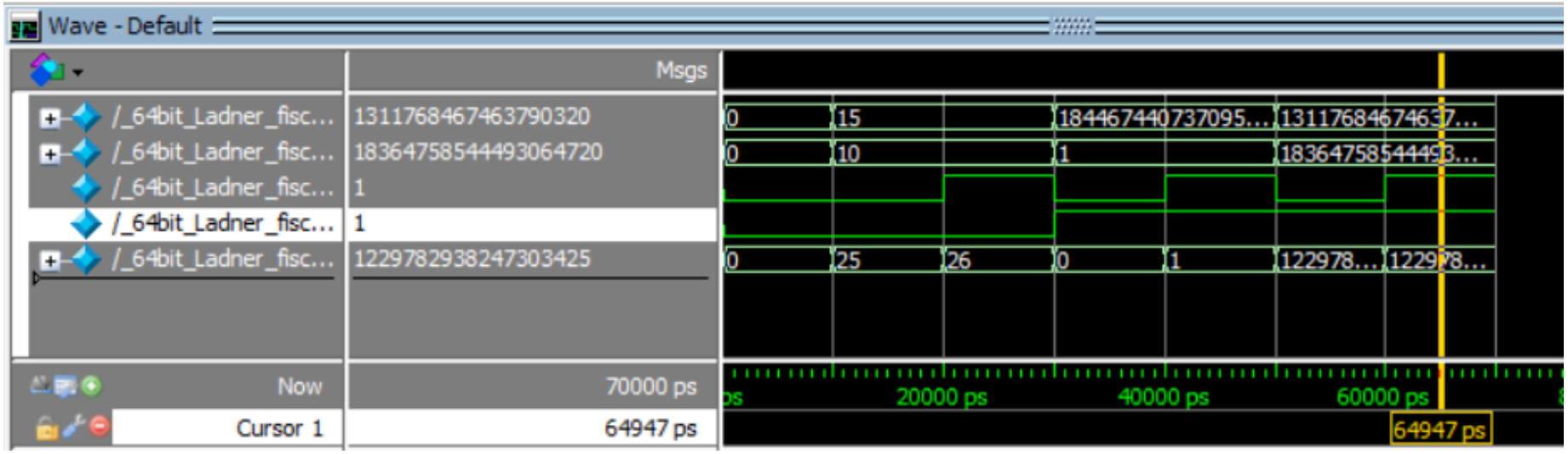
1- 64-bit Ladner_Fischer adder:

