

Data Processing & Structures

iMonnit

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IGNITION Living Lab

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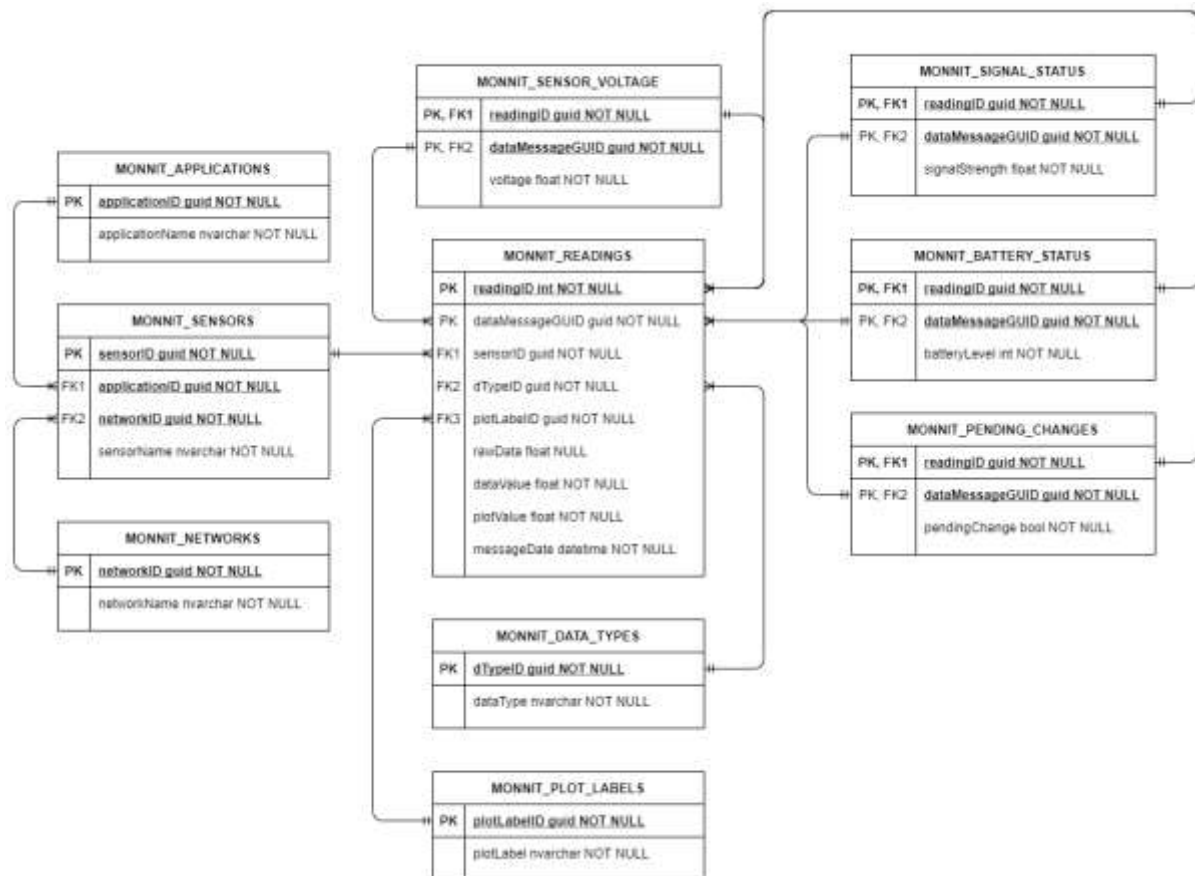
Normalisation

