

# $\pi$ Mesh: Practical Implementation of A Low-Cost Wireless Mesh for Indoor Networking

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## **Abstract**

Wi-Fi access technology has become popular in recent years. Many users nowadays use Wi-Fi solution to gain wireless access to the Internet from offices, public libraries, shopping malls, homes and so on. However current Wi-Fi deployment is limited to the areas where wired LAN is available. Due to its relatively short transmission range in indoor environment (typically several tens of meters), Wi-Fi coverage needs to be extended significantly to give full coverage of a certain area. Wireless mesh network (WMN) has emerged as an effective solution to address this problem. WMN consists of mesh routers and mesh clients, where mesh routers form the backbone of WMNs and have limited mobility. Mesh clients can be either stationary or mobile and get Internet access through the relay of mesh routers. In this thesis, we present  $\pi$ Mesh, a *practical* implementation of wireless mesh networks for indoor environment.  $\pi$ Mesh is based on simple protocols, implementable in normal notebooks or PCs and is compatible with existing Wi-Fi AP and Wi-Fi clients (i.e., no AP and client modifications). It requires no

extra hardwares and uses existing noproprietary off-the-shelf technology to build a cost-effective indoor wireless mesh. To achieve better end-to-end delay and throughput,  $\pi$ Mesh dynamically selects its access path based on the ETX metric. Simulations show ETX achieves better throughput than hop-count metric. We also implemented  $\pi$ Mesh and conducted proof-of-concept experiments in indoor environment.