

IGP bandwidth based metric FRR

(draft-spallagatti-rtgwg-bandwidth-based-metric-01.txt)

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IETF-92

- In IETF-92 we presented
 - Use cases.
 - Interface-groups.
 - Derivation of interface-group metric.

Why multiple backup FRR?

- RFC 5286 does not restrict for single backup path as LFA
 - But most implementation has single backup path for LFA or remote LFA.
 - Congested backup path.
 - With ECMP no backup installed.
- LFA Or remote LFA does not consider bandwidth for backup path calculation.

Assumptions & limitation

- The forwarding plane SHOULD be able handle multiple paths per route and let control plane set the preference for each path over the others.
- Downstream path check MUST be implemented to avoid loops.
- End to End bandwidth is not considered.
- Single link failure only.

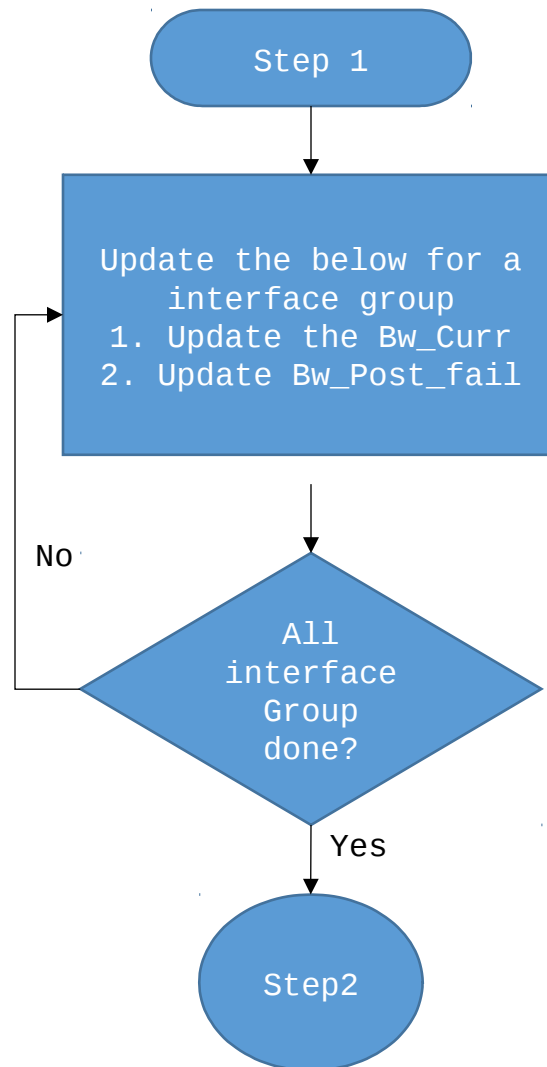
New FRR Configuration

Config	Details
Min_BW	This is the minimum bandwidth below which outgoing traffic MUST not be carried on this interface-group. It needs to load-balance across links of best/non-best interface-groups as well.
Restore_BW	This is the bandwidth above which the outgoing traffic MUST entirely be carried over the members of this interface-group not needing to load-balance across member links of other non-best interface-groups, provided it provides a path with shortest metric.

