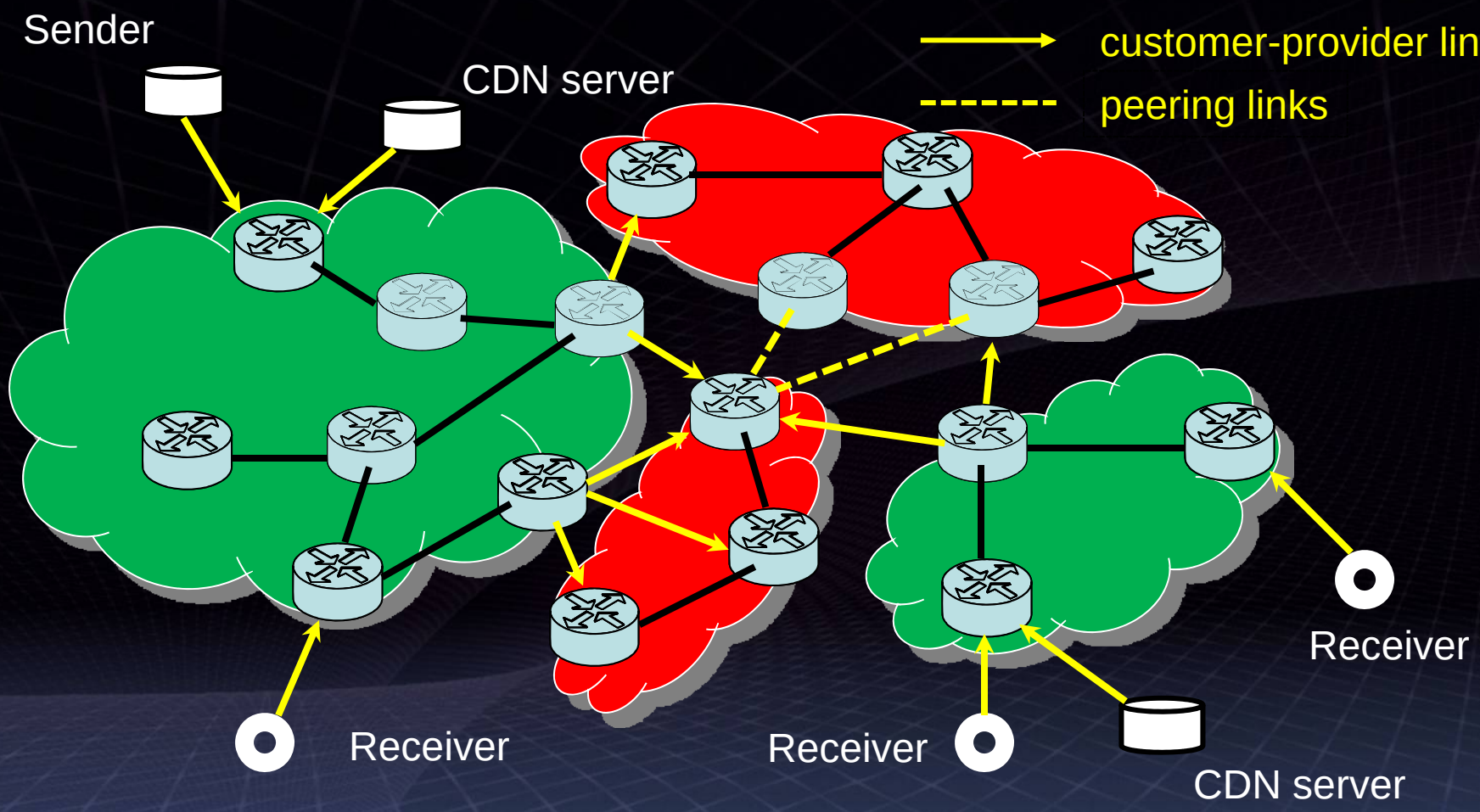





Technically suboptimal but successfully deployed

# Multi-Provider Nature of the Internet



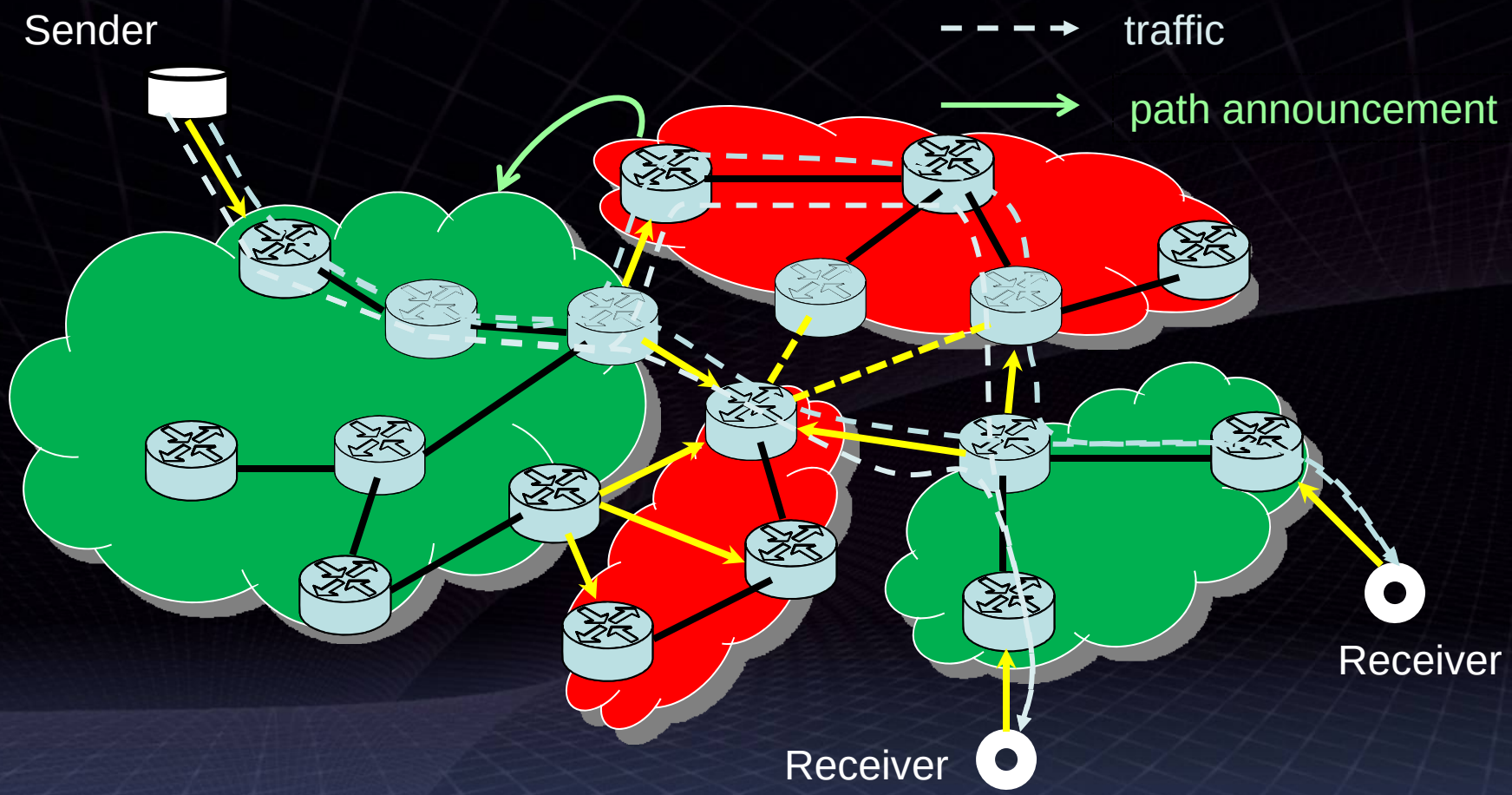



Administrative structure and economic incentives are crucial

# Our Research Expertise and Interests

- Technical domains
  - Network planning, differentiated services, content distribution, routing , transmission control, packet forwarding, link scheduling , buffering
- Economic dimensions
  - Technology pricing
    - Technical implications of current pricing schemes
    - New pricing schemes for growth and innovation
  - Network neutrality, provider relationships, and new business models
  - Non-technological costs, temporal, administrative, and geographic factors
- Real data (both technical and economic) and industry collaborations

# Sample Work: Revenue-Boosting Traffic Attraction




Transit providers have economic incentives to hijack traffic

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