An Evaluation Study of Router FIB Aggregatability

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draft-zhang-fibaggregation-02.txt
FIB Aggregation (FA)
FIB Aggregation: Pros and Cons
Why FA Can Be Effective
What we have done
Level-1 Aggregation

Letter in the circle: next hop
Blank circle: prefix not in RIB
Level-2 Aggregation
Level-3 Aggregation

Blue nodes: extra routable space
Level-4 Aggregation

For details, see draft-zhang-fibaggregation-02.txt
Evaluation Methodology
FIB Size Reduction
FIB Size Reduction Over Years

![Graph showing the reduction of FIB size over years. The graph compares different levels: Level 1, Level 2, Level 3, Level 4 (A), and Level 4 (B). The x-axis represents the years from 2001 to 2008, and the y-axis represents the table size ratio (Aggregated FIB/RIB). The data shows a gradual decrease in FIB size over the years for all levels.](image-url)
What does the ratio mean?
Computation Time
Extra Routable Space
Handling Routing Updates
Update Processing Time

<table>
<thead>
<tr>
<th>Algorithms</th>
<th>T_RIB(s)</th>
<th>t_RIB(us)</th>
<th>N_FIB</th>
<th>n_FIB</th>
<th>p_FIB</th>
<th>T_FIB(s)</th>
<th>t_FIB(us)</th>
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T_RIB: total RIB processing time;
t_RIB: average RIB processing time per routing update;
N_FIB: total number of FIB updates;
n_FIB: total number of prefixes affected in the FIB;
p_FIB: average number of affected prefixes per FIB update;
T_FIB: total FIB processing time;
t_FIB: average FIB processing time per affected prefix

• The above table is computed using one month of BGP updates in 2008.12
• Not all updates cause FIB changes (e.g., same nexthop).
Periodical Re-Aggregation

- Using one month of BGP updates of one router in 2008.12
- Full Level-4 aggregation after table size reaches 150K (50% of full table); otherwise incrementally update the aggregated FIB.
- Need run full aggregation only 7 times in a month.
Conclusion
More Details
The Current RouteViews Oregon Collector Data Sources

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