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Boundaries of right angled Coxeter groups with manifold nerves.

All abstract reflection groups act geometrically on non-positively curved geodesic spaces. Their natural space at infinity, consisting of (bifurcating) infinite geodesic rays emanating from a fixed base point, is called a boundary of the group.

We will present a condition on right angled Coxeter groups under which they have topologically homogeneous boundaries. The condition is that they have a nerve which is a connected closed orientable PL manifold.

In the event that the group is generated by the reflections of one of Davis’ exotic open contractible $n$-manifolds ($n \geq 4$), the group will have a boundary which is a homogeneous cohomology manifold. This group boundary can then be used to equivariantly $\mathbb{Z}$-compactify the Davis manifold.

If the compactified manifold is doubled along the group boundary, one obtains a sphere if $n \geq 5$. The system of reflections extends naturally to this sphere and can be augmented by a reflection whose fixed point set is the group boundary. It will be shown that the fixed point set of each extended original reflection on the thusly formed sphere is a tame codimension-one spheres.