$m-$split
$\Rightarrow$ split n
to overlap

A

data on rank 0	A_0
	A_1
	A_2
	A_3

$\times$

B

data on rank 0			
B_0	B_1	B_2	B_3

$=$

C

data on rank 0	C_{00}	C_{01}	C_{02}	C_{03}
	C_{10}	C_{11}	C_{12}	C_{13}
	C_{20}	C_{21}	C_{22}	C_{23}
	C_{30}	C_{31}	C_{32}	C_{33}
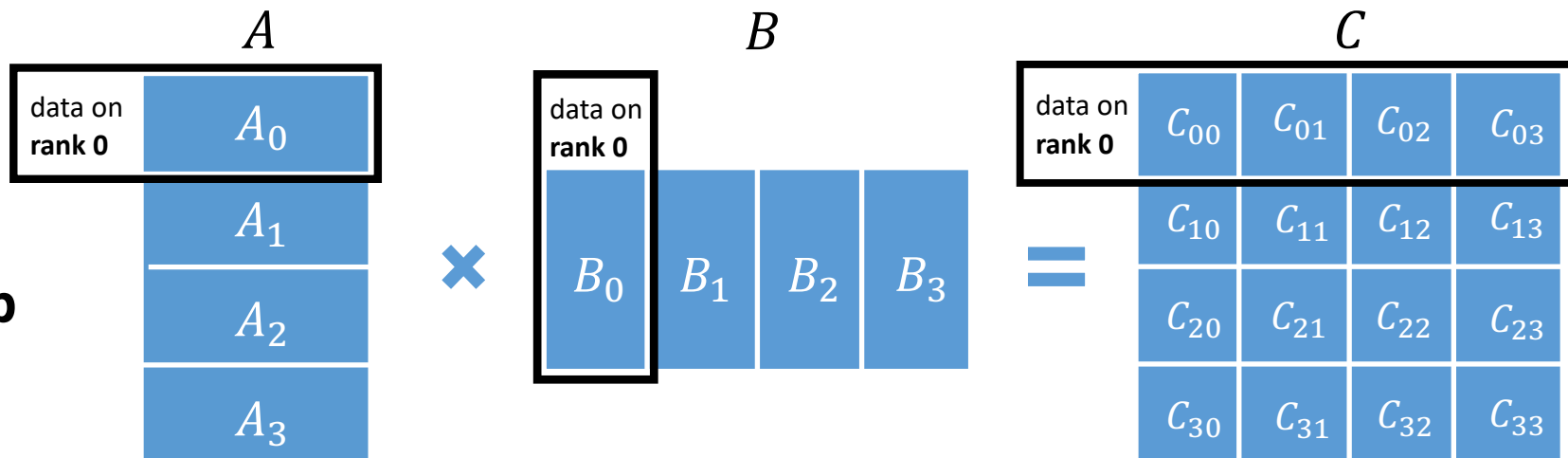
rank 0:

with overlap of communication and computation

comp. thread:

main thread:

$C_{00} = A_0 B_0$	$C_{01} = A_0 B_1$	$C_{02} = A_0 B_2$	$C_{03} = A_0 B_3$

comm. thread:

B_1	B_2	B_3

main thread:

All-gather(B_0, B_1, B_2, B_3)	$[C_{00}, C_{01}, C_{02}, C_{03}] = A_0 [B_0, B_1, B_2, B_3]$
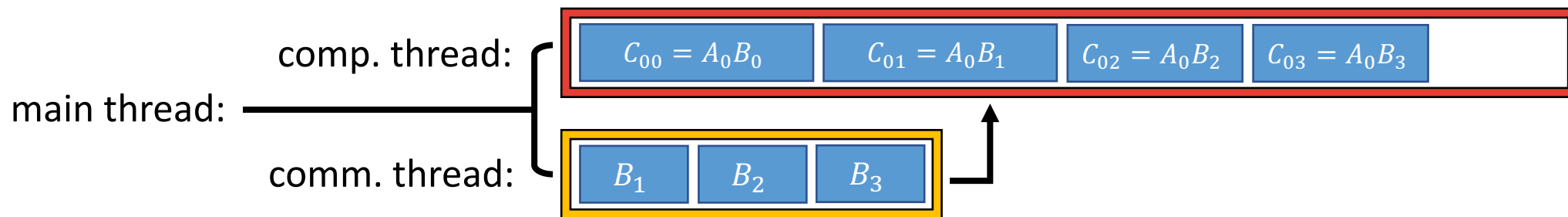
without overlap of communication and computation