### Overview

This working example provides a great overview of streaming sensor data into a small low cost Vertica single node database. Live data feeds are captured in real-time. D kidding on setup location expect to receive hundreds up to thousands of data rows per second! In the provided examples data is batched into 10,000 row chunks and loaded into Vertica continually. Enhancements to the raw flight data include the FAA aircraft registration database, flight arrival and departure data for historical purposes. Use the built-in Vertica geospatial functions to calculate distance, airspeed and routing.

### IoT Device (edge)

**Raspberry pi Model 3**

CPU Broadcom BCM2837
1.2 GHz quad-core ARM Cortex A53
1 GB LPDDR2-900 SDRAM

**1090MHz antenna**

Receive data within a 150 mile radius based on antenna location and area.

### Vertica SQL

```sql
create table dump1090 (  record_type          char(3),  record_type_num integer,  sg_session_id integer,  sg_aircraft_id integer,  hex_ident varchar(10),  sg_flight_id integer,  msg_gen_ts timestamp,  msg_log_ts timestamp,  call_sign   varchar(12),  altitude   integer,  ground_speed integer,  track       integer,  latitude   decimal(8,5),  longitude  decimal(8,5),  vertical_rate integer,  squawk      varchar(12),  alert       integer,  emergency integer,  spi integer,  ts_on_ground integer);
```

### Dump1090 is a simple Mode S decoder for RTLSDR devices

**Example decoded message**

```
M56,3,1,1,1,62608B,1,2017/04/24,22:03:33.105,2017/04/24,22:03:33.121,,36000,,,34.65
```

### Commands to collect dump1090 data and load into Vertica

```bash
nc localhost 30003 | head -10000 > batch.txt
```

Cat newest batch of rows pipe to ssh command to Vertica server, dumpfix reformats date into standard TIMESTAMP format for Vertica COPY.

```bash
cat batch.txt | ssh dbadmin@192.168.1.8 "cat - | /home/dbadmin/dumpfix > /home/dbadmin/dump.pipe" >> load.log
```

### Optional: Kafka Integration

Kafka is designed for a streaming use case (high volumes of data with low latency). Using the Kafka integration feature, data enters Kafka as a message. A feed of messages in a common category come together to form topics. Kafka divides the topics up into partitions that it can be fed in parallel to Vertica target tables and analyzed by you.

**Consumer:** Vertica

**Producer:** data stream

**Job scheduler**

**Kafka cluster**

**Kafka**

**Vertica 8.1.0 Database Server**

1-node, < $1,000, Intel i5 CPU
3.20GHz, SSD Disk, 16GB RAM, CentOS 7

### Edge Analytics

Collect data from multiple Vertica edge devices into a central location cloud or private data center to provide broad historical coverage, predictive analytics.

For more information [www.vertica.com/iot](http://www.vertica.com/iot)