IOT SENSING FRAMEWORK WITH INTER-CLOUD COMPUTING CAPABILITY IN VEHICULAR NETWORKS

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Introduction

- Iot can improve quality of life
- Representative application
- Iot components
- Location based services

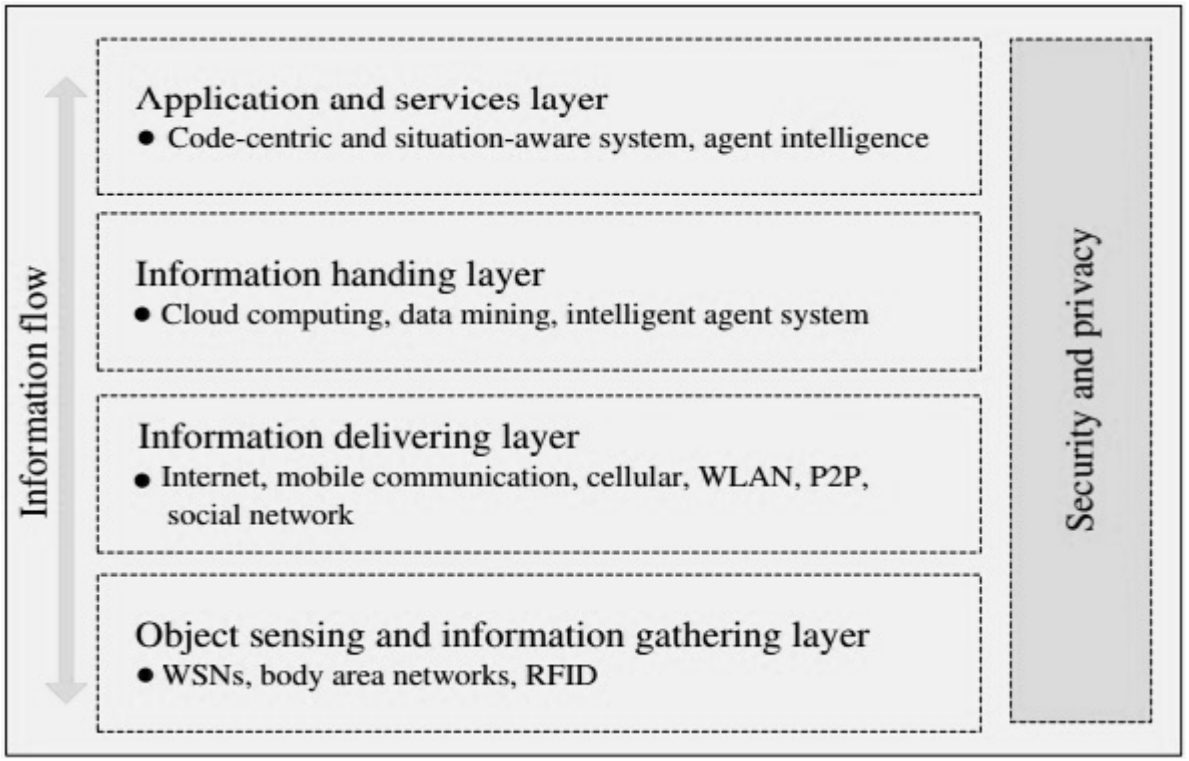
Terms to know

- PPS – Platform Production Services [1]
- VNA – Vehicular network application
- VMS – Vehicular maintenance service [1]

