BCPR203 Database Management Systems

Assignment One:

Signal Tester Log Database Analysis

for Vector Advanced Metering Services (AMS)

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# Introduction

antennaTestType ENUM('Blade', 'Whip', 'Blade&Whip'), the test equipment has ability to test blade and whip antennas at the same. Although vector has not tested both antennas at the same time, there are possibility that vector will test both antennas at the same time in the future. Therefore, a data of 'Blade&Whip' is included in the ENUM of antennaTestType attribute in Test Table

A constraint of NOT NULL AUTO\_INCREMENT was added in the attributes such as thresholdId in Threshold Table, testId in Test Table and BtSigId in BluetoothSignal Table. A constraint of NOT NULL was added in the attributes testId in Test Table (not auto-increment for prevent mis-match between PK and FK).

A constraint of NOT NULL was added in the attributes testId in Test Table and Job Table.

The attribute testId in Job Table was set to be Unique Key, Foreign Key and part of the composite primary key.

All PK and FK and UK are set as NOT NULL.

# Data Cleansing

antennaTestType: Blade and/or Whip

Signal Result Vodafone Blade: Fail

Signal Result Vodafone Whip: Fail (fake fail) fail is because the test was not done but not really a fail (correct the data to ‘NotTested’)

Signal Result Telstra Blade: Pass

Signal Result Telstra Blade: Fail (it should be whip)

Signal Result External Modem: Fail (add a Denied) Vector answer: These corresponds to the network status of the modem. Sometimes I noticed the signal failed and it is not due to poor signal, but the network rejects the modem from registering.

For RSSI, RSCP & RSRP, Data cleansing is required. Some values of zero are not because the tests got zero but because the tests were not conducted or the network was denied. For these cases, the zero will be changed to Null.

For RSSI, RSCP & RSRP, Client required to round the numerical values to 2 decimal points

For Timeout, Data cleansing is required. Some values of False are not because the tests got False but because the tests were not conducted. For these cases, the False will be changed to Null.

For Network attributes (5 similar items), Data cleansing is required. Values of Unknown were because the networks were not used or the connections were denied. The unknown values were changed to NULL or Denied if not tested or Denied accordingly

Raw Array Vodafone Blade: [] Empty arrays are not inserted into RawData table

Found 16 data in 2.txt file and 5.txt file

Frequency number I ??????? in 4.txt and don’t know the network provider

Address the null used in the missing of GPS value

My git <https://github.com/harrykhlo/DatabaseAnalysis>

# Database Normalisation

## 1st Normalised Form

### Primary Key

A composite primary key consisting of the Bluetooth Name, the Work Order and the Date is chosen to represent an entire individual signal tester logfile. For convenient propose, a primary key named JobId is introduced to represent this composite key. The representatives (Andy and Marco, named representatives hereinafter) from Vector mentioned that the Bluetooth Name in the logfile is unique and the combination of the Work Order and Date in the logfile is unique too.

### Partial Dependency

### Transitive Dependency

## 2nd Normalised Form

## 3rd Normalised Form

# Entity Relationship Diagram

## Identify Entity Relationship

## Data Dictionary

# Suggestions

dataNature attribute in the RawData Table is a composite attribute can be separated, then the database size can be reduced.

Logfiles after Data Cleansing (corrected data are highlighted in yellow)

Logfile: 1.txt

User Name: Eevee

Work Order: WO-00251301

Bluetooth Name: REAPER

Date: 19-2-2019--13-14

Antenna Test Type: Blade

Signal Result Vodafone Blade: Denied

Signal Result Vodafone Whip: NotTested

Signal Result Telstra Blade: Pass

Signal Result Telstra Whip: NotTested

Signal Result External Modem: NotTested

RSSI Vodafone Blade: NULL

RSSI Vodafone Whip: NULL

RSSI Telstra Blade: NULL

RSSI Telstra Whip: NULL

RSSI External Modem: NULL

RSCP Vodafone Blade: NULL

RSCP Vodafone Whip: NULL

RSCP Telstra Blade: NULL

RSCP Telstra Whip: NULL

RSCP External Modem: NULL

RSRP Vodafone Blade: NULL

RSRP Vodafone Whip: NULL

RSRP Telstra Blade: 61.13

RSRP Telstra Whip: NULL

RSRP External Modem: NULL

RSSI Threshold: 6.0

RSSI Higher Threshold: 12.0

RSCP Threshold: 15.0

RSCP Higher Threshold: 30.0

RSRP Threshold: 10.0

RSRP Higher Threshold: 20.0

Timeout Vodafone Blade: True

Timeout Vodafone Whip: NULL

Timeout Telstra Blade: False

Timeout Telstra Whip: NULL

Timeout External Modem: NULL

Network Vodafone Blade: Denied

Network Vodafone Whip: NULL

Network Telstra Blade: "Telstra Mobile"

