

Reasoning about a w.h.p. statement with i) an asymptotic bound in the event description and ii) a \forall quantifier with respect to α .

In a simple case, a w.h.p. statement only requires an existence proof of an asymptotic probability bound (α and other constants exist) for an event description without an asymptotic bound.

Steps for reasoning about a w.h.p. statement with i) an asymptotic bound in the event description and ii) a \forall quantifier with respect to α :

- 1) assume a specific pair (c, n_0) for the event bound
- 2) show there exist constants for a probability bound: c maps to $\alpha \geq 1 \forall n$, thus n_0 can be used for the probability bound
- 3) if any event bound (c, n_0) maps to a probability bound, and any $c \geq c_0$ with $c_0 > 0$ maps 1:1 to $\alpha \geq 1$, then any $\alpha \geq 1$ maps to an event bound

e.g. $\alpha = c - 1, c_0 = 2$

In the randomized skip list analysis, each w.h.p. bound is a bound on one property with respect to another property of randomized skip list structure.

On different machines, executing the same traversal in a given randomized skip list structure may take a different number of machine steps. For each α , we adjust (c, n_0) of the corresponding existing “in-structure” event bound according to machine parameters.