Related work

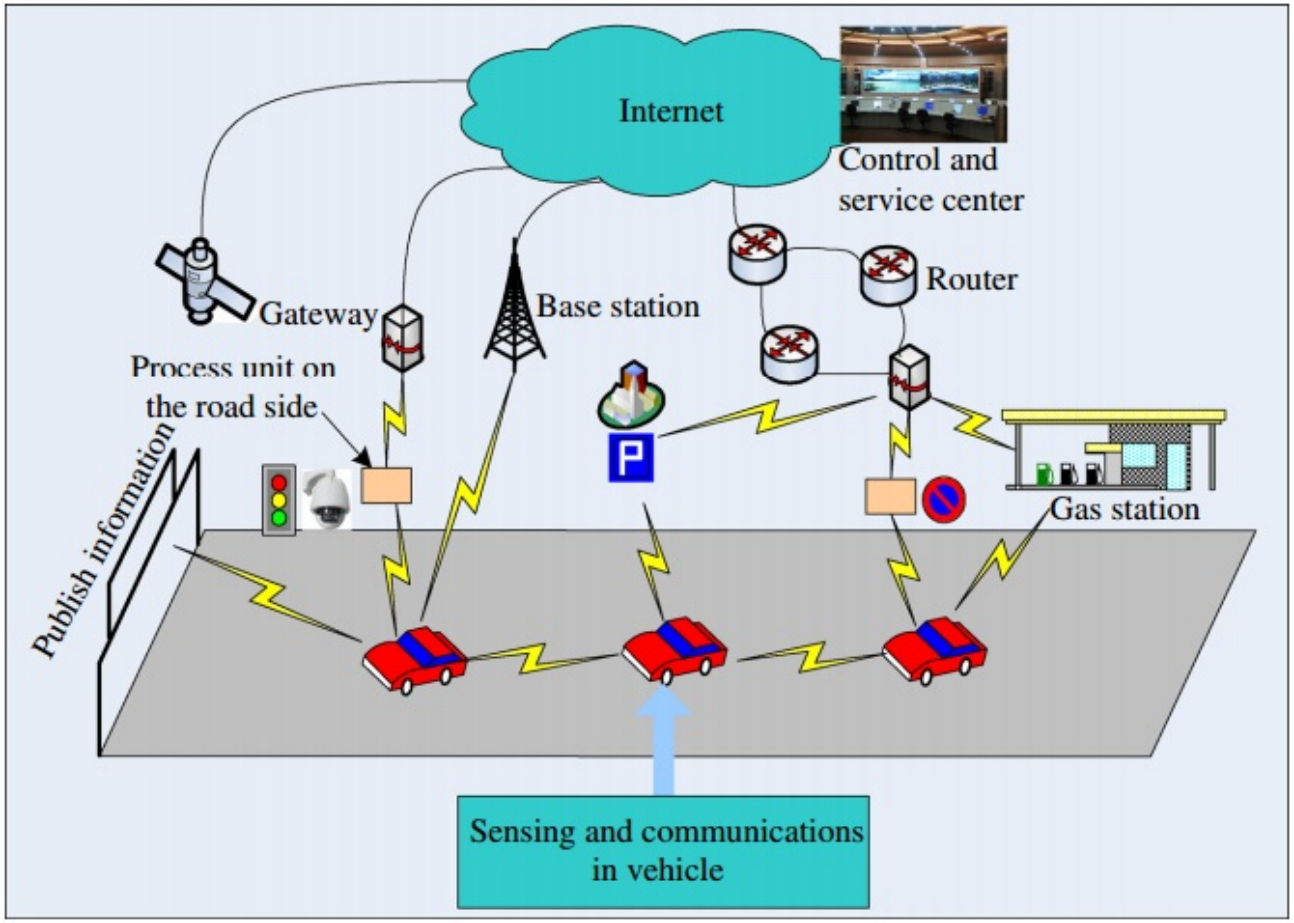
- Iot four layer architecture
- Vehicular network
- Cloud computing
- Event based architecture [1]

IOT FOUR LAYER ARCHITECTURE



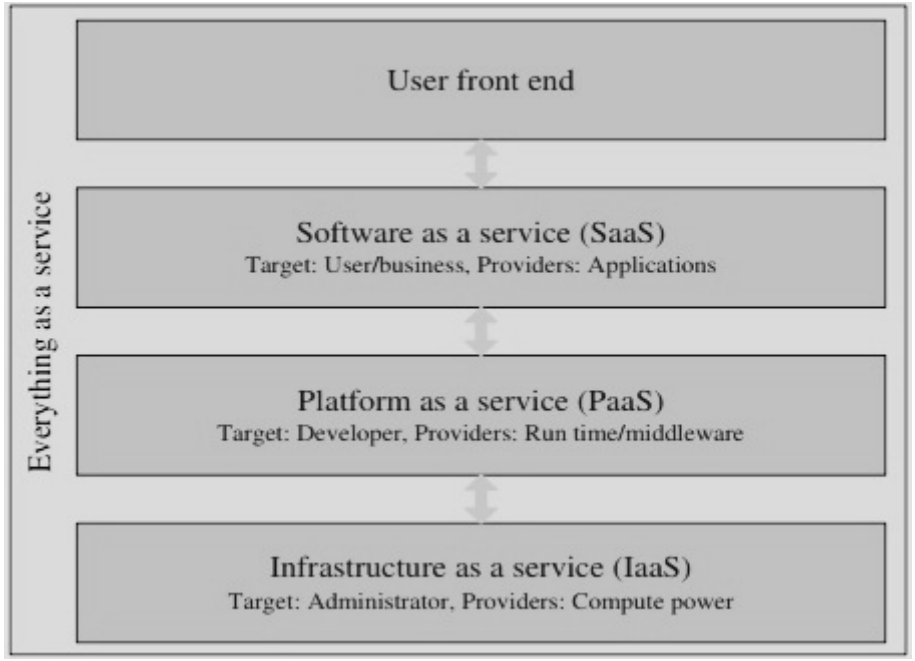
[1]

