SignalFire Ranger – MQTT Sparkplug B Implementation

The SignalFire Ranger uses MQTT messaging to publish its sensor data to a MQTT broker. MQTT is a transport protocol designed to be a lightweight publish-subscribe protocol which is ideal for low-power/low-bandwidth IIot devices and is quickly being adopted by many device and SCADA systems. Sparkplug is an open specification that defines things such as the Topic Namespace, State Management, and Payload which allows IIoT devices to easily interoperate. Devices that follow the Sparkplug specification allow for auto discovery of data without any configuration.

For these reasons, the Ranger utilizes the Sparkplug B specification for publishing data and receiving commands over MQTT.

The flowing is a brief description of how the Ranger is following the Sparkplug B specification. For specific details on Sparkplug B, the specification can be found here: https://www.eclipse.org/tahu/spec/Sparkplug%20Topic%20Namespace%20and%20State%20ManagementV2.2-with%20appendix%20B%20format%20-%20Eclipse.pdf

In Sparkplug, edge nodes like the Ranger publish their data to MQTT topics in the following format:

namespace/group_id/message_type/edge_node_id/[device_id]

The **namespace** is always "spBv1.0". The **group_id** usually indicates the company or group of the edge node, the default is "none" until it is configured. The **edge_node_id** is the unique name for that edge node, the Ranger uses its modem's IMEI by default. The **device_id** is only used for reporting individual sub-devices of the edge node (expansion cards, Modbus slave devices, etc).

The **message_type** type depends on which direction the message is being sent, and the context of the edge node's connection.

After the Ranger first connects to the MQTT broker, it will send a **NBIRTH** message with all its metrics, including their names, aliases, min/max/units, and initial values. From that point on, the Ranger will send **NDATA** messages on every report interval containing the aliases and values of metrics that have changed in value. The server can also send commands to the Ranger by sending **NCMD** messages, usually to write a given metric to a new value.

When the edge node disconnects, an **NDEATH** message will be sent to indicate that it is no longer active, and its data tags have old values.

SignalFire also has a document containing the details of the tag names used by the Ranger which can be downloaded from the Ranger product page here: https://signal-fire.com/lte-m1-cellular-products/ranger-node/