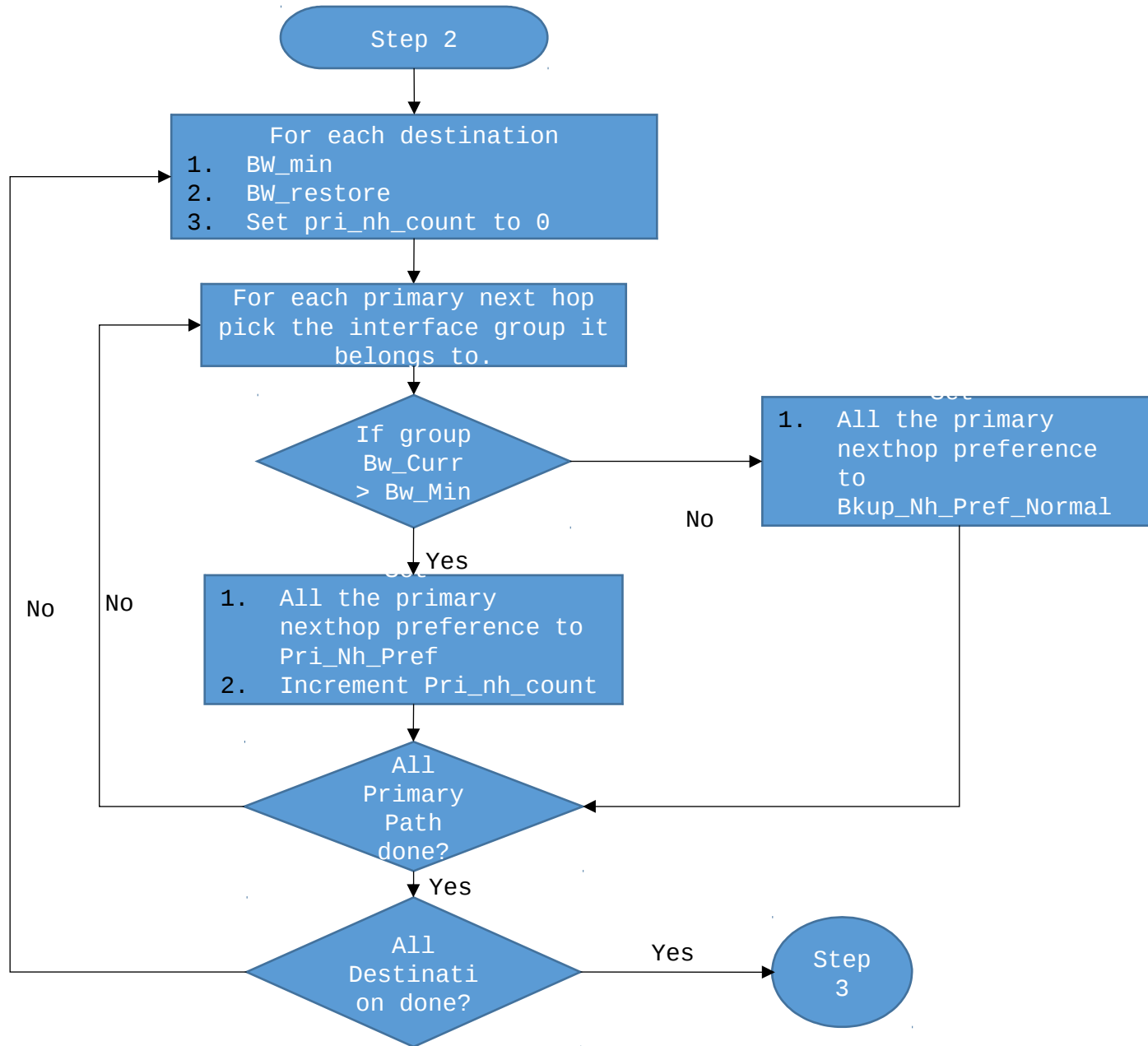
Nexthop preferences

Preference-Type	Significance	Suggested
Pri_Nh_Pref	Preference type for normal primary paths.	0x1
Bkup_Nh_Pref_High	Preference type for paths, which are preferred, more than normal backup paths but less compared to normal primary paths.	0xF100
Bkup_Nh_Pref_Normal	Preference type for normal backup paths.	0xFF00

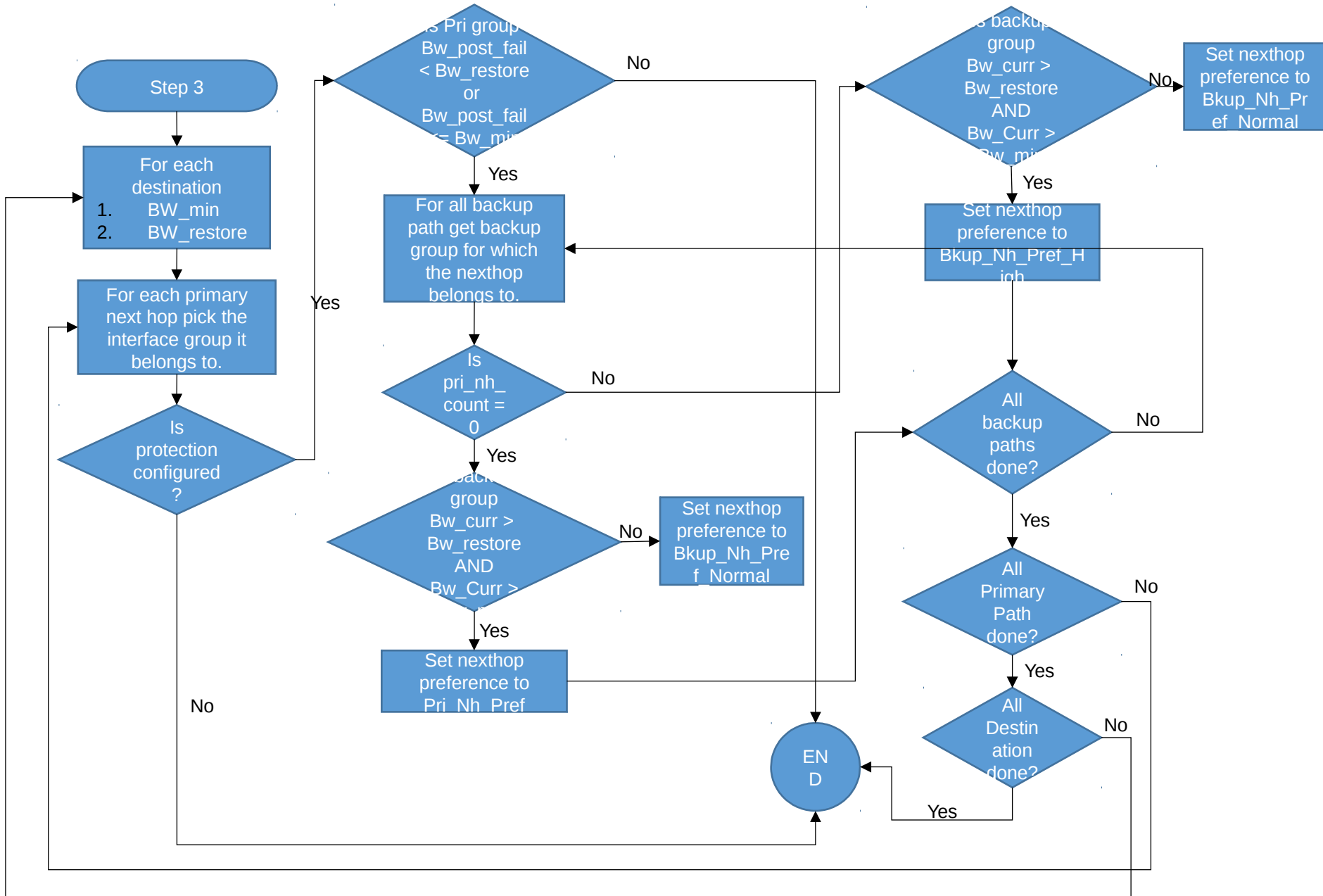
Backup calculation: Step 1



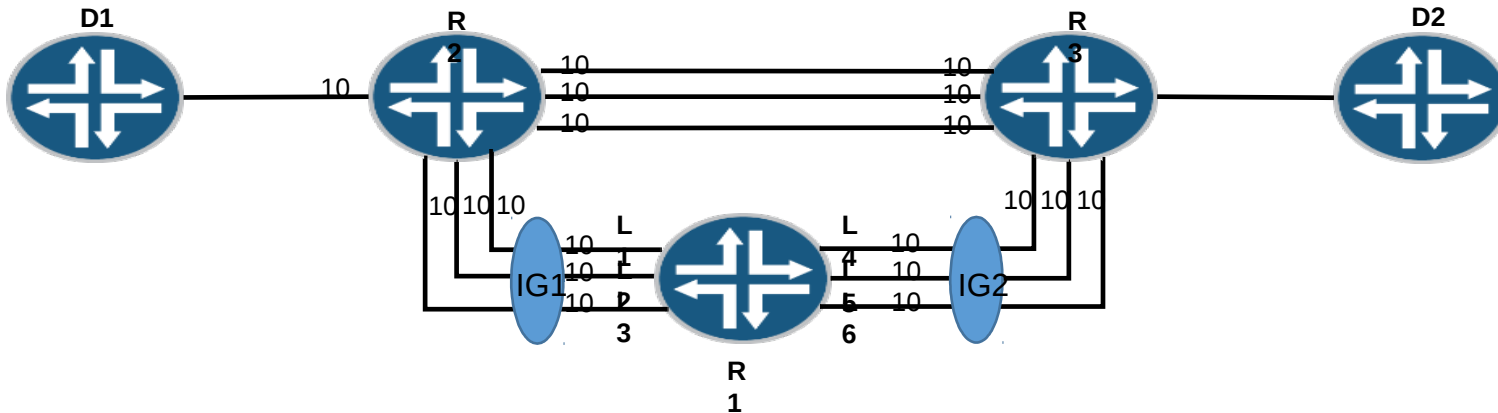
Backup calculation: Step 2



Backup calculation: Step 3



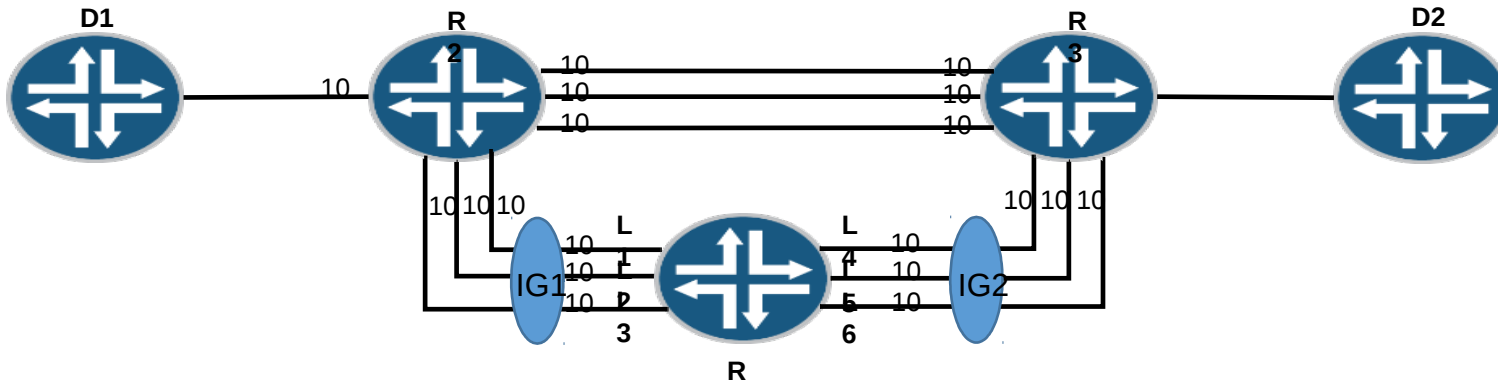
Backup calculation: Example



Interface Group	IG1			IG2		
Links	L1	L2	L3	L4	L5	L6
Link-Bw	100G	100G	100G	100G	100G	100G
Bw-Threshold	Min = 100G/revert = 200G			Min = 100G/revert = 200G		
BBM metric	Default = 100, 200G = 10 & 100G = 50			Default = 100, 200G = 10 & 100G = 50		

1. L1 goes down
2. Then L2 goes down
3. And then L4 goes down
4. And finally L5 goes down

Contd..



Events	Initially	L1 goes down		L2 goes down		L4 goes down		L5 goes down	
Pri_BW_curr	300G	200G	200G	300G	100G	100G	100G	100G	100G
Pri_BW_postfail	200G	100G	200G	200G	0G	200G	0G	200G	0G
