## **Thoughts about how to minimize LoRaWAN packet size**

1. **GPS fix Timestamp (currently 5 bytes, before 8)**

Initial timestamp can “flip” the month-day order to save bit depth

M/D/Y/H/M/S

123199235959 37 bits 5 bytes

D/M/Y/H/M/S

311299235959 39 bits 5 bytes

Comments:

* doesn’t really matter if we keep everything at the “byte” level for packet building
* still saves 3 bytes over splitting the “date” versus “time” as 4 bytes each

1. **Latitude and Longitude (currently 6 bytes, before 8)**

GPS resolution is limited by fix time, we can make it more compact by limiting decimals places to 4, which is ± 5.5 meters.

Latitude

1599999 21 bits 3 bytes

Latitude

3599999 22 bits 3 bytes

Comments:

* This saves a byte over sending as 4 bytes, more if we send it bitwise

1. **Horizontal Dilution of Precision (currently 1 byte)**

Comments:

* Hard to optimize, because we want a range of values from 10 to 100, could save a bit or two

1. **Battery Voltage (currently 1 byte)**

Comments:

* Range needs to be between ~ 3.00 and 4.20, 120 steps at 0.01 resolution
* Could represent this a value between 0 and 120 easily, 7 bits or 1 byte

1. **Atmospheric Pressure (currently 3 bytes)**

Pascals

120,000 (full) 17 bits 3 bytes

1. **Temperature (currently 1 byte, before 2 bytes)**

°C

-10 to 50 (0.01) 10 bits 2 bytes

Comments:

* 600 steps at 0.01 resolution. This would require actually 10 bits to represent
* Combine with Pressure and shift by non-byte interval