

3D-ROUTING TABLE ALGORITHMS IN SEMANTIC INFORMATION CENTRIC NETWORKING

Our proposed Semantic routing scheme takes into consideration the four types of data usage [1]. In addition, it can match between publisher knowledge and the subscriber-interested knowledge. Currently, the search engine holds this role. In other words, the whole network will work as a big routing search engine that matches subscriber interest to data, and subscriber interest to publishers. This is done with the help of the three-dimension-naming scheme or 3D-address: Geographical address, User (publisher/subscriber) unique address and Semantic address [2]. That is done in the extremes not in the core.

Routers will hold three tables where the three address dimensions' combined in them. The first one is the Semantic- ID connects semantic address to publisher ID address. The second one is the Geo-ID connects publisher ID address and geographical address, and the third table is the Geo-Semantic matches semantic address to geographical address.

These three address dimensions will allow the matching between publisher and subscriber based on naming scheme that includes any publisher ID, semantic or geographical address in the network and designed to include the four types of data and the four types of subscriber's requests. A subscriber interested in one of the three address dimensions can find a match to the other two address dimensions using the proposed routing tables. For example, an interest message containing only a semantic address can easily be matched to the publisher's IDs and their geographical location using these tables. Considering another example where a subscriber having a phone call with a specific publisher ID can follow the geographical location of the publisher using the second table.

Each table includes two parts. The first part, which is the address part (publisher ID, geographical, and semantic addresses) that names the data and are learnt or defined from publisher advertisement. The address part consists of semantic and publisher ID addresses in Semantic- ID table and of publisher ID and geographical addresses in Geo-ID table, and of semantic addresses and geographical addresses, in Geo-Semantic table.

The second part of each table, which is the orientation part (cache (*TTL*) and Interface) that directs the data toward the subscriber, and are learnt from subscriber interest message. The interface are the input output ports, which connects network nodes.

The following algorithms were developed for the proposed routing protocol: update algorithm will add new records, update *TTL* for the record, add records to cache when *TTL* reaches threshold another update algorithm will update the *TTL* in the cache (Figure).

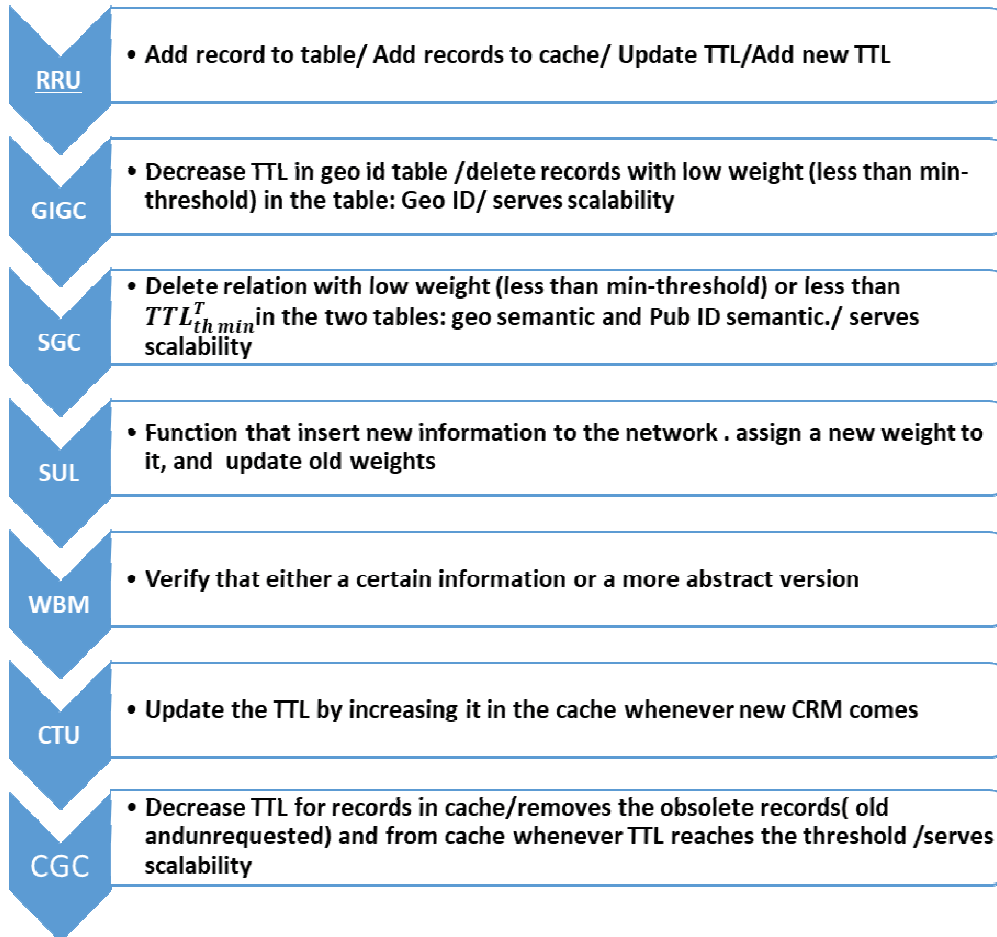


Figure. Algorithms functions

In addition, matching algorithm is presented. Moreover, garbage collector algorithm for records in tables (addresses) and caches (data) are presented. Garbage collector algorithm role is to remove the records based on *TTL* thresholds to manage the volume helping in scalability issue.

REFERENCES

- 1 N. Patsei, G. Jaber. Routing Schem for Information-Centric Networking//11th International Conference NEET. Lublin University of Technology, Lublin, Poland, June 25 – 28, 2019 – P.29.
- 2 Ghassan Jaber, Patsei Natallia Vladimirovna, Fatima Rahal. Different Naming in Information-Centric Networks (ICN) // Scholars Journal of Engineering and Technology, 2019; 7(8). – pp.235-237.