VEHICULAR NETWORK



[2]

Cloud computing



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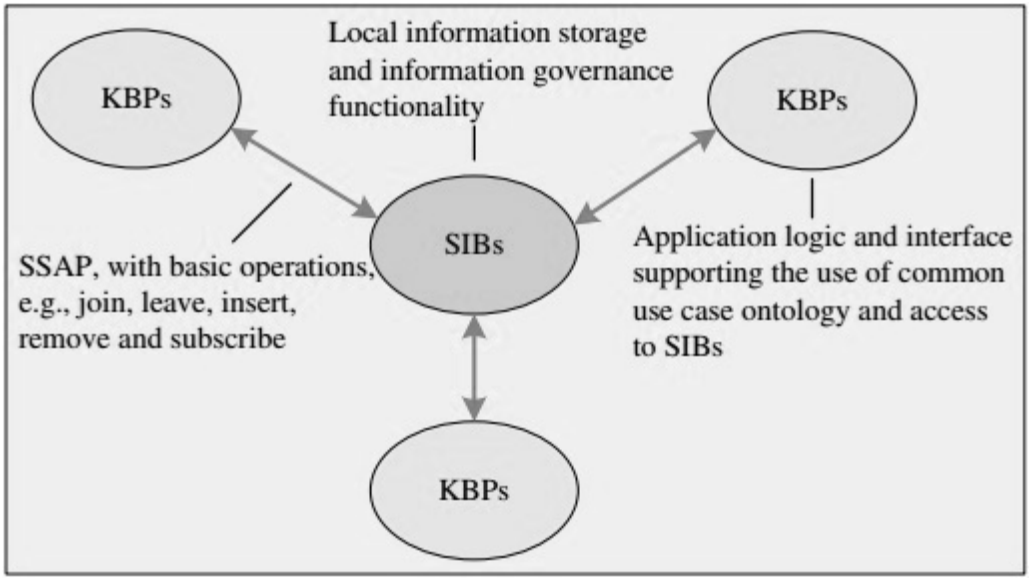
Event based architecture

- SoFia – Smart Object for intelligent applications
- SIB – Semantic information broker
- KBP – Knowledge based processors
- SSAP – Smart space access protocol



