

Data Processing & Structures

NOVUS FieldLogger

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IGNITION Living Lab

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Background & Breakdown

Fieldlogger CSV only records the channel name & the datetime.

Metadata about connected sensors (units ranges, etc.) must be manually specified elsewhere and factored into the processing stage on the server.

Increasing the number of channels in use will increase the number of columns in the generated CSV, this will need to be unpivoted for processing to maintain a format that can be parsed efficiently.

The generated CSV from the logger is illegal as it includes an additional header at the start of the file that includes the specified tag for the logger.

Values are encapsulated in double quotes and lines are delimited with a semicolon.

Serial number for the logger is not included in the CSV, but is included in the directory name, could be possible to extract this.

The recorded values in the CSV are stored in a pivoted state which will complicate the processing system because the data will have to be unpivoted using a fixed system with specific routines for each connected sensor.

This will prevent the use of an adaptive system that could flexibly incorporate new sensors into the dataflow without additional work.

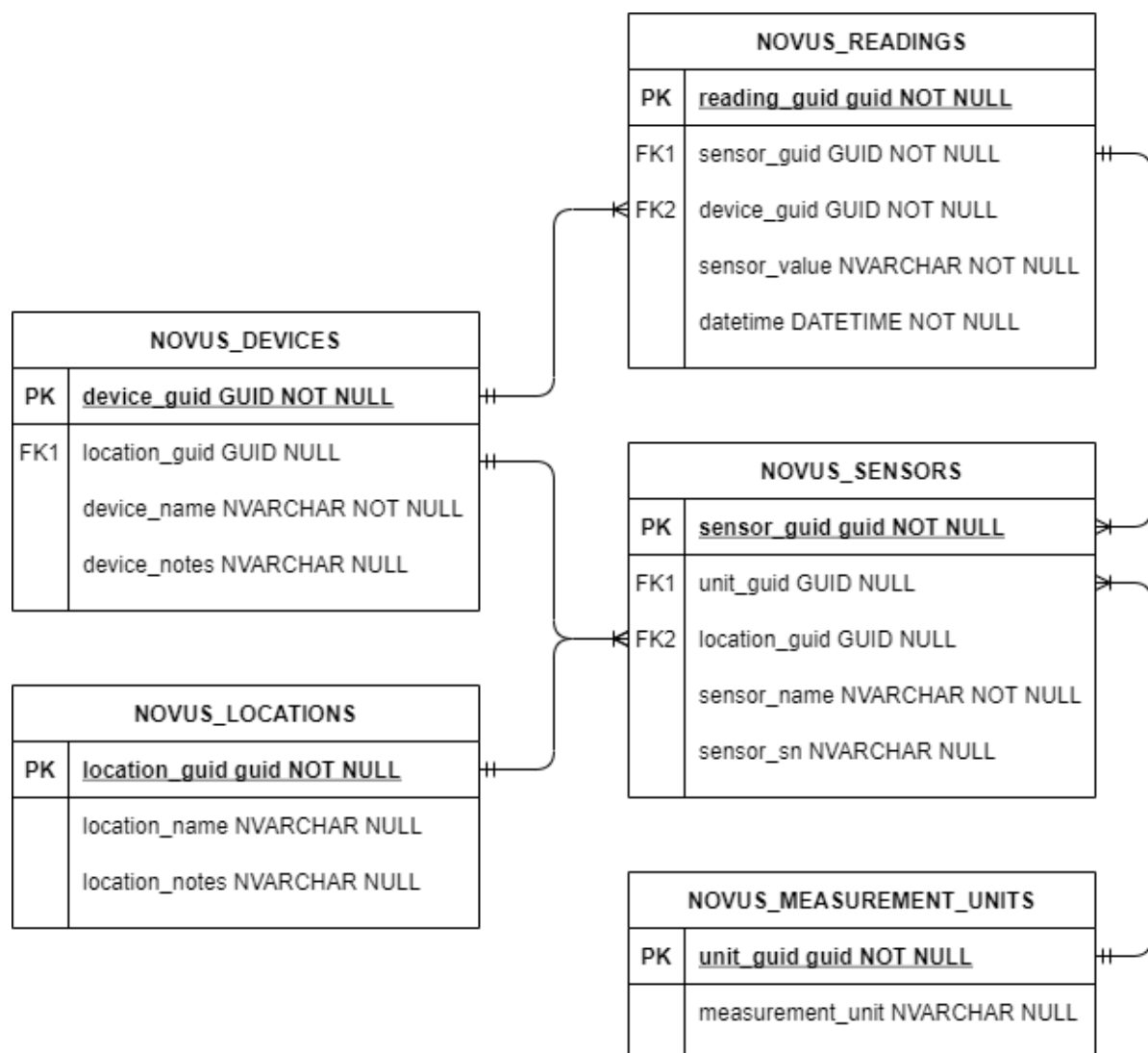
Some variables will change between their raw form and UNF this is because pre-processing will be necessary to prepare the data for normalisation.

