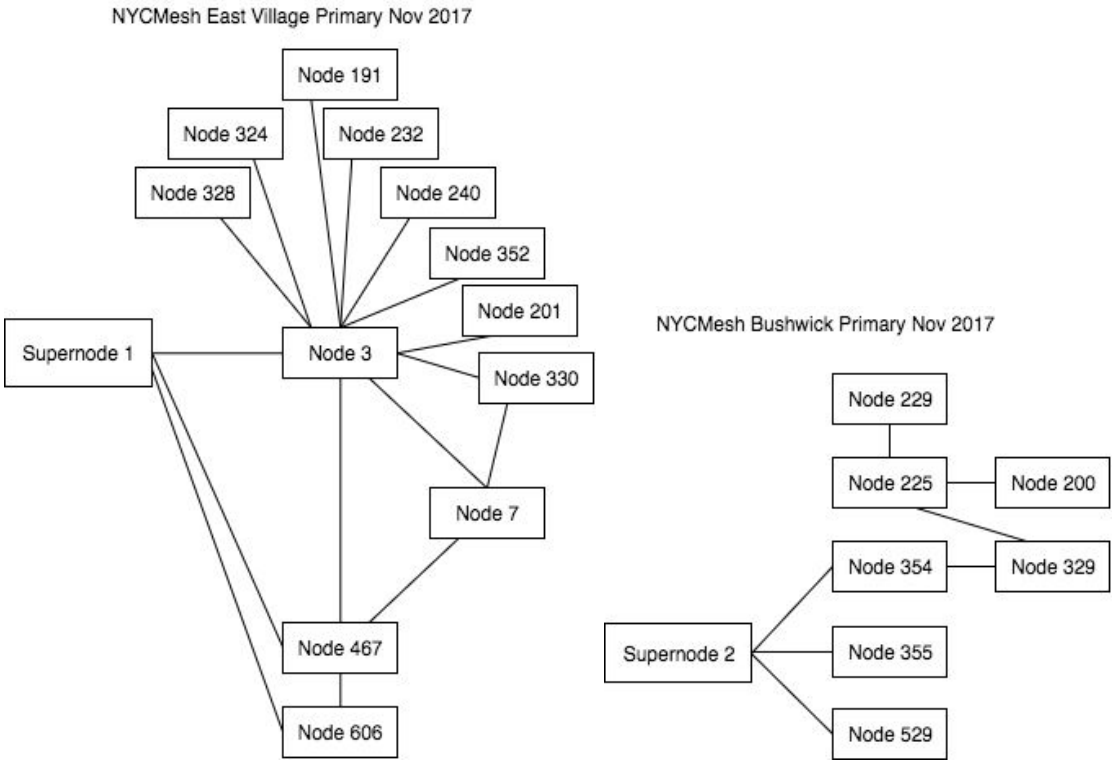
Technical Diagrams
For
Mozilla WINs Smart Community Networks
NYCMesh Multi-Level Network

The NYC Mesh Multi-Level network will consist of standard mesh networks in neighborhoods, for as far as they can extend, interconnected by a larger city-wide mesh that will increase their reach and functionality.
The mesh network will consist of two layers. Different from a classic mesh network, where a single routing protocol is exchanged across the entire mesh, we propose to build "neighborhood meshes" which help limit the failure region and scalability problems. These neighborhood meshes will interconnect together in a larger city-wide mesh. Even though the network will be two levels, the entire network will appear seamless, maintaining full end-to-end connectivity across the network.
Below we describe the logical and physical layout of our existing working prototype network, and show what a full-scale deployment may look like.

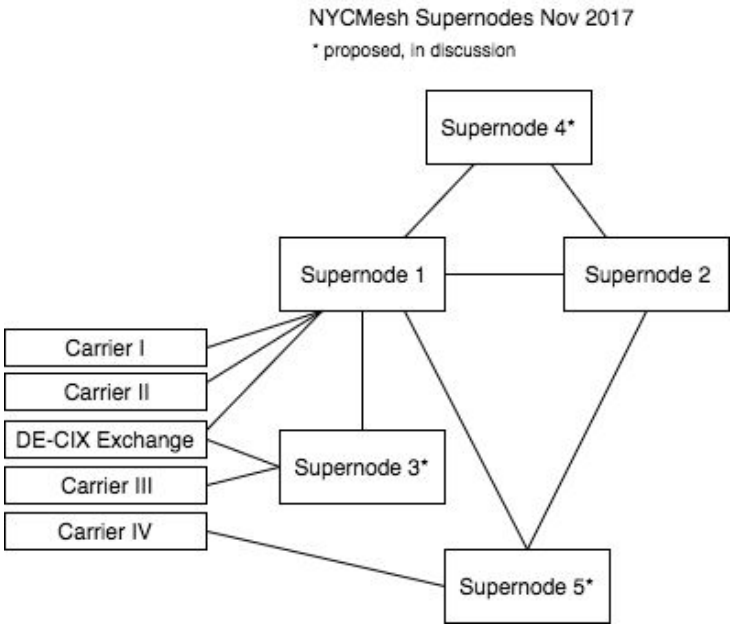
Existing Prototypes:
The NYCMesh East Village is our best example working prototype network, consists of approximately 12 nodes in a rooftop-to-rooftop configuration, with several also hosting Supernode access antennas. These nodes are routed together using BMX6 on our version of the qMp firmware.
Another neighborhood mesh network, in Bushwick, is connected using off-the-shelf equipment and standard routing protocols such as OSPF.

