

PhD student : Guereguin Der S. SIDIBE

Dicector : Pr. Michel MISSON

Advisor : Dr. Marie Françoise SERVAJEAN

I. Introduction

➔ **Wireless sensor networks (WSN)** are widely used in environmental monitoring (Fig1)

➔ **Advantages** : easy to deploy, auto configurable and many applications areas (eg : environment, military, industry..)

➔ **Technologies used** : PHY & MAC protocols layer (IEEE 802.15.4, LoRa, Sigfox) Network layer (Zigbee, LoRaWAN...)

➔ **Disadvantages** : Ressource constrained (memory, battery..) Dfficult to maintain

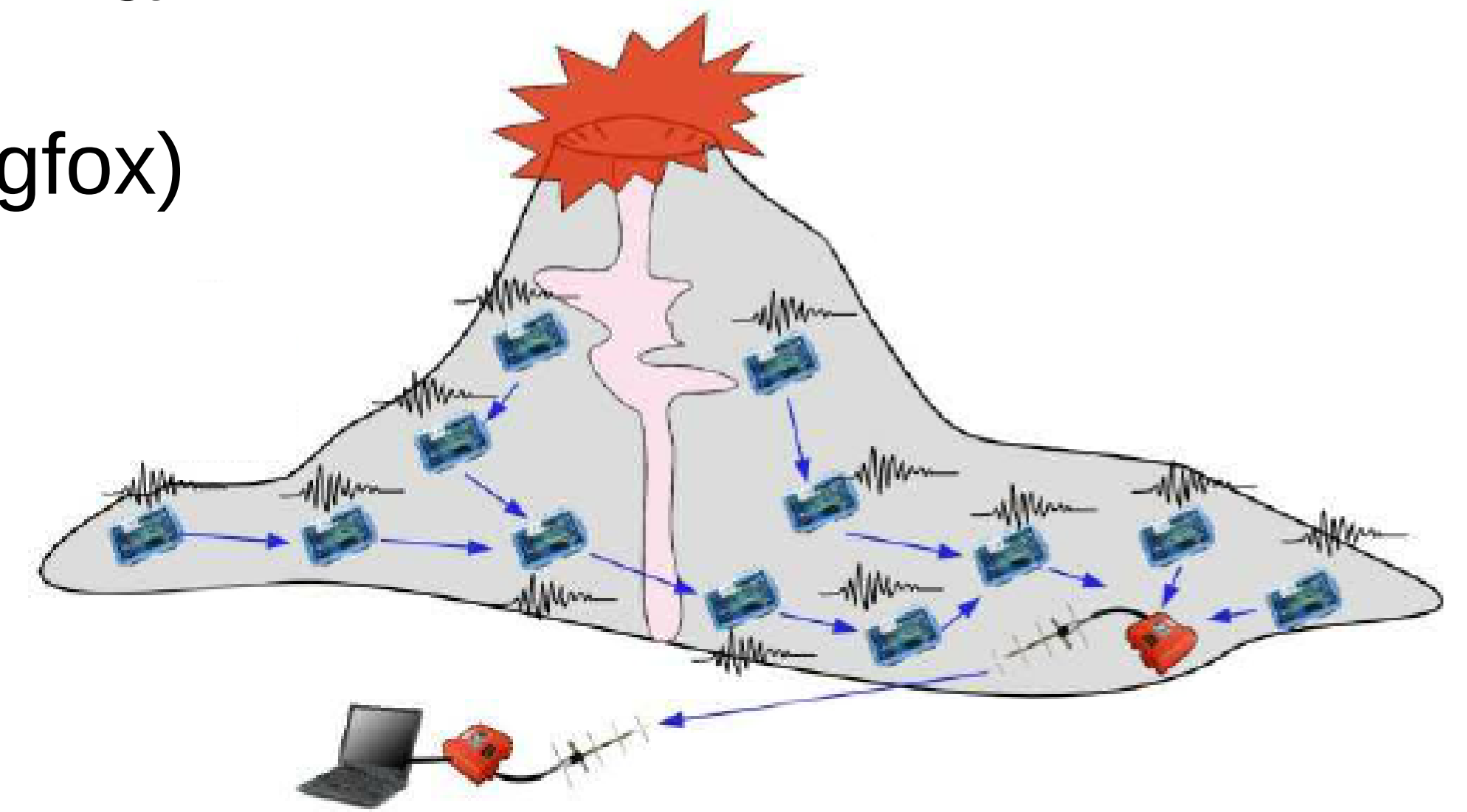


Fig1 : Volcan monitoring with WSN

II. Problematic & Objectives

➔ Emerging solutions in data collection area prioritize long range transmission in the expense of data rate (eg: 27 kps for loRa)

➔ How to statisfy applications that need long transmission range and high data rate ?

