Problem

We can apply network flow principles to solve this problem. First we can construct the graph without attention to the range parameter. We can have a set of nodes N such that each node n_i represents each client. We then attach a source node s and draw an edge from s to each node in N. We give each of these nodes a capacity of 1 to indicate that each client must end up connected to a base. We can then have a set of nodes K such that each node k_i represents a base. We can then attach a sink node t and draw an edge from each base k_i to t. The capacity of each of these edges is the load parameter associated with each base, such that e(k_i, t) has the load parameter of base k_i as its capacity. This ensures that each base does not exceed its load capacity. Now to address the range parameter, we draw edges from clients to bases only where the client is within range of the base, ensuring that we do not get any out of range pairings. We give each of these edges a capacity of 1. Now we have a graph where each possible client-base pairing is a flow along the path s, n_i, k_i, t. There is a valid solution to this problem if and only if there is an s-t flow of value n. The running time of this solution is the time it takes to run the Ford-Fulkerson algorithm.