Network Telstra Whip: NULL

Network External Modem: NULL

Raw Array Vodafone Blade: Ignored (not going to insert into database)

Raw Array Vodafone Whip: Ignored (not going to insert into database)

Raw Array Telstra Blade: ["58\_12-6", "61\_19-6", "61\_30-6", "61\_30-6", "62\_30-6", "62\_32-6", "62\_32-6", "61\_26-6", "61\_26-6", "61\_30-6", "61\_29-6", "61\_21-6", "62\_27-6", "62\_27-6", "61\_31-6"]

Raw Array Telstra Whip: Ignored (not going to insert into database)

Raw Array External Modem: Ignored (not going to insert into database)

BT Signal: [-59.0, -52.0]

GPS Long : NULL

GPS Lat: NULL

GPS Accuracy: kCLLocationAccuracyKilometer

Device Type: iPad6,12

SIM Vodafone: 89314404000248157530

SIM Telstra: 89610180002243817774

SIM External: NULL

Serial No: SDS-196B

Firmware No: GAT-17R3

App Version No: 2.2.5

Battery Level: 3.92

Modem Type: EWM400

Modem Status Vodafone Blade: Registeration Denied

Modem Status Vodafone Whip: NULL

Modem Status Telstra Blade: Registered, home network

Modem Status Telstra Whip: NULL

Modem Status External: NULL

Logfile: 2.txt

User Name: Pikachu

Work Order: WO-00104116

Bluetooth Name: CORSSRAY

Date: 1-5-2018--8-5

Antenna Test Type: Blade

Signal Result Vodafone Blade: Pass

Signal Result Vodafone Whip: NotTested

Signal Result Telstra Blade: Pass

Signal Result Telstra Whip: NotTested

Signal Result External Modem: NotTested

RSSI Vodafone Blade: NULL

RSSI Vodafone Whip: NULL

RSSI Telstra Blade: NULL

RSSI Telstra Whip: NULL

RSSI External Modem: NULL

RSCP Vodafone Blade: 14.65

RSCP Vodafone Whip: NULL

RSCP Telstra Blade: 20.5

RSCP Telstra Whip: NULL

RSCP External Modem: NULL

RSRP Vodafone Blade: 23.08

RSRP Vodafone Whip: NULL

RSRP Telstra Blade: 21.77

RSRP Telstra Whip: NULL

RSRP External Modem: NULL

RSSI Threshold: 6.0

RSSI Higher Threshold: 12.0

RSCP Threshold: 15.0

RSCP Higher Threshold: 30.0

RSRP Threshold: 10.0

RSRP Higher Threshold: 20.0

Timeout Vodafone Blade: False

Timeout Vodafone Whip: NULL

Timeout Telstra Blade: False

Timeout Telstra Whip: NULL

Timeout External Modem: NULL

Network Vodafone Blade: "vodafone AU"

Network Vodafone Whip: NULL

Network Telstra Blade: "Telstra Mobile"

Network Telstra Whip: NULL

Network External Modem: NULL

Raw Array Vodafone Blade: ["39\_33-1", "39\_33-1", "39\_37-1", "99\_99-0", "99\_99-0", "99\_99-0", "99\_99-0", "99\_99-0", "40\_18-4", "40\_18-4", "40\_18-4", "39\_29-4", "39\_23-4", "39\_23-4", "40\_29-4"]

Raw Array Vodafone Whip: Ignored (not going to insert into database)

Raw Array Telstra Blade: ["41\_33-2", "41\_33-2", "41\_33-2", "99\_99-0", "99\_99-0", "99\_99-0", "28\_6-4", "29\_6-4", "29\_6-4", "28\_4-4", "28\_7-4", "27\_2-4", "28\_6-4", "29\_11-4", "29\_11-4", "28\_7-4"]

