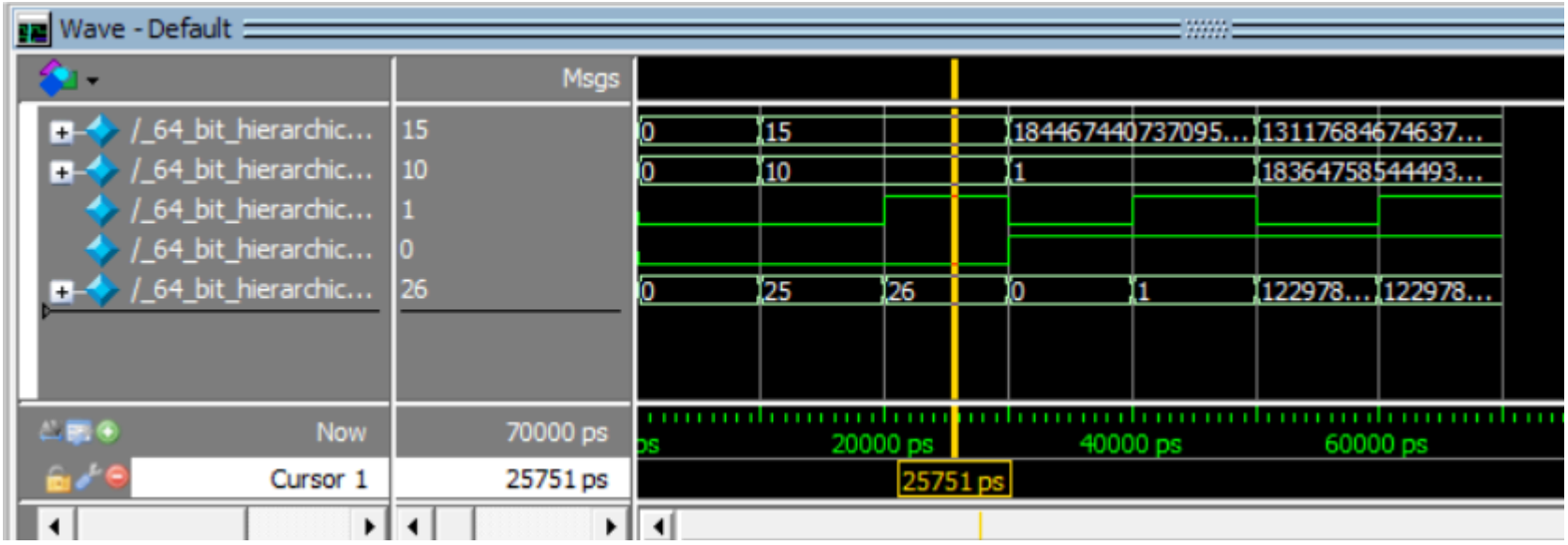
1- 64-bit Ling adder:

Output and wave simulation

```
# At time                0, a =                  0, b =                  0, cin = 0, sum =                  0, cout = 0, {cout, sum} =                  0
# At time            10000, a =                 15, b =                 10, cin = 0, sum =                 25, cout = 0, {cout, sum} =                 25
# At time            20000, a =                 15, b =                 10, cin = 1, sum =                 26, cout = 0, {cout, sum} =                 26
# At time            30000, a = 18446744073709551615, b =                  1, cin = 0, sum =                  0, cout = 1, {cout, sum} = 18446744073709551616
# At time            40000, a = 18446744073709551615, b =                  1, cin = 1, sum =                  1, cout = 1, {cout, sum} = 18446744073709551617
# At time            50000, a =  1311768467463790320, b = 18364758544493064720, cin = 0, sum =  1229782938247303424, cout = 1, {cout, sum} = 19676527011956855040
# At time            60000, a =  1311768467463790320, b = 18364758544493064720, cin = 1, sum =  1229782938247303425, cout = 1, {cout, sum} = 19676527011956855041
```

