**On the design of aggregation algorithms to extend router life-time**

Yaoqing Liu

As the global FIB table size has been increasing beyond what hardware can support, we propose a series of design considerations for FIB aggregation algorithms to extend router lifetime. As we all know that FIB entries do not always keep static but dynamic with frequent route updates. Therefore, aggregation processing and update handling are two main aspects we focus on in order to shrink FIB size as much as possible. As for Aggregation, we show the relationships between aggregation ratio, extra routable space, and computation time with different aggregation algorithms. For update handling, we take into account the processing time and impact upon route changes, and conduct comparison between original output and the results after doing aggregation. As the best knowledge, it's the first time that we illustrate those considerations using real data via ORTC Patricia trie implementation.

A traditional perspective to reduce routing table size is to shrink RIB size and it can also make FIB size decrease. However, RIB aggregation cannot be implemented for one day and thus has very limited adoption in the Internet. It would cause much inconvenience for packet routing selection. Moreover, it may have to change current Internet architecture and related protocols to adopt it. Therefore, FIB aggregation will be more effective than RIB aggregation for FIB size reduction, since it is purely a local decision. It can combine multiple entries in the forwarding table without changing the next hops or interface for data forwarding. Also, it does not require any change on current protocols or hardware, but merely needs a software upgrade and the impact would be only limited within the router. Our research illustrates that the FIB size can be aggregated and shrink by much as 85% using proper aggregation algorithms. The fact means it can help delay the exhaustion of memory of FIB tables around two or three years through applying corresponding aggregation techniques. This is exciting news for ISPs and vendors.