Computing *i**

- The argument shows that the central server receives i^*

- Can send all $O(s^{p-1} \cdot \log^3 n)$ coordinates to all servers and ask for $x_i(j)$

- Requires a total of $O(s^p \cdot \log^3 n)$ communication

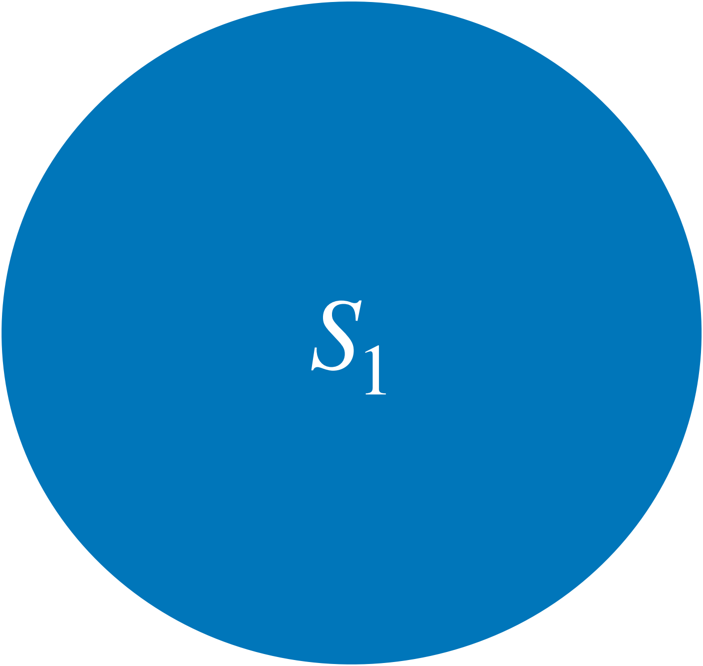
- Coordinator needs to find a small set S such that $i^* \in S$

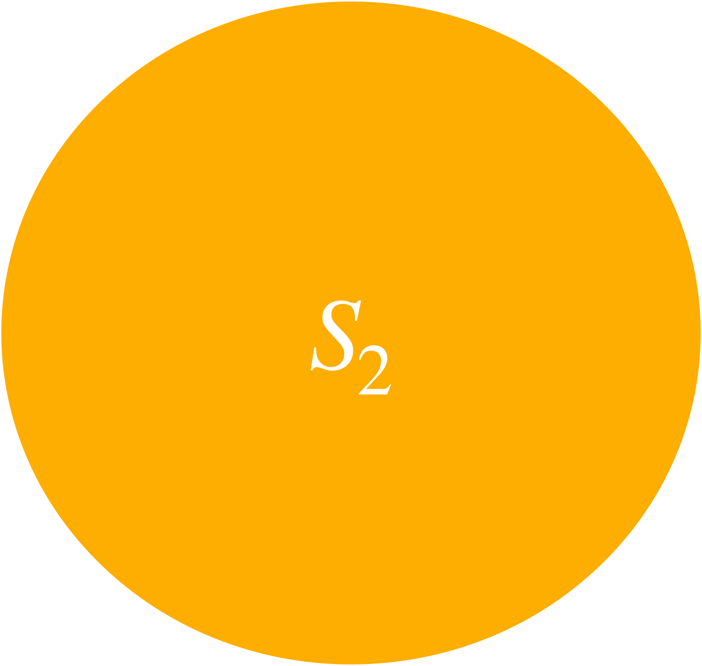
- We show such S with $|S| \leq \text{polylog}(n)$ can be computed by computing approximations to $\mathbf{e}_i^{-1} x_i^p$ for all i by using the sampled coordinates and their values at the sampled servers