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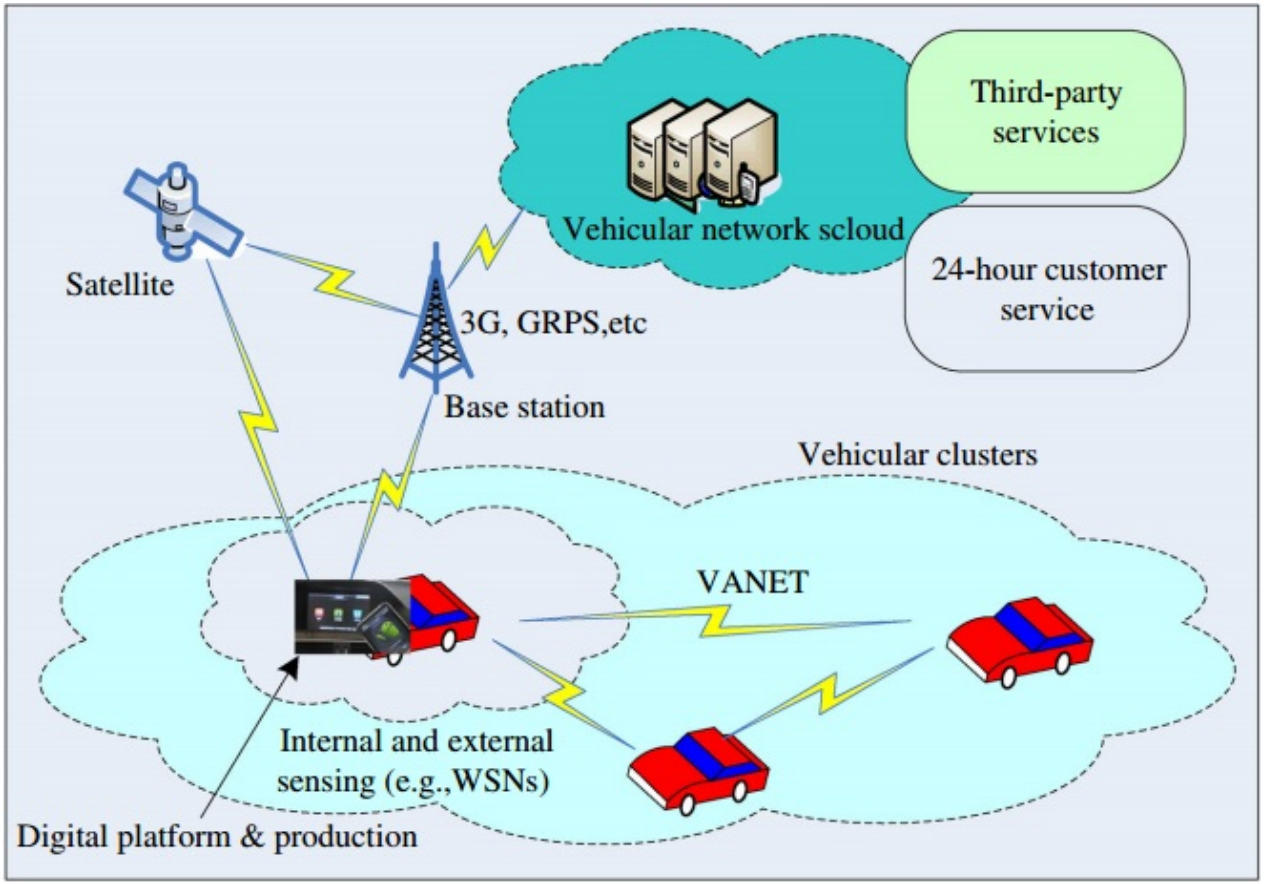
Business Model



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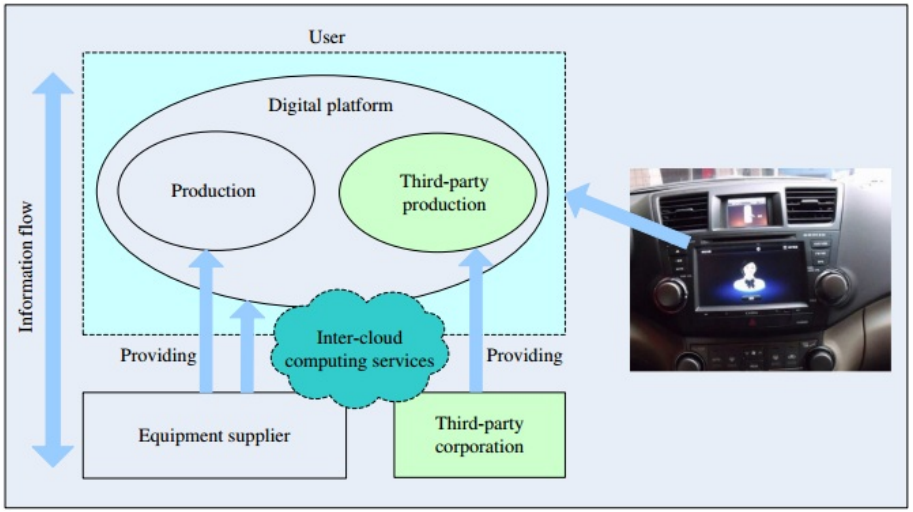
Business Model – digital platform



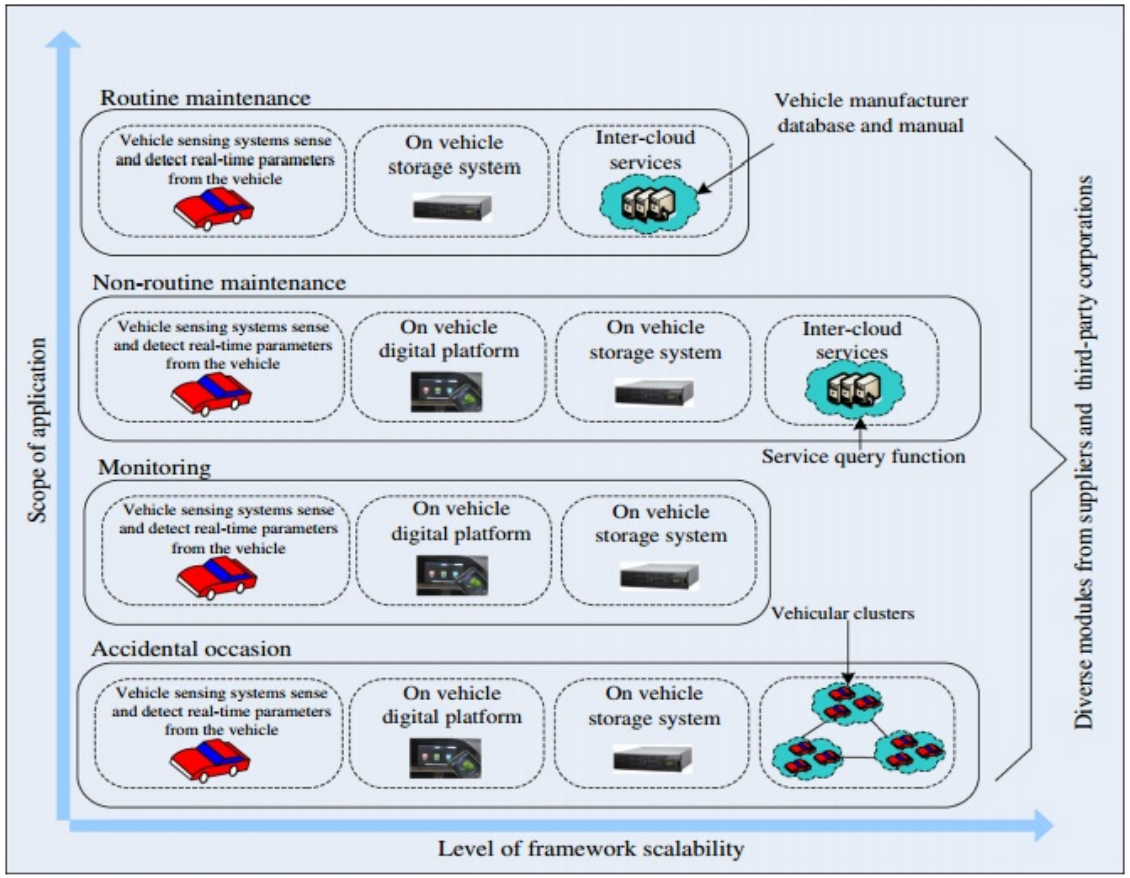
[1]

Table 1 Properties of different types of AD Hoc networks

Property	VANET	WSNs	WMN	MANET
Network size	Large	Large	Moderate	Medium
Energy limitations	Very low	Very high	Very low	High
Node's mobility	High, nonrandom	Mostly static	Static	Random
Location dependency	Very high	High	Very low	Low
Node's computation power	High	Very low	High	
Node's memory capacity	High	Very low	High	

[4]

