



# DNS OX records allows new semantic uses

Lic. Francisco Javier Díaz  
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Versión 1



# DNS uses

- DNS has been mostly used for the last 30 years to map names to IP addresses.
- Several attempts to extend this scope of DNS:
  - As a result, people have overloaded the semantic of TXT records when desiring to store private Data in the DNS.
  - The DNS SINK record was proposed in 1997 as a generic container to address this role but got little uptake.



# DNS new extension

- A new effort is underway, merging two things:
  - a) a new structured OX RR type that enable people to define their own semantic and type space
  - b) persistent identifiers that are not linked to human activities



# DNS new extensión OX

These techniques can be used in a large variety of context and provide a powerful tool for IoT (such as updating firmware and checking configuration/status among other)



# OX example 1

## Persistent type

In our University we are adding IoT sensors for the street lightning. Adding Lora Sensors to provide these Smart City Ligths with persistent id such as:

pole25.50street.streetligths.26811.persistent.lat

Where 26811 is the "enterprise number" from IANA for UNLP



# OX example 2

- Implementing OX over
  - Lora
  - LoraWan
  - Sigfox
  - NarrowBand

Testing how processing DNSsec(resolving within the sensor or the application server) or TLS between sensor an GTWY affects power consumption and life of the batteries



# South-South Collaboration

A south-south collaboration has started between Ghana and Argentina to use these techniques to solve a real problem: tracking cattle that are roaming free and creating conflicts between farmers and ranchers. Partners

**University of Cape Coast (UCC)**

**University of La Plata (UNLP)**

**CABASE**



# Research Project

The objective is to track the cow location with a low-cost solution and publishing the results using OX identifiers that enables a mediator to identify the cattle of a certain owner and to display the last known positions of the cow.

Similar test will be made for goats in UNLP (Argentina)



# Low cost Technology

The IoT solution will explore different alternatives having in mind cost, coverage and battery consumption using either a low-cost GPS sensor or a low-cost sensor located by triangulation of the concentrator/gateways.

Testing with Lore provides for almost 10 miles coverage, triangulation location provides for aprox 80mts accuracy, sensor life time between 5 to 10 years.



# Low cost Technology (2)

Testing how to add solar panels to the Lora Gateways and how to provide wireless internet connection in order not to depend on the electric grid of the countries and neither on wideband internet connection for the project.



# Intended Goal

- The OX record type shall be used as a standard way to publish the acquired information.
- This information shall be accessible using mobile phones enabling the mediator to solve conflicts reported to him.
- Information Servers at UCC



# OX example 3

Cow#22.cattle.enterprise\_numberUCC.\$PANCHOR

The sensor on the cows identifies using OX once per hour (the signal is triangulized by three or four GTWY and the location of the cow is stored in the DB associated with the cow)

Also checking if this connection can also send some information of the cow such as temperature to prevent illness or desisease.



# OX more examples

- Using OX for tracking luggage
- Using OX for interoperability within a Smarthouse

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[jdiaz@unlp.edu.ar](mailto:jdiaz@unlp.edu.ar)