Pri_BW_revert	200G	200G	200G	200G	200G	200G	200G	200G	200G
Pri_BW_min	100G	100G	100G	100G	100G	100G	100G	100G	100G
Pri_Intf_Group	IG1	IG1	IG2	IG1	IG1	IG1	IG1	IG1	IG1
Pri_NH_Count	3	2	3	0	0				
PFE Gateways	IGP Setup	Local repair	IGP repair	Local repair	IGP repair	Local repair	IGP repair	Local repair	IGP repair
L1 (metric/ weight)	20 / 0x0001	-- / 0xFFFF							
L2 (metric/weight)	20 / 0x0001	20 / 0xFF00	20 / 0x0001	-- / 0xFFFF					
L3 (metric/weight)	20 / 0x0001	20 / 0xFF00	20 / 0x0001	20 / 0xFF00	--	--	60 / 0xFF00	60 / 0xFF00	60 / 0xFF00
L4 (metric/weight)	--	--	30 / 0xF100	30 / 0xF100	30 / 0x0001	-- / 0xFFFF			
L5 (metric/weight)	--	--	30 / 0xF100	30 / 0xF100	30 / 0x0001	30 / 0xFF00	30 / 0x0001	-- / 0xFFFF	
L6 (metric/weight)	--	--	30 / 0xF100	30 / 0xF100	30 / 0x0001	30 / 0xFF00	30 / 0x0001	30 / 0xFF00	70 / 0xFF00

Thank you