Archaeal chromosomal DNA is not confined to an envelope-enclosed organelle such as the nucleus in eukaryotes. Unlike Euryarchaea, the Crenarchaea also lack homologues of eukaryotic histones that wrap DNA. Rather their genome is organized and compacted by interaction with small architectural proteins such as Alba, Sul7 and CC1. These proteins generally act by bridging or bending DNA. Recently, a new family member, conserved among crenarchaea, Cren7, was identified. Structurally this protein is similar to Sul7 (Guo et al., Nucl Acids Res, 2008). In order to obtain a better understanding of the architectural properties of this protein we use a single-molecule approach. Magnetic tweezers and scanning force microscopy reveal that the protein effectively compacts DNA by decreasing its effective persistence length, which is attributed, to DNA bending. We also report evidence that the protein might have a second(ary) mode of modulating the spatial folding of the genome in addition to its ability to bend DNA.