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INFORMATIK UND
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Topic for a Bachelor/Master/Pre-Thesis, Master Project, or to work on as a Student Research Assistant

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On-Line Visualization and Configuration of IEEE 802.11s WLAN Mesh Networks using the NetJSON Interchange Format

The IEEE 802.11s amendment standard enables vendor-independent establishment of a wireless mesh network based on WLAN technology (WLAN Mesh Network – WMN). Since it is completely integrated into the 802.11 MAC layer, 802.11s can be used with conventional WLAN hardware directly above the existing WLAN physical layers 802.11 a/b/g/n/ac/ax. The Linux kernel currently incorporates the most advanced reference implementation of 802.11s (https://wireless.wiki.kernel.org/en/developers/documentation/ieee80211/802.11s) as part of its WLAN software protocol stack.

For the practical operation, administration and maintenance of complex WMN setups, the visualization of the network topology and node status information is important. A variety of existing network visualization frameworks support the data interchange format NetJSON (http://netjson.org/) as a standardized input representation for network status information. Beyond that, NetJSON is also intended to carry configuration information, which would be beneficial for network administration and experimentation.

While NetJSON bindings have already been developed for some IP-layer WMN routing protocols (e.g., OLSR or BATMAN, see http://netjson.org/docs/implementations.html), no binding for the 802.11s-specific information and the routing protocol HWMP (Hybrid Wireless Mesh Protocol) is available yet. Therefore, the aim of this work is to realize an interface for providing 802.11s status information and configuration parameters via NetJSON.

Summarized, the following tasks have to be solved:

- Familiarization with the basics of the IEEE 802.11s WMN specification and its Linux implementation
- Familiarization with the data interchange format NetJSON and existing network visualization frameworks that support NetJSON as data format
- Conception and implementation of an interface for continuous delivery of WMN status information to visualization frameworks using the NetJSON format
- Planned extension: delivery of WMN configuration parameters using the NetJSON format
- Experimental validation of the prototype implementation in a real WMN setup
- Detailed documentation of all work steps

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