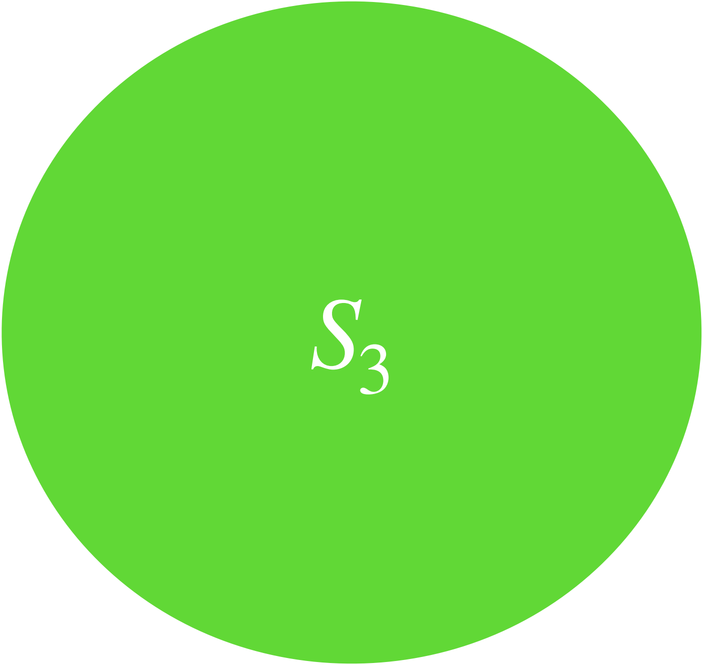
- Critically uses the properties that individual contribution of i^* is quite large and that $\mathbf{e}_{i^*}^{-1} x_{i^*}^{p}$ is significant fraction of $\sum_i \mathbf{e}_i^{-1} x_i^k$

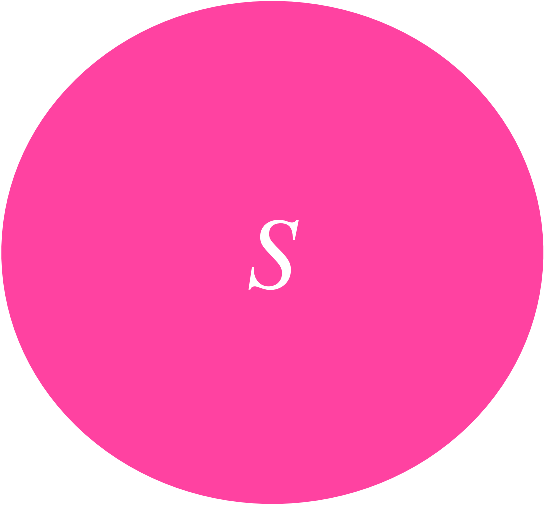
- Ask the servers for $x_i(j)$ for only $i \in S$ -- $O(s \cdot \text{polylog}(n))$ communication

