How is Sketching Useful?

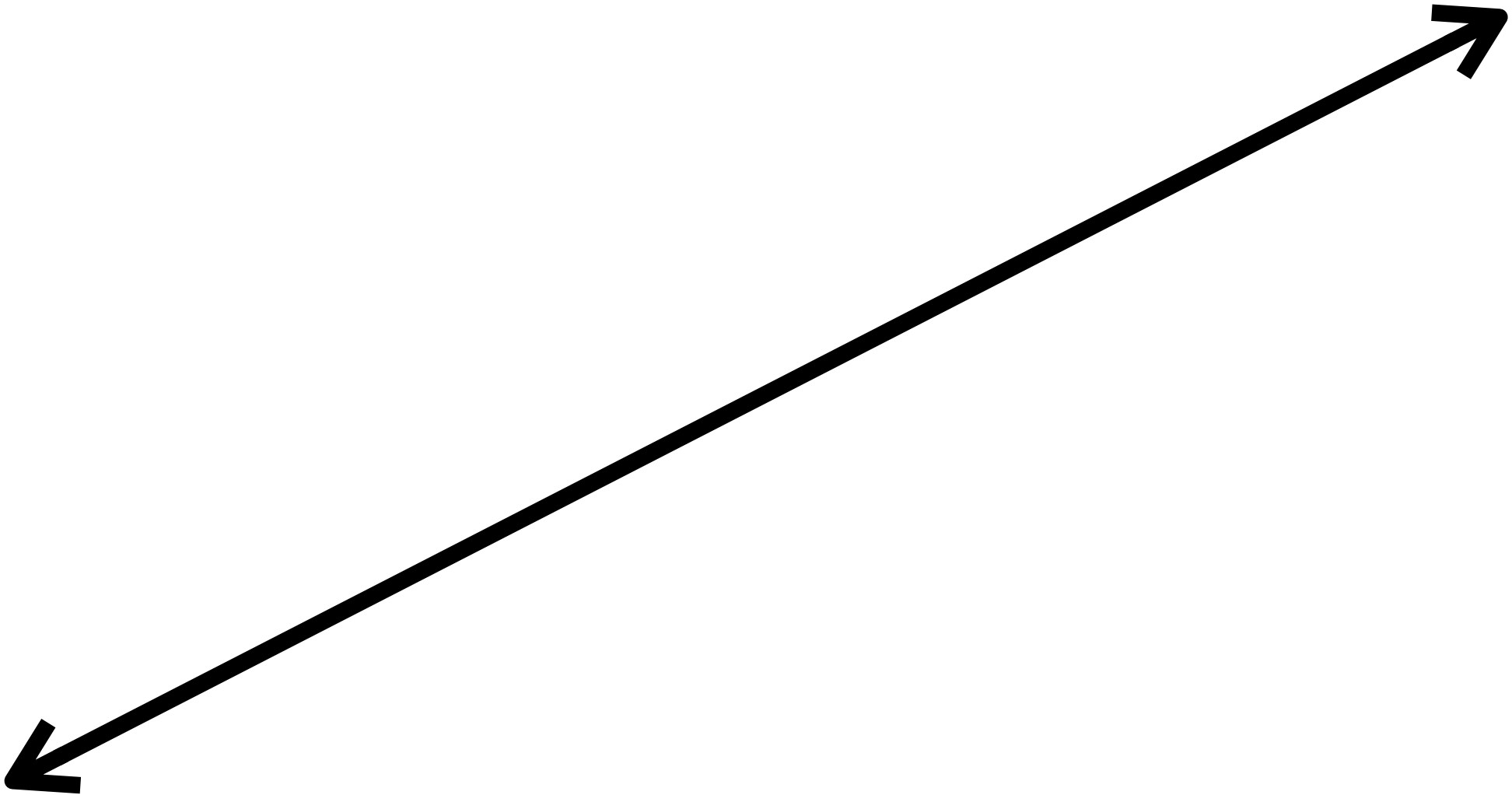
$A(1)$