Business Model - scope



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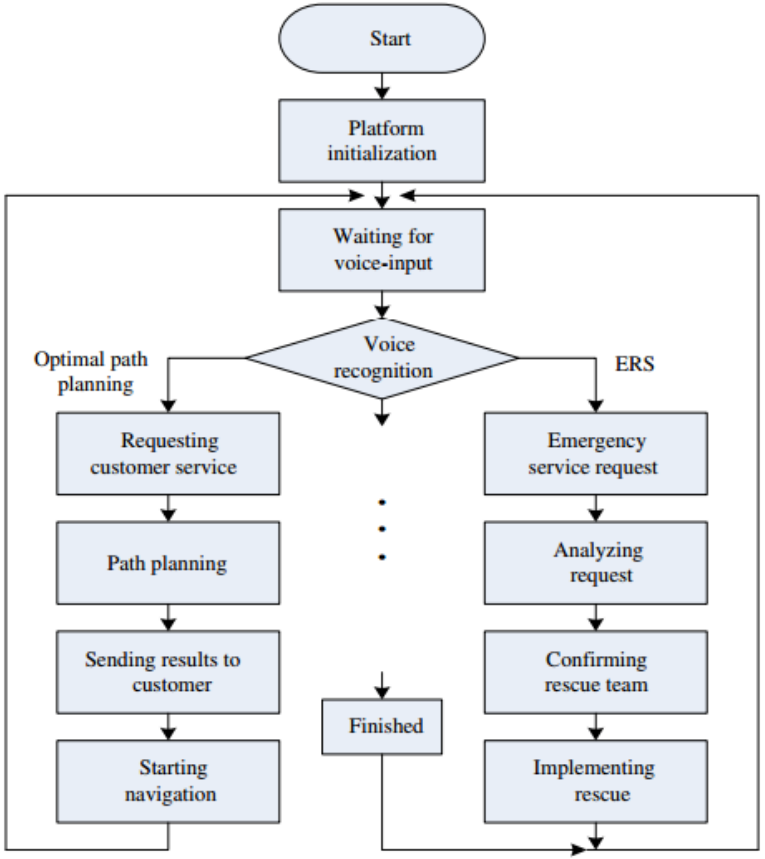
Business Model – Customer service



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Mobile cloud computing

- Semantic Operation - SPARQL
- Inter-Cloud Service – XMPP based protocol
- Capabilities of Inter-Cloud
- Semantic model in inter-cloud

MOBILE CLOUD COMPUTING

```
<?xml version="1.0"?>
<!DOCTYPE rdf:RDF [<!ENTITY xsd "http://www.w3.org/2001/XMLSchema#">]>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
                    xmlns:exterms="http://www.example.com/terms/">
    <rdf:Description rdf:ID="vehicle123">
        <exterms:brand rdf:datatype="&xsd;string">HongQi</exterms:brand>
        <exterms:speed rdf:datatype="&xsd;decimal">60</exterms:speed>
        <exterms:longitude rdf:datatype="&xsd;decimal">113.4</exterms:longitude>
        <exterms:latitude rdf:datatype="&xsd;decimal">23.2</exterms:latitude>
    </rdf:Description>
</rdf:RDF>
```

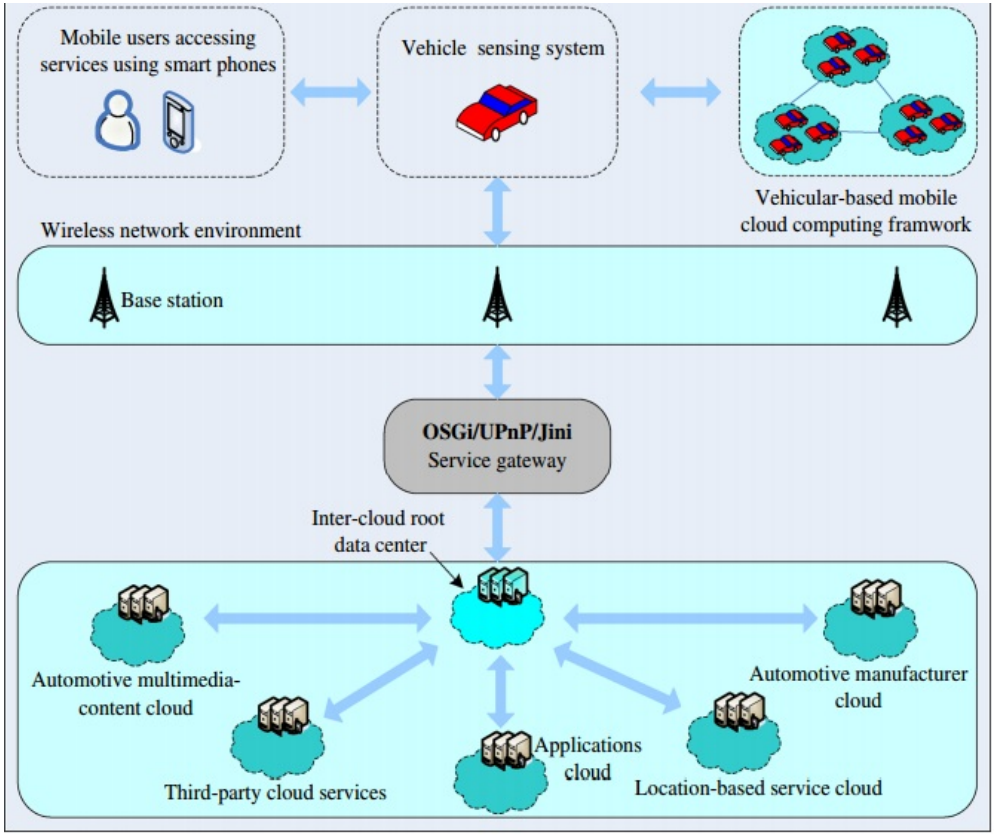
Table 4 Examples of semantic queries for the vehicle network

