OpenMesh: OpenFlow in Wireless Mesh Networks

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Abstract. The adoption of Wireless Mesh Networks (WMNs) is a solution to provide last mile indoor and outdoor Internet access and is gaining an important attention academic and industry research groups in recent years. WMNs will support the distribution of diverse type of services, ranging from battlefield surveillance to high quality mobile audio and video applications.

As an alternative to proprietary solutions, IEEE 802.11 equipments with an extended firmware can be used as an open source and low-cost solution in Linux environments [Tsarmpopoulos et al. 2005]. This type of solution allows the easy creation of digital and multimedia environments, enabling the distribution of new services for fixed and mobile devices and attracting new customers.

There is an open source WMN solution used in a production network in the Federal University of Pará (UFPA). The WMN that was deployed in an area that has buildings with an average height of eight meters, with a predominance of large trees, typical of the Amazon region, and also with high rate of rainfall.

The WMN located in the UFPA has six mesh kits. These kits are made from air-tight box to hold the wireless routers and omnidirectional antenna of 18.5 dBi gain. The wireless routers used in the network are Linksys WRT54GL.

Since it is a production network, is difficult to run experimental protocols on it. However with the aim to solve this problem, the OpenFlow solution [McKeown et al. 2008] was propose, to allow tests with new network architectures and protocols over a production network.

On this work we show the use of OpenFlow protocol solutions and FlowVisor [Sherwaood et al. 2009] in a OpenMesh [Pinheiro et al. 2009] network, to provide a laboratory in a production networking. The OpenFlow was deployed in ours router, that have the OpenWRT firmware already, and the FlowVisor was used to created slices, where multimedia traffic was inserted to evaluate the network metric, mainly the delay produced by the redirecting of flows over a wireless multi-hop network.

References

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Biographies

Billy Anderson is member of Study Group on Computer Networks and Multimedia Communications (GERCOM), graduated in Computer Science for Federal University of Para(UFPA). Currently, is a Ph.D. student of pos-graduate program in electrical engineering at UFPA. Has experience in program language, wireless mesh network and management.

Fernando Farias received a B.Sc degree in Mathematics from Federal University of Pará in 2003 and his M.Sc. degree in Electrical Engineering from the same institution in 2008. He is now a Ph.D. student at the Technology Institute, Federal University of Pará, Belém , Brazil. His main research activities are in the field of networking and include, next-generation optical networks, traffic engineering and network management. His current research is related to management issues for next-generation optical networks.

Vagner Nascimento Born in Macapa, Amapa, Brazil, on January 23, 1981.It concludes his graduate degree in Computer Science at the University Center of Pará (CESUPA) in 2005. Active student of the Graduate Program in Computer Science (PPGCC) at Federal University of Pará (UFPA). As a member of the Study Group on Computer Networks and Multimedia Communications (GERCOM) published articles in wireless mesh networks, TCP and cross-layer.

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