

A wide-angle photograph of a grassy hill under a blue sky with scattered clouds. Several tall, metal communication towers with various antennas and equipment are visible on the hill. Some trees and small buildings are also present on the hillside.

The sensible IoT network

LoRa Workshop

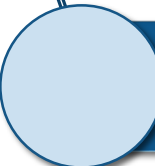
PALO ALTO, CA

JULY 2015

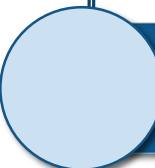
What we do

A light blue circle with a thin black outline, connected to the next circle by a thin black line.

Low power, wide area Network as a Service provider for IoT solutions

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Public LoRaWAN network for North America

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Scalable, cloud-based, Software-Defined Network architecture

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Application on-boarding, data streaming and warehousing

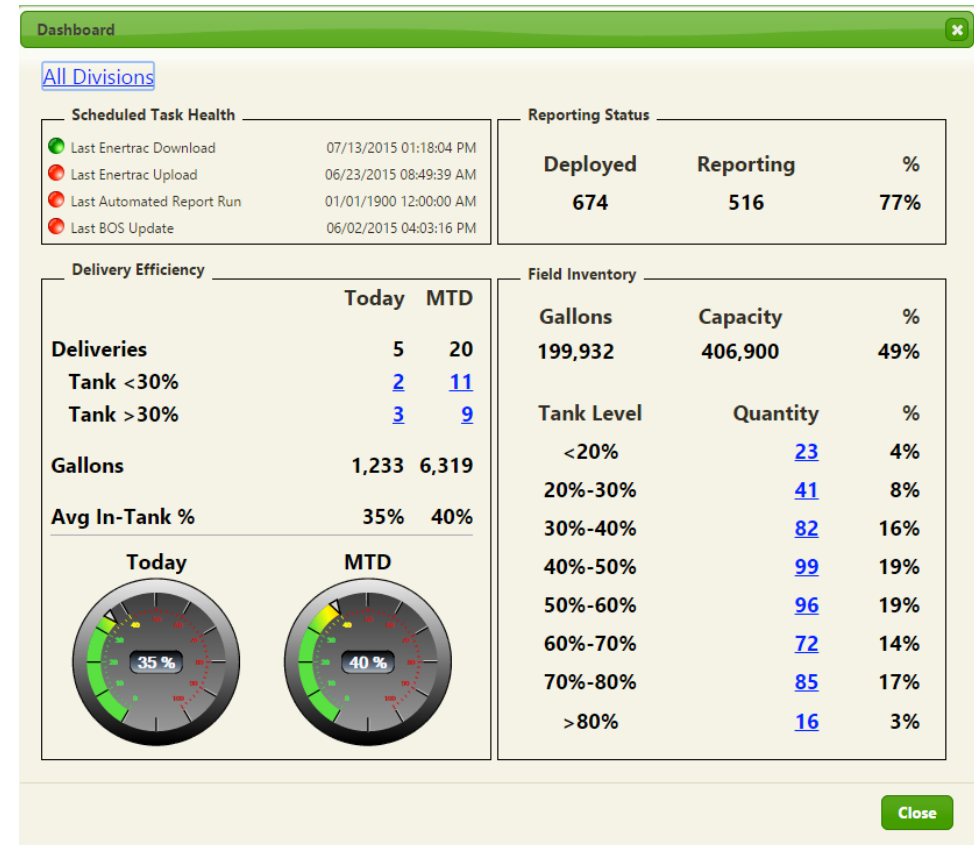
Enertrac^{SE} – Senet's Example Solution

End-to-End solution for Fuel Delivery Automation

- LoRaWAN Sensors
 - First FCC certified LoRaWAN end-device
 - FHSS, Hybrid, DTS capable at +20dBm
 - >7 year battery life w/2000 mAh AA
- Data streaming
 - Integrated with all major industry ERP systems
- Cloud-based monitoring and reporting
 - Fuel dealer/distributor aggregation
 - End-customer portal

Compelling value-driven solution

- Saves 10-15% on dealer total operational costs
- ~50k sensors deployed



North American Network Coverage

58 LoRa macro cell base stations installed

- 72 channel NA plan
- ~700 sq-miles per base station

~40k sq-miles

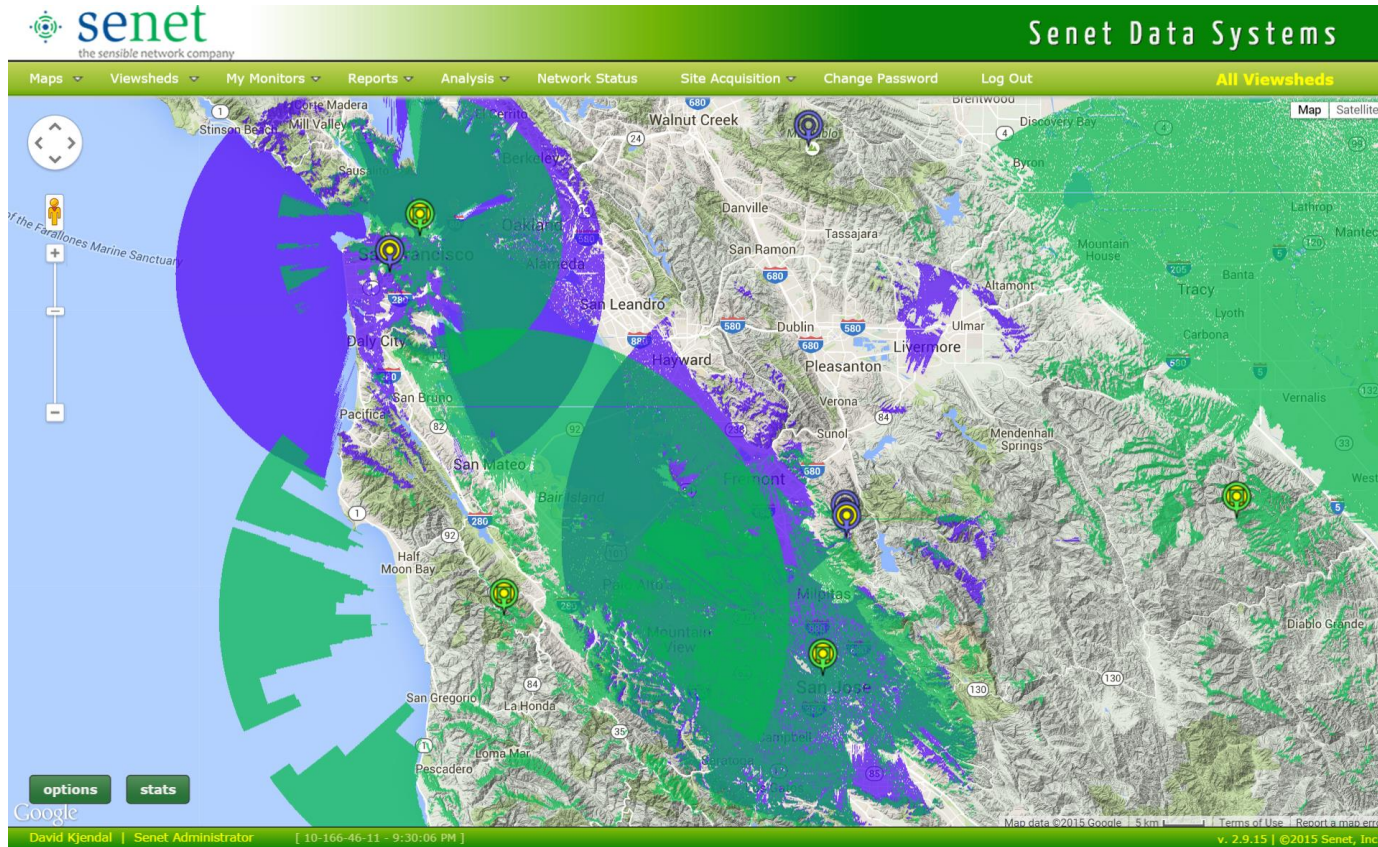
Geographic centers

- California
- North East
- Mid West

Build-out follows the applications



SF Bay Area Coverage



Broad coverage throughout the majority of the SF Bay Area

Blue indicates in-process

Network operational since March 2015

Extensive range-testing confirms viewshed accuracy

Macro Cell Base Stations



Full NA 72 channel plan capable

- Provides complete utilization of the available 902-928 bandwidth
- Supports all types of LoRaWAN end-devices
 - +30 dBm FHSS
 - +20 dBm Hybrid
 - +26 dBm DTS

Average mounting height +200' above ground level

- Preference for high ground (mountain tops)
- Longest recorded reception is > 100 miles with +20 dBm end-device
- Rural and sub-urban coverage planning based on 15 mile expected range
 - Outdoor end-device deployment
- Urban coverage planning based on 3-5 mile expected range

LoRaWAN Interoperability

Senet's network is LoRaWAN 1.0 compliant

End-device verified interoperability

- Source code
 - GitHub LoRaMAC 3.2
 - IBM LMIC 1.5
 - Semtech mbed LMIC_MOTE_L152RC
- Turn-key modules
 - Multitech mDot
 - Microchip LoRa PICTail (pre-release)
- Independent Implementations

Contributing members of the LoRa-Alliance





Application Developer Support

Developer portal to
provision up to 10 devices

Snapshots of last activity

Provision device specific
keys for the developer
network

Configure stream
forwarding

app.senetco.com/senetdev



Dave Kjendal
Senet, Inc

App EUI: 00250C0000010001

REQUEST NEW EUI BLOCK										LOG OUT
Last refresh: July 22, 2015 10:18:46 PM										Refresh
	EUI	Description	Join ID	Last Reported	Last Gateway	Last RSSI	Last SNR	Forward API	Last PDU	
   	00250C0100000011	LoRaMote #2	1547	July 22, 2015 08:53:42 AM	00250C0001000000	-80	10.5	None	001D003CBE3FCD363F0031	
   	00250C0100000010	LoRaMote #1	1348	July 22, 2015 08:53:26 AM	00250C0001000000	-70	12.25	None	001EE43CBE3FCD364D002F	
   	00250C0100000283	Senet Oil Monitor 283	13	July 22, 2015 10:19:02 PM	00250C0001000000	-81	9.5	M2X	010300000000FFFFFFFFF00	
   	0080000000009B87	mDot-9B87	10	July 18, 2015 07:41:16 AM	00250C00010000FF	-63	9	M2X	002334	
   	0080000000009C49	mDot-EVB 9C49	14	July 20, 2015 06:37:30 AM	00250C00010000FF	-57	8.25	M2X	0001	

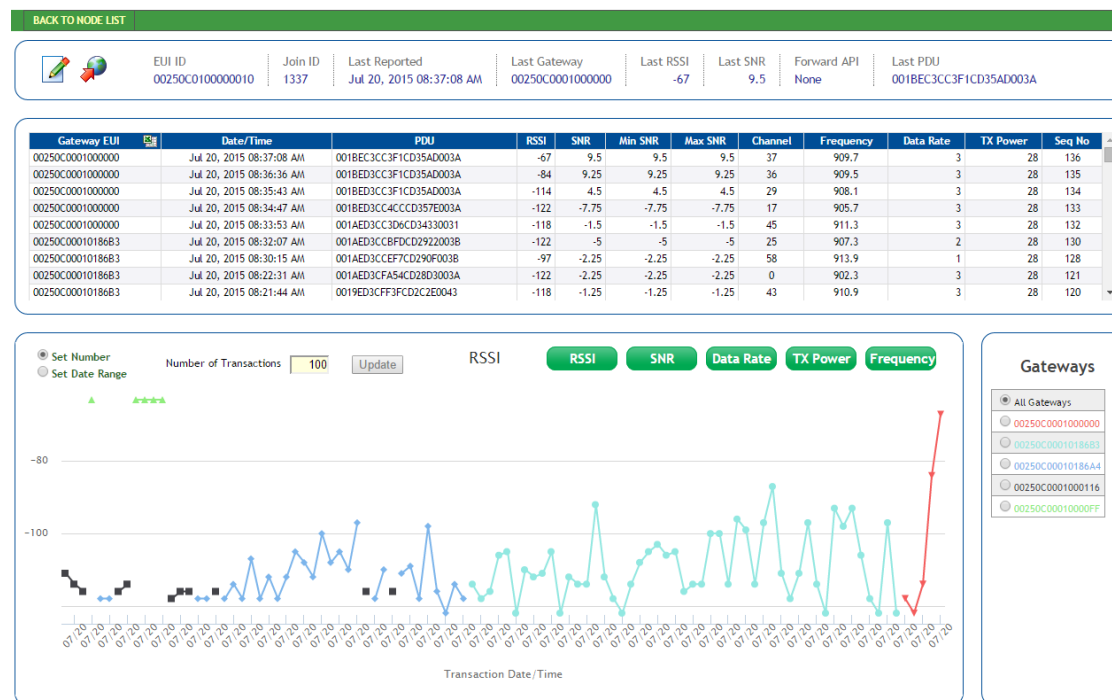
End-Device Details

Queue downlink messages

Manage the downlink queue

Export uplink message and meta data

Visualize RF meta data





Thank You

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