Raw Array Telstra Whip: Ignored (not going to insert into database)

Raw Array External Modem: Ignored (not going to insert into database)

BT Signal: [-76.0, -72.0, -66.0]

GPS Long :152.752432376289

GPS Lat: -27.6047716895375

GPS Accuracy: kCLLocationAccuracyKilometer

Device Type: iPad Air

SIM Vodafone: 89314404000248186935

SIM Telstra: 89610180002249048341

SIM External: NULL

Serial No: SDS-043C

Firmware No: GAT-17R3

App Version No: 2.2.5

Battery Level: 3.92

Modem Type: EWM400

Modem Status Vodafone Blade: Registered, Roaming

Modem Status Vodafone Whip: NULL

Modem Status Telstra Blade: Registered, home network

Modem Status Telstra Whip: NULL

Modem Status External: NULL

Logfile: 3.txt

User Name: Celebi

Work Order: WO-00105349

Bluetooth Name: DIXIE

Date: 30-4-2018--14-48

Antenna Test Type: Blade

Signal Result Vodafone Blade: Denied

Signal Result Vodafone Whip: NotTested

Signal Result Telstra Blade: Pass

Signal Result Telstra Whip: NotTested

Signal Result External Modem: NotTested

RSSI Vodafone Blade: NULL

RSSI Vodafone Whip: NULL

RSSI Telstra Blade: NULL

RSSI Telstra Whip: NULL

RSSI External Modem: NULL

RSCP Vodafone Blade: NULL

RSCP Vodafone Whip: NULL

RSCP Telstra Blade: 27.2

RSCP Telstra Whip: NULL

RSCP External Modem: NULL

RSRP Vodafone Blade: NULL

RSRP Vodafone Whip: NULL

RSRP Telstra Blade: NULL

RSRP Telstra Whip: NULL

RSRP External Modem: NULL

RSSI Threshold: 6.0

RSSI Higher Threshold: 12.0

RSCP Threshold: 15.0

RSCP Higher Threshold: 30.0

RSRP Threshold: 10.0

RSRP Higher Threshold: 20.0

Timeout Vodafone Blade: True

Timeout Vodafone Whip: NULL

Timeout Telstra Blade: False

Timeout Telstra Whip: NULL

Timeout External Modem: NULL

Network Vodafone Blade: Denied

Network Vodafone Whip: NULL

Network Telstra Blade: "Telstra Mobile"

Network Telstra Whip: NULL

Network External Modem: NULL

Raw Array Vodafone Blade: Ignored (not going to insert into database)

Raw Array Vodafone Whip: Ignored (not going to insert into database)

Raw Array Telstra Blade: ["28\_31-2", "26\_27-2", "26\_27-2", "26\_25-2", "26\_25-2", "26\_25-2", "25\_27-2", "25\_27-2", "28\_31-2", "28\_31-2", "28\_31-2", "30\_29-2", "30\_29-2", "25\_25-2", "25\_25-2", "25\_25-2", "26\_29-2", "26\_29-2", "26\_29-2", "28\_29-2", "28\_29-2", "28\_29-2", "28\_29-2", "28\_29-2", "29\_31-2", "29\_31-2", "28\_31-2", "28\_31-2", "28\_31-2", "29\_31-2"]

Raw Array Telstra Whip: Ignored (not going to insert into database)

Raw Array External Modem: Ignored (not going to insert into database)

BT Signal: [-83.0, -74.0, -79.0]

