 <h1 style="margin: 0;">Cayenne LPP (Low Power Payload)</h1>	
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I - Overview

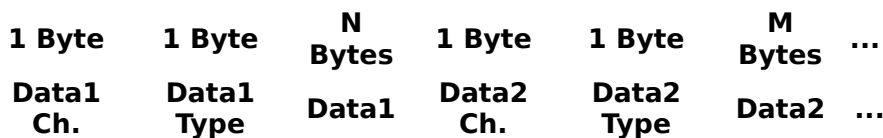
The **Cayenne Low Power Payload (LPP)** provides a convenient and easy way to send data over **LPWAN** networks such as **LoRaWAN**. The Cayenne LPP is compliant with the payload size restriction, which can be lowered down to **11 bytes**, and allows the device to send multiple sensor data at one time.

Additionally, the **Cayenne LPP** allows the device to send different sensor data in different frames. In order to do that, each sensor data must be prefixed with two bytes :

- **Data Channel:** Uniquely identifies each sensor in the device across frames, eg. “indoor sensor”
- **Data Type:** Identifies the data type in the frame, eg. “temperature”.

II - Payload

II.1. Payload Structure



II.2. Data Type

Data Types conform to the **IPSO Alliance Smart Objects Guidelines**, which identifies each data type with an “**Object ID**”. However, as shown below, a conversion is made to fit the **Object ID** into a single **byte**.

$$\text{LPP_DATA_TYPE} = \text{IPSO_OBJECT_ID} - 3200$$

Each data type can use 1 or more bytes to send the data according to the following table.

Type	IPSO	LPP	Hex	Data Size	Data Resolution per bit
Digital Input	3200	0	0	1	1
Digital Output	3201	1	1	1	1
Analog Input	3202	2	2	2	0.01 Signed
Analog Output	3203	3	3	2	0.01 Signed
Illuminance Sensor	3301	101	65	2	1 Lux Unsigned MSB
Presence Sensor	3302	102	66	1	1
Temperature Sensor	3303	103	67	2	0.1 °C Signed MSB
Humidity Sensor	3304	104	68	1	0.5 % Unsigned
Accelerometer	3313	113	71	6	0.001 G Signed MSB per axis
Barometer	3315	115	73	2	0.1 hPa Unsigned MSB
Gyrometer	3334	134	86	6	0.01 °/s Signed MSB per axis
GPS Location	3336	136	88	9	Latitude : 0.0001 ° Signed MSB
					Longitude : 0.0001 ° Signed MSB
					Altitude : 0.01 meter Signed MSB

II.3. Examples

Device with 1 temperature sensor and 1 humidity sensor :

Payload (Hex)	03 67 01 10 05 68 96	
Data Channel	Type	Value
03 ⇒ 3	67 ⇒ Temperature	0110 = 272 ⇒ 27.2°C
05 ⇒ 5	68 ⇒ Humidity	96 = 150 ⇒ 75 %

Device with temperature and acceleration sensors :

Frame N

Payload (Hex)	01 67 FF D7	
Data Channel	Type	Value
01 ⇒ 1	67 ⇒ Temperature	FFD7 = -41 ⇒ -4.1°C

Frame N+1

Payload (Hex)	06 71 04 D2 FB 2E 00 00	
Data Channel	Type	Value
06 ⇒ 6	71 ⇒ Accelerometer	X: 04D2 = +1234 ⇒ +1.234G
		Y: FB2E = -1234 ⇒ -1.234G
		Z: 0000 = 0 ⇒ 0G

Device with GPS :

Payload (Hex)	01 88 06 76 5f f2 96 0a 00 03 e8	
Data Channel	Type	Value
01 ⇒ 1	88 ⇒ GPS	Latitude: 06765f ⇒ 42.3519
		Longitude: F2960a ⇒ -87.9094
		Altitude: 0003E8 ⇒ 10 meters