IS-IS Flooding Test Result

IETF 109 LSR WG

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Motivation

Goal of Flooding rate parameter justification:

a) Minimum Flooding Time
b) Minimum Retransmission

We set up the test to explore some parameter's configuration for typical ISIS flooding scenario

In test	In standard	Desc.
Window	InterfaceLSPReceiveWindow	Retransmission queue length threshold, it is nLSPs.
	minimumInterfaceLSPTransmissionInterval	minimum LSP Sending Speed, short for MininterfaceTxInterval.
TxInterval	minimumLSPTransmissionInterval	Retransmission Timer, in seconds.
interfaceTxInterval	minimumBroadcastLSPTransmissionInterval	LSP Sending Speed. In mLSPs/nMS. Default is 100 LSPs/100ms.
	partialSNPInterval	Configured as constant value, 5s in standard, and 800ms in code.

Test cases:

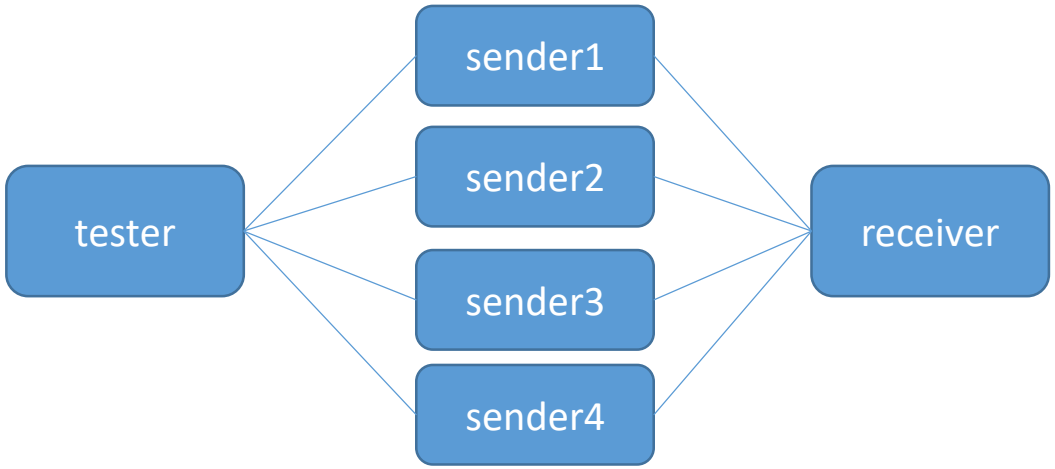
TestCase1 : Exploring the Impact of the *TxInterval*
TestCase2 : Exploring the Impact of the *InterfaceLSPReceiveWindow*
TestCase3 : Exploring the Impact of the interfaceTxInterval

Test Procedures : The tester simulates flooding of 20000 LSPs and sends them to sender. Then sender floods them to receiver.

Scenario 1: Single link networking

Scenario 2: parallel links networking

Scenario 3: Dual-homed networking



Case 1: Modify the Txinterval parameter

Scenario 1	NO.	Window	TxInterval	interfaceTxInterval	Flooding Time	retransmission
	1	NA	5s	100/100ms	1min13s	1123/20000
	2	NA	3s	100/100ms	1min40s	7222/20000
	3	NA	1s	100/100ms	1min27s	12181/20000

Scenario 2	NO.	Window	TxInterval	interfaceTxInterval	Flooding Time	retransmission
	1	NA	5s	100/100ms	1min04s	1596/20000
	2	NA	3s	100/100ms	1min08s	3530/20000
	3	NA	1s	100/100ms	1min06s	3947/20000