Combine switched beam antennas (Fig2) with WSN low layers (IEEE 802.15.4)
-reach long distance provided by the antenna
-250 kps data rate

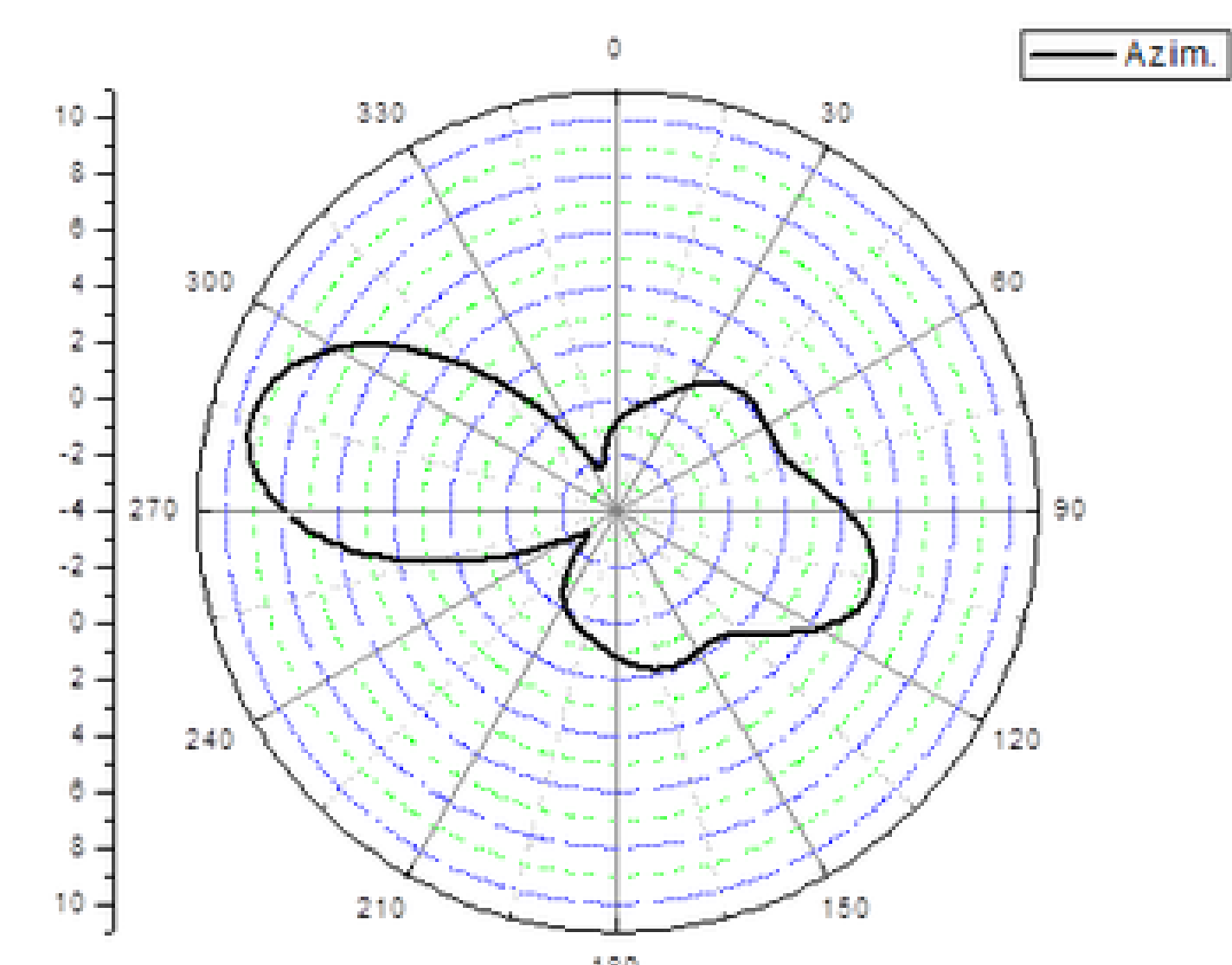


Fig2 : Switched beam antenna radiation pattern

III. Approach

➔ In data collection the trend is to retain star topologies (LoRa : Fig4)

