Location-aware Overlay Model

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Presentation Outline

• P2P Overlay Introduction
• Proposed Location-aware Overlay Model
• Performance Evaluation Results
• Service/Application
• Feedback and Suggestion?
Peer-to-Peer Overlay Network

P2P overlay network is a virtual network of Internet-connected devices w/o authority

Characteristics:
1) No fixed IP address
2) Decentralized
3) Self-Organizing
Mismatched Overlay Problems

**Overlay**: Independent from the underlying network structure

- → High end-to-end Latency
- → Inefficient network resource usage
- → Unscalability
Location-aware overlay Architecture

**Overlay Application Layer**
e.g.,: Peer Name Resolution, Distributed File Storage, P2P multicast, etc.

**Application Routing Layer**
Interface with the upper layer to deliver any kinds of P2P applications

**Overlay Network Layer**
Interface with the lower layer to explore the underlying network topology

**Physical Underlying Network**
Geographical Partitioning
Simulation Result

![Graph showing simulation results. The x-axis represents the number of nodes, ranging from 1 to 1020. The y-axis represents the average relative delay penalty. The graph includes four lines representing different methods: Geo-Combined, Pastry_PNS, and Bin with 9 landmarks. The Geo-Combined method shows the highest average relative delay penalty as the number of nodes increases.]
Name Resolution Service

Alice moves to Part 2 and update the new locationHash (names) to find their managers and store the current locations.

Find Alice’s current location by requesting Alice manager.

Hash (names) to find their managers and store the current locations.

Alice moves to Part 2 and update the new location.
Mobile IP
Some drawbacks of basic MIP

• Scalable issue, esp. to support large number of MNs
• Inefficient (triangle) Routing
• Delay depends on the distance between HA and MN rather than between CH and MN
• Fast moving problem because of slow convergence info.
Conclusions

Location-aware overlay Model can:
• Reduce end-to-end delay
• Use network resources more efficiently
• Scale to a large number of nodes

Name Resolution Service:
• Support *Reachability* and *Mobility*
• Take into account *Locality* bet. CH and MN
• More scalable due to no HA restriction
Q&A + Suggestion???

Thank you!