

Enhanced Bluetree: A Mesh Topology Approach Forming Bluetooth Scatternet

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Abstract

This study presents the enhanced Bluetree, a mesh topology scheme for Bluetooth scatternet formation. The scatternet formation algorithm includes two phases. In the first phase, a root node begins to create a conventional tree-shaped topology. To improve the network reliability of tree topology, a return connection mechanism is introduced in the second phase to generate more connection paths and to convert the tree-shape into a mesh-shaped topology. The mechanism contains two connection models including the ‘slave/slave mesh’ (SSM) and the ‘master/slave mesh’ (MSM) models. The SSM model builds a meshshaped topology by interconnecting more leaf nodes, whereas the MSM model connects additional intermediate nodes to establish the backbone connection in a mesh-shaped topology. Simulation results show that the enhanced Bluetree effectively improves the performance metrics, including the piconet efficiency, path length and end-to-end delay, beyond the Bluetree with more formation packets. As a result, the enhanced Bluetree not only builds a mesh-shaped topology that improves the network reliability but also generates an efficient network with less packet delay performance than a conventional Bluetree network.

Keyword : Bluetooth, Ad hoc networks, Scatternet formation