Peer-to-Peer Networks Outline Survey Self-organizing overlay network File system on top of P2P network Contributions from Peter Druschel	 Background Distribution Decentralized control Self-organization Symmetric communication
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Examples Pioneers Napster, Gnutella, FreeNet Academic Prototypes Pastry, Chord, CAN, 	Common Issues • Organize, maintain overlay network – node arrivals – node failures • Resource allocation/load balancing • Resource location • Locality (network proximity) Idea: generic p2p substrate
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Node Departure (Failure)

Leaf set members exchange keep-alive messages

- Leaf set repair (eager): request set from farthest live node in set
- **Routing table repair (lazy):** get table from peers in the same row, then higher rows

API

- *route(M, X):* route message *M* to node with nodeId numerically closest to *X*
- *deliver(M)*: deliver message *M* to application
- *forwarding(M, X):* message *M* is being forwarded towards key X

• *newLeaf(L):* report change in leaf set *L* to application

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PAST: Cooperative, archival file storage and distribution

- Layered on top of Pastry
- Strong persistence
- High availability
- Scalability

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- Reduced cost (no backup)
- Efficient use of pooled resources

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