Realistic Model of the Load Due to BGPSEC Beacons

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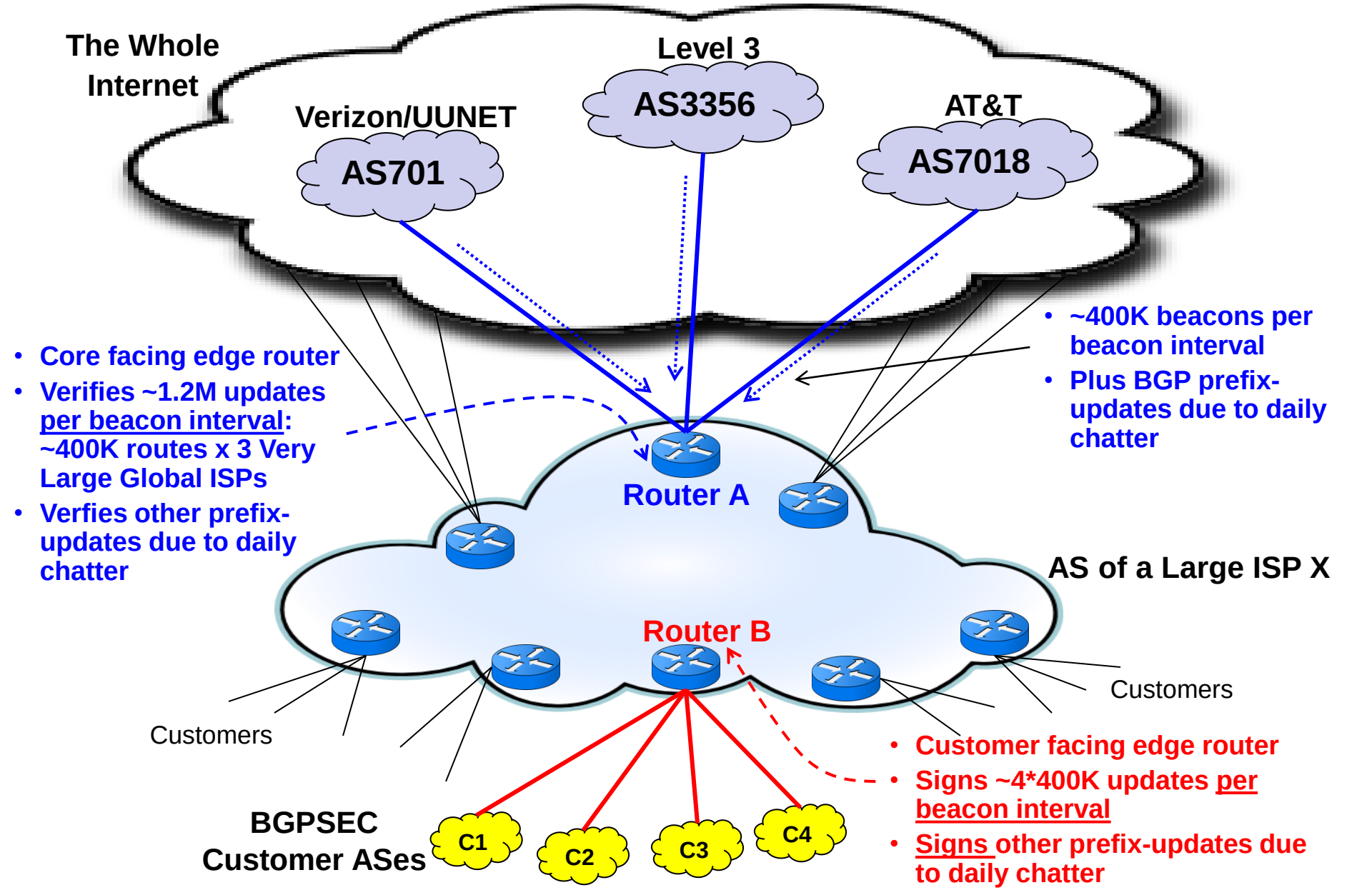
Key Observations for Modeling

