# MobiCCN - Mobility Support with Greedy Routing in Content-Centric Networks

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## Solving Data Source Mobility Leads to the Solutions to

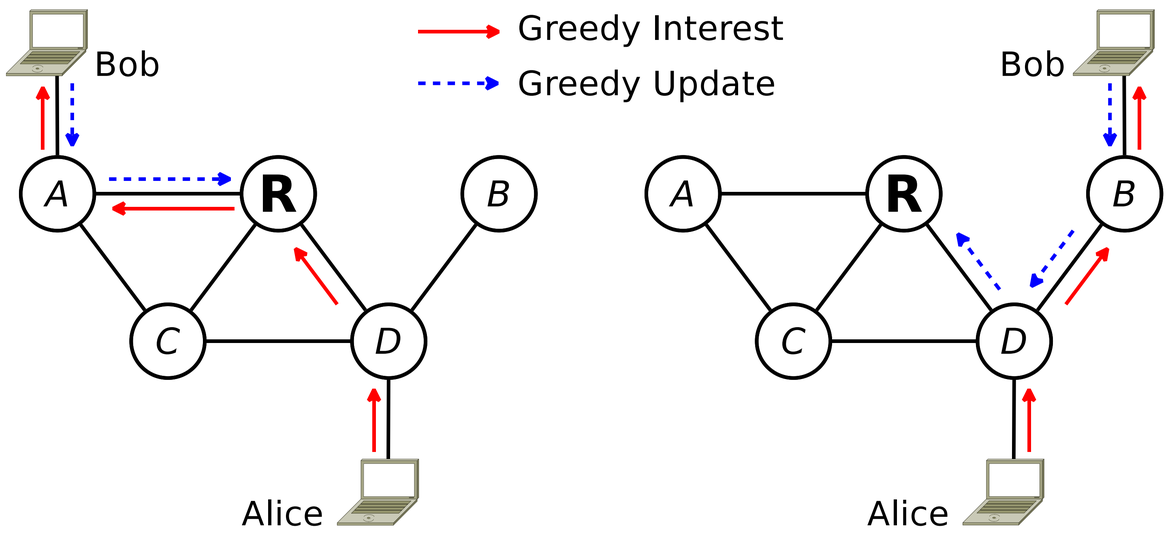
- Mobile content publication and dissemination.
- Adoption of connection-based communications.
- Disparity between enormous space of application names and scarce of routers' resources.

## Use Greedy Routing Protocol

- Nodes are assigned virtual coordinates from a metric space.
- Destination coordinate is embedded in the packet header.
- Packets are routed to the neighbour closest to the destination.
- Implemented as an underlay in current CCNx architecture.

## Benefits & Challenges

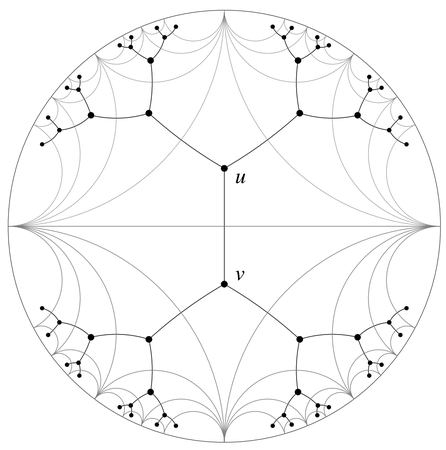
- No need for the global knowledge of the network, nodes only maintain their directly connected neighbours.
- Packets can be routed in the "dark", and routing protocol is simple.
- Graph embedding may increase the stretch.
- Nodes may suffer from ***local minimum*** issue.
- How & who should allocate the coordinates?

