

# API get started

version 2 (26.10.2015)

In order to understand the data provided by API, you need a map of the junction, metadata of the junction, and a portion of data for the junction.

Let's take a map of TRE306 junction (Fig. 1) and find signal groups and detectors there.

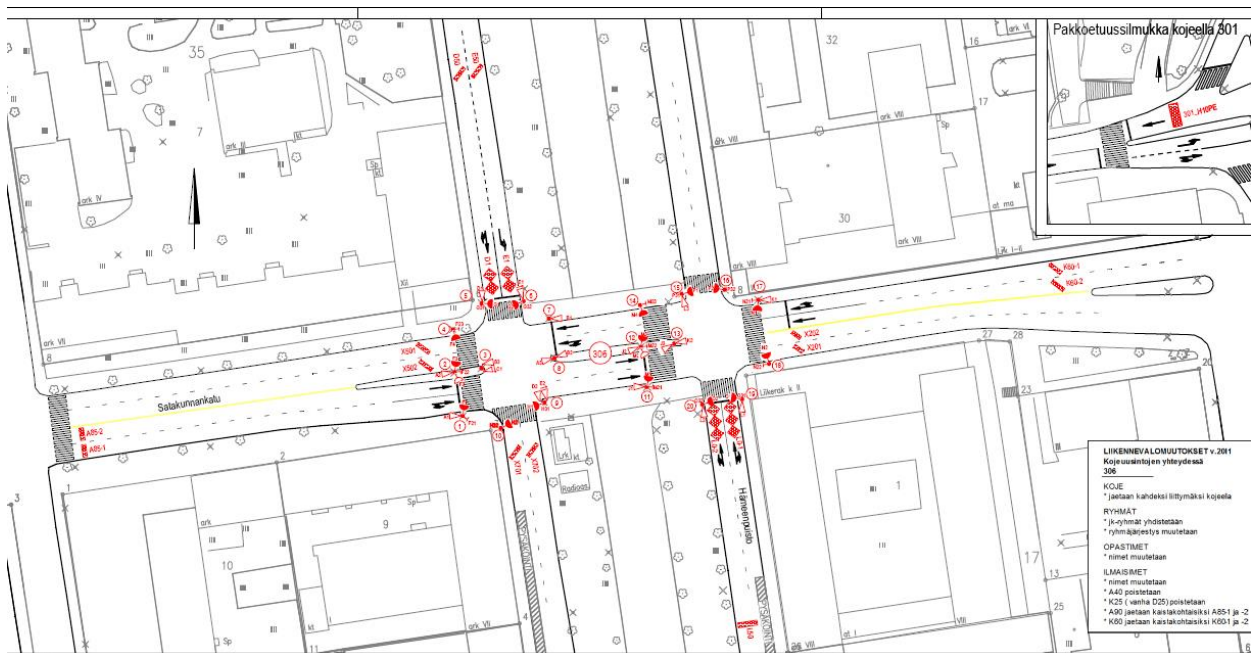


Figure 1. TRE306 junction

## 1. Reading signal states (traffic light states)

A number in the circle corresponds to a signal group although a number itself doesn't have a relation to traffic data. In order to identify a direction that the signal group regulates and the index where this signal group appears in the data, you have to study the map and the metadata. Let's have a look at the signal group metadata of TRE306 junction:

```
{
  "Meta": [
    {
      "location": "TRE306",
      "packageTime": "2015-10-01 12:41:51.882",
      "signals": [
        {"index": "0", "name": "A"},
        {"index": "1", "name": "B"},

```

```

        {"index": "2", "name": "C"},
        {"index": "3", "name": "D"},
        {"index": "4", "name": "E"},
        {"index": "5", "name": "_F"},
        {"index": "6", "name": "_G"},
        {"index": "7", "name": "_H"},
        {"index": "8", "name": "J"},
        {"index": "9", "name": "K"},
        {"index": "10", "name": "L"},
        {"index": "11", "name": "_M"},
        {"index": "12", "name": "_N"},
        {"index": "13", "name": "_O"},
        {"index": "14", "name": "_P"}
    ],
    "detectors": [
        {"index": "0", "name": "A40_1", "signalIndex": "0", "threshold": "40"},
        {"index": "1", "name": "A40_2", "signalIndex": "0", "threshold": "40"},
        {"index": "2", "name": "X501", "signalIndex": "0", "threshold": "84"},
        {"index": "3", "name": "X502", "signalIndex": "0", "threshold": "84"},
        {"index": "4", "name": "D50", "signalIndex": "3", "threshold": "40"},
        {"index": "5", "name": "D1", "signalIndex": "3", "threshold": "84"},
        {"index": "6", "name": "E50", "signalIndex": "4", "threshold": "40"},
        {"index": "7", "name": "E1", "signalIndex": "4", "threshold": "84"},
        {"index": "8", "name": "K60_1", "signalIndex": "9", "threshold": "40"},
        {"index": "9", "name": "K60_2", "signalIndex": "9", "threshold": "40"},
        {"index": "10", "name": "X201", "signalIndex": "0", "threshold": "84"},
        {"index": "11", "name": "X202", "signalIndex": "0", "threshold": "84"},
        {"index": "12", "name": "L0_1", "signalIndex": "10", "threshold": "84"},
        {"index": "13", "name": "L50", "signalIndex": "10", "threshold": "40"},
        {"index": "14", "name": "L0_2", "signalIndex": "10", "threshold": "84"},
        {"index": "15", "name": "A90", "signalIndex": "0", "threshold": "84"},
        ...
    ]
}
]