➔ **Our approach** : Equip the sink in a star topoly (Fig3 sink is the node 1) with a switched beam antenna

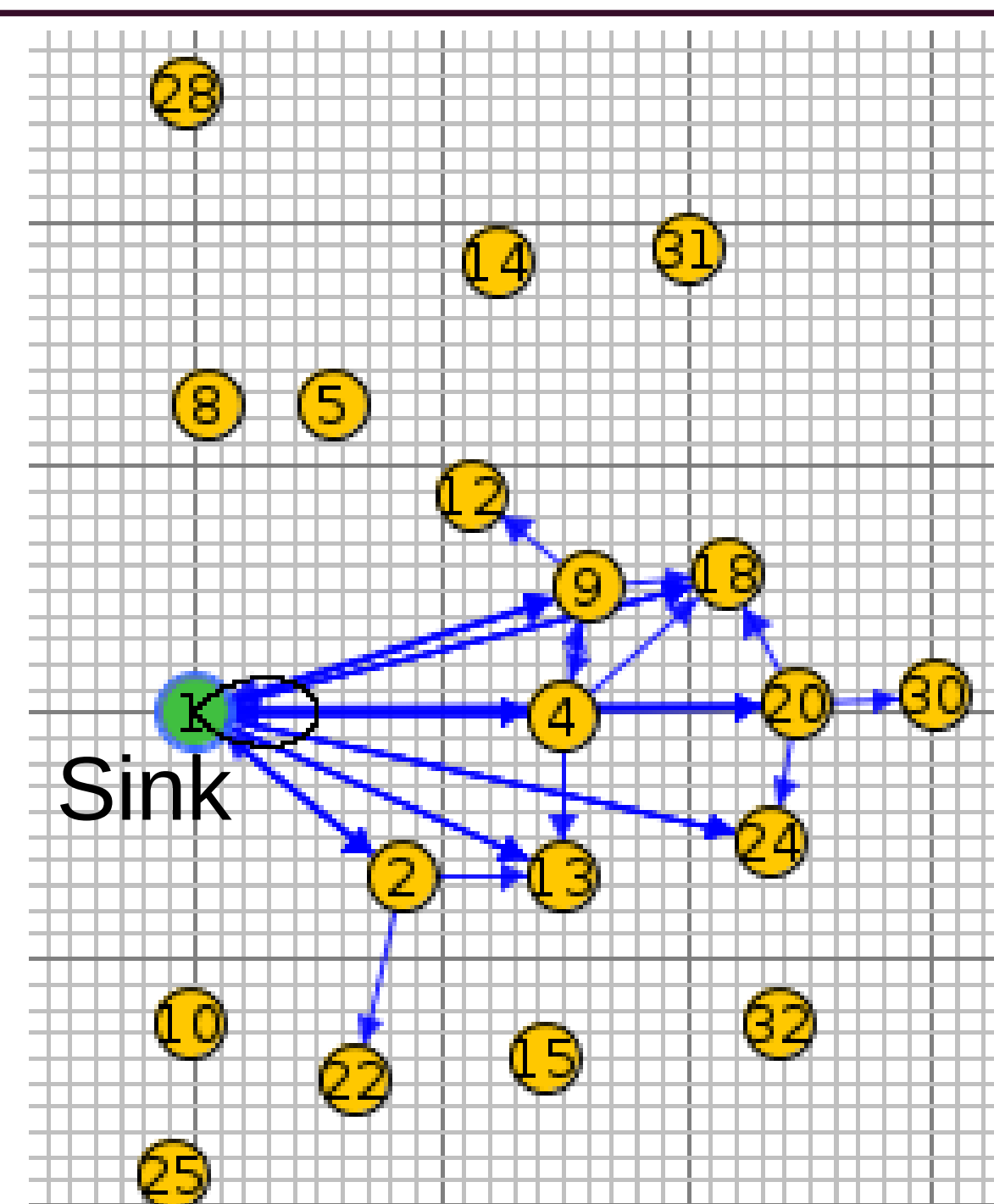


Fig3 :Star network with a switched beam antenna in the sink