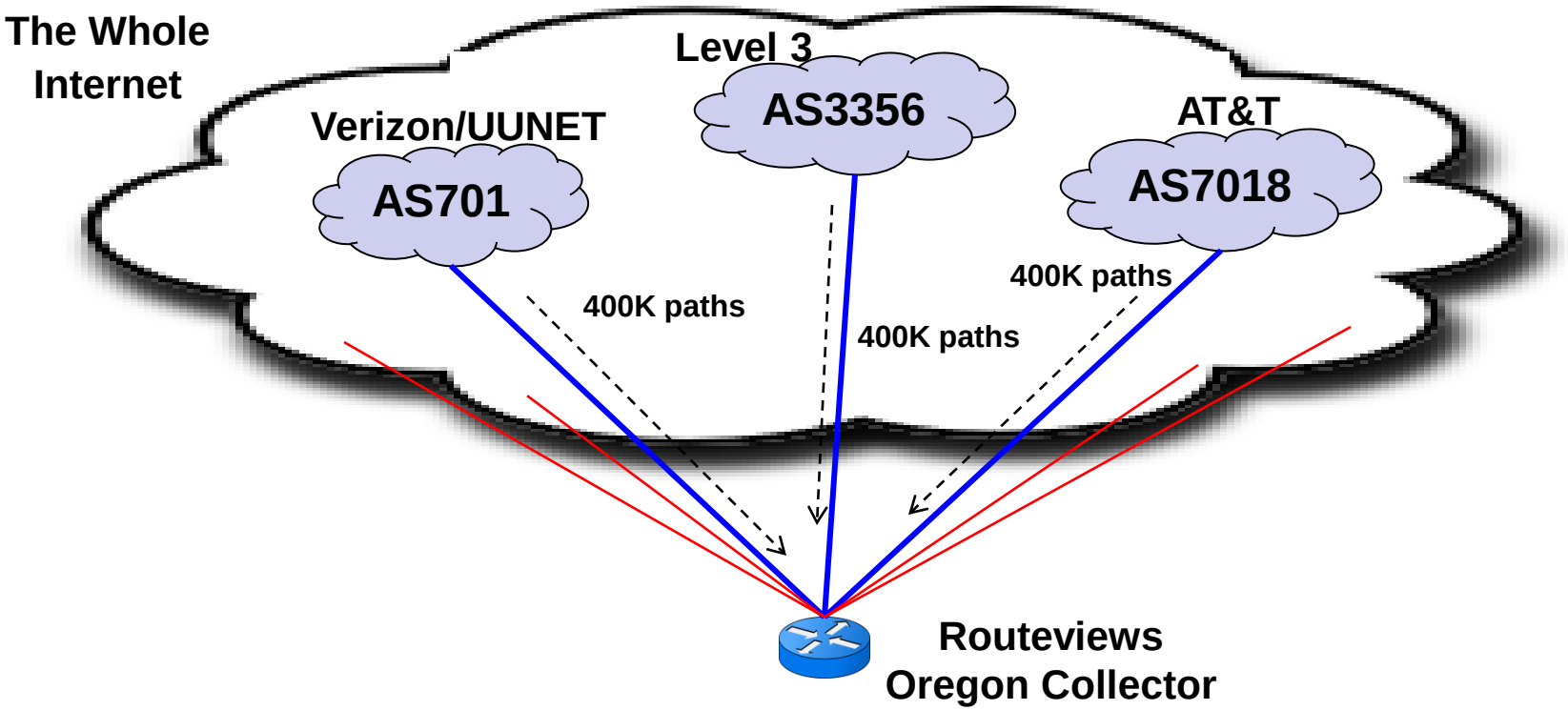
- Each peer eBGPSEC router propagates about 400K beacons (one per prefix in Internet) once per peering interval
- Beacons are randomly jittered over the beacon interval which is assumed to be 1/3 the signature expire time
- Beacons are uniformly distributed (not bursty); we model them as a Poisson process
- Data for daily BGP chatter in today's Internet is derived from Routeviews measurements (peering with three large global ISP ASs : AS7018, AS701, AS3356)

Realistic BGPSEC Router Load Model



Typically 84% of Customer ASes are stubs; Assume: 20 customers; 4 are non-stub

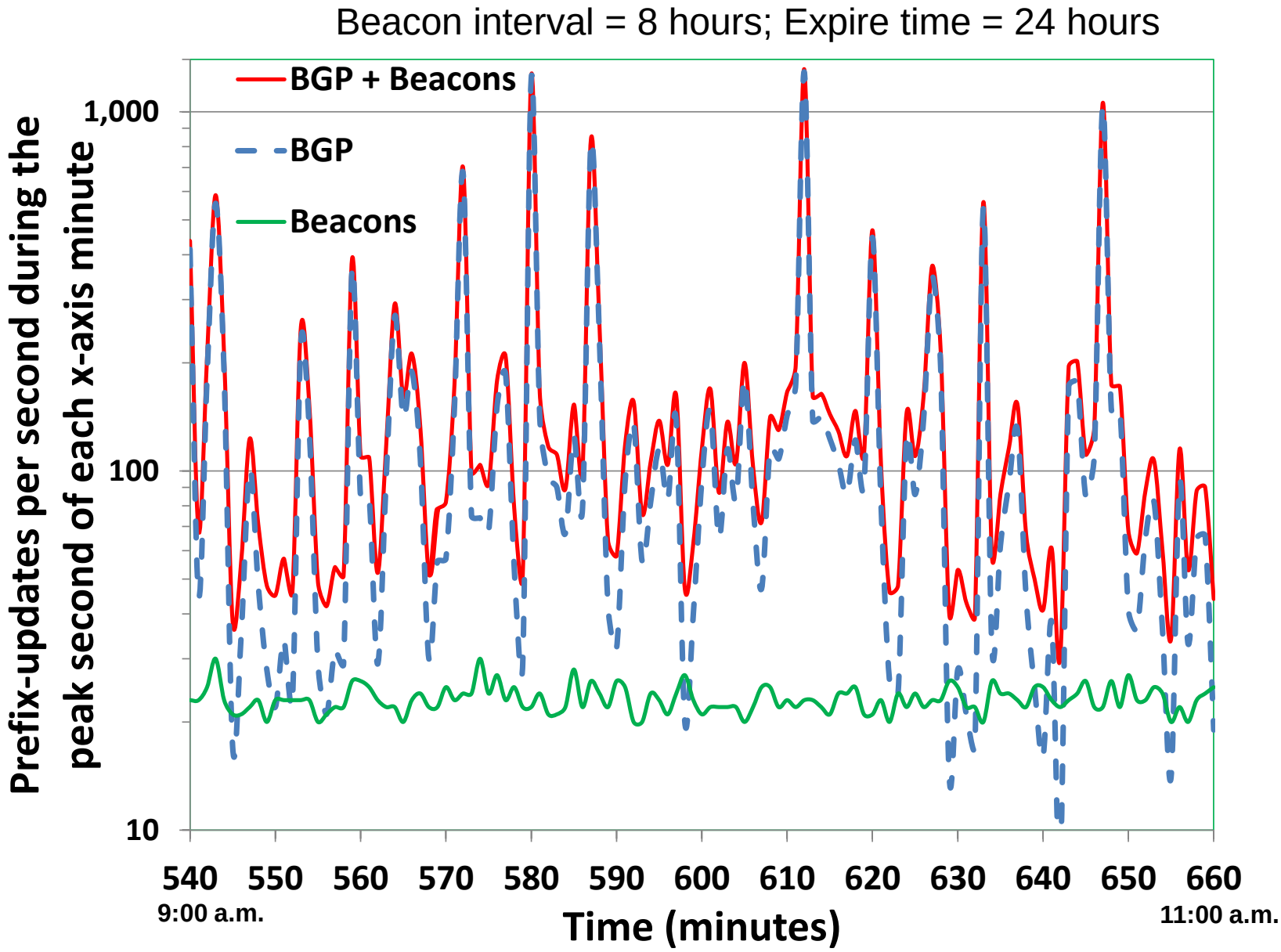
Measurement Data



- Roureviews collector collects data from many different peer ASes
- Filter and keep data for only the Very Large Global ISP peers that we are interested to model (AS701, AS3356, AS7018)
- The Routeviews data helps capture # prefixes and AS path lengths accurately for beacons (at Router A and B, slide 3)
- The data also helps capture the exact arrival process and everything else for the non-beacon-related BGP updates

