

The Benefits of IP in Sensor Networks

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IP, the Internet Protocol, and not IP, Intellectual Property, has long been considered too “heavy weight”, too complicated, too much overhead and just not necessary for sensor networks – the phrase, “I need something more optimized” is often heard or used. The reality today is that IP is not only applicable in sensor network applications, but can be better suited and more efficient than special purpose or “optimized” protocols. This talk presents the current state of available standards such as IEEE 802.15.4, 6LoWPAN, RPL, COAP and provides information on the cost / benefit analysis of IP and the choices at each layer. It is important for engineers and developers to understand the impact of their decisions, to either try to invent their own “optimized” solution, to use another proprietary protocol or to build an interoperable system using IP. Quite often this decision is based on faulty or insufficient information. Additionally there are design choices such as “mesh under” vs “route over” that impacts network design and architecture; TCP vs UDP that affect resource management and COAP vs HTTP that change system complexity. Choosing to insert a gateway to translate from that proprietary solution to IP in order to be compatible with the Internet and its systems is fraught with problems that include maintenance, cost and security. There are implementation of a complete IP stack in well under 20K of code and requiring under 2K of RAM and that enables the development of IP capable sensors and controllers for under \$2. The protocol that has connected much of the World's 6 billion population can and should now be used to connect the World's trillions of devices.