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Topological Measurement of the B^+ and B^0 Lifetimes at SLD

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The lifetimes of the B^+ and B^0 mesons have been measured using the entire sample of $\sim$ 550,000 hadronic Z^0 decays collected by the SLD experiment at the SLC between 1993 and 1998. The analysis reconstructs the decay length and charge of the B meson using a topological vertexing technique. This method results in a high statistics sample of around 70000 B decay vertices. The effective charge purity is enhanced by using the reconstructed vertex mass and longitudinal electron beam polarization information. A new technique is used to reduce the magnitude of the systematic uncertainty due to b-quark fragmentation. The ratio of the B^+ to B^0 lifetimes is measured with a total error of $\sim$ 4%.