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Web Science

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Mesh Networking and Large Area Networks

One of the greatest opportunities available to many countries today is internet access, this access is however limited by where a connection is present, and before the advent of wireless routers, it was practically impossible for a city to set itself a goal of providing internet access to everyone within the city, but now that we have wireless access points it is still really difficult for many to access wireless networks. So the problem requires a solution that can solve both delivering access to the internet to a large population in a small area and then also handling how traffic is routed among the populous and cutting down on problems that lower the speed of connection because of traffic on the network. The simplest solution that one can find is distributed mesh networks.

Mesh networks are not a new idea at all, in fact they power one of the world’s largest file sharing service; torrents. For the layout of this solution we will examine a city and so we arbitrarily choose Seattle as a perfect candidate for this solution. So the solution becomes simple, you set up an algorithm that tracks the location of a wireless router, in this case any mobile device in Seattle, and you dynamically change which router i.e. device serves up a wireless connection point to others around it. You change which router does this job throughout the day and the week. Essentially no one person’s phone will always be serving up an internet connection, but rather it changes or hops from device to device to provide a wireless network that anyone in the city can use even as they travel from one part of the city to another. The beauty of this system is a diverse one, first of all is that it has a very small setup cost, no need to buy thousands of routers that remain in fixed positions, the network should never be down unless the wireless service providers have an outage, and the network is dynamic so if there is a larger grouping of people in one area of the city than others then there can be more wireless networks made at the grouping and it doesn’t require any special set up.

Obviously with any solution requiring people and their mobile devices there will be problems arising from the fact that people will worry about their privacy and their security if they participate in this project. Now it’s easy for some scientist to say that this solution is an excellent idea and push forward without care for these problems, but it is more important for people to care about these problems especially with what has happened in recent months here in the United States. So the solution to security is simply having the servers that handle figuring out where a wireless network should be to also provide all of the encryption for the network, or at least a key to the encryption for every connection that will occur, a separate encryption for each connection will ensure that the network can’t be taken over control by only one access point. For the other problem of privacy it comes down to having the users understand just how much data the service needs, all it needs to know is where the device is, it doesn’t care if one person is using the device or another person. It doesn’t track the users of the device it only tracks a location of the device. So with no personal information collected about the user of the device or network, and with specific encryption methods one could avoid the problems that arise with this solution.

Tracking the network usage using several metrics can be easily done, although one note on measuring the diameter of the network. The measurement of the diameter fo the network has no value in understanding the network. This is because of the fact that really there will never be more than a chain of two nodes connected at once. Sure it looks like one large network over the city of Seattle, but in reality it’s a ton of overlapping tiny networks with a few people all connected to one network point. So the diameter is always the same no matter what the network looks like.

This solution obviously has a ton of small little inconsistencies that have limited it from being put into use so far. These small little problems are things like how to pay for the use, how one decides how much money an internet connection should cost. These coupled with the big problems presented earlier are some of the things that are holding back this solution from becoming an actual method of networking in today’s world.