Greedy Routing in Future Internet

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Nowadays, a message can leave one computer and travel halfway across the world through several different networks and arrive at another computer in less than a second. Routers are responsible to determine where to send information from one computer to another. They use a table including the routes to particular network destinations. In Internet, messages are sent in the form of packets containing the source and the destination addresses of that packet. Once a packet arrives at a router, the router checks the destination address of it and based on the information in its routing table, it determines the next hop of the packet towards the destination. In this process, the routing table is similar to the road signs (arrows) which give directions to certain destinations.

Internet traffic keeps growing, the routing table sizes are increasing and higher speed links are demanded. The number of entries in the routers are expected to increase to 2 million in near future. Also the address lookup is becoming a bottleneck due to ever increasing throughput demands. Going back to our comparison of routing tables and road signs, with more destinations, the number of road signs increases and also finding the correct direction to the intended destination will be more difficult.

As a solution, greedy routing is proposed to replace address lookups with computation. In this scheme, each network node is assigned a coordinate. This coordinate can be the physical location of a node or a virtual one. Network nodes knowing the coordinates of their neighbors could route greedy, by forwarding incoming packets to the neighbors which are closer to the packet's destination such that the distance towards the packets destination decreases. This scheme only requires nodes to store the coordinates of their neighbors in order to make routing decisions which makes it more memory efficient than current routing schemes.The scheme also shows interesting characteristics in terms of routing quality.