GPS Long :139.34259429587

GPS Lat: -35.6776790181507

GPS Accuracy: kCLLocationAccuracyKilometer

Device Type: iPad Air

SIM Vodafone: 89314404000266650267

SIM Telstra: 89610180002249046930

SIM External: NULL

Serial No: SDS-061C

Firmware No: GAT-17R3

App Version No: 2.2.5

Battery Level: 3.88

Modem Type: EWM400

Modem Status Vodafone Blade: Not Registered, searching for network

Modem Status Vodafone Whip: NULL

Modem Status Telstra Blade: Registered, home network

Modem Status Telstra Whip: NULL

Modem Status External: NULL

Logfile: 4.txt

User Name: Snorlax

Work Order: WO-00110610

Bluetooth Name: ASSAM

Date: 17-4-2018--10-41

Antenna Test Type: Blade

Signal Result Vodafone Blade: NotTested

Signal Result Vodafone Whip: NotTested

Signal Result Telstra Blade: NotTested

Signal Result Telstra Whip: NotTested

Signal Result External Modem: Pass

RSSI Vodafone Blade: NULL

RSSI Vodafone Whip: NULL

RSSI Telstra Blade: NULL

RSSI Telstra Whip: NULL

RSSI External Modem: 9.0

RSCP Vodafone Blade: NULL

RSCP Vodafone Whip: NULL

RSCP Telstra Blade: NULL

RSCP Telstra Whip: NULL

RSCP External Modem: NULL

RSRP Vodafone Blade: NULL

RSRP Vodafone Whip: NULL

RSRP Telstra Blade: NULL

RSRP Telstra Whip: NULL

RSRP External Modem: NULL

RSSI Threshold: 6.0

RSSI Higher Threshold: 12.0

RSCP Threshold: 15.0

RSCP Higher Threshold: 30.0

RSRP Threshold: 10.0

RSRP Higher Threshold: 20.0

Timeout Vodafone Blade: NULL

Timeout Vodafone Whip: NULL

Timeout Telstra Blade: NULL

Timeout Telstra Whip: NULL

Timeout External Modem: False

Network Vodafone Blade: NULL

Network Vodafone Whip: NULL

Network Telstra Blade: NULL

Network Telstra Whip: NULL

Network External Modem: "vodafone AU"

Raw Array Vodafone Blade: Ignored (not going to insert into database)

Raw Array Vodafone Whip: Ignored (not going to insert into database)

Raw Array Telstra Blade: Ignored (not going to insert into database)

Raw Array Telstra Whip: Ignored (not going to insert into database)

Raw Array External Modem: ["9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I", "9\_99-I"]

BT Signal: [-91.0, -87.0, -81.0, -70.0, -86.0, -74.0, -76.0]

GPS Long :152.984367638172

GPS Lat: -27.4171041995673

GPS Accuracy: kCLLocationAccuracyKilometer

Device Type: iPad6,12

SIM Vodafone: NULL

SIM Telstra: NULL

SIM External: 89314404000266723023

Serial No: SDS-008C

Firmware No: GAT-17R3

App Version No: 2.2.5

Battery Level: 3.94

Modem Type: EWM1000

Modem Status Vodafone Blade: NULL

Modem Status Vodafone Whip: NULL

Modem Status Telstra Blade: NULL

Modem Status Telstra Whip: NULL

Modem Status External: Registered, Roaming

Logfile: 5.txt

User Name: Charizard

Work Order: WO-00110925

Bluetooth Name: DAIBRAVE

Date: 26-4-2018--10-31

Antenna Test Type: Blade

Signal Result Vodafone Blade: Pass

Signal Result Vodafone Whip: NotTested

Signal Result Telstra Blade: Pass

Signal Result Telstra Whip: NotTested

Signal Result External Modem: NotTested

RSSI Vodafone Blade: NULL

RSSI Vodafone Whip: NULL

RSSI Telstra Blade: NULL

RSSI Telstra Whip: NULL

RSSI External Modem: NULL

RSCP Vodafone Blade: 12.0

RSCP Vodafone Whip: NULL

RSCP Telstra Blade: 16.4

RSCP Telstra Whip: NULL

RSCP External Modem: NULL

RSRP Vodafone Blade: 26.92

RSRP Vodafone Whip: NULL

RSRP Telstra Blade: 30.79

RSRP Telstra Whip: NULL

RSRP External Modem: NULL

RSSI Threshold: 6.0

RSSI Higher Threshold: 12.0

RSCP Threshold: 15.0

RSCP Higher Threshold: 30.0

RSRP Threshold: 10.0

RSRP Higher Threshold: 20.0

Timeout Vodafone Blade: False

Timeout Vodafone Whip: NULL

Timeout Telstra Blade: False

Timeout Telstra Whip: NULL

Timeout External Modem: NULL

Network Vodafone Blade: "vodafone AU"

Network Vodafone Whip: NULL

Network Telstra Blade: "Telstra Mobile"

Network Telstra Whip: NULL

Network External Modem: NULL

Raw Array Vodafone Blade: ["42\_43-1", "42\_43-1", "99\_99-0", "99\_99-0", "99\_99-0", "99\_99-0", "99\_99-0", "41\_17-4", "41\_17-4", "43\_22-4", "45\_24-4", "45\_26-4", "45\_23-4", "45\_24-4", "45\_24-4"]