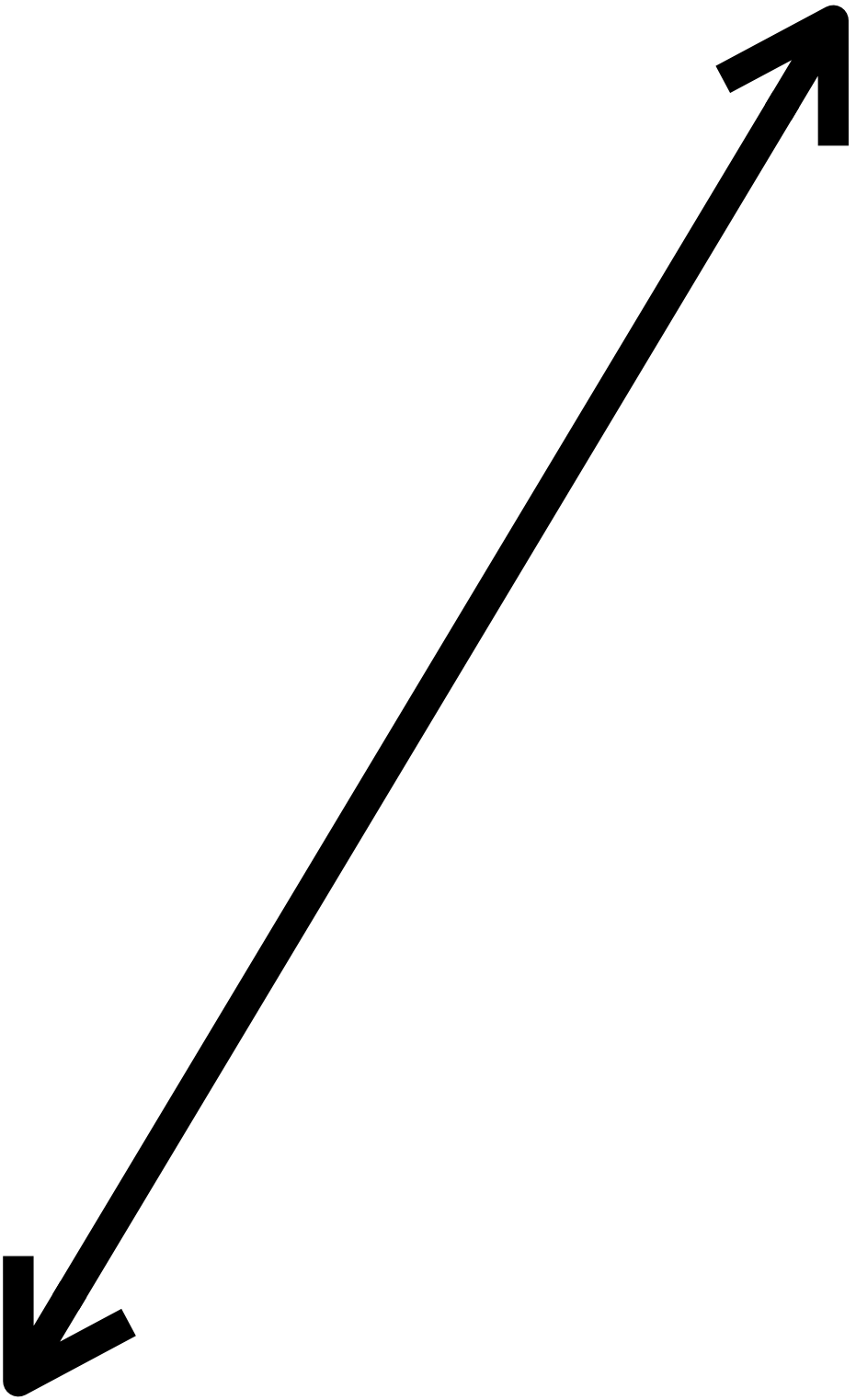
Server 1

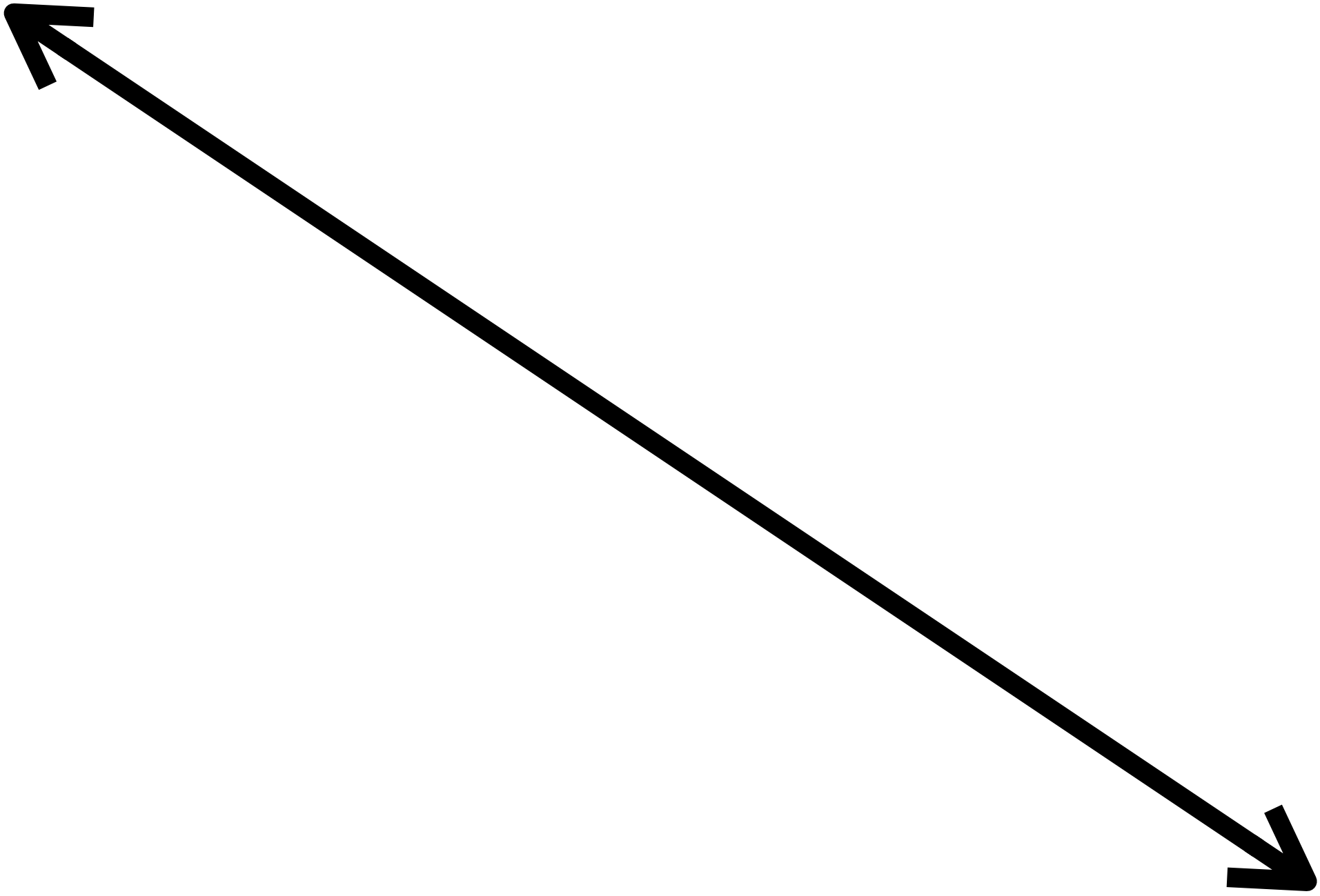
$A(2)$

Server 2

Coordinator







A

$$= A(1) + \cdots + A(s)$$

$A(s)$

Server s


sk(A_1)


sk(A_2)

