Abstract: We consider structures on the set of real numbers having the property that connected components of definable sets are definable. All o-minimal structures on the real line $(\mathbb{R}, <)$ have the property, as do all expansions of the real field that define the set $\mathbb{N}$ of natural numbers. Our main analytic-geometric result is that any such expansion of $(\mathbb{R}, <, +)$ by boolean combinations of open sets (of any arities) is either o-minimal or undecidable. We also show that expansions of $(\mathbb{R}, <, \mathbb{N})$ by subsets of $\mathbb{N}^n$ ($n$ allowed to vary) have the property if and only if all arithmetic sets are definable. (Joint with A. Dolich, A. Savatovsky and A. Thamrongthanyalak.)