

# CB resource usage

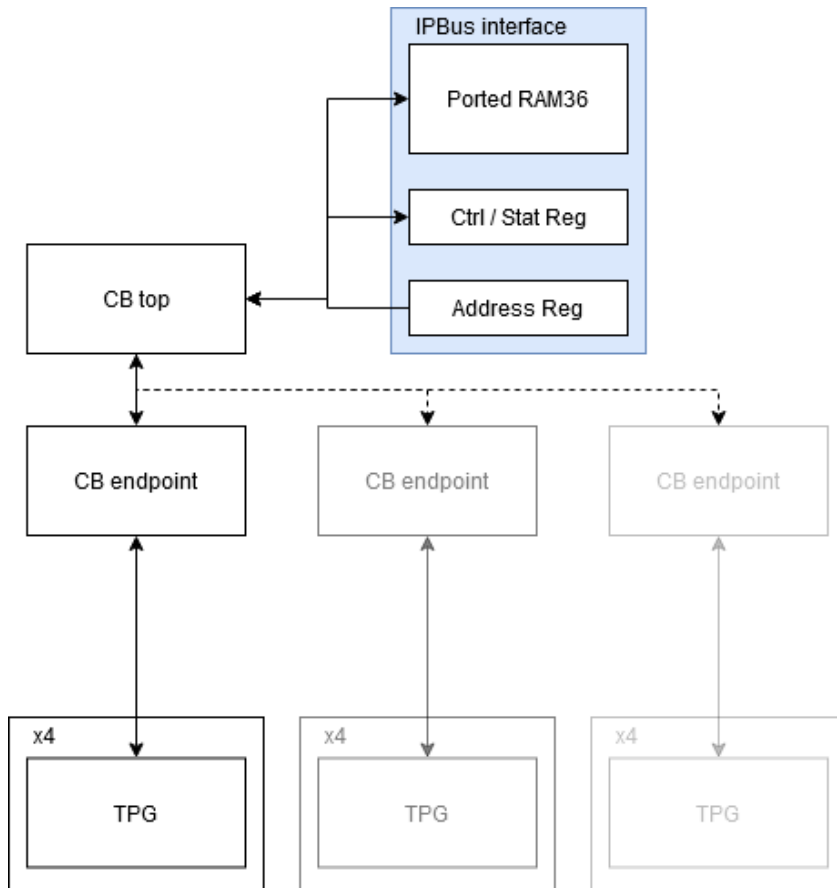
William Wulff

Upstream DAQ

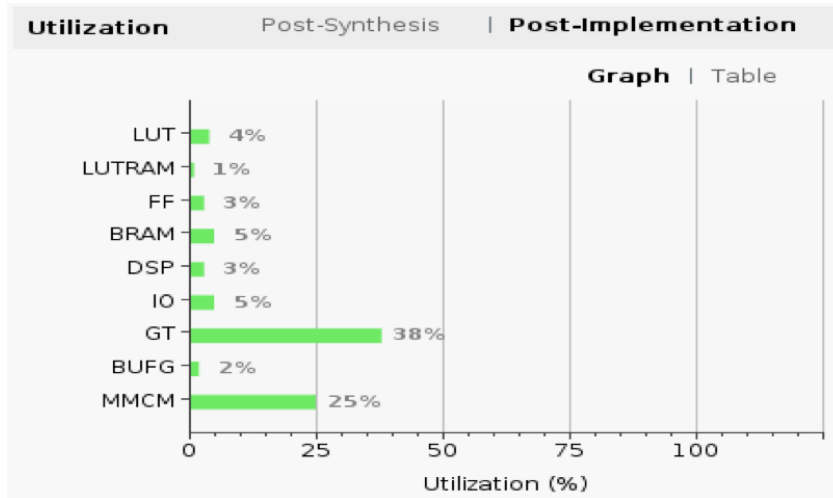
28-01-2021

# Config Block integration

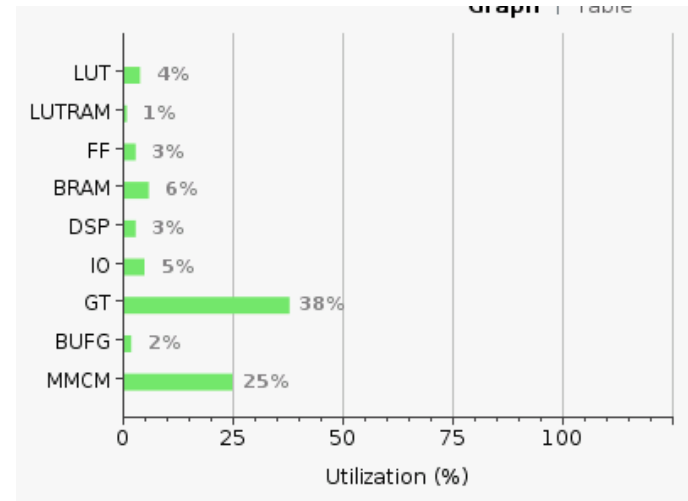
- Integration done for the tpngen-1 fibre project
- ZCU based
- One processing chain
- Ipbus interface + CB top + CB endpoint



# Before



# After



Utilization Post-Synthesis | Post-Implementation

Graph | Table

Resource	Utilization	Available	Utilization %
LUT	10010	274080	3.65
LUTRAM	322	144000	0.22
FF	17905	548160	3.27
BRAM	42.50	912	4.66
DSP	72	2520	2.86
IO	15	328	4.57
GT	9	24	37.50
BUFG	9	404	2.23
MMCM	1	4	25.00

Resource	Utilization	Available	Utilization %
LUT	10410	274080	3.80
LUTRAM	322	144000	0.22
FF	18089	548160	3.30
BRAM	58.50	912	6.41
DSP	72	2520	2.86
IO	15	328	4.57
GT	9	24	37.50
BUFG	9	404	2.23
MMCM	1	4	25.00

# Specifics

Instance	Module	Total LUTs	Logic LUTs	FFs	RAMB36
cb_toplevel	conf_block_top	282 (0.10%)	282 (0.10%)	160 (0.03%)	16 (1.75%)
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(cb_toplevel)	conf_block_top	38 (0.01%)	38 (0.01%)	0 (0.00%)	0 (0.00%)
CB_BACKEND	cb_backend	101 (0.04%)	101 (0.04%)	59 (0.01%)	0 (0.00%)
fabric	ipbus_fabric_sel__parameterized0__1	33 (0.01%)	33 (0.01%)	0 (0.00%)	0 (0.00%)
mem1	ipbus_ported_dpram36	80 (0.03%)	80 (0.03%)	17 (0.01%)	16 (1.75%)
reg	ipbus_syncreg_v__parameterized1	30 (0.01%)	30 (0.01%)	52 (0.01%)	0 (0.00%)
slave1	ipbus_reg_v__parameterized0	1 (0.01%)	1 (0.01%)	32 (0.01%)	0 (0.00%)

Instance	Module	Total LUTs	Logic LUTs	FFs	RAMB36
endpoint	cb_endpoint	40 (0.01%)	40 (0.01%)	42 (0.01%)	0 (0.00%)
endpoint	cb_endpoint	40 (0.01%)	40 (0.01%)	42 (0.01%)	0 (0.00%)

# Integration summary

- An increase of
  - 400 LUTs
  - 184 FFs
  - 16 BRAMs
- Backend and Endpoint close to expected utilisation
- IPBus component accounts for roughly 50% of 1-link build

# Can we do better?

- Some options for optimisation of logic remain
  - Will most likely only result in minor gains
- Memory usage is high
  - Currently uses more memory than needed (14 bits)
  - CB is designed with the assumption that all parameters need to be stored internally. Is this needed?

# Virtual memory