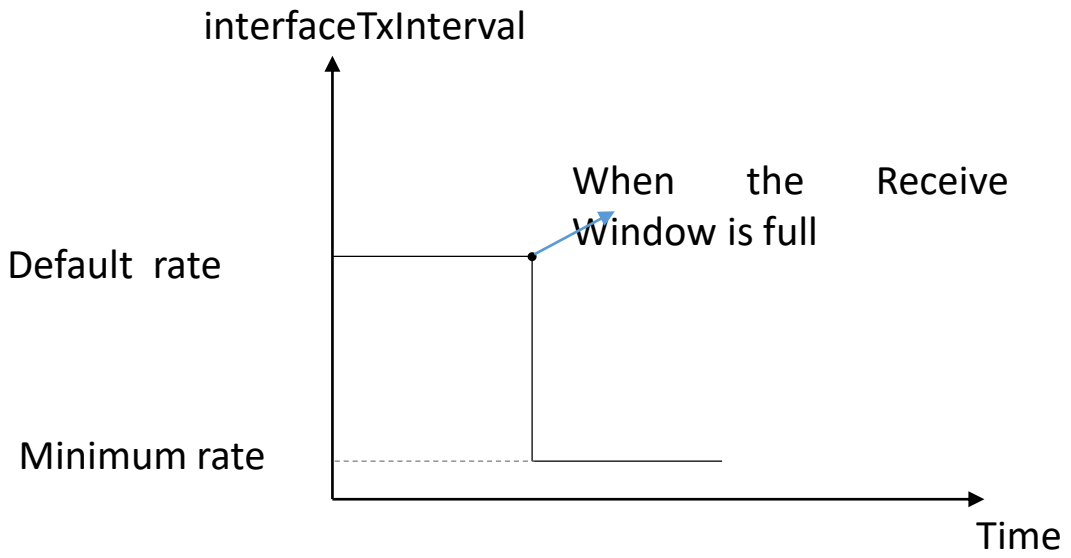
Scenario 3	NO.	Window	TxInterval	interfaceTxInterval	Flooding Time	retransmission
	1	NA	5s	100/100ms	1min07s	1437/20000
	2	NA	3s	100/100ms	1min 11s	1974/20000
	3	NA	1s	100/100ms	1min23s	3167/20000

This group of results shows that TxInterval as 1s, 3s and 5s, the impact of this factor to the flooding timer is small. The LSP flooding behavior in the 3 scenarios is similar.

Case 2: Modify the Window parameter

- Rate Control based window:
  - default rate: 100/100ms
  - Minimum rate: 10/100ms, when number of un-acknowledged LSPs reached threshold(window).

NO.	Window	TxInterval	interfaceTxInterval	Flooding Time	retrans
1	NA	5s	100/100ms	57s	2449/20000
2	1500	5s	Static Rate Control	3min29s	360/20000
3	2000	5s	Static Rate Control	2min09s	2310/20000
4	2500	5s	Static Rate Control	57s	2461/20000



A proper window value can effectively reduce the number of retransmitted LSPs on the interface but deteriorates the flooding time.

Case 3: Modify the interfaceTxInterval parameter

- Rate Control based window:
  - default LSP sending rate: 100 LSPs/100ms
  - Dynamic rate: if the number of un-acknowledged LSPs reached threshold(window), decrease the rate by 50%. Otherwise increase the rate by 20% until 200/100ms. The process schedule per 1s.

NO.	Window	TxInterval	interfaceTxInterval	Flooding Time	retrans
1	NA	5s	100/100ms	57s	2449/20000
2	1500	5s	Static Rate Control	3min29s	360/20000
3	2000	5s	Static Rate Control	2min09s	2310/20000
4	2500	5s	Static Rate Control	57s	2461/20000

NO.	Window	TxInterval	interfaceTxInterval	Flooding Time	retrans
1	NA	5s	100/100ms	57s	2449/20000
2	1500	5s	Dynamic Rate Control	33s	628/20000
3	2000	5s	Dynamic Rate Control	24s	1725/20000
4	2500	5s	Dynamic Rate Control	40s	4065/20000

1. dynamic speed adjustment based on the static window significantly reduces the LSP flooding time and the number of retransmitted LSPs.
2. When we set the window to 2500, the Speed keep rising because the sending lsps have not received the threshold.

Conclusion

1. The sender should be aware of the capability and processing status of the receiver to increase the flooding time and reduce the number of retransmissions.
2. If only the static window is used to control the transmit rate of the sender, the number of retransmissions can be reduced, but the flooding time will be prolonged.
3. If the window size we set is too small, the flooding time would be too long. If the window size is too large, the upper limit of the window cannot be reached and the flooding speed on the interface keeps rising until Maximum. Adaptive learning is required to obtain an appropriate window size.
4. Dynamic adjustment of the sending speed based on an appropriate window can achieve better flooding time and LSP retransmissions.

Next step

1. Keep on testing and optimizing the IGP flooding process.
2. Any more suggestion?

Thank You