

# An Evaluation Study of Router FIB Aggregationability

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draft-zhang-fibaggregation-02.txt

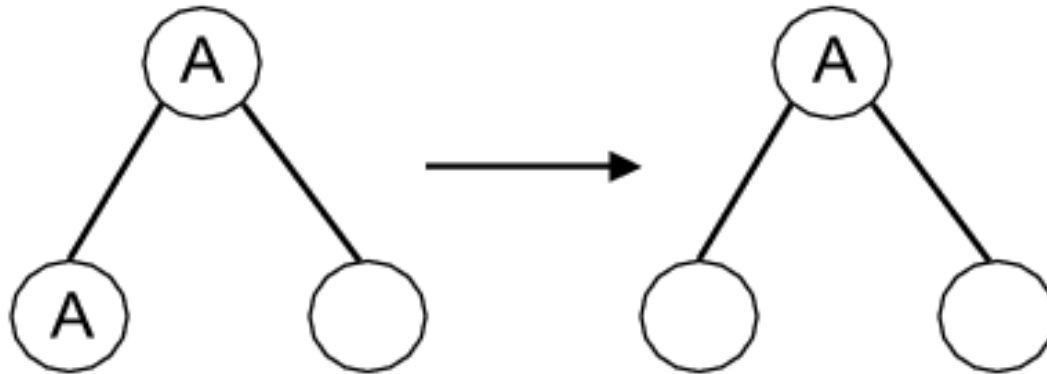
# FIB Aggregation (FA)