```

}

We have 15 signal groups in the “signals” list, including 7 pedestrian signals (names with “\_” prefix) and 8 vehicle signals. Read letters and symbols located near circles on the map. For example, the signal group with the number 2 on the map in Fig. 2 has a red triangle showing the direction (the angle pointing at the red circle) and a letter A indicating that this signal group corresponds to the signal name A and consequently to the index 0 (see the metadata above). It means, first, this signal state should be read as a character in the 0 position of the string “signalStates” in the data, second, this signal group regulates the traffic detected by the inductive loops (detectors) with the names starting with “A” prefix. Similarly, the signal group with the number 4 on the map in Fig. 2 does not have a red triangle but only a red circle which indicates that this is a pedestrian signal group. Looking at the metadata above, indeed we can find that this is a pedestrian signal with the name “\_F” and the index 5.

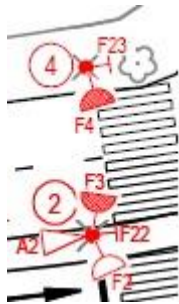


Figure 2. Signal symbols.

Doing the same analysis of the map and metadata, we can identify each signal group index and associated detectors (Table 1).

Table 1. Signal groups of TRE306

Signal number on the map	Signal index in the metadata	Signal name	Regulating type	Examples of associated detectors
1	0	A	traffic	A40_1, A40_2, A90
2				
7	1	B	traffic	
8				
3	2	C	traffic	
5	3	D	traffic	D1, D50
6	4	E	traffic	E1, E50
4	5	_F	pedestrian	
10	7	_H	pedestrian	
11	8	J	traffic	
12				
17				
15	10	L	traffic	L0_1, L0_2, L50
19				
20				
14	11	_M	pedestrian	
18	12	_N	pedestrian	
16	14	_P	pedestrian	



- 'A' - *MINIMUM\_RED*,
- 'B' - *PASSIVE\_RED*,
- 'C' - *RED\_REQUEST*,
- 'D' - *RED\_PRIORITY*,
- 'E' - *RED\_PRIVILEGE*,
- 'F' - *RED\_WAIT*,
- 'G' - *RED\_STOP*,
- 'H' - *INTERGREEN*,
- 'I' - *FIXED\_AMBER\_START*,
- 'J' - *FIXED\_RED\_START*.

Thus, if we code green light as G, red light as R, and amber light as A, the “signalStates” line “CBC3C3CCCC333CC” should be read as “RRRGRGRRRRGGGRR” when “tickCount” is equal to 6. It means that signal groups 1 and 2 with the corresponding index 0 (see Table 1) is Red, signal groups 7 and 8 with the corresponding index 1 is Red, signal group 3 with the corresponding index 2 is Red, signal group 5 with the corresponding index 3 is Green and so on. In other words, the states of traffic signals in the junction TRE306 at the timestamp 1445500407600 are as illustrated in Fig. 3.



Figure 3. Signal states in the junction TRE306 at the timestamp 1445500407600.

## 2. Reading detectors

You will need metadata for understanding detectors. Detectors of the type “inductive loops” are depicted in the map with a name consisting letters and numbers. More often, the name of the detector is exactly the same as a name shown on the map. However, detectors might be re-configured from time to time and receive a new name. For information about changes check the right bottom box on the map (Fig. 4). For example, detectors “X501”, “X502”, “D1”, “E1” have

identical names on the map and in the metadata, while detectors “A40\_1” and “A40\_2” are new and should be located on the lanes regulated by the signal groups with the numbers 1 and 2.

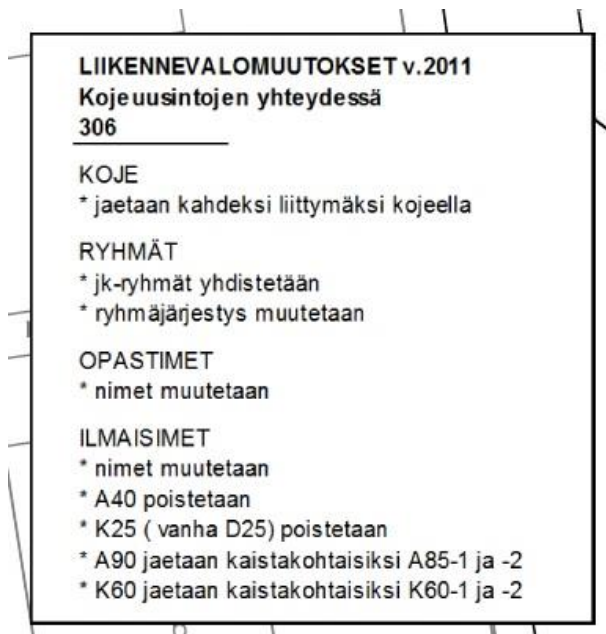


Figure 4. Versions of the map.

