Title of presentation: Lightweight Architecture and Protocols for the Internet of Things

**Abstract**

The success of the Internet architectural model Internet has been demonstrated during the last three decades.  This model is flexible enough to cover a large variety of applications from file transfer, telephony, gaming, television,... and can cover a vast amount of technologies such as phone lines with modem, ADSL, 4G, satellite links, high speed optical fiber,...
The success can be explained by several technical choices: Internet Protocol abstracts media layers offering  homogenous view to applications and complex operations are done at the network boundary in nodes; routers execute simple operations to forward information toward the destination. This has been resumed by Steve Deering as the hourglass model. IPv6 goes  further in that direction, making packet forwarding even simpler. Combined with a global addressing scheme the protocol became universal and IP can be viewed as the common language for any communicating device.

On the other hand, this model leads to be too conservative and Internet  risks to face ossification, The poor deployment of IPv6 after 20 years of efforts  is a perfect example of the momentum introduced by the large number of heterogenous connected devices .

Recently  new networking concepts emerged due either to electronic miniaturization or the development of cheap and energy-aware radio technologies. They  can be  regrouped under the generic concept of Wireless Sensor Network (WSN) or more generally Internet of Things (IoT). They introduced challenges that  the Internet has  never faced before. Since energy is limited, the volume of communication must be reduced, which includes either the data plane (i.e. the volume of information  sent or received by a node) or the control plane (i.e. bootstrap protocols, routing protocols,...). Since the memory is also reduced, the code footprint has to be as small as possible, as well as buffers and other contexts used to maintain connectivity.

How innovative architectural model can be introduce to take into account  constraints of new networks ? How communication between legacy devices either on the Internet side or in the Object side can be maintained ? In this talk, we will present some results from the French ANR project ARESA2 dealing with smart water meters in an urban context. We will introduce the concept of a border gateway adding flexibility on packet format to adapt the protocol to the environment. Based on these concepts, signaling traffic and protocols can be reduced. Constrained devices do not need to have all the necessary information to sent information to legacy nodes.