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When a path-connected group topology is refined, a natural question arises about the continued existence of paths in the new topology. In this paper, we examine certain group topologies to determine which paths remain in refinements of the topology. In particular, we investigate whether or not the plane with the usual topology is a maximally path-connected topological group. First, we address the general issue of how compact subsets of topological groups are affected when the topology is refined. Then, the particular case when the set is a path in the plane is studied. (Received September 29, 2000)