Star P and weakly star P properties

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For a topological property P, we say that a space X is *star P* (respectively, *weakly star P*) if for every open cover $\mathcal{U}$ of the space X, there is a subspace A of X satisfying P such that
$$X = st\,(A, \mathcal{U}) = \bigcup \{U \in \mathcal{U} : U \cap A \neq \emptyset\}$$
(respectively, $X = cl_X st\,(A, \mathcal{U})$).

In this talk we focus our attention on the star *ccc* and the star countable spread properties. We give the relations between these two properties and the well-known star countable and star Lindelöf properties. Under *CH* we give an example of a Tychonoff star countable spread space which is not star countable. We also investigate the weakly star countable spaces and weakly star Lindelöf spaces. In particular we show that if the hyperspace $F\,[X]$ of all non-empty finite subsets of X endowed with the Pixley–Roy topology where X has countable tightness is weakly star Lindelöf, then X is hereditarily Lindelöf and hereditarily separable.

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