# FIB Aggregation: Pros and Cons

# Why FA Can Be Effective

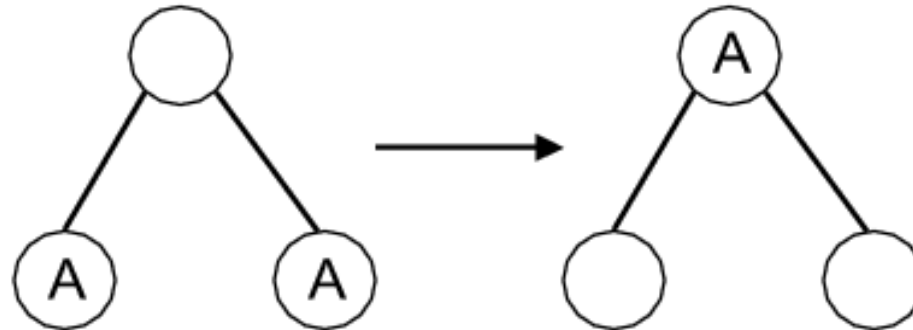
# What we have done

# Level-1 Aggregation

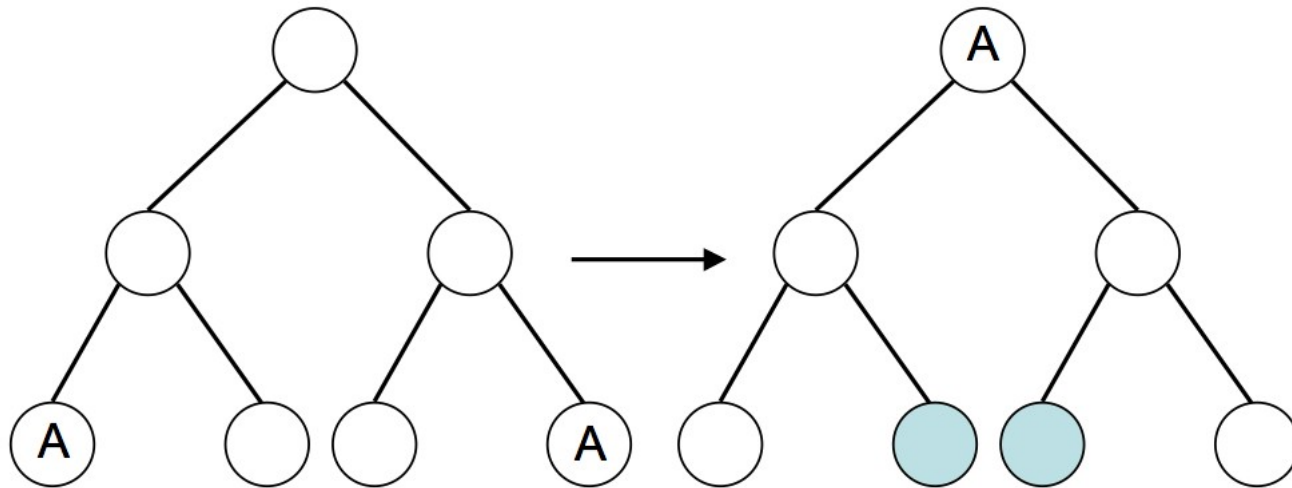


Letter in the circle: next hop  
Blank circle: prefix not in RIB

# Level-2 Aggregation



# Level-3 Aggregation

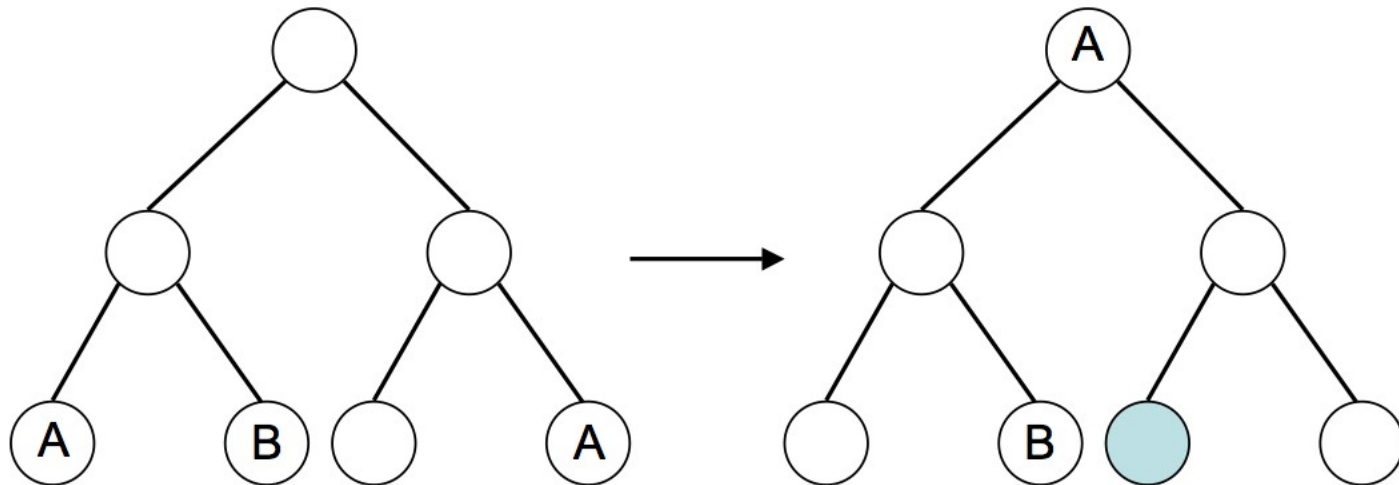


Blue nodes: extra routable space



# Level-4 Aggregation

For details, see [draft-zhang-fibaggregation-02.txt](#)

