Let $G$ be the class of countably infinite graphs of connectivity 1. We give necessary and sufficient conditions for a graph in $G$ to be lobe-transitive. We further show that given any biconnected graph $L$, any subgroup $H$ of $\text{Aut}(L)$, and a prescribed list of multiplicities of $H$-orbits, there exists a unique lobe-transitive graph $G \in G$ whose lobes are isomorphic to $L$ and such that the multiset of $H$-orbits of copies of $L$ to which each vertex of $G$ belongs is determined by the given list. These results are then applied to give necessary and sufficient conditions for a graph in $G$ to be edge-transitive. (Received September 13, 2018)