Name

Harsimran Singh Maan

Kuntal Joshi

Prabal Sharma

Group Number G10

i. A short description of how you implemented your data structure. Often a picture is worth a thousand words.

Ans. We are using unordered hash map to implement fast lookup. We created a function which, based on all octet values of the IP address gives a unique hash value. All entries are indexed by this hash value which is of type Integer and thus it is easy to compare.
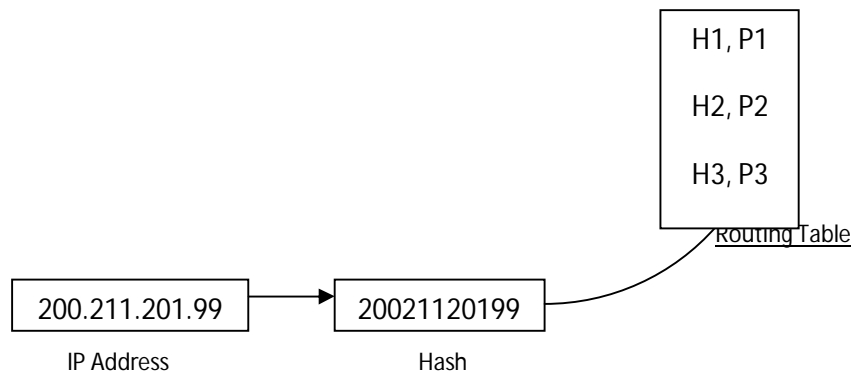
ii. The average time to perform a lookup.

Ans. 0.080394 microseconds per lookup

iii. An estimated average throughput of a switch built using this routing table (in packets per second), given that you have 40,000 entries in your routing table.

Ans. Throughput = 1000000/0.080394 = 12438739.2094 (packets per second). Therefore, the throughput is approximately 12 million packets per second.

iv.

A. an estimate of what the worst case would be in your implementation (in terms of the number of entries in the table, n), and

Ans. The complexity will be linear i.e. O(n) in worst case and in average case it is constant.

B. your measured estimate of this worst case.

Ans. In order to estimate for the worst case we placed the last IP address as 255.255.255.255. The measured time to perform lookups was 16.001 microseconds, when number of entries in the routing table was taken as 40000. In case, when we took number of entries in the routing table as 400000, the measured time to perform lookups was 29.141 microseconds.