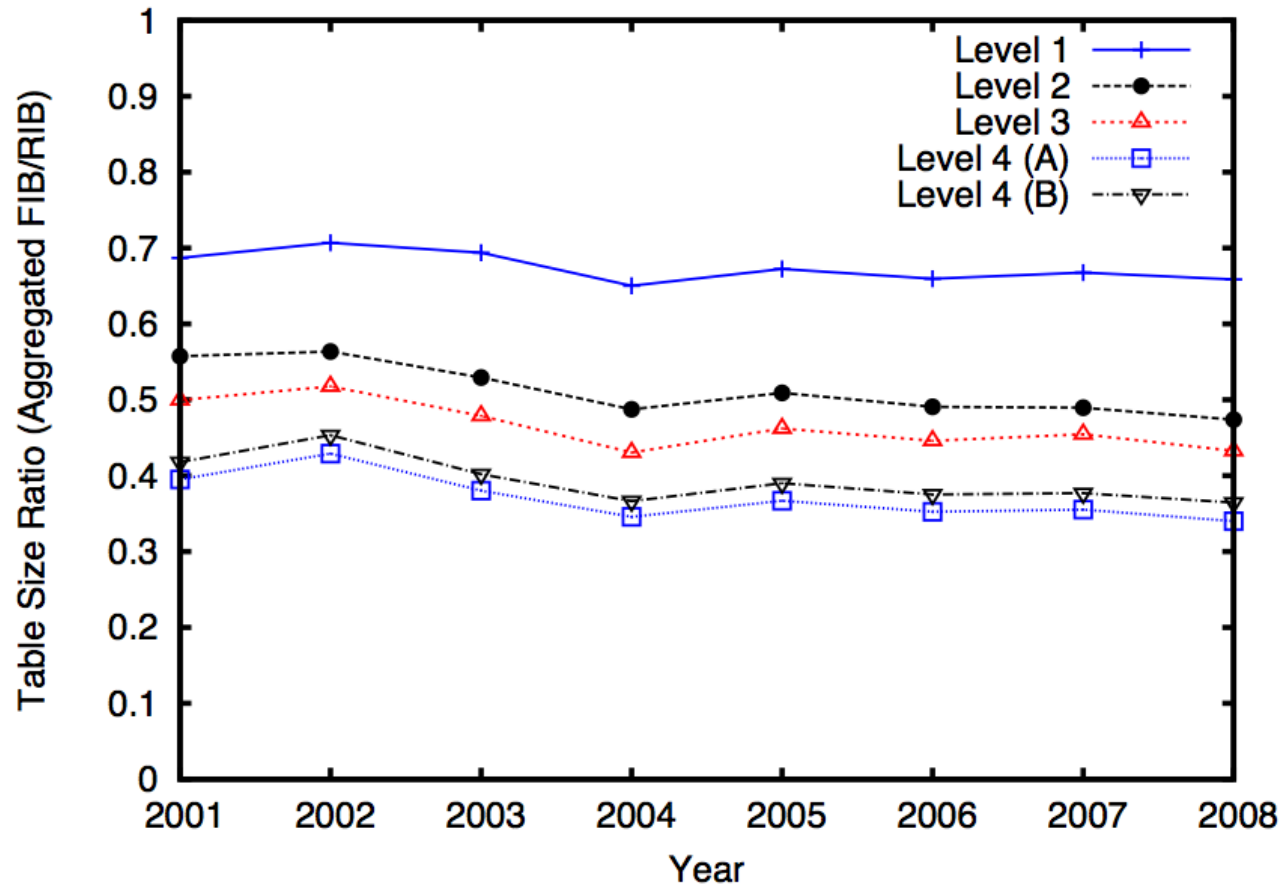


# Evaluation Methodology

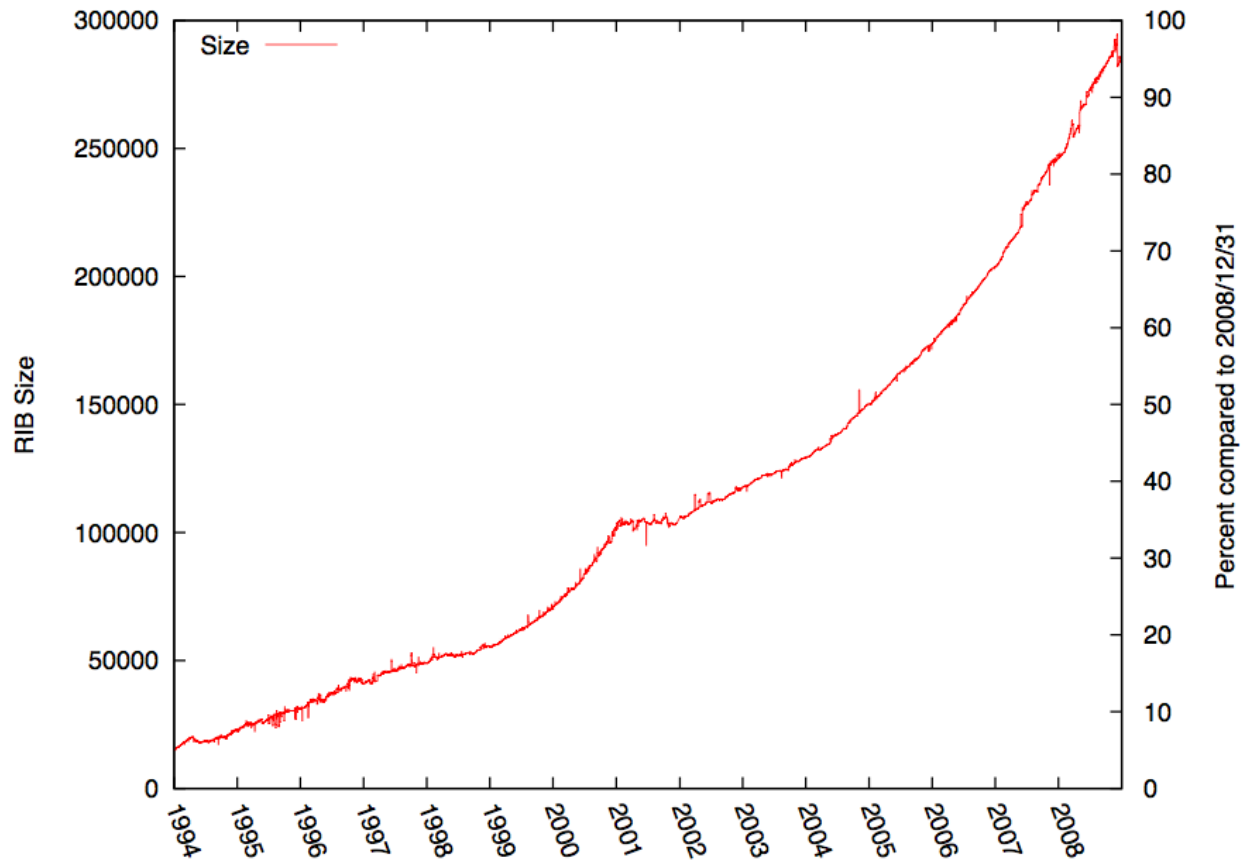
# FIB Size Reduction



# FIB Size Reduction Over Years



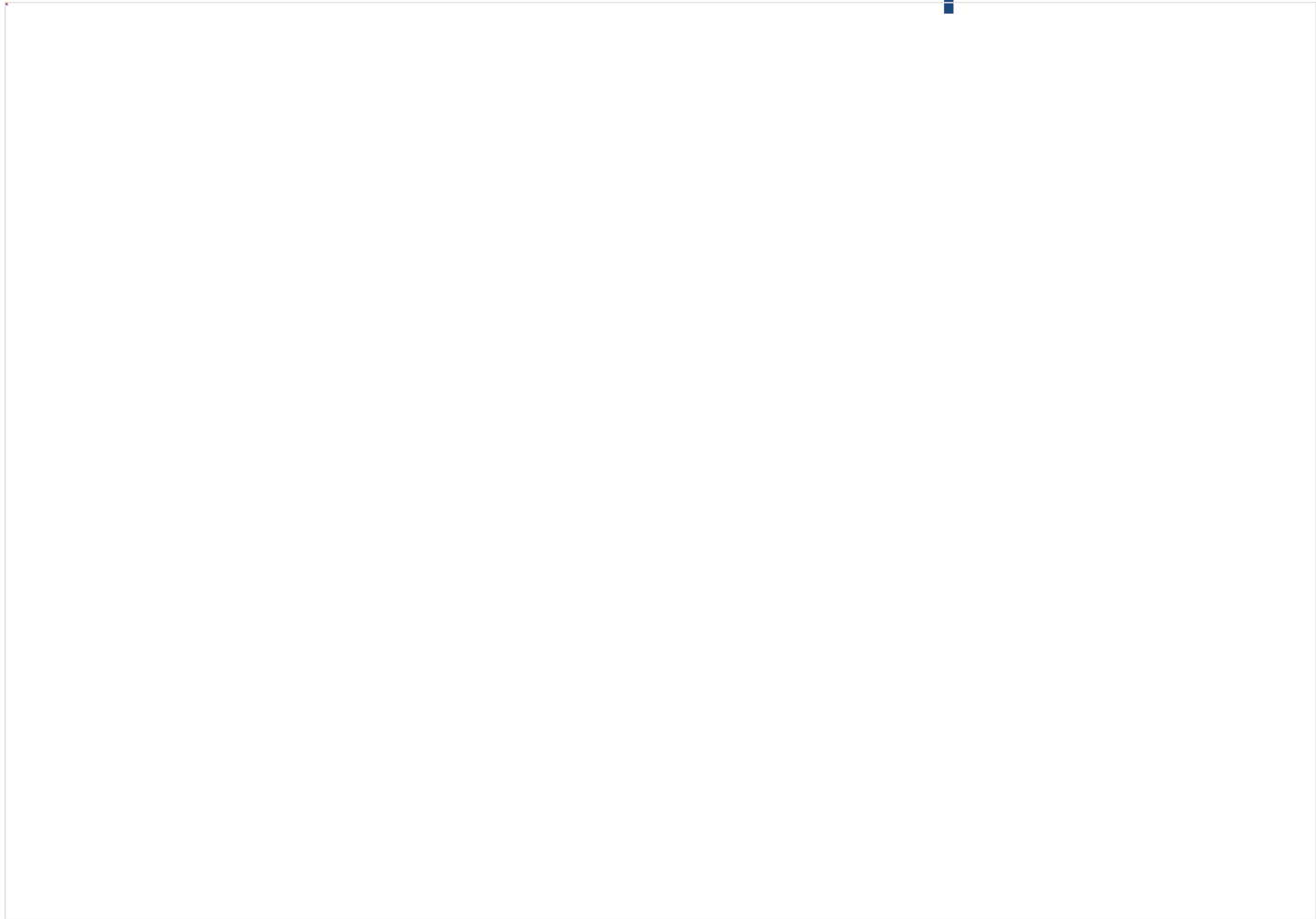
# What does the ratio mean?



# Computation Time



# Extra Routable Space



# Handling Routing Updates



# Update Processing Time

Algorithms	T_RIB(s)	t_RIB(us)	N_FIB	n_FIB	p_FIB	T_FIB(s)	t_FIB(us)
Original	4.30	0.593	2914020	2914020	1.000	2.60	0.892
Level-1	5.85	0.806	2904630	2921335	1.005	2.53	0.866
Level-2	5.96	0.822	2901530	2940178	1.013	2.45	0.833
Level-3	5.98	0.824	2900389	2941398	1.014	2.42	0.823
Level-4A	6.10	0.841	2897450	2942969	1.016	2.33	0.792
Level-4B	6.41	0.880	2913988	3388764	1.162	2.61	0.770

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;