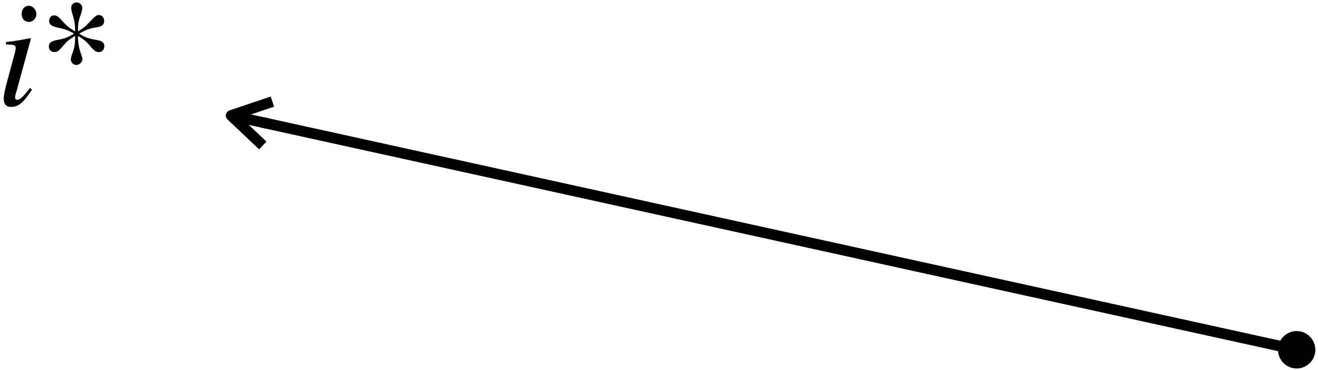
24


S_1

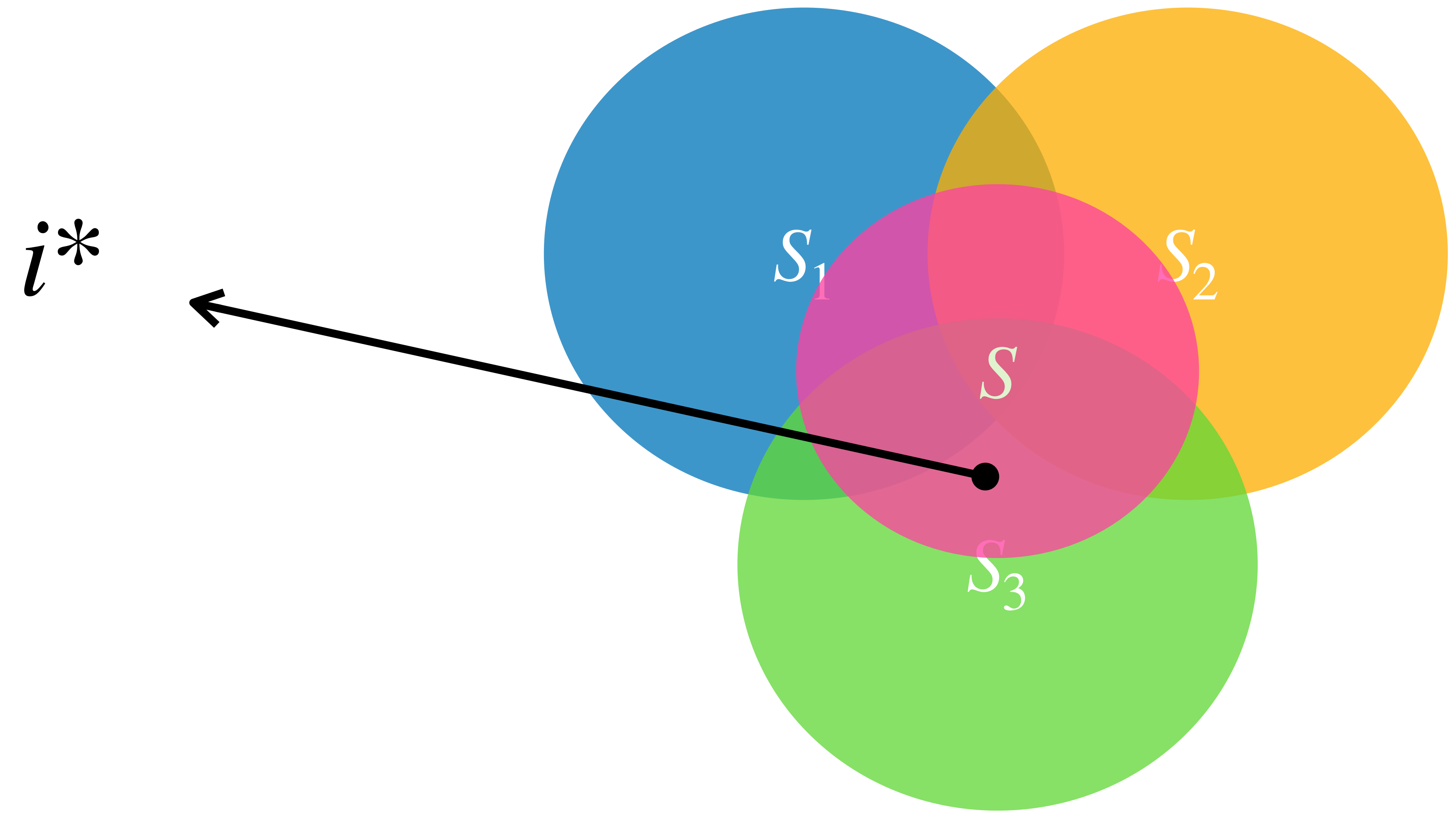

S_2


S_3


S


i^*

Computing i^*



- The argument shows that the central server receives i^*
- Can send all $O(s^{p-1} \cdot \log^3 n)$ coordinates to all servers and ask for $x_i(j)$
  - Requires a total of $O(s^p \cdot \log^3 n)$ communication
  - Coordinator needs to find a small set S such that $i^* \in S$
  - We show such S with $|S| \leq \text{polylog}(n)$ can be computed by computing approximations to $\mathbf{e}_i^{-1} x_i^p$ for all i by using the sampled coordinates and their values at the sampled servers
    - Critically uses the properties that individual contribution of i^* is quite large and that $\mathbf{e}_{i^*}^{-1} x_{i^*}^p$ is significant fraction of $\sum_i \mathbf{e}_i^{-1} x_i^k$
  - Ask the servers for $x_i(j)$ for only $i \in S$ -- $O(s \cdot \text{polylog}(n))$ communication

Extending to general functions f