Check Fig. 5 to find the location of detectors and corresponding metadata. You can also get thresholds, regulating signal group indexes and detector indexes from the metadata.

After understanding metadata, location and purpose of detectors, you can check traffic situation and track vehicles based on API data. Let's check vehicles detected by “A40\_1”, “A40\_2”, “X501”, “X502”, “D1” and “E1” detectors. The first 2 detectors have indexes 0 and 1 and threshold equal to 40. The other detectors have indexes 2, 3, 5 and 7 consequently, and they all have the same threshold equal to 84. Therefore we are interested in the numbers with the indexes 0, 1, 2, 3, 5, and 7 in the list of detector levels (“detectorLevels” in the data) equal or greater than 40 and 84 to identify vehicles.



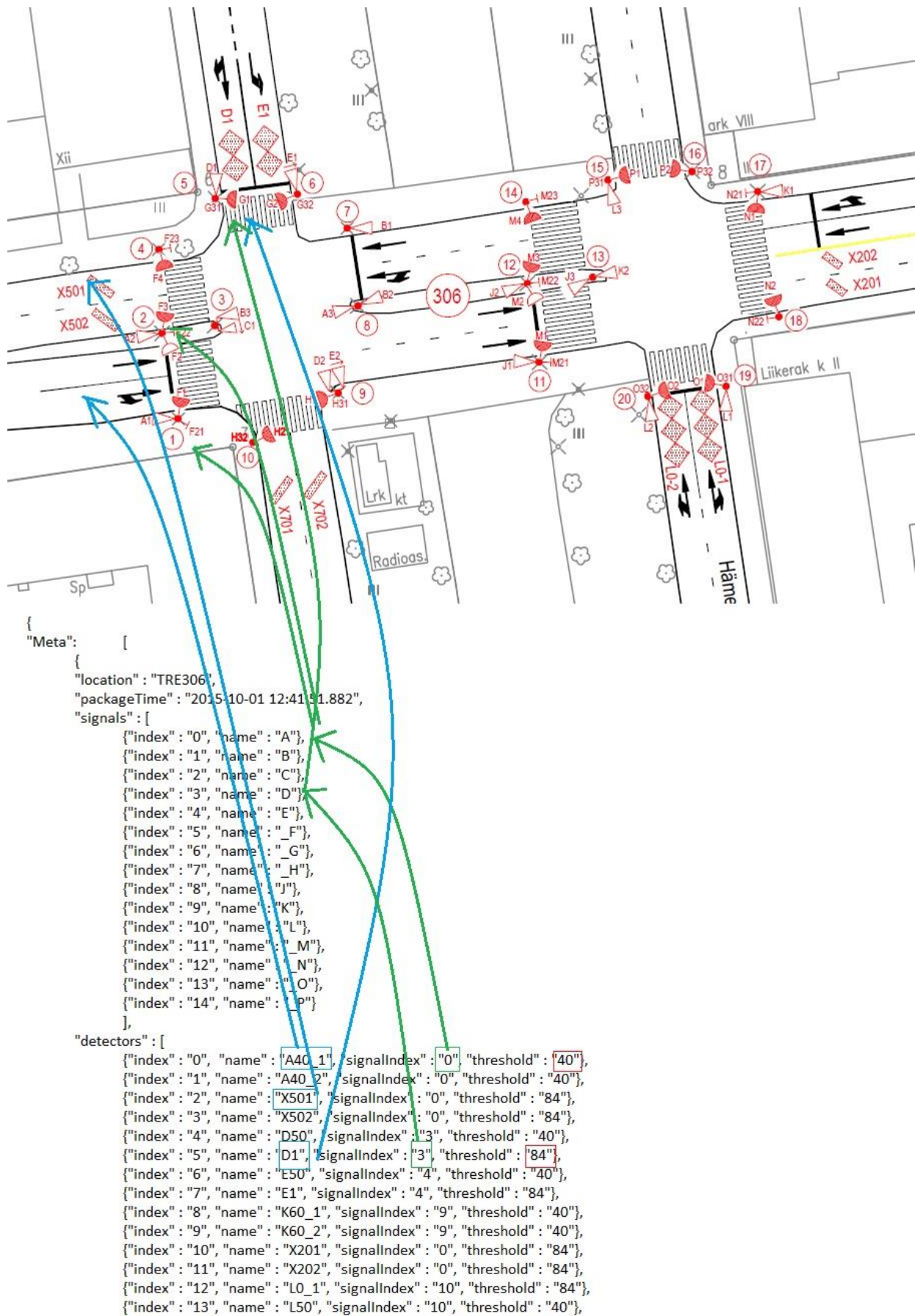


Figure 5. Relationship between metadata and a map.

Let's assume that we have received the following data:





