Comparision of Routes Availability of MALN with Four Tree MIN

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Abstract: In this paper, paths available in proposed MIN MALN and existing MIN Four Tree (FT) Network have been evaluatedand compared Permutation Passables which depend on the probability of request generation at the input has been studied.

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Introduction

Identity and incremental permutations passable isa set of N data transfers, all of which are performed simultaneously in the network.

In MALN, paths of length 2 or $\log_2 N$ are available. The Permutations passed due to a fault in any component when P_{req_gen} is 100%, like multiplexer (MUX), SE in stage i (Si) or a demultiplexer (DEMUX) through various path lengths have been evaluated. The percentage of requests getting matured under Non-critical (n-cr) and critical (cr) cases for Identical and Incremental Permutations have been shown in the Table 3.6 and Table 3.7 respectively.

Table1: Identity permutations passable of MALN

Fault	Total Path Length	Total No. of requests matured	Average Path Length	% of requests Matured
No Fault	48	16	3	100
MUX	48	16	3	100
S1 n-cr	42	14	3	87.5
S1 cr	30	12	2.5	75
S2 n-cr	42	14	3	87.5
S2 cr	28	12	2.33	75
S3 n-cr	42	14	3	87.5
S3 cr	28	12	2.33	75
S4	42	14	3	87.5
DEMUX	28	15	2.33	93.75

Table2: Incremental permutations passable of MALN

Fault	Total Path Length	Total No. of requests matured	Average Path Length	% of requests Matured
No Fault	24	8	3	50
MUX	24	8	3	50
S1 n-cr	32	8	4	50
S1 cr	16	4	4	25
S2 n-cr	28	7	4	43
S2 cr	20	5	4	31

S3 n-cr	28	7	4	43
S3 cr	24	6	4	37
S4	24	8	3	50
DEMUX	24	8	3	50

Table 3:**Identity permutations of FT**

Fault	Total Path Lengt	Total No. of requests matured	Average Path Length	% of requests Matured
No Fault	52	16	3.25	100
MUX	52	16	3.25	100
S1 n-cr	46	14	3.28	87.5
S1 cr	40	12	3.33	75
S2 n-cr	42	14	3	87.5
S2 cr	32	12	2.66	75
S3 n-cr	42	14	3	87.5
S3 cr	32	12	2.66	75
S4 n-cr	42	14	3	87.5
S4 cr	32	12	2.66	75
S5	46	14	3.28	87.5
DEMUX	50	15	3.33	93.75

Table 4: Incremental permutations of FT

Fault	Total Path Length	Total No. of requests matured	Average Path Length	% of requests Matured
No Fault	20	4	5	25
MUX	20	4	5	25
S1 n-cr	20	4	5	25
S1 cr	20	4	5	25
S2 n-cr	10	2	5	12
S2 cr	0	0	0	0
S3 n-cr	10	2	5	12
S3 cr	0	0	0	0
S4 n-cr	10	2	5	12
S4 cr	0	0	0	0
S5	20	4	5	25
DEMUX	20	4	5	25