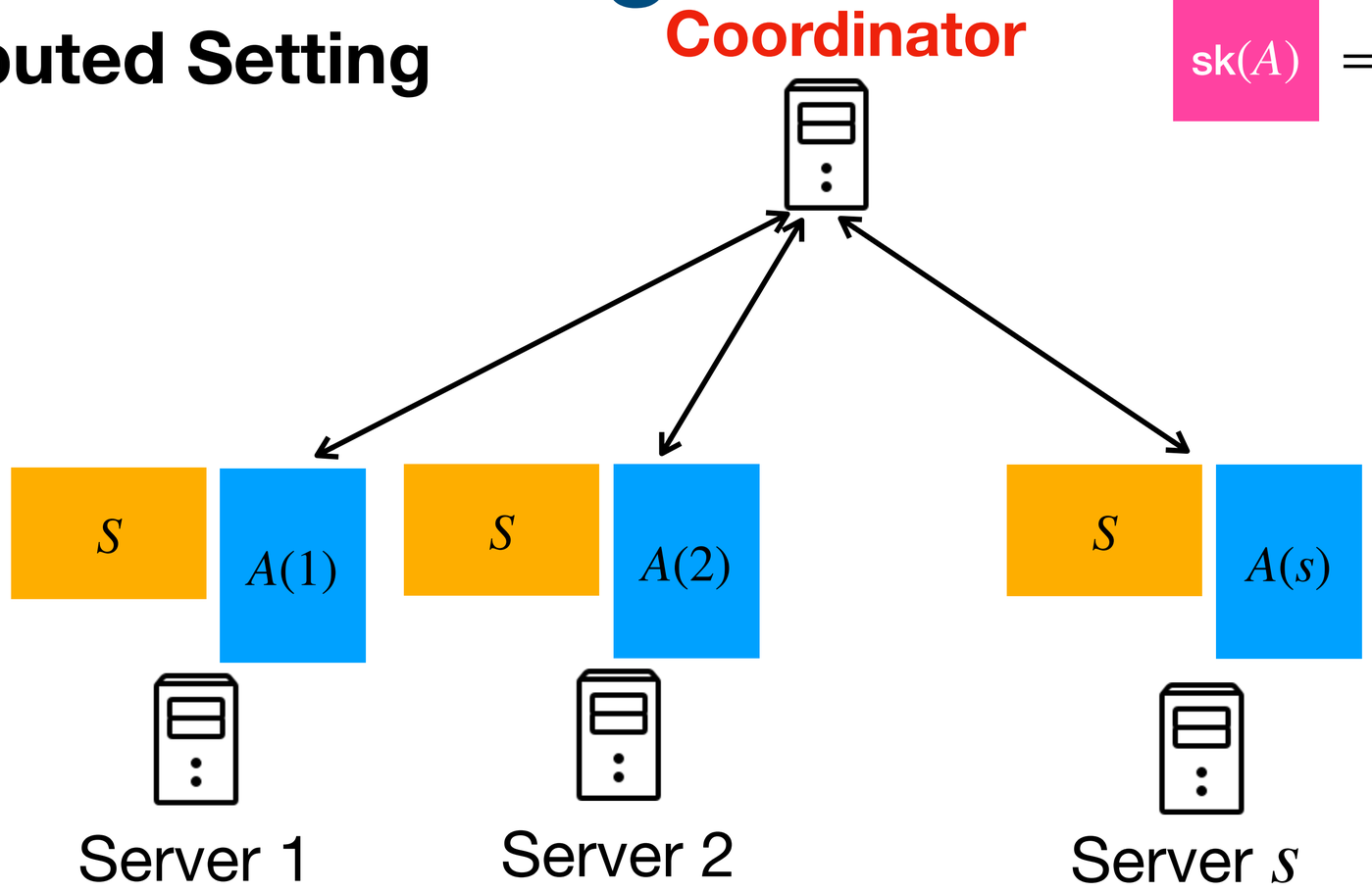

sk(A_S)

$$\mathrm{sk}(A) = \mathrm{sk}(A_1) + \mathrm{sk}(A_2) + \cdots + \mathrm{sk}(A_s)$$

Distributed Setting

How is Sketching Useful?

Distributed Setting



$$\mathsf{sk}(A) = \mathsf{sk}(A_1) + \mathsf{sk}(A_2) + \cdots + \mathsf{sk}(A_s)$$

$$A = A(1) + \cdots + A(s)$$

Recap of Sketching

- Broad set of techniques to shrink the data
    - Fast algorithms in Classic setting
    - Communication efficient algorithms in distributed setting
    - Memory-efficient algorithms in streaming setting