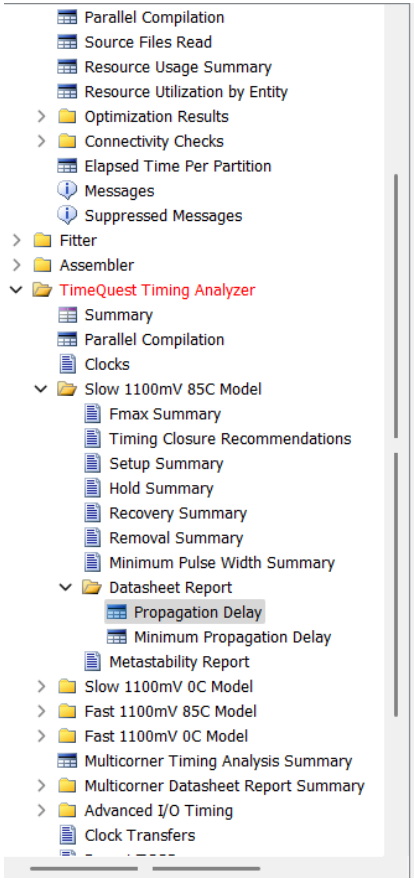


FPGA Utilization and Delay

Analysis & Synthesis Resource Usage Summary

	Resource	Usage
1	Estimate of Logic utilization (ALMs needed)	119
2		
3	Combinational ALUT usage for logic	197
1	-- 7 input functions	0
2	-- 6 input functions	41
3	-- 5 input functions	64
4	-- 4 input functions	42
5	-- <=3 input functions	50
4		
5	Dedicated logic registers	0
6		
7	I/O pins	194
8	Total DSP Blocks	0
9	Maximum fan-out node	_64_bit_Ling_CLA:lcla|_16_bit_Ling_CLA:lcla1|four_bit_Ling_CLA:lcla5|G~5
10	Maximum fan-out	11
11	Total fan-out	1113
12	Average fan-out	1.90