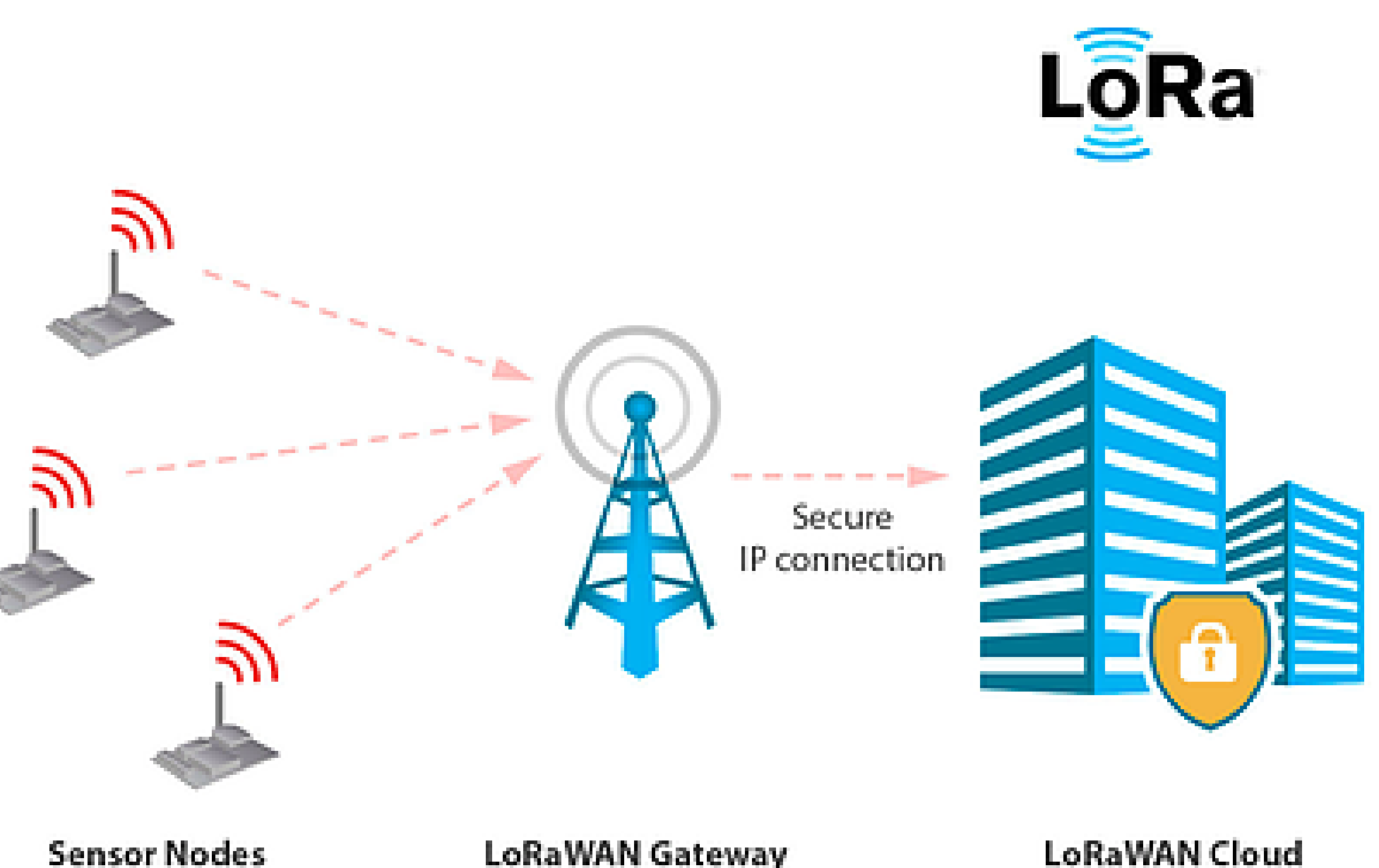


Fig4 : LoRa network

III. Perspectives

➔ Optimize the neighbor dsicorvery phase

➔ Optimize the beam switching scheme to inquire nodes

