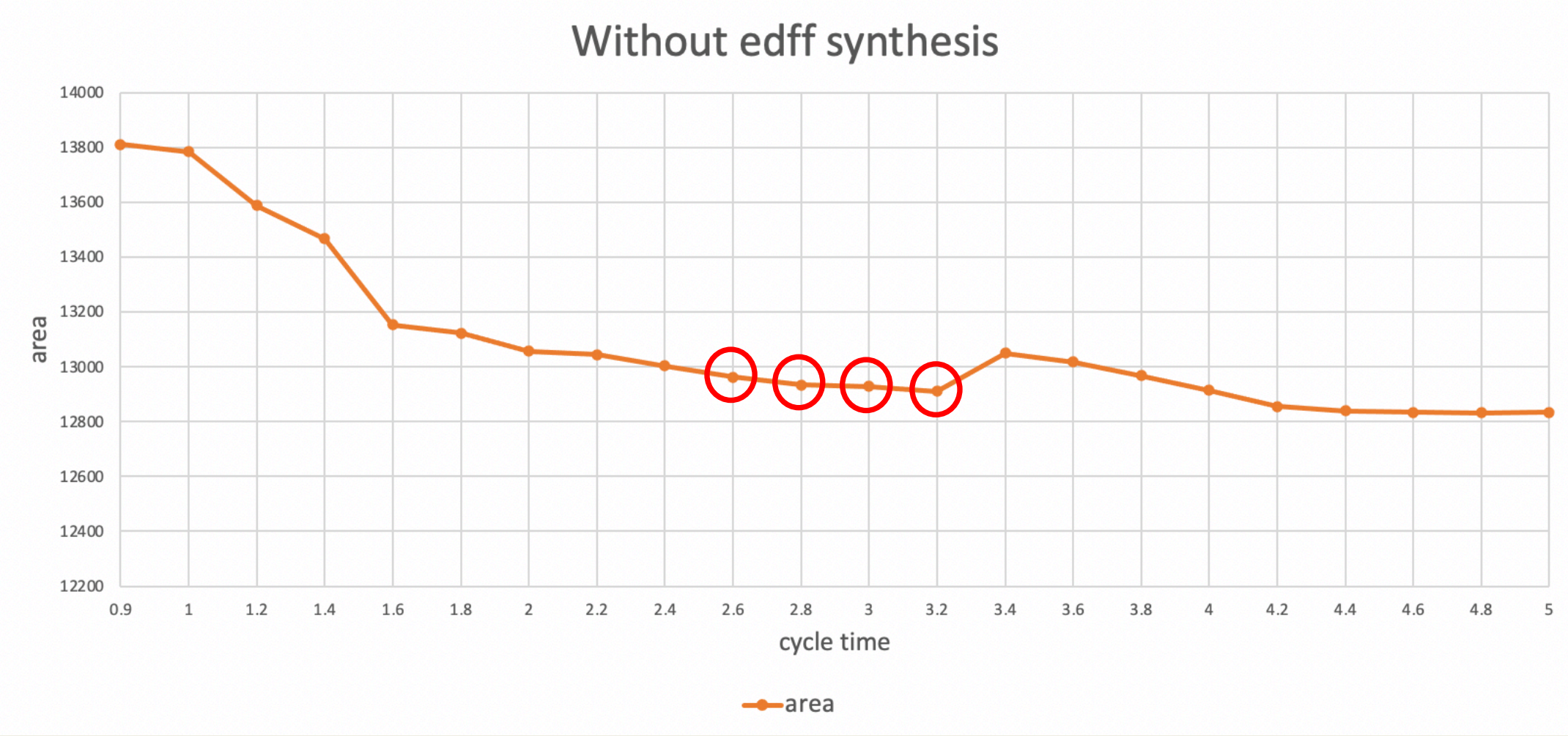
5/6 MEETING

Analyze the processor with EDFF

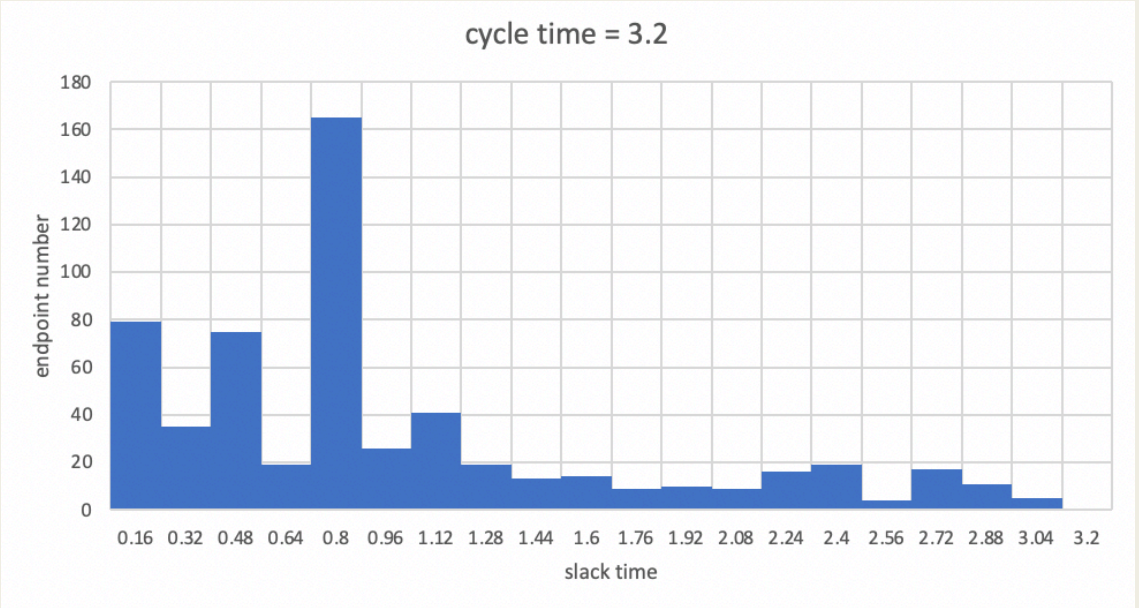
- Can’t replace the flip-flop related to data memory.
- The number of EDFF may be around 100~200(586).
- Pattern 1 : general
- Pattern 2 : load, several ALU operation, store
- Pattern 3 : load , one ALU operation, store

Choose proper cycle time to add EDFF



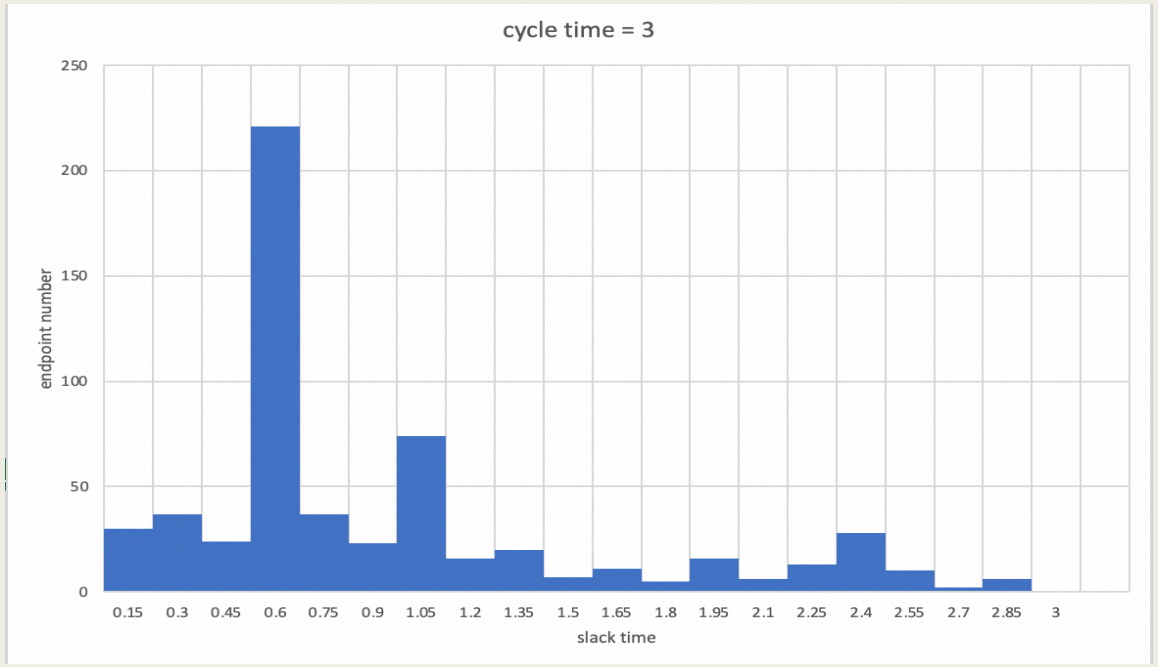
Experiment : CT=3.2 ns

Padding ratio	Padding length	Pattern-1 poff/limit	Pattern-2 poff/limit	Pattern-3 poff/limit	EDFF number
NONE	NONE	1.3 ns	1.5 ns	2.9 ns	0
20%	20%	failed	failed	failed	258
15%	20%	2.1/1.3(5)	1.9/1.6(4)	2.9	154
15%	25%	2.1/1.3(3)	2/1.8(5)	2.9	154
15%	30%	2.1/1.3(6)	1.9/1.6(4)	2.9	154



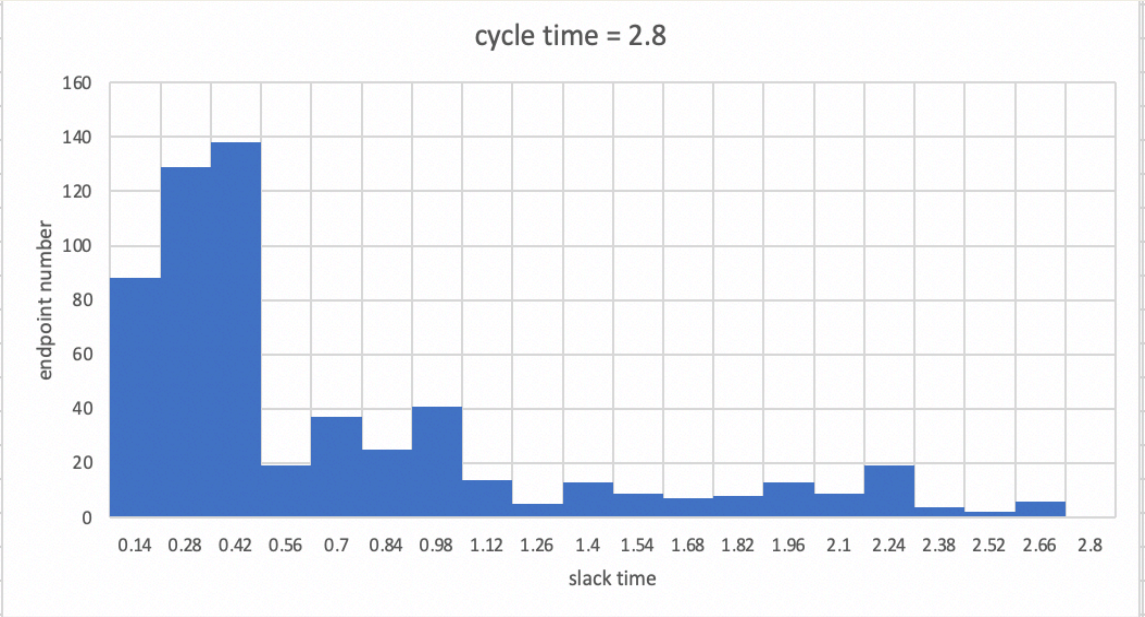
Experiment : CT=3.0 ns

Padding ratio	Padding length	Pattern-1 poff/limit	Pattern-2 poff/limit	Pattern-3 poff/limit	EDFF number
NONE	NONE	1.6 ns	1.3 ns	2.8 ns	0
15%	20%	1.8/1.6(1)	1.6/1.5(8)	2.8	62
15%	25%	1.9/1.6(2)	1.8/1.6(8)	2.8	62
15%	30%	1.9/1.6(1)	1.6/1.5(8)	2.8	62



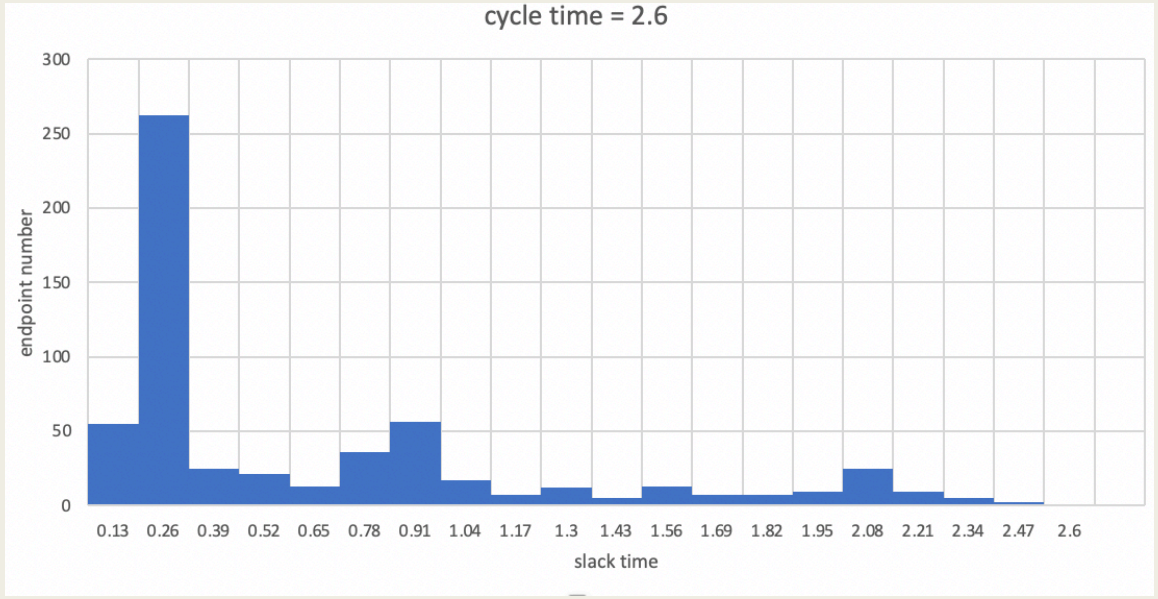
Experiment : CT=2.8 ns

Padding ratio	Padding length	Pattern-1 poff/limit	Pattern-2 poff/limit	Pattern-3 poff/limit	EDFF number
NONE	NONE	1.7 ns	1.4 ns	2.6 ns	0
10%	10%	failed	failed	failed	161
8%	20%	1.8/1.7(1)	1.6/1.4(5)	2.6	108
8%	25%	1.9/1.7(1)	1.8/1.6(3)	2.6	108
8%	30%	1.9/1.7(1)	1.6/1.4(4)	2.6	108

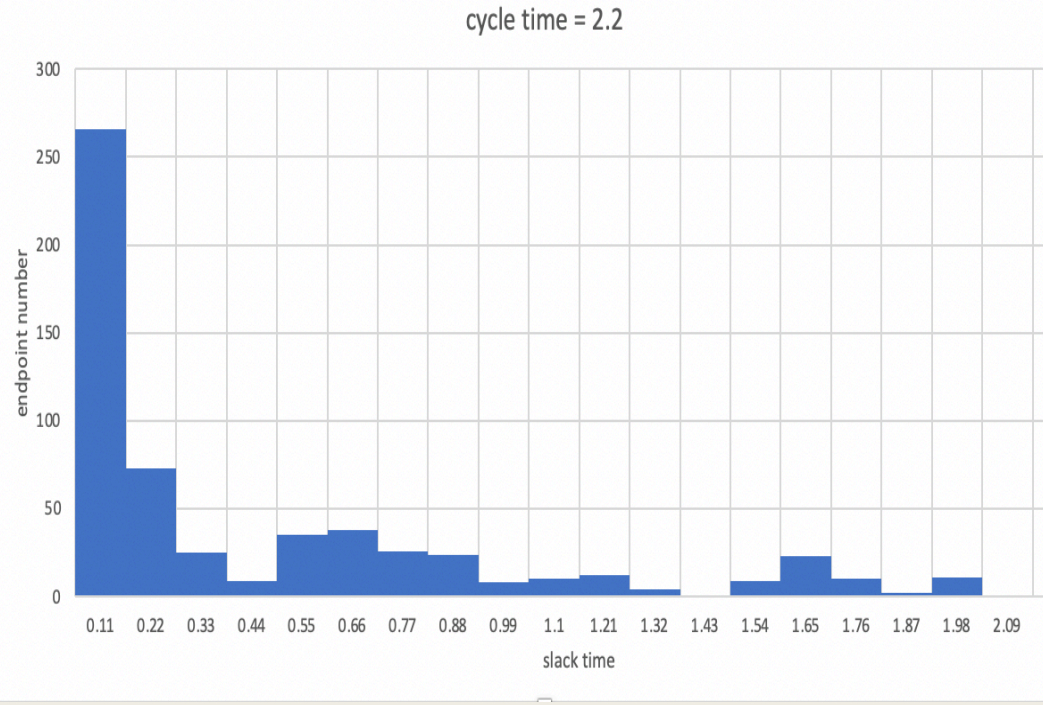


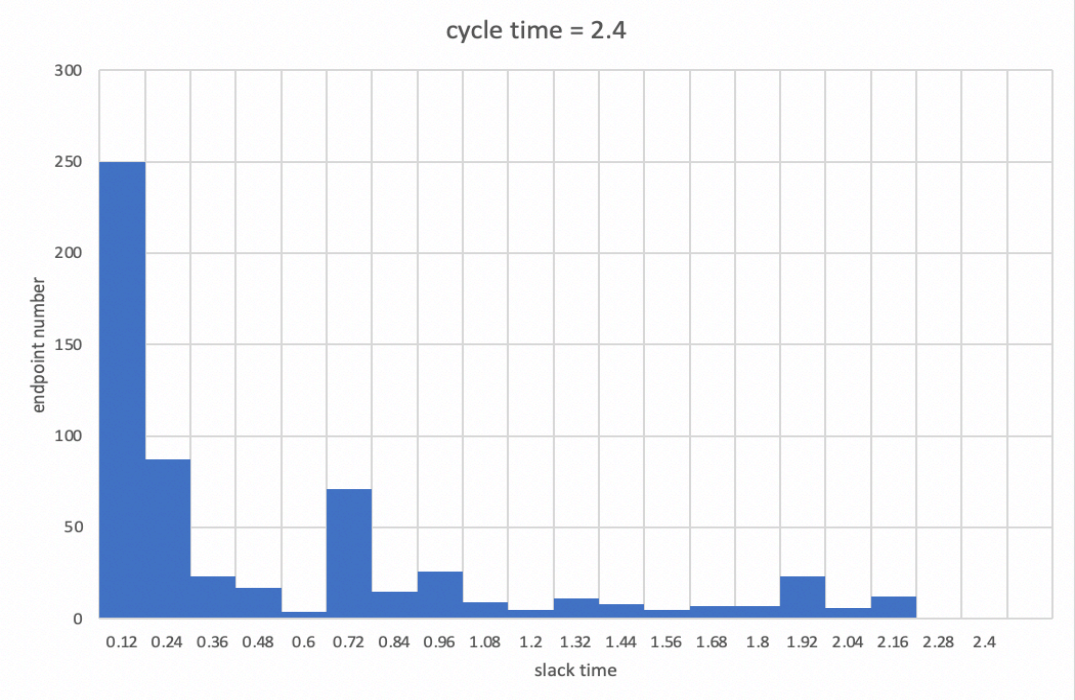
Experiment : CT=2.6 ns

Padding ratio	Padding length	Pattern-1 poff/limit	Pattern-2 poff/limit	Pattern-3 poff/limit	EDFF number
7%	20%	failed	failed	failed	61
6%	20%	failed	failed	failed	61

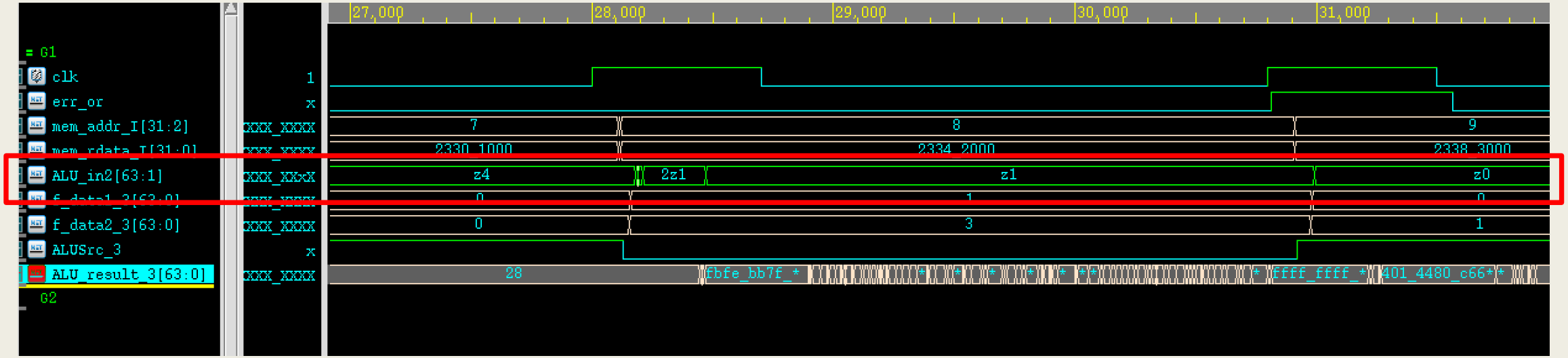


Analysis : slack time distribution





Problem： ALU_in2會有z出現




```
assign  ALU_in2 = (ALUSrc_3)? {{32{immediate_3[31]}},immediate_3} : f_data2_3;
assign  PC_4_out_3 = {32'b0,mem_addr_I_o, 2'b0} + 4;
assign  PC_imm_out = {32'b0,mem_addr_I_o, 2'b0} + {{32{immediate_3[31]}},immediate_3};
assign  Jalr_adder_out = f_data1_3 + {{32{immediate_3[31]}},immediate_3};
assign  nxt_mem_addr_I = (Branch || Jal_3)? (PC_imm_out-8) : (Jalr_3) ? Jalr_adder_out : PC_4_out_3;
```