TECHNICAL INSIGHTS

MOBILE & WIRELESS

TECHNOLOGY ALERT

- **UNIQUE INTEGRATION SCHEME OF FIBER AND WIRELESS TECHNOLOGIES FOR MULTIMEDIA APPLICATIONS**

UNIQUE INTEGRATION SCHEME OF FIBER AND WIRELESS TECHNOLOGIES FOR MULTIMEDIA APPLICATIONS

One of the ways of easing the strain on the service operators in terms of network deployment is by introducing optical backhaul technologies. This is expected to result in reducing the power consumption of the access networks and contribute toward the realization of green internet. Hence, there is a strong need to use optical technologies in the wireless broadband networks.

To address this need, researchers from Montreal-based Institut National de la Recherche Scientifique (INRS), Canada, have developed a fiber-wireless broadband access networks (FiWi). This is expected to seamlessly integrate the mobility of wireless networks with the capacity of the optical fiber technologies. The researchers have made an attempt to integrate the next-generation WLAN-based wireless mesh network (WMN), and the ethernet passive optical network (EPON).

The FiWi network was developed keeping in mind the QoS for multimedia applications, such as video streaming, which is expected to dominate the Internet traffic in future. The researchers have attempted to build on the next-generation IEEE 802.11n WLAN, with a focus on the development of new media access control (MAC) enhancements, and explore the use of emerging optical and wireless network and sensor technologies in integrated FiWi networks. They have also brought about the integration in a pay-as-you-grow manner while protecting previous investments and providing backward compatibility with legacy infrastructure.

The researchers from INRS have evaluated the capacity of the networks through probabilistic analysis and verifying simulations. They have also tried to highlight the benefits of leveraging advanced frame aggregation techniques from next generation WLANs in EPONs. The result of examining the performance of the FiWi network consisting of WLAN-based WMN and EPON depicted that the proposed aggregation techniques enhanced the throughput-delay performance under data, voice, and video traffic types. The researchers are trying to strike a balance in terms of network performance, capital and operational expenditures, and carbon dioxide (CO2) imprint, considering the strengths and limitations of optical and wireless broadband access technologies.

This research is a collaborative effort of researchers from Montreal-based INRS and Technical University Berlin, Germany. Currently, the researchers are working in collaboration with a research group at Massachusetts Institute of Technology (MIT) to explore the potential deployment of network coding in FiWi networks. They are also planning to hold a proof-of-concept demonstration at Optical Zeitgeist Laboratory in Montreal, Canada. With multimedia applications occupying a great hold in the wireless industry, service operators are likely to lap up the FiWi network due to its unique features, such as high speed yet low-cost solutions, less power consumption and enhanced throughput-delay performance under voice, and video and data traffic types. In future, the researchers are planning on the integration of FiWi broadband networks with in-home networks that might be based on plastic optical fiber or WLAN technologies in order to explore applications, such as nanodatacenters.

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