Output and wave simulation

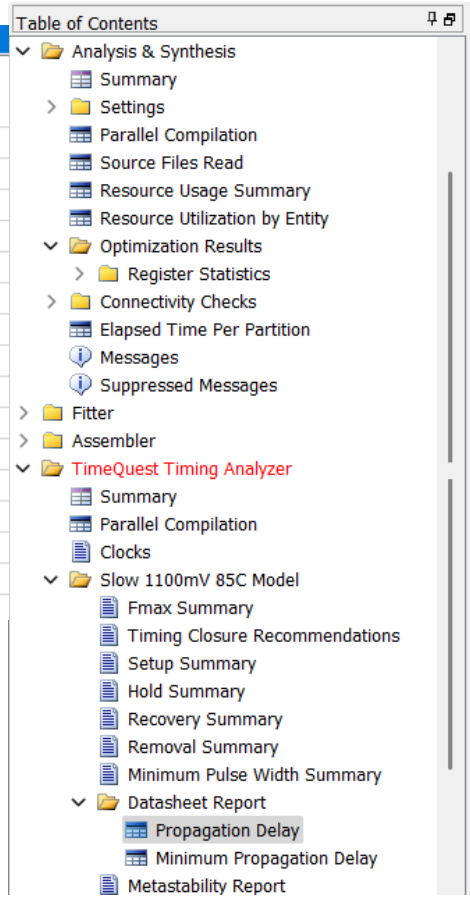
```
# At time                0, a =                  0, b =                  0, cin = 0, sum =                  0, cout = 0, {cout,sum} =                  0
# At time            10000, a =                 15, b =                 10, cin = 0, sum =                 25, cout = 0, {cout,sum} =                 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)	102
2		
3	Combinational ALUT usage for logic	171
1	-- 7 input functions	0
2	-- 6 input functions	32
3	-- 5 input functions	35
4	-- 4 input functions	36
5	-- <=3 input functions	68
4		
5	Dedicated logic registers	0
6		
7	I/O pins	194
8	Total DSP Blocks	0
9	Maximum fan-out node	_64bit_Lander_fischer_network:lfn|carry_compine:a[0].cp1|G~0
10	Maximum fan-out	6
11	Total fan-out	939
12	Average fan-out	1.68



Propagation Delay

	Input Port	Output Port	RR	RF	FR	FF
1	a[4]	s[61]	35.522	37.046	35.712	37.236
2	a[3]	s[61]	35.502	37.026	35.653	37.177
3	a[5]	s[61]	35.495	37.019	35.669	37.193
4	a[0]	s[61]	35.407	36.945	38.217	39.741
5	b[5]	s[61]	35.368	36.892	35.576	37.100
6	b[4]	s[61]	35.356	36.880	35.504	37.028
7	b[3]	s[61]	35.307	36.831	35.812	37.336
8	b[2]	s[61]	35.147	36.671	35.859	37.383
9	b[8]	s[61]	34.936	36.460	35.169	36.693
10	a[8]	s[61]	34.904	36.428	35.022	36.546
11	a[2]	s[61]	34.811	36.335	35.425	36.949
12	a[4]	s[63]	33.915	34.112	34.105	34.302
13	a[3]	s[63]	33.895	34.092	34.046	34.243
14	a[5]	s[63]	33.888	34.085	34.062	34.259
15	a[4]	s[60]	33.818	34.091	34.008	34.281
16	a[3]	s[60]	33.798	34.071	33.949	34.222
17	a[5]	s[60]	33.791	34.064	33.965	34.238
18	a[0]	s[63]	33.764	33.968	36.610	36.807
19	b[5]	s[63]	33.761	33.958	33.969	34.166
20	b[4]	s[63]	33.749	33.946	33.897	34.094
21	a[0]	s[60]	33.733	33.999	36.513	36.786
22	b[3]	s[63]	33.700	33.897	34.205	34.402
23	a[0]	cout	33.693			36.794
24	b[5]	s[60]	33.664	33.937	33.872	34.145
25	b[4]	s[60]	33.652	33.925	33.800	34.073
26	b[3]	s[60]	33.603	33.876	34.108	34.381
27	a[4]	s[62]	33.573	33.720	33.763	33.910
28	b[0]	s[61]	33.572	35.110	35.779	37.303
29	a[3]	s[62]	33.553	33.700	33.704	33.851
30	a[5]	s[62]	33.546	33.693	33.720	33.867

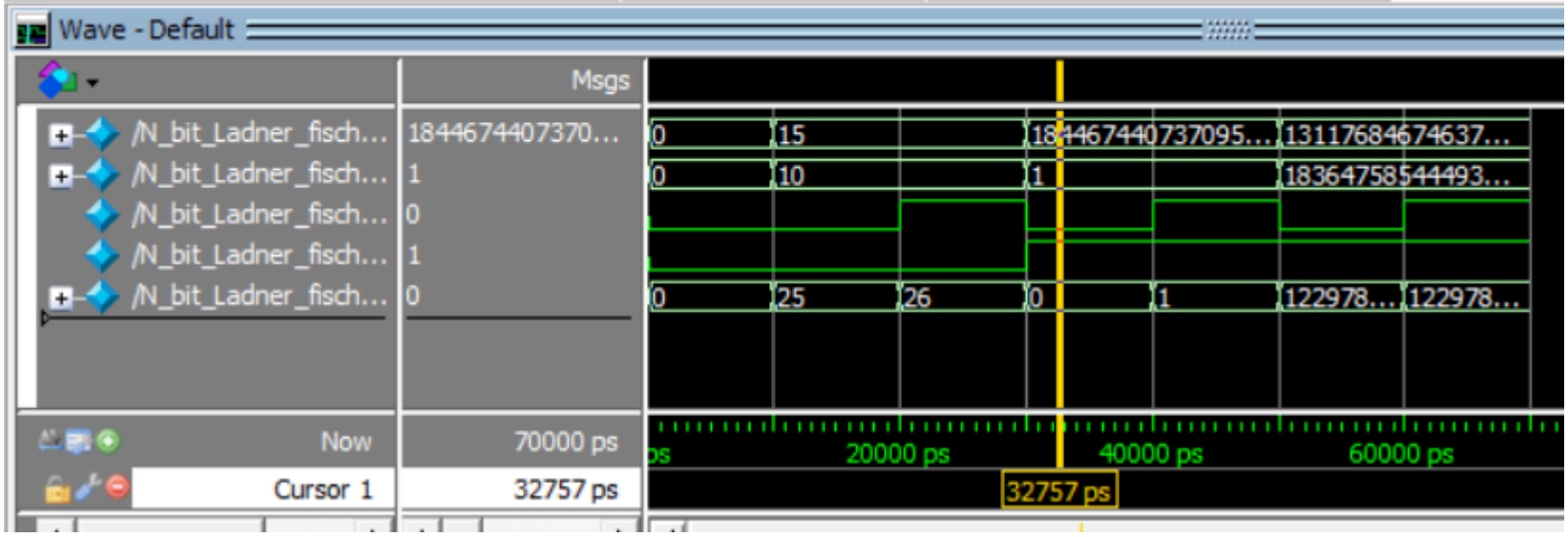
critical path delay is 35.522

It is too large because it must be smaller than CLA adder and Ling adder but I don’t know where is the problem

2- N-bit Ladner_Fischer 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
```