Load Due to BGP and Beacons per Peer

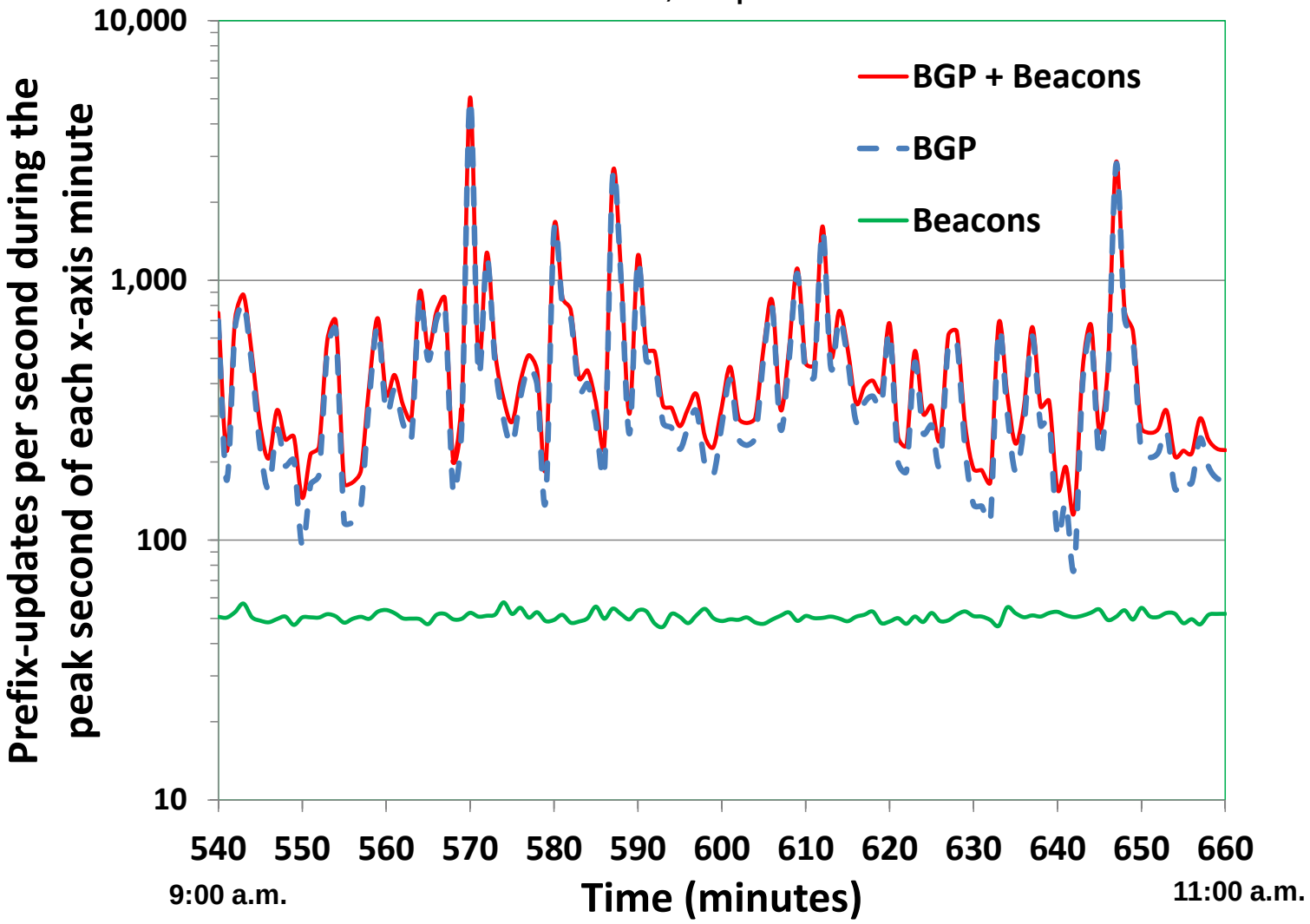
(BGP feed from AS7018 peer router; Routeviews; Feb 1, 2012)



Load Due to BGP and Beacons for 3 Peers

(BGP feeds from AS7018, AS 701, AS 3356 peer routers combined; Routeviews; Feb 1, 2012)

Beacon interval = 8 hours; Expire time = 24 hours



Comparison of Prefix Update Load Due to BGP and Beacons

	Max Peak prefix-update rate (mearured minute-ly over 24 hours)				
		Beacons			
	BGP (existing BGP-4 chatter)	BI = 8 hr; ET = 24 hr	% increase over BGP chatter	BI = 24 hr; ET = 72 hr	% increase over BGP chatter
Verizon (AS701)	2189	30	1.37%	15	0.69%
AT&T (AS7018)	3155	30	0.95%	15	0.48%
Level3 (AS3356)	15681	30	0.19%	15	0.10%

BGP feeds from AS701, AS7018, and AS3356 peer routers in Routeviews - Feb 1, 2012

Conclusions

- Network operator would normally size resources for the peak periods
- Load due to BGP (present day chatter) is very bursty peaking to 1000's prefix-updates per sec per peer for peak seconds (over successive minutes)
- Load due to beacons is uniform and non-bursty peaking to only 20 to 30 prefix-updates per sec per peer (assuming beacon interval of 8 hours; expire time of 24 hours)
- So the load due to beacons adds negligibly to prefix-update load during the peak seconds

Data* on Number of Peers per Router and Number of Customers per Router for Large ISPs

ISP	Total BGP Peers	Transit Peers (Full Table)	BGP Customers	BGP Non-Stub Customers (16%)
W	29	TBD	95	15
X	3	TBD	20	3
Y	6	TBD	12	2
Z	8	TBD	16	3

- **Only non-stub customers are bi-directional BGPSEC**
- **84% of customer ASes are stubs and 16% are non-stub**
- **Router does not sign updates to stub customers**

* Source: Data collected by Randy Bush