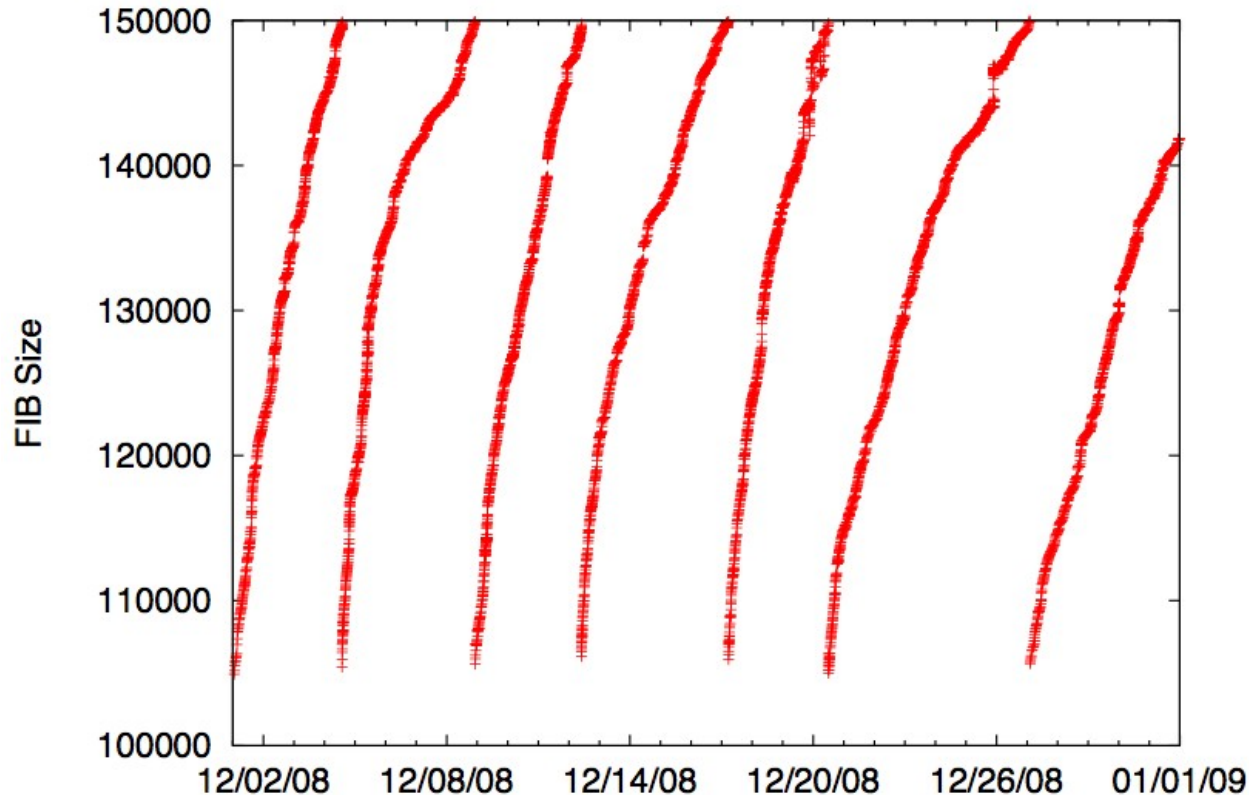
p\_FIB: average number of affected prefixes per FIB update;

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

AOL	ORD	PIPEX	PIPEX
APAN/tppr-tokyo	ORD	Port80	Stockholm
ATT	CA	PSG	SEA
CENIC	CA	PSG	SEA
ENA	TN	RUSnet	St Petersburg
ESNet	New York	SAVVIS	SF
France Telecom	NYC	SAVVIS	SF
Global Crossing	London	SeaBone	NEW
Global Crossing	Palo Alto	Sprint/Canada	Toronto
Group Telecom Service	BC	Sprint	Stockton
Hurricane Electric	SJ	Telefonica	Miami
IJJ	Japan	Teleglobe	LHR
INIT7	Zurich	Teleglobe	PAIX
Internet2	Chicago	Telia	NYC
IP-PLUS	ZRH	Telstra	Sydney
ISC	CA	TELUS	Calgary
KPNE	AMSIX	TELUS	Toronto
KPNE	LINX	Tiscali	
LAMBDANET	VA	TransPAC2	LA
Level3	SEA	UUNET	Africa
Net Access	NYC	uunet	mci
netINS	DSM	WCICABLE	Hillsboro OR
NTT-A	CA		
NTT-Δ	VA		