

**UCL DEPARTMENT OF COMPUTER SCIENCE**  
NETWORKS RESEARCH GROUP

**UNIVERSITY OF ST ANDREWS, SCHOOL OF COMPUTER SCIENCE**  
NETWORKS AND DISTRIBUTED SYSTEMS RESEARCH GROUP



**UCL**

# **Coalition-Based Connectivity for Flexible Communication**

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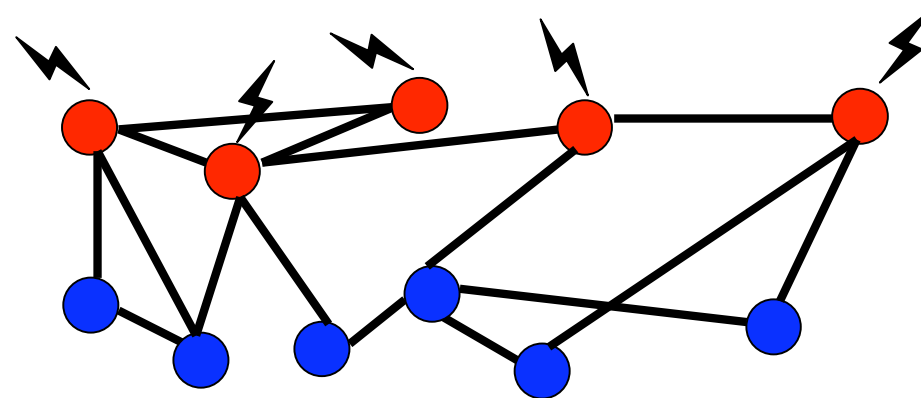
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# The Changing Nature of Connectivity

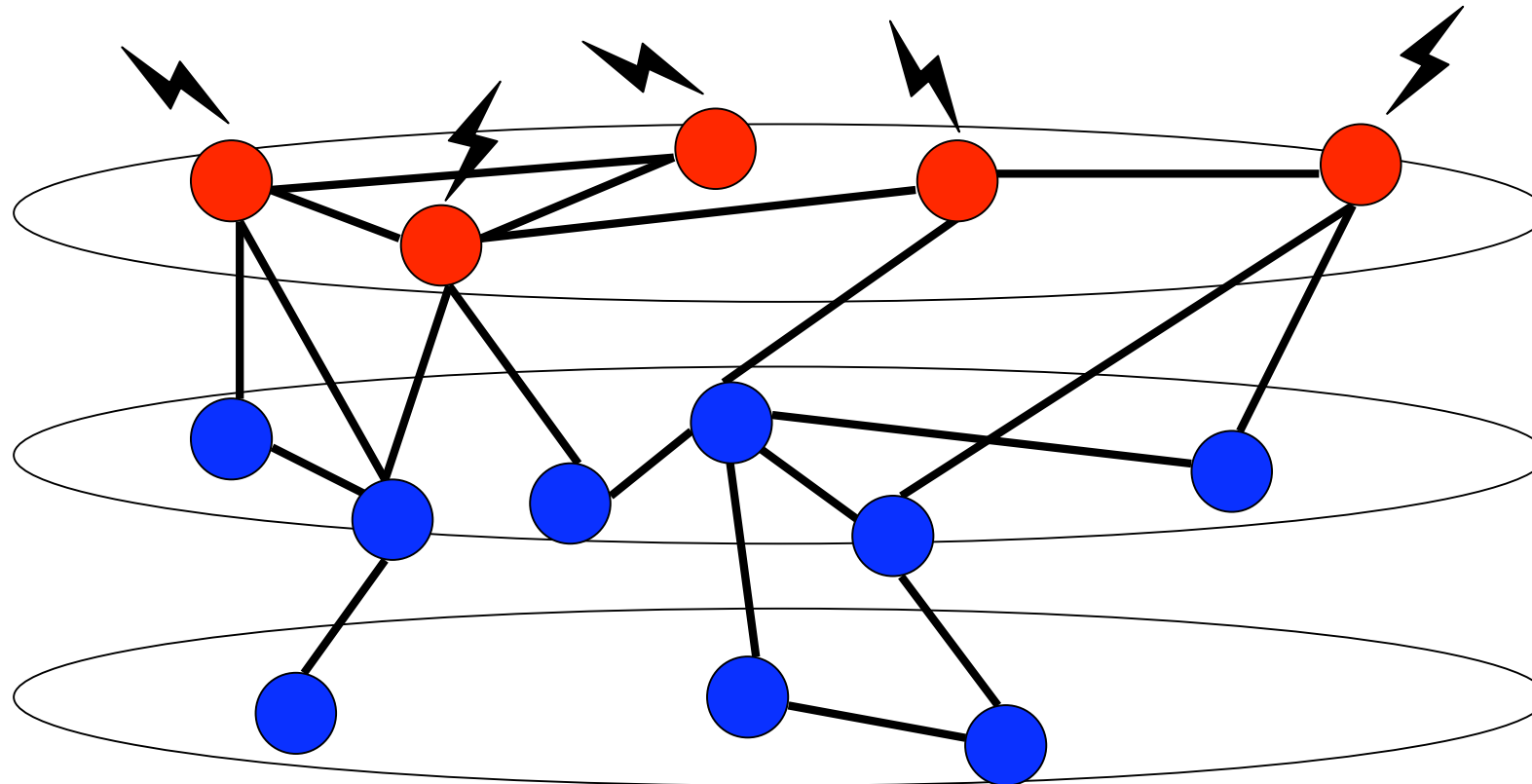
- An Increasingly Visible Class of Community-Area Network:



● Wide-Area Capable Peer  
● Local-Area Only Peer

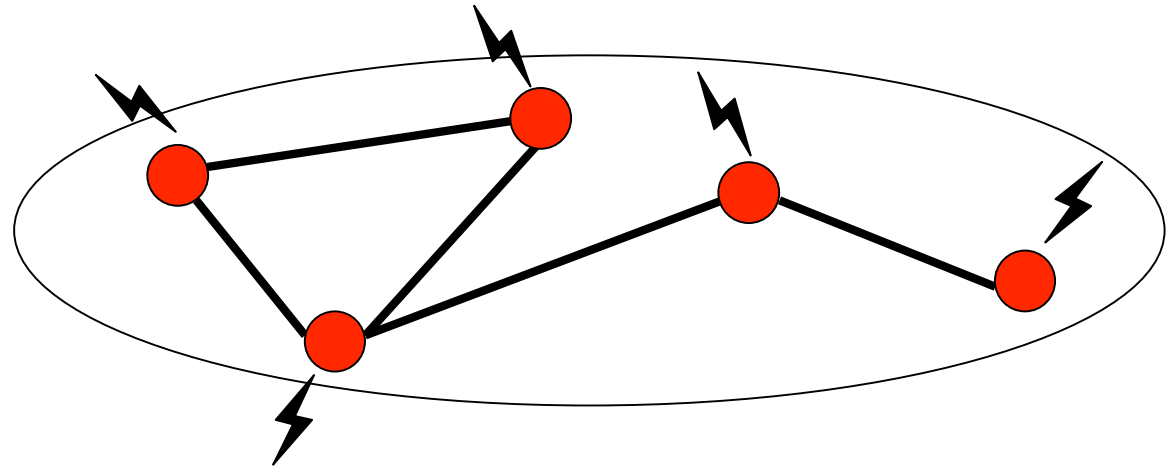
⚡ Wide-Area Connectivity  
— Ad Hoc Peering Agreement

# Coalition Peering Domain (CPD) Architecture



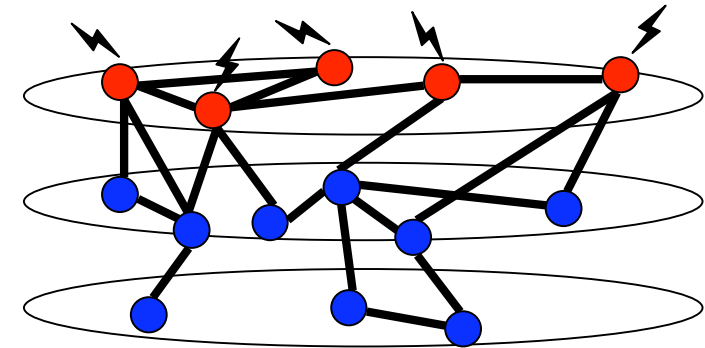
- Coalition-Edge Forwarder (CEF)
- Coalition-Internal Forwarder (CIF)
- Local Peering Agreement

# Challenges



- Dynamic Formation
- Addressing
  - Centralised Function – Distributed System
- Routing
  - Multi-Homing, Multi-Path Forwarding
  - Implications for Higher Layer Protocols
  - Reverse Path Aggregation
- Mobility
- Security and Trust

# Applications



- Highly Survivable Networks
  - Robustness in Overall Connectivity Through Multi-Homing
- Emergency and Disaster Scenarios
  - Heterogeneity and Resource-Limitation
  - Time-Critical: Disseminate Information Quickly
- Networked Embedded Systems
  - Sensor Networks
  - Personal Area Networks
- Heterogeneous Wide-Area Connectivity

# Summary

- Local-Area Peering
  - Missing Opportunities to Better Utilise Connectivity
- The Coalition Peering Domain
  - New Architectural Element
  - Manage Available Resources Dynamically
- Diverse set of Scenarios