Neighborhood diagrams:

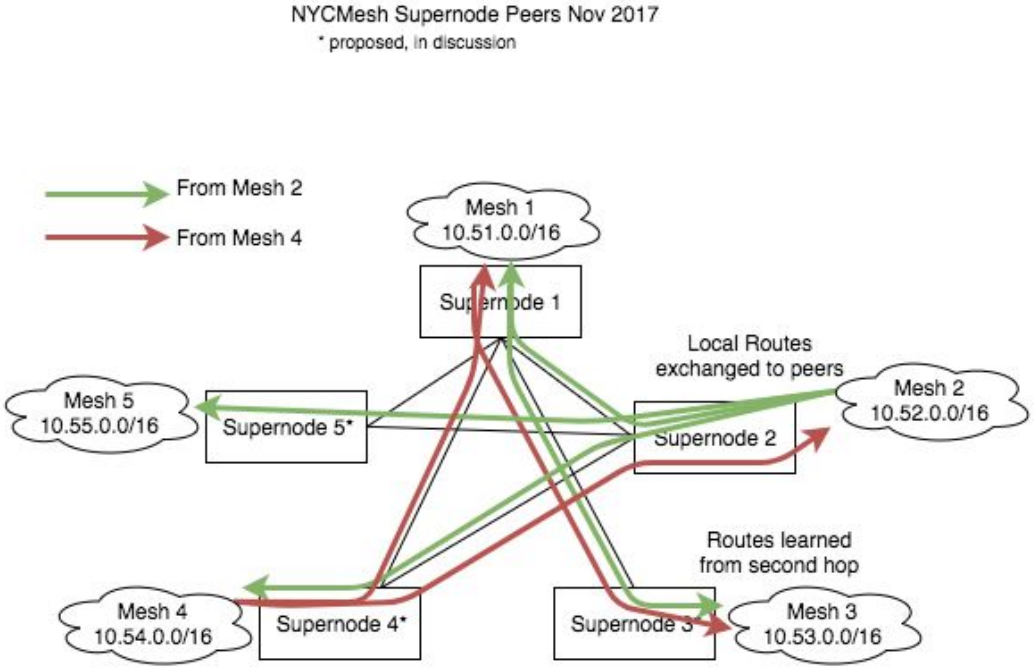


There are also smaller networks, such as the Chinatown network, which is just starting. Due to building height and neighborhood boundaries, these networks can not see each other. The Supernodes can see multiple neighborhood networks and can see each other for interconnection. Each Supernode can provide internet from several common carriers at those sites and merge together a high quality diverse internet connection for all the neighborhoods. All neighborhoods will exchange routes between each other via the supernodes; potentially connecting to several supernodes, if visible.

Supernodes Interconnection Diagram:

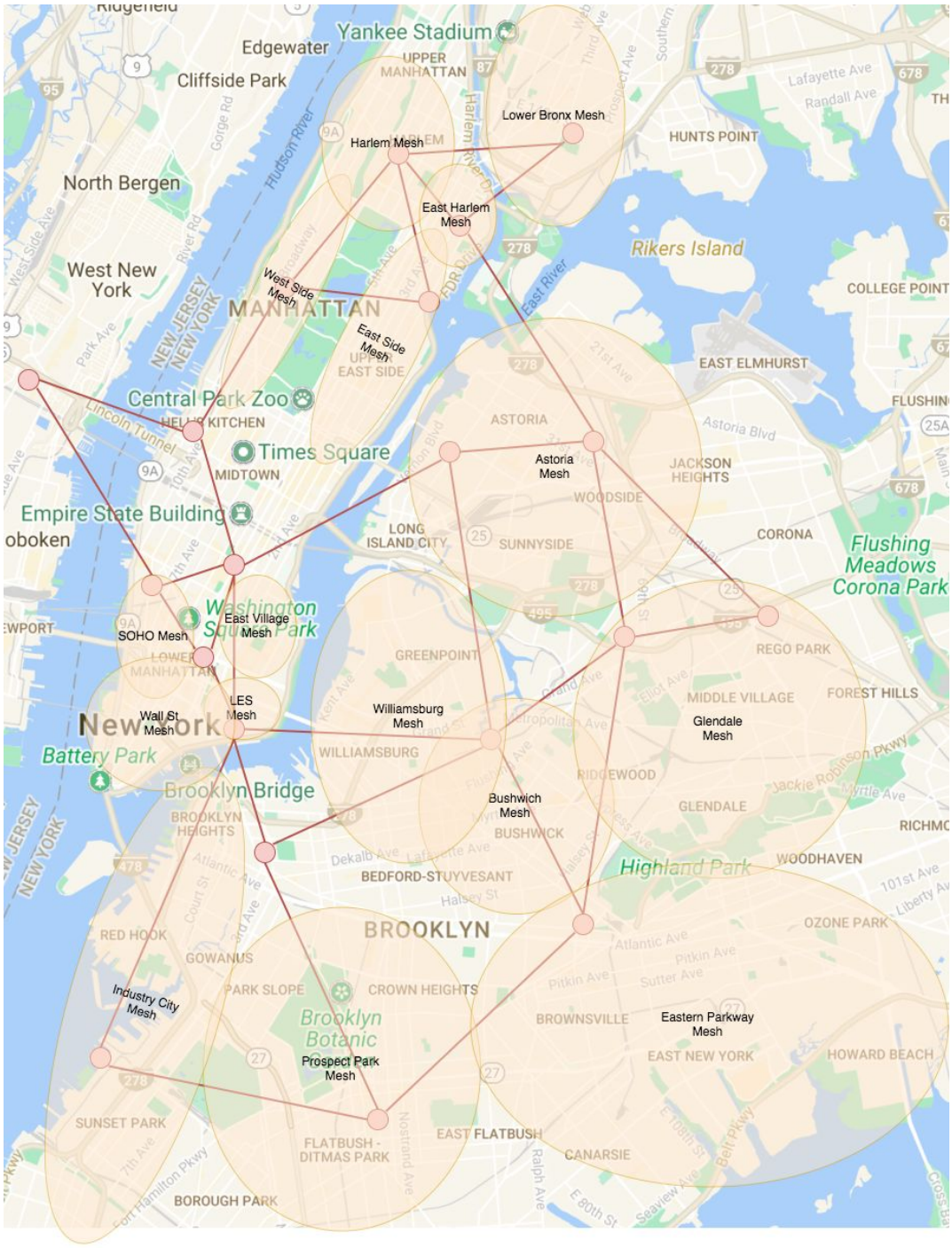


Supernodes Path Learning Diagram:



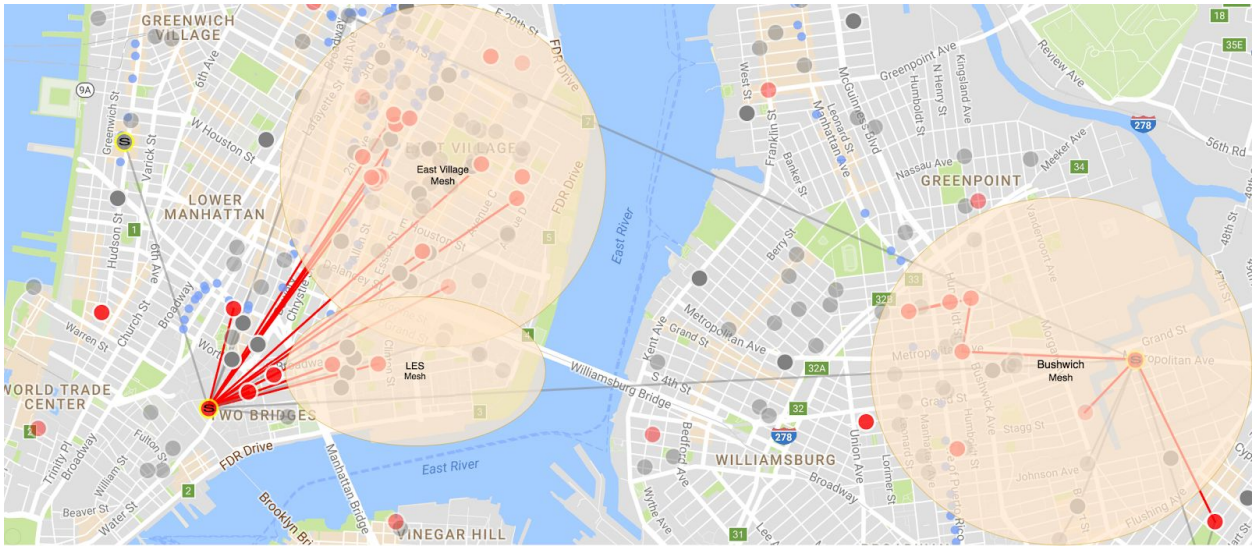
Supernodes attached networks will coordinate access across neighborhoods by exchanging the routing information between neighborhoods. In the above example the supernode logical diagram shows the interconnection of carriers and across supernodes (due to physical proximity). The second above diagram shows how networks from different regions will by exchanged and learned, even multiple hops downstream of a supernode.

Full City Potential Supernode Layout with Neighborhood Meshes:



In this diagram, we have our existing Supernode, and three existing meshes. Meshes vary in size due to building height and visibility of Supernodes. This idea is key, as one of the primary challenges with an urban mesh setting is the highly variable neighborhood building heights, creating a different interconnection style for each region.

Lower Manhattan Existing Layout:



Our existing network, which is a working prototype, covers three mesh networks as shown on the map. They are diverse (they can not see each other), use multiple protocols, and communicate via Supernodes.