Some equivariant properties of Milnor's construction

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In 1953 John Milnor, for a topological group G, introduced the notion of an infinite join $E_G = G * G * \dots$. This space possesses a natural action of the group G under which it becomes a universal principal G-fibration. The orbit space $B_G = E_G/G$ is well known as a classifying space. In this talk I will present a more transparent approach to constructing of E_G that will allow us to show that the natural action $G \curvearrowright E_G$ is proper in the sense of R. Palais whenever G is a locally compact group. As a result we obtain some new equivariant properties of this classic space. Similar research is carried out for the complete infinite join $\widetilde{E}_G$ (which is the completion of E_G with respect to a suitable metric) introduced in 1992 by T. Banakh.