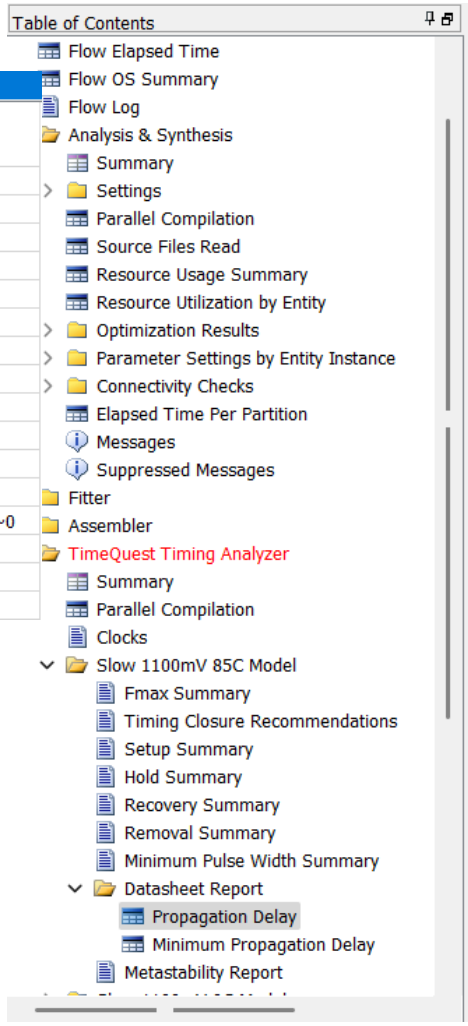


FPGA Utilization and Delay

Analysis & Synthesis Resource Usage Summary

	Resource	Usage
1	Estimate of Logic utilization (ALMs needed)	102
2		
3	Combinational ALUT usage for logic	171
1	-- 7 input functions	0
2	-- 6 input functions	32
3	-- 5 input functions	35
4	-- 4 input functions	36
5	-- <=3 input functions	68
4		
5	Dedicated logic registers	0
6		
7	I/O pins	194
8	Total DSP Blocks	0
9	Maximum fan-out node	N_bit_Ladner_fischer_network:lfn|carry_compine:a[6].b[32].cc|G~0
10	Maximum fan-out	6
11	Total fan-out	939
12	Average fan-out	1.68

critical path delay is 31.427



Propagation Delay

	Input Port	Output Port	RR	RF	FR	FF
1	a[2]	s[60]	31.427	32.839	31.941	33.353
2	a[2]	s[62]	31.155	32.078	31.669	32.592
3	a[2]	s[59]	31.109	32.519	31.623	33.033
4	b[0]	s[60]	30.552	31.958	31.608	33.020
5	b[0]	s[59]	30.250	31.625	31.290	32.700
6	b[0]	s[62]	30.231	31.160	31.336	32.259
7	a[4]	s[60]	29.684	31.096	29.997	31.409
8	b[3]	s[60]	29.652	31.064	30.002	31.414
9	a[2]	s[63]	29.576	29.902	30.090	30.416
10	a[2]	s[54]	29.469	30.331	29.983	30.845
11	a[5]	s[60]	29.441	30.853	29.961	31.373
12	b[4]	s[60]	29.430	30.842	29.617	31.029
13	a[4]	s[62]	29.412	30.335	29.725	30.648
14	b[3]	s[62]	29.380	30.303	29.730	30.653
15	a[4]	s[59]	29.366	30.776	29.679	31.089
16	b[3]	s[59]	29.334	30.744	29.684	31.094
17	a[5]	s[62]	29.169	30.092	29.689	30.612
18	b[4]	s[62]	29.158	30.081	29.345	30.268
19	a[5]	s[59]	29.123	30.533	29.643	31.053
20	b[4]	s[59]	29.112	30.522	29.299	30.709
21	b[2]	s[60]	28.927	30.339	29.448	30.860
22	b[5]	s[60]	28.902	30.314	29.218	30.630
23	a[3]	s[60]	28.871	30.283	29.091	30.503
24	a[0]	s[60]	28.664	30.070	29.686	31.098
25	b[2]	s[62]	28.655	29.578	29.176	30.099
26	b[0]	s[63]	28.653	28.986	29.757	30.083
27	b[5]	s[62]	28.630	29.553	28.946	29.869
28	b[2]	s[59]	28.609	30.019	29.130	30.540
29	b[0]	s[54]	28.605	29.418	29.650	30.512
30	a[3]	s[62]	28.599	29.522	28.819	29.742
31	b[5]	s[59]	28.584	29.994	28.900	30.310
32	a[3]	s[59]	28.553	29.963	28.773	30.183
33	a[2]	cout	28.528	29.072	28.318	29.586
34	a[2]	s[61]	28.479	28.646	28.993	29.160