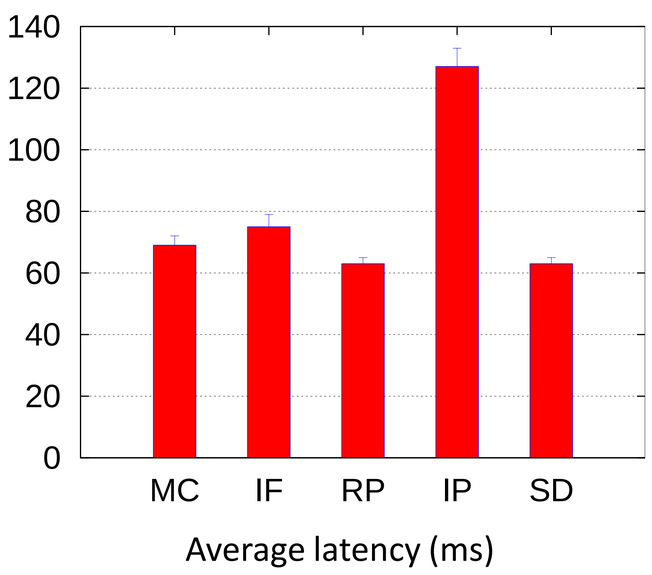


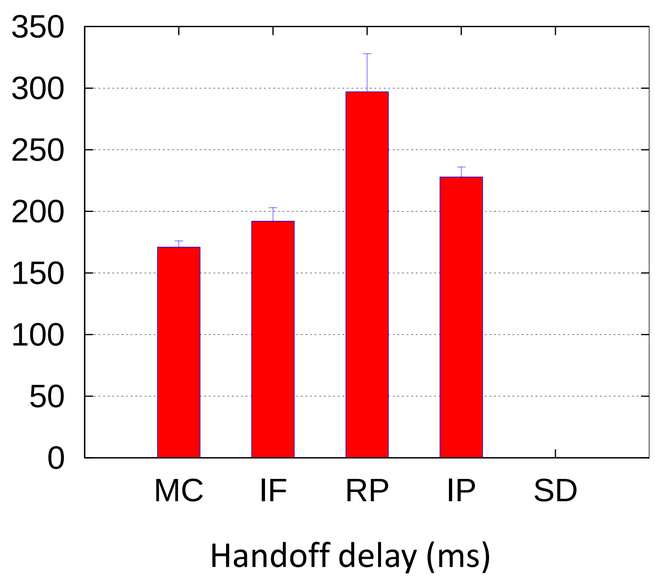

MobiCCN Scenario. Bob's host router is R and between the left and right figure Bob changes his attachment point from A to B. Since router D caches Bob's update and therefore Alice's Interest packet on the right-hand figure does not need to go to R but D is able to forward it directly to B.

Using hyperbolic space instead of Euclidean space guarantees every graph has a greedy embedding.

**Poincaré disc** is a model for hyperbolic space. Right figure illustrates how a 3-tree is embedded into the hyperbolic space.



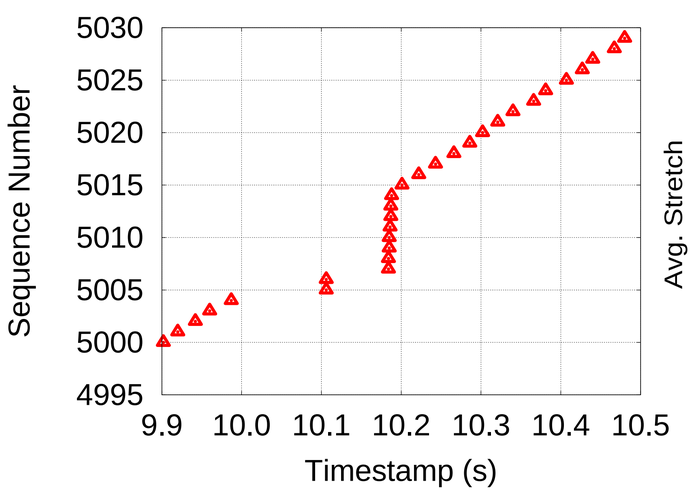



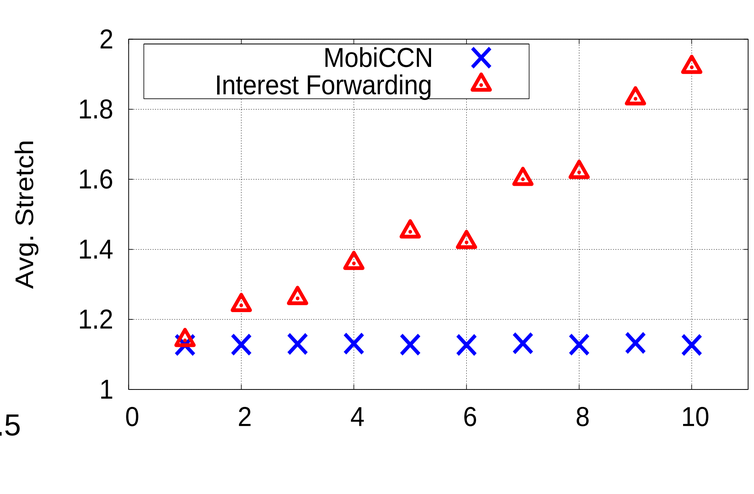

## Compare Other Schemes

- **Performance**: Achieve both low average latency and low handoff delay.
- **Compatibility**: Coexist with standard CCNx routing protocol.
- **Complexity**: Minimum modification to the current CCNx architecture.
- **Flexibility**: Handle simultaneous handoffs of both sender and receiver.
- **Scalability**: Handle continuous handoffs.

**MC**: MobiCCN
**IF**: Interest Forwarding
**RP**: Rendezvous Point
**IP**: Indirection Point
**SD**: Sender-Driven Msg




Simultaneous handoffs




Continuous handoffs

## Future Work

- Reduce the stretch by using better embedding algorithm.
- Tackle the security issue in the current solution.
- Implement as a plugin in CCNx platform.

**References**:
Kleinberg, Robert. "Geographic routing using hyperbolic space." In *INFOCOM 2007.* pp. 1902-1909. IEEE, 2007.
Jacobson, Van, et al. "Networking named content." In *ACM CoNEXT 2009*. ACM, 2009.