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Inventors

Dr. Martin Reisslein
Assistant Professor
School for Electrical, Computing, and Energy Engineering

Akhilesh Thyagaturu
Graduate PhD Student
School for Electrical, Computing, and Energy Engineering

Intellectual Property Status:
Pending

Contact

Bill Loux

Director of Business Development, Physical Sciences

Arizona Technology Enterprises, LLC (AzTE)

P: 480.884.1992

F: 480.884.1984

BLOUX@AZTE.COM

TECHNOLOGYVENTURES@AZTE.COM

www.AzTE.com

Layered SDN Backhaul Architecture (LayBack) for Small Cells
AzTE Case #M16-091P

Background

Backhaul access networks bridge telecommunications devices to core networks that provide internet, but have bottlenecking concerns due to insufficient bandwidth (rate of data transfer). Though networks that provide connectivity (i.e. Radio Access Networks, RANs) and core networks are able to handle large streaming capacities, backhaul networks require costly equipment with proprietary software and thus, have delayed advancements in technology. Therefore, researchers are now looking to design an improved system architecture that reduces signal load and enables technological progress of backhaul networks.

Invention Description

Researchers at ASU have developed a backhaul network architecture based on software-defined networking (SDN) that reduces signal load and enables upgrades to technology. The backhaul network uses a novel handover protocol that duplicates and forwards network traffic information in a way that relieves backhaul bottlenecking. Additionally, the architecture decouples the wireless RAN (i.e. LTE, WiFi) from the backhaul, which allows for both future improvements and control of the individual network components. Further, it is fully compatible with current technologies and as a result, removes the need to replace the entire framework, providing substantial efficiency improvements at a low cost. Overall, the network architecture utilizes a unique handover protocol that permits function with current devices, reduces bottlenecking, and allows for future improvements that result in a low-cost and efficient network.

Potential Applications

- Telecommunication and Wireless Service Providers
- Backhaul Architectures for Wireless Networks
- Interference, Communication, and Video Streaming Handover Protocol

Benefits and Advantages

- **Low Cost –** The architecture allows function with current devices instead of replacing the entire framework
- **Effective –** The handover protocol quickens the overall rate of data transfer by reducing bottlenecking at the backhaul by making it independent of the RAN, allowing individual control of the various network components
- **Innovative –** Separate control of the network components permits future advancements of them, preparing for simple adaptations of future technology