

Simple Bound

- ▶ Use uniform initial weights $w_i^1 = 1/N$
- ▶ Total Weight is at least the weight of the best expert.

$$\begin{aligned} L_A^T &= -\log W^{T+1} = -\log \sum_{i=1}^N w_i^{T+1} \\ &= -\log \sum_{i=1}^N \frac{1}{N} e^{-L_i^T} = \log N - \log \sum_{i=1}^N e^{-L_i^T} \\ &\leq \log N - \log \max_i e^{-L_i^T} = \log N + \min_i L_i^T \end{aligned}$$

- ▶ Dividing by T we get $\frac{L_A^T}{T} = \min_i \frac{L_i^T}{T} + \frac{\log N}{T}$