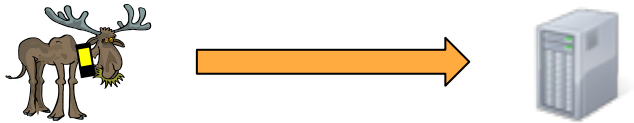
Standardizing data transfer from bio-logging sensors

From sensors to databases: A user perspective



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In the ’old’ days …

- 1 project – Tracking of moose in one single area
- 1 tag/sensor provider
- Few tags/sensors
- Rare data delivery events
- Local data storage
- => manual data handling possible ????

Today: Moose movement research in Sweden

- Several ongoing projects
- 6 tag providers
- 836 tags
- Sensors for GPS, acceleration, heart freq, body temperature, proximity
- Delivery: several times/hour 24-7
- A ’normal’ day:
  > 600 data deliveries (SMS, text files, emails etc.)

Delivery methods

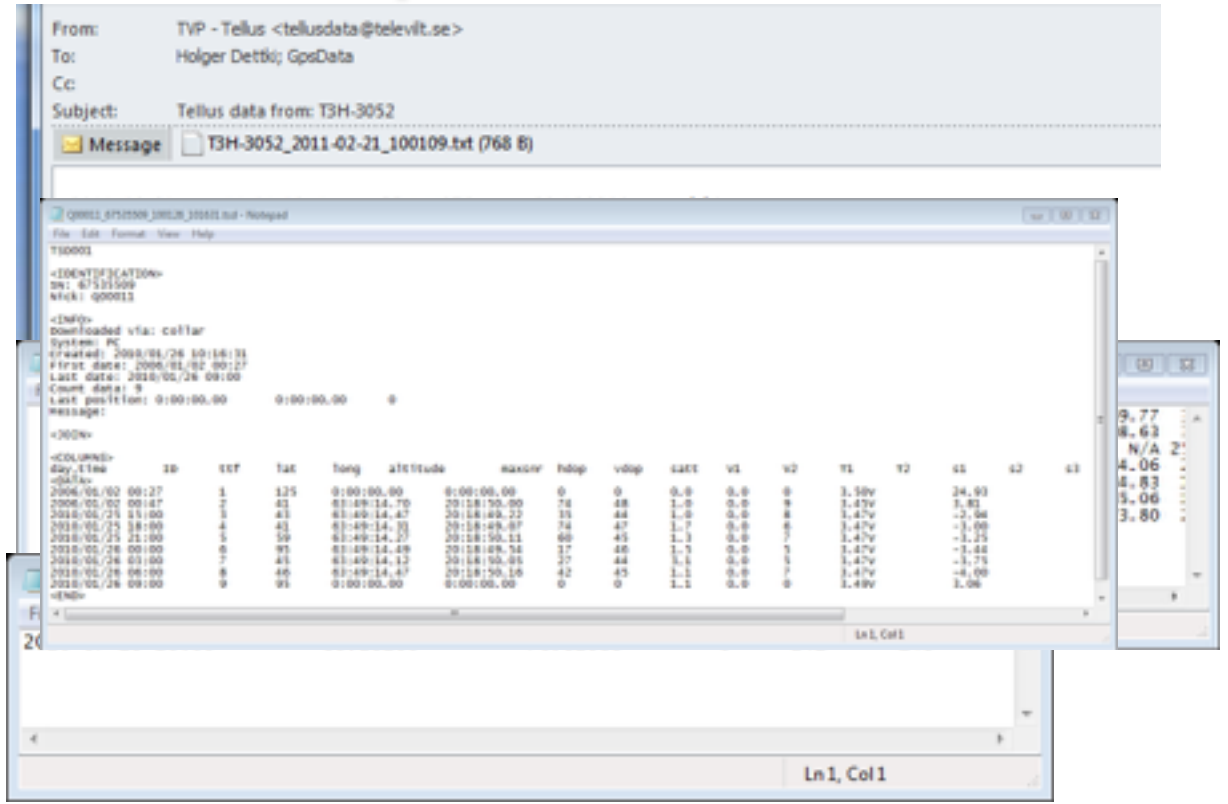
Network	Delivery	VAS	FIT	MTI	TS	Lotek	TVS
GSM	Email attachment	X	X			X	X
GSM	SMS	X				X	
Iridium	Email attachment	X					
ARGOS	Email body (ArgosDirect)			X			
Cable download	Text-file -> Email attachment	X			X		X

- 6 Providers, 7 formats, 3 delivery methods
- Some delivered files are encrypted
- Different formats: Date, time, type of information

Encryption

ARGOSDirect email: Manual parsing needed by propriety software!

Data deliveries - examples



My requirements as a researcher

- Easy handling of my sensor data
  No fussing around with text-files, emails, SMS, json-streams etc.!

- Easy access to ALL my sensor data from DIFFERENT providers in ONE place
  No manual copy/paste, merging, re-formating of values!

- I need to understand what exactly is delivered to me – from my sensors or other dBs
  All data must be documented and follow proper standards – time zones, map datum & projection etc.…

- I need to store information about the use of the sensor on my animals

Solution

- All providers enable direct data delivery to a database (local dB or bio-logging dB)
- Metadata about the sensor (provider, type, version, etc.) is delivered to the dB
- All data/metadata packages are delivered in a standard machine-readable format
- All data values are formatted according to established, documented standards (vocabularies / dictionaries)
- Additional information about sensor-on-animal can be stored in a similar way