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Smart Gateway (Sm-GW) SDN Backhaul for Small Cells

Emerging mobile device applications, like those supporting augmented reality, require high data rates, but the rapidly growing number of devices connecting to the internet complicates the network and increases backhaul infrastructure cost. Small cells (devices that connect to a network via DSL or cable) offer better reception and reduced transmit power for prolonging battery life. However, interference between cells constrains network performance. Scarcity of the radio frequency spectrum, lack of coordination between small cells and networks, and complex requirements at the mobile device require the small cells to share network resources. Therefore, there is a need to create a novel wireless network architecture supporting small cells that mitigates interference.

Researchers at ASU have developed a novel wireless network architecture for small cells using software defined networking (SDN). The SDN-based backhaul network, Smart Gateway (Sm-GW), leverages available network resources to throttle data transfer, effectively reducing bottlenecking and delivering seamless internet access to a higher number of devices. SDN configures the backhaul and equally distributes resources to provide a uniform rate of data to the small cells without installing costly infrastructure. In conclusion, the network architecture increases user capacity through optimal resource distribution, resulting in enhanced coverage, reliable connectivity, and reduced operational and capital costs.

Potential Applications

- Wireless Networking and Telecommunications
- Small Cell Deployments
- Self-Organizing Networks
- Interference Management

Benefits and Advantages

- Enhanced Coverage and Capacity – The Sm-GW accommodates a higher number of connections by using network resources to throttle data transfer, reducing backhaul bottlenecking and increasing connection capacity
- Improved Data Offload – SDN at the backhaul equally distributes resources to network connections, ensuring stable connectivity without additional infrastructure
- Robust Mobility – The framework supports mobility management, resource and transmit power management, backhaul operation, and self-configuration solutions culminating in an extensively reliable network

For more information about the inventor(s) and their research, please see:

[Dr. Martin Reisslein's directory webpage](#)