Type	Query	Meaning
SQWRL	Road(?r) ∧ hasTraffic (?r, ?t) ∧ hasType (?t, ?type) => sqwrl: select (?type)	Select the type of the road traffic
SQWRL	NationalRoad(?r) => sqwrl:select (?r)	Select the national road

SPARQL	PREFIX foaf:<http://xmlns.com/foaf/0.1/>
	SELECT ?name ?type
	WHERE {
	?road a foaf:Road.
	?road foaf:name ?name.
	?road foaf:type ?type.
	}
		Select names and types of every road in the dataset

[5]

Inter-cloud Architecture



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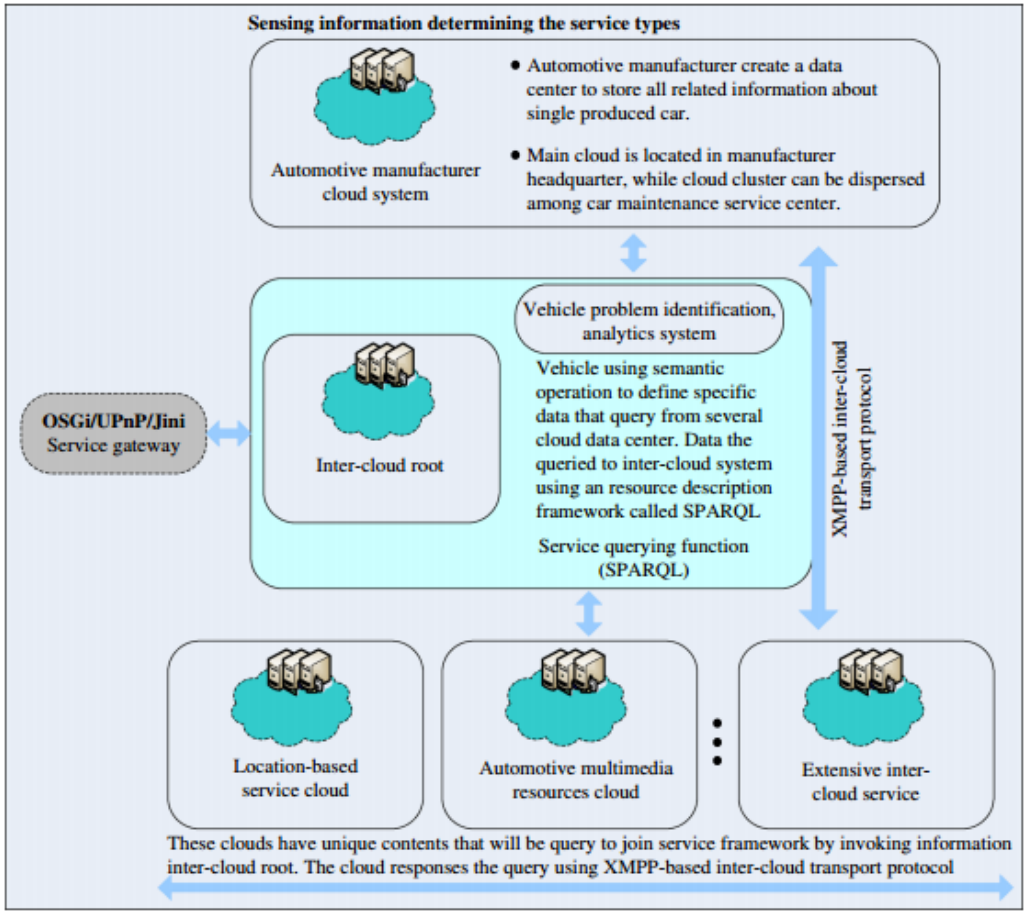