Sensor Data

UNF Repeating attributes indented	1NF Remove repeating attributes and identify PK	2NF Remove partial dependencies	3NF Remove non-key dependencies
sensorID sensorName applicationID dataMessageGUID sensorState messageDate rawData dataType dataValue plotValues plotLabels batteryLevel signalStrength pendingChange voltage gatewayID gatewayName accountID networkID messageType gatewayPower batteryLevel gatewayDate gatewayCount signalStrength pendingChange	sensorID sensorName applicationID networkID	sensorID sensorName applicationID networkID	sensorID sensorName applicationID* networkID*
	dataMessageGUID rawData dataValue plotValues messageDate	dataMessageGUID rawData dataValue plotValues messageDate	readingID dataMessageGUID sensorID* dTypeID* plotLabelID* rawData dataValue plotValues messageDate
	dataType	dataType	dTypeID dataType
	plotLabels	plotLabels	plotLabelID plotLabels
	batteryLevel	batteryLevel	readingID* dataMessageGUID* batteryLevel
	signalStrength	signalStrength	readingID* dataMessageGUID* signalStrength
	pendingChange	pendingChange	readingID* dataMessageGUID* pendingChange
	voltage	voltage	readingID* dataMessageGUID* voltage
			applicationID applicationName
			networkID networkName
			accountID accountName
	gatewayID gatewayName accountID messageType gatewayPower batteryLevel gatewayDate gatewayCount signalStrength pendingChange	gatewayID gatewayName accountID messageType gatewayPower batteryLevel gatewayDate gatewayCount signalStrength pendingChange	gatewayID gatewayName accountID* messageType gatewayPower batteryLevel gatewayDate gatewayCount signalStrength pendingChange

Entity Relations

Sensor Data



Data Dictionaries

Sensors

Sensors

Database:	salfordMove
Entity:	SENSORS
Definition:	Contains fixed data for individual sensors

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
sensorID	PK	GUID	-	N/A	GUID of a specific sensor, is unique because each sensor should only have one entry.
sensorName	-	NVARCHAR	20	N/A	The name of the sensor. Used for initially finding if a sensor exists in the DB.
applicationID	FK	INT	-	00000 - 99999	ID of the application that the sensor is associated with. (Data from MONNIT)
networkID	FK	INT	-	00000 - 99999	ID of the network that the sensor is associated with. (Data from MONNIT)

Readings

Database:	salfordMove
Entity:	READINGS
Definition:	Contains data relating to measurements collected by the installed sensors.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
readingID	PK	GUID	-	N/A	GUID generated when a reading is written to the database.
dataMessage GUID	PK	GUID	-	N/A	GUID generated by MONNIT for a set of readings from a specific sensor. Some sensors have multiple measurands, so this field duplicates after data is split.
sensorID	FK	GUID	-	N/A	GUID for the sensor that collected the reading. Foreign key from Sensors table
rawData	-	NVARCHAR	5	N/A	The raw value recorded by the sensor.
dataValue	-	NVARCHAR	5	N/A	The value recorded by the sensor with respect to its data type. Actual difference from rawData unclear, likely interchangeable.
dataTypeID	FK	GUID	-	N/A	GUID for the data type of the current reading. Foreign key from Data Types table.
plotValue	-	NVARCHAR	5	N/A	The value recorded by the sensor with respect to its recorded Plot Label. Actual difference from rawData unclear, likely interchangeable.
plotLabelID	FK	GUID	-	N/A	GUID for the plot label of the current reading. Foreign key from Plot Labels table
messageDate	-	DATETIME	-	YYYY-MM-DD HH:MM:SS	The datetime when the reading was collected by the sensor.

Data Types

Database:	salfordMove
Entity:	DATA_TYPES
Definition:	Table for storing data relating to the data types of the readings stored in the Readings table

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
dTypeID	PK	GUID	-	N/A	GUID generated to identify a data type.
dataType	-	NVACHAR	10	N/A	The data type of a value in the Readings table.

Plot Labels

Database:	salfordMove
Entity:	PLOT_LABELS
Definition:	Table for storing data relating to the plot labels of the readings stored in the Readings table

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
plotLabelID	PK	GUID	-	N/A	GUID generated to identify a plot label.
dataType	-	NVARCHAR	10	N/A	The data type of a value in the Readings table.

Battery Status

Database:	salfordMove
Entity:	BATTERY_STATUS
Definition:	Table for storing the battery status of a sensor when a reading was taken.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
readingID	PK/FK	GUID	-	N/A	GUID for a specific reading, referenced to the Readings table. Used as part of a composite key.
dataMessage GUID	PK/FK	GUID	-	N/A	GUID from the MONNIT dataset identifying a specific set of readings, used as part of a composite key.
batteryLevel	-	INT	-	N/A	Integer reading of the battery level of the sensor when a reading was taken.

Signal Status

Database:	salfordMove
Entity:	SIGNAL_STATUS
Definition:	Table for storing the signal strength of a sensor when a reading was taken.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
readingID	PK/FK	GUID	-	N/A	GUID for a specific reading, referenced to the Readings table. Used as part of a composite key.
dataMessage GUID	PK/FK	GUID	-	N/A	GUID from the MONNIT dataset identifying a specific set of readings, used as part of a composite key.
signalStrength	-	FLOAT	-	N/A	Float representing the signal strength of a sensor when a reading was taken.

Pending Changes

Database:	salfordMove
Entity:	PENDING_CHANGES
Definition:	Table for storing if a sensor has any outstanding changes to be applied to its configuration when a reading was taken.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
readingID	PK/FK	GUID	-	N/A	GUID for a specific reading, referenced to the Readings table. Used as part of a composite key.
dataMessage GUID	PK/FK	GUID	-	N/A	GUID from the MONNIT dataset identifying a specific set of readings, used as part of a composite key.
pendingChange	-	BIT	-	N/A	Boolean/Bit representing if a change was scheduled or not.

Sensor Voltage

Database:	salfordMove
Entity:	VOLTAGE
Definition:	Table for storing the current voltage reading of a sensor when a reading was taken.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
readingID	PK/FK	GUID	-	N/A	GUID for a specific reading, referenced to the Readings table. Used as part of a composite key.
dataMessage GUID	PK/FK	GUID	-	N/A	GUID from the MONNIT dataset identifying a specific set of readings, used as part of a composite key.
voltage	-	FLOAT	-	N/A	Float representing the voltage level of a sensor when a reading was taken.

Miscellaneous

Applications

Database:	salfordMove
Entity:	APPLICATIONS
Definition:	Table for storing simple metadata about the applications the MONNIT sensors are assigned to. Data aggregated from MONNIT data JSON.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
applicationID	PK	INT	-	00000 - 99999	ID of the application that the sensor is associated with. (Data from MONNIT)
applicationName	-	NVARCHAR	20	N/A	Name of an application.

Networks

Database:	salfordMove
Entity:	NETWORKS
Definition:	Table for storing simple metadata about the networks the MONNIT sensors are assigned to. Data aggregated from MONNIT data JSON.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
networkID	PK	INT	-	00000 - 99999	ID of the network that the sensor is associated with. (Data from MONNIT)
networkName	-	NVARCHAR	20	N/A	Name of a network.

Accounts

Database:	salfordMove
Entity:	ACCOUNTS
Definition:	Table for storing simple metadata about the accounts the MONNIT sensors are assigned to. Data aggregated from MONNIT data JSON.

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
accountID	PK	INT	-	00000 - 99999	ID of the account that the gateway is associated with. (Data from MONNIT)
accountName	-	NVARCHAR	20	N/A	Name of an account.

Gateways

Database:	salfordMove
Entity:	GATEWAYS
Definition:	Data relating to gateways associated with the Monnit platform. Data is l

Attribute	Key	Data Type	Size	Input Mask/Validation	Definition
gatewayID	PK	INT	-	000000 - 999999	Integer generated by Monnit for identifying a specific gateway.
gatewayName	-	NVARCHAR	20	N/A	The name given to the gateway.
accountID	-	INT	-	N/A	Integer generated by Monnit for identifying an account the gateway is assigned to.
messageType	-	NVARCHAR	100	N/A	Data generated by Monnit. Unclear what its purpose is.
gatewayPower	-	INT	20	N/A	Likely represents if the gateway is online. Unclear why it's recorded.
batteryLevel	-	INT	-	N/A	Integer reading of the battery level of the sensor when a reading was taken.
gatewayDate	-	DATETIME		N/A	The datetime of the gateway when the data was sent.
gatewayCount	-	INT	-	N/A	Data generated by Monnit. Unclear what its purpose is.
signalStrength	-	INT	-	N/A	Float representing the signal strength of a gateway when the data was sent.
pendingChange	-	BIT	-	N/A	Boolean/Bit representing if a change was scheduled or not.