ISSN: 2321-8169
198 - 201

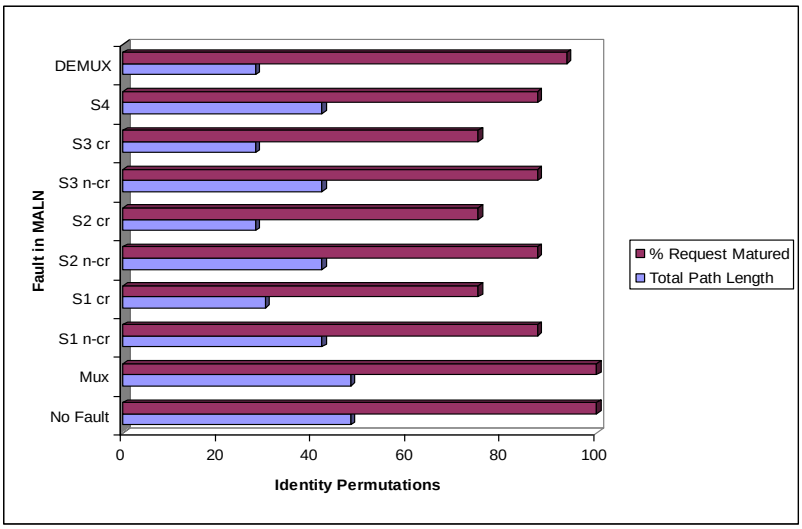

Fig 1: Identity permutations passable in MALN

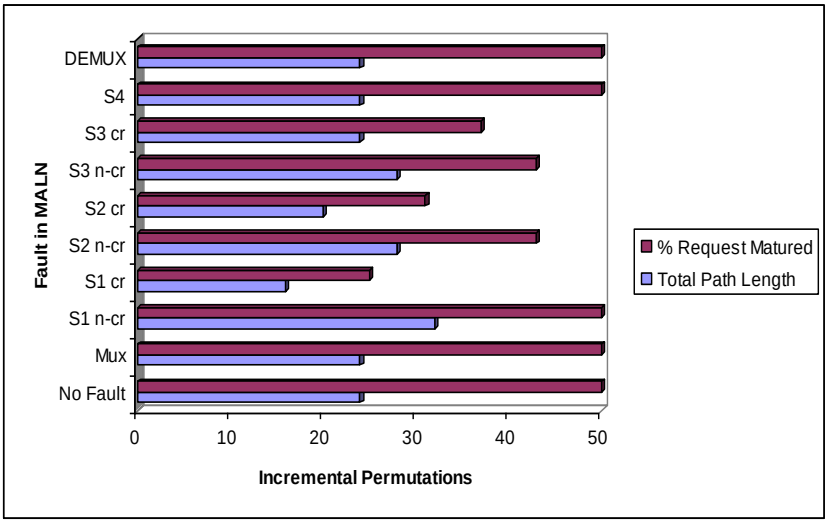

Fig 2: Incremental permutations passable in MALN

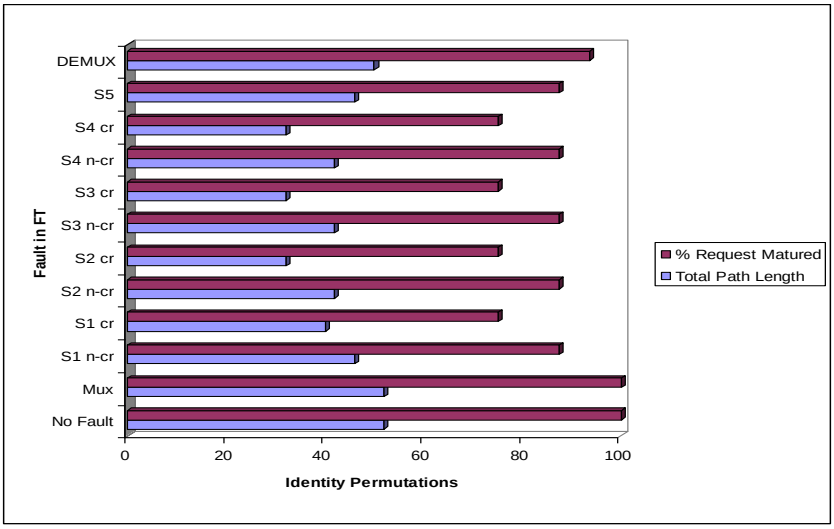

Fig 3: Identity permutations passable in FT

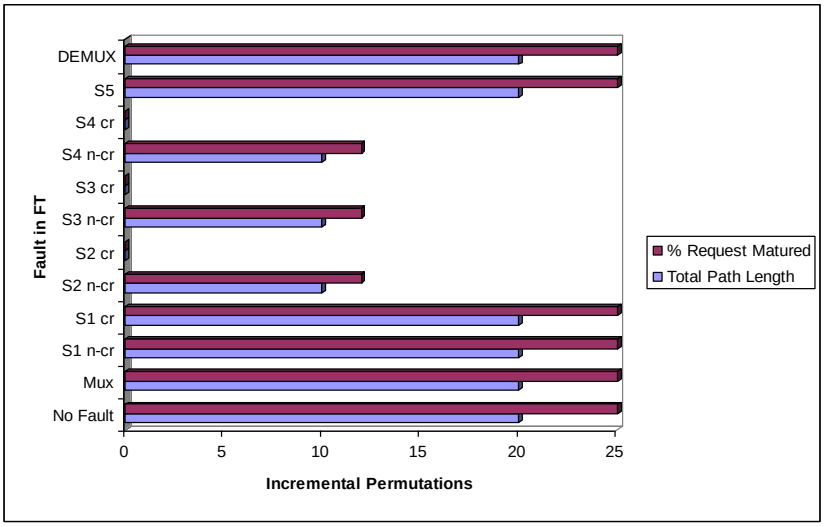

Fig 4: Incremental permutations passable in FT

Conclusion

By comparing the Fig 1 and Fig 2 with Fig 3 and Fig 4, it is clear that proposed MALN MIN shows improvement in the Identity and Incremental routing capability as compared to existing Four Tree MIN. The proposed MIN is comparable to FT in case of Identity Permutations, but shows significant improvement when the packets are delivered in Incremental Permutations. The average path length in the proposed MIN is better in Fault-free and fault conditions. More number of requests is getting matured in the proposed MIN under the faults in the intermediate stages.

References

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