RAW Form	UNF	Notes
Logger Name	device_name	The additional header of the CSV will be used to identify the sending device if the serial number is unobtainable.
DATE	datetime	The DATE and TIME fields will be combined into a single value representing datetime.
TIME		
(Channel name) + n header	sensor_name	The header of each channel will be converted into a dedicated variable.
(Channel name) + n	Sensor_value	The sensor value for each sensor will be unpivoted to be stored in a single field.

Normalisation

UNF Repeating attributes indented	1-NF Remove repeating attributes and identify a primary key	2-NF Remove partial dependencies	3-NF Remove non-key dependencies
device_name device_notes datetime sensor_name sensor_value device_location sensor_location sensor_sn measurement_unit	device_GUID device_name device_notes device_location	device_GUID device_name device_notes device_location	device_GUID location_GUID* device_name device_notes
	sensor_GUID sensor_name sensor_value sensor_sn sensor_location measurement_unit datetime	sensor_GUID unit_GUID* sensor_name sensor_sn sensor_location	sensor_GUID unit_GUID* location_GUID* sensor_name sensor_sn
		unit_GUID measurement_unit	unit_GUID measurement_unit
		reading_GUID sensor_GUID* device_GUID* sensor_value datetime	reading_GUID sensor_GUID* device_GUID* sensor_value datetime
			location_GUID location_name location_notes

ERD



Data Dictionaries

Readings

Database:	Living Lab
Entity:	NOVUS_READINGS
Definition:	Contains readings collected by a datalogger.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
reading_GUID	PK	GUID	NA	NA	GUID of the reading.
sensor_GUID	FK	GUID	NA	NA	GUID of the sensors recording the reading.
device_GUID	FK	GUID	NA	NA	GUID of the device recording the sensor reading.
sensor_value	-	NVARCHAR	20	NA	Reading recorded by the sensor.
datetime	-	DATETIME	NA	YYYY/MM/DDTHH:MM:SS	Datetime when the reading was taken.

Devices

Database:	Living Lab
Entity:	NOVUS_DEVICES
Definition:	Contains devices recording data from sensors, typically dataloggers.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
device_GUID	PK	GUID	NA	NA	GUID of a device.
location_GUID	FK	GUID	NA	NA	GUID of a location for a device.
device_name	-	NVARCHAR	30	NA	Name of a device.
device_notes	-	NVARCHAR	MAX	NA	Misc notes about a device.

Sensors

Database:	Living Lab
Entity:	NOVUS_SENSORS
Definition:	Contains data about sensor connected to devices.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
sensor_GUID	PK	GUID	NA	NA	GUID of a sensor.
unit_GUID	FK	GUID	NA	NA	GUID of a measurement unit for the sensor.
location_GUID	FK	GUID	NA	NA	GUID of a location of a sensor.
sensor_name	-	NVARCHAR	30	NA	Name of a sensor.
sensor_sn	-	NVARCHAR	50	NA	Serial number of a sensor.

Locations

Database:	Living Lab
Entity:	NOVUS_LOCATIONS
Definition:	Contains data relating to locations of sensors and devices.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
location_GUID	PK	GUID	NA	NA	GUID of a location.
location_name	-	NVARCHAR	NA	NA	Name of a location.
location_notes	-	NVARCHAR	MAX	NA	Any notes about a location

Measurement Units

Database:	Living Lab
Entity:	NOVUS_MEASUREMENT_UNITS
Definition:	Contains measurement units for connected sensors.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
unit_GUID	PK	GUID	NA	NA	GUID of a measurement unit.
measurement_unit	-	NVARCHAR	NA	NA	Name of a measurement unit.