This paper presents an approach to perform bit rate reduction transcoding by video segmentation. The paper shows how a high performance distributed video transcoder can be built using multiple processing units and a Message Passing Interface based parallel programming model. The computation parallelization and data distribution among computing units is discussed. For data distribution coarse grain approach is used in which significant gain in terms of execution speedup is obtained. The segmentation of video stream with (1) equal size having unequal number of intra frames and (2) unequal size having equal number of intra frames is performed to achieve high performance. The results show that the proposed distributed video transcoder provides very short startup times.