critical path delay is 11.789

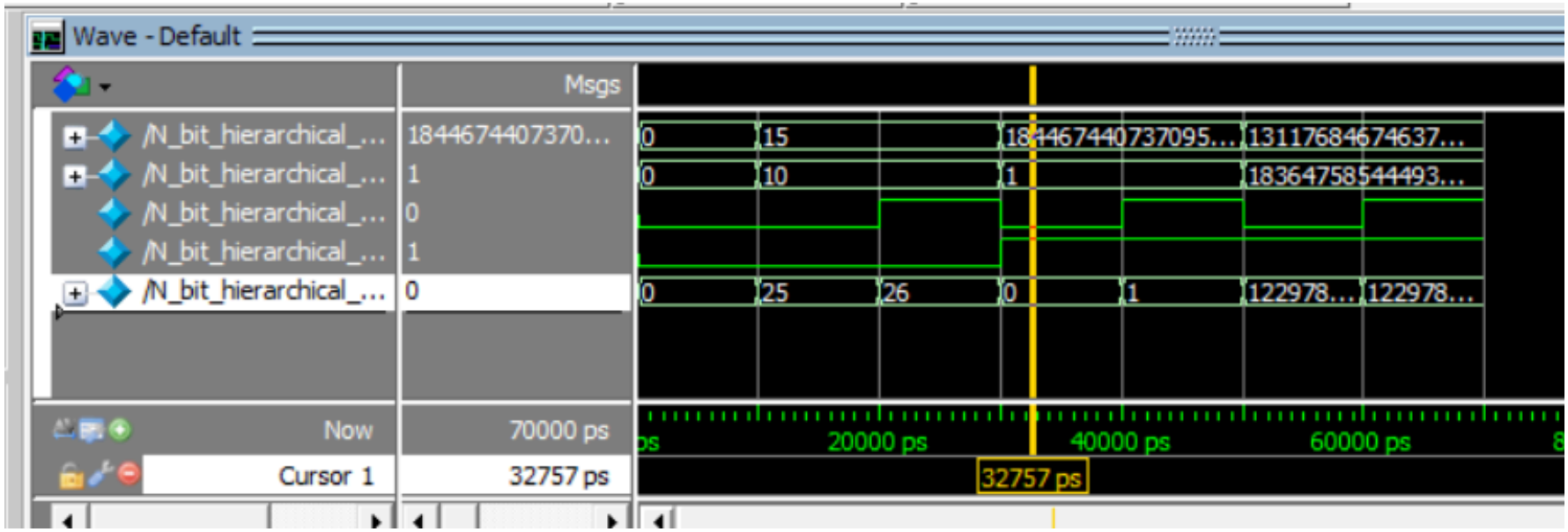


	Input Port	Output Port	RR	RF	FR	FF
1	a[0]	cout	11.789	11.531	11.264	12.294
2	a[0]	s[0]	8.779	8.947	9.163	9.323
3	a[0]	s[1]	8.703	8.815	9.087	9.191
4	a[0]	s[2]	7.628	7.952	7.995	8.301
5	a[0]	s[3]	9.376	9.647	9.738	9.995
6	a[0]	s[4]	10.815	11.034	11.241	11.411
7	a[0]	s[5]	11.130	11.506	11.513	11.907
8	a[0]	s[6]	11.195	11.453	11.663	11.903
9	a[0]	s[7]	11.909	12.274	12.364	12.721
10	a[0]	s[8]	10.878	11.085	11.259	11.466
11	a[0]	s[9]	9.359	9.520	9.740	9.900
12	a[0]	s[10]	10.388	11.019	10.761	11.392
13	a[0]	s[11]	9.776	10.234	10.149	10.607
14	a[0]	s[12]	11.319	11.660	11.692	12.033
15	a[0]	s[13]	11.170	11.348	11.543	11.721
16	a[0]	s[14]	11.521	11.724	11.894	12.097
17	a[0]	s[15]	11.492	11.690	11.865	12.063
18	a[0]	s[16]	10.542	10.893	10.742	11.044
19	a[0]	s[17]	11.501	12.036	11.678	12.222
20	a[0]	s[18]	10.961	11.201	11.139	11.388
21	a[0]	s[19]	12.767	13.131	12.944	13.316
22	a[0]	s[20]	11.562	11.999	11.668	12.056
23	a[0]	s[21]	11.436	11.669	11.378	11.736
24	a[0]	s[22]	15.180	16.324	15.278	16.416
25	a[0]	s[23]	12.426	12.878	12.556	13.054
26	a[0]	s[24]	11.500	11.931	11.639	12.079
27	a[0]	s[25]	11.816	12.379	11.954	12.525
28	a[0]	s[26]	11.986	12.302	12.305	12.528
29	a[0]	s[27]	12.952	13.657	13.173	13.913
30	a[0]	s[28]	11.427	11.743	11.685	11.993
31	a[0]	s[29]	11.351	11.680	11.595	11.959
32	a[0]	s[30]	12.400	13.081	12.758	13.314
33	a[0]	s[31]	12.023	12.550	12.226	12.703
34	a[0]	s[32]	12.287	12.503	12.401	12.582

1- N-bit Ling adder:

Output and wave simulation

```
# At time                0, a =                  0, b =                  0, cin = 0, sum =                  0, cout = 0, {cout,sum} =                  0
# At time            10000, a =                 15, b =                 10, cin = 0, sum =                 25, cout = 0, {cout,sum} =                 25
# At time            20000, a =                 15, b =                 10, cin = 1, sum =                 26, cout = 0, {cout,sum} =                 26
# At time            30000, a = 18446744073709551615, b =                  1, cin = 0, sum =                  0, cout = 1, {cout,sum} = 18446744073709551616
# At time            40000, a = 18446744073709551615, b =                  1, cin = 1, sum =                  1, cout = 1, {cout,sum} = 18446744073709551617
# At time            50000, a =  1311768467463790320, b = 18364758544493064720, cin = 0, sum =  1229782938247303424, cout = 1, {cout,sum} = 19676527011956855040
# At time            60000, a =  1311768467463790320, b = 18364758544493064720, cin = 1, sum =  1229782938247303425, cout = 1, {cout,sum} = 19676527011956855041
```



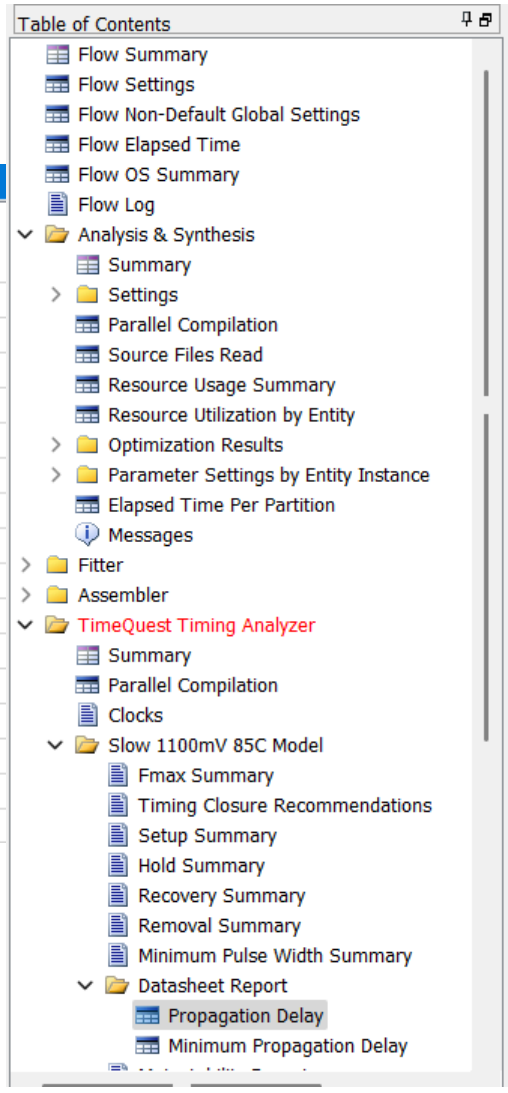
FPGA Utilization and Delay

Analysis & Synthesis Resource Usage Summary

	Resource	Usage
1	Estimate of Logic utilization (ALMs needed)	84
2		
3	Combinational ALUT usage for logic	133
1	-- 7 input functions	0
2	-- 6 input functions	34
3	-- 5 input functions	23
4	-- 4 input functions	6
5	-- <=3 input functions	70
4		
5	Dedicated logic registers	0
6		
7	I/O pins	194
8	Total DSP Blocks	0
9	Maximum fan-out node	N_bit_SUMgenerator:sg|s[2]~0
10	Maximum fan-out	4
11	Total fan-out	778
12	Average fan-out	1.49

critical path delay is 37.125

مش عارف لي ضرب كده



Propagation Delay

	Input Port	Output Port	RR	RF	FR	FF
1	a[0]	cout	37.125			37.577
2	a[0]	s[0]	12.870	14.032	13.105	14.273
3	a[0]	s[1]	10.471	10.597	10.706	10.839
4	a[0]	s[2]	10.898	11.036	11.079	11.263
5	a[0]	s[3]	11.326	11.478	11.537	11.681
6	a[0]	s[4]	11.633	11.775	11.780	11.968
7	a[0]	s[5]	11.883	12.171	12.205	12.368
8	a[0]	s[6]	11.483	11.615	11.647	11.729
9	a[0]	s[7]	14.520	14.660	14.080	14.228
10	a[0]	s[8]	15.229	15.370	14.745	14.892
11	a[0]	s[9]	15.639	15.903	15.155	15.425
12	a[0]	s[10]	16.120	16.391	15.628	15.913
13	a[0]	s[11]	14.194	14.222	13.712	13.748
14	a[0]	s[12]	16.176	16.455	15.733	15.967
15	a[0]	s[13]	15.292	15.521	14.776	15.011
16	a[0]	s[14]	15.083	15.244	14.558	14.768
17	a[0]	s[15]	15.935	16.253	15.421	15.690
18	a[0]	s[16]	17.732	17.929	17.051	17.373
19	a[0]	s[17]	17.344	17.434	16.470	16.568
20	a[0]	s[18]	18.443	18.690	17.525	17.778
21	a[0]	s[19]	18.207	18.332	17.289	17.421
22	a[0]	s[20]	18.276	18.485	17.417	17.577
23	a[0]	s[21]	18.445	18.588	17.574	17.711
24	a[0]	s[22]	22.354	23.318	21.495	22.414
25	a[0]	s[23]	19.344	19.637	18.408	18.747
26	a[0]	s[24]	18.646	18.754	17.746	17.840
27	a[0]	s[25]	27.902	29.710	27.812	29.755
28	a[0]	s[26]	24.503	24.644	24.473	24.712
29	a[0]	s[27]	23.880	24.022	24.006	24.172
30	a[0]	s[28]	23.721	24.215	23.833	24.318
31	a[0]	s[29]	24.732	24.885	24.844	24.987
32	a[0]	s[30]	24.988	25.116	25.166	25.284
33	a[0]	s[31]	24.996	25.217	25.175	25.386
34	a[0]	s[32]	26.823	27.036	26.961	27.167