Raw Array Vodafone Whip: Ignored (not going to insert into database)

Raw Array Telstra Blade: ["41\_37-2", "41\_39-2", "99\_99-0", "99\_99-0", "99\_99-0", "37\_22-4", "40\_21-4", "43\_26-4", "39\_23-4", "38\_9-4", "38\_9-4", "38\_7-4", "42\_26-4", "37\_26-4", "40\_26-4", "39\_26-4"]

Raw Array Telstra Whip: Ignored (not going to insert into database)

Raw Array External Modem: Ignored (not going to insert into database)

BT Signal: [-76.0, -69.0, -69.0, -76.0, -73.0, -76.0]

GPS Long :153.024695282944

GPS Lat: -27.1806907654062

GPS Accuracy: kCLLocationAccuracyKilometer

Device Type: iPad7,2

SIM Vodafone: 89314404000248233075

SIM Telstra: 89610180002249047685

SIM External: NULL

Serial No: SDS-049C

Firmware No: GAT-17R3

App Version No: 2.2.5

Battery Level: 3.69

Modem Type: EWM400

Modem Status Vodafone Blade: Registered, Roaming

Modem Status Vodafone Whip: NULL

Modem Status Telstra Blade: Registered, home network

Modem Status Telstra Whip: NULL

Modem Status External: NULL

Logfile: 6.txt

User Name: Mewtwo

Work Order: WO-00248593

Bluetooth Name: CARIVOU

Date: 19-2-2019--8-42

Antenna Test Type: Blade

Signal Result Vodafone Blade: Denied

Signal Result Vodafone Whip: NotTested

Signal Result Telstra Blade: Pass

Signal Result Telstra Blade: NotTested

Signal Result External Modem: NotTested

RSSI Vodafone Blade: NULL

RSSI Vodafone Whip: NULL

RSSI Telstra Blade: NULL

RSSI Telstra Whip: NULL

RSSI External Modem: NULL

RSCP Vodafone Blade: NULL

RSCP Vodafone Whip: NULL

RSCP Telstra Blade: NULL

RSCP Telstra Whip: NULL

RSCP External Modem: NULL

RSRP Vodafone Blade: NULL

RSRP Vodafone Whip: NULL

RSRP Telstra Blade: 46.07

RSRP Telstra Whip: NULL

RSRP External Modem: NULL

RSSI Threshold: 6.0

RSSI Higher Threshold: 12.0

RSCP Threshold: 15.0

RSCP Higher Threshold: 30.0

RSRP Threshold: 10.0

RSRP Higher Threshold: 20.0

Timeout Vodafone Blade: True

Timeout Vodafone Whip: NULL

Timeout Telstra Blade: False

Timeout Telstra Whip: NULL

Timeout External Modem: NULL

Network Vodafone Blade: Denied

Network Vodafone Whip: NULL

Network Telstra Blade: "Telstra Mobile"

Network Telstra Whip: NULL

Network External Modem: NULL

Raw Array Vodafone Blade: Ignored (not going to insert into database)

Raw Array Vodafone Whip: Ignored (not going to insert into database)

Raw Array Telstra Blade: ["43\_19-6", "43\_19-6", "47\_23-6", "47\_23-6", "47\_18-6", "47\_18-6", "46\_19-6", "46\_19-6", "46\_19-6", "44\_12-6", "47\_26-6", "47\_23-6", "47\_25-6", "47\_28-6", "47\_28-6"]

Raw Array Telstra Whip: Ignored (not going to insert into database)

Raw Array External Modem: Ignored (not going to insert into database)

BT Signal: [-76.0, -85.0]

GPS Long :152.971914761231

GPS Lat: -27.0792295037818

GPS Accuracy: kCLLocationAccuracyKilometer

Device Type: iPad Air

SIM Vodafone: 89314404000281178914

SIM Telstra: 89610180002249045296

SIM External: NULL

Serial No: SDS-026C

Firmware No: GAT-17R3

App Version No: 2.2.5

Battery Level: 3.88

Modem Type: EWM400

Modem Status Vodafone Blade: Registeration Denied

Modem Status Vodafone Whip: NULL

Modem Status Telstra Blade: Registered, home network

Modem Status Telstra Whip: NULL

Modem Status External: NULL