

Changing the underlying data layout

Example: (m, n, k, P) = (8, 8, 8, 8)

Steps: Parallel(m/2, n/2, k/2)

A	B	C
0 0 2 2 1 1 3 3	0 0 4 4 2 2 6 6	0 0 1 1 2 2 3 3
0 0 2 2 1 1 3 3	0 0 4 4 2 2 6 6	0 0 1 1 2 2 3 3
0 0 2 2 1 1 3 3	0 0 4 4 2 2 6 6	0 0 1 1 2 2 3 3
0 0 2 2 1 1 3 3	0 0 4 4 2 2 6 6	0 0 1 1 2 2 3 3
4 4 6 6 5 5 7 7	1 1 5 5 3 3 7 7	4 4 5 5 6 6 7 7
4 4 6 6 5 5 7 7	1 1 5 5 3 3 7 7	4 4 5 5 6 6 7 7
4 4 6 6 5 5 7 7	1 1 5 5 3 3 7 7	4 4 5 5 6 6 7 7
4 4 6 6 5 5 7 7	1 1 5 5 3 3 7 7	4 4 5 5 6 6 7 7

communication (B):

- 0 ↔ 4
- 1 ↔ 5
- 2 ↔ 6
- 3 ↔ 7

A									
0	0	2	2	1	1	3	3		
0	0	2	2	1	1	3	3		
0	0	2	2	1	1	3	3		
0	0	2	2	1	1	3	3		
<hr/>									
4	4	6	6	5	5	7	7		
4	4	6	6	5	5	7	7		
4	4	6	6	5	5	7	7		
4	4	6	6	5	5	7	7		

B									
0	0	4	4	2	2	6	6		
0	0	4	4	2	2	6	6		
0	0	4	4	2	2	6	6		
0	0	4	4	2	2	6	6		
1	1	5	5	3	3	7	7		
1	1	5	5	3	3	7	7		
1	1	5	5	3	3	7	7		
1	1	5	5	3	3	7	7		

C									
0	0	1	1	2	2	3	3		
0	0	1	1	2	2	3	3		
0	0	1	1	2	2	3	3		
0	0	1	1	2	2	3	3		
<hr/>									
4	4	5	5	6	6	7	7		
4	4	5	5	6	6	7	7		
4	4	5	5	6	6	7	7		
4	4	5	5	6	6	7	7		



0	0	2	2	1	1	3	3		
0	0	2	2	1	1	3	3		
0	0	2	2	1	1	3	3		
0	0	2	2	1	1	3	3		

0	0	0	0	2	2	2	2		
0	0	0	0	2	2	2	2		
0	0	0	0	2	2	2	2		
0	0	0	0	2	2	2	2		
1	1	1	1	3	3	3	3		
1	1	1	1	3	3	3	3		
1	1	1	1	3	3	3	3		
1	1	1	1	3	3	3	3		

0	0	1	1	2	2	3	3		
0	0	1	1	2	2	3	3		
0	0	1	1	2	2	3	3		
0	0	1	1	2	2	3	3		

A

0 0 2 2 1 1 3 3
0 0 2 2 1 1 3 3
0 0 2 2 1 1 3 3
0 0 2 2 1 1 3 3

B

0 0 0 0		2 2 2 2
0 0 0 0		2 2 2 2
0 0 0 0		2 2 2 2
0 0 0 0		2 2 2 2
1 1 1 1		3 3 3 3
1 1 1 1		3 3 3 3
1 1 1 1		3 3 3 3
1 1 1 1		3 3 3 3

C

0 0 1 1		2 2 3 3
0 0 1 1		2 2 3 3
0 0 1 1		2 2 3 3
0 0 1 1		2 2 3 3

communication (A):

0 – 2

1 – 3

0 0 0 0 1 1 1 1
0 0 0 0 1 1 1 1
0 0 0 0 1 1 1 1
0 0 0 0 1 1 1 1

0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
1 1 1 1
1 1 1 1
1 1 1 1
1 1 1 1

0 0 1 1
0 0 1 1
0 0 1 1
0 0 1 1



communication (C):
with reduction

0 – 1

A

0000		1111
0000		1111
0000		1111
0000		1111

B

0000	
0000	
0000	
0000	
<hr/>	
1111	
1111	
1111	
1111	

C

0011
0011
0011
0011



0000
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		1111
	0000	1111
0011	0000	1111
0011	0000	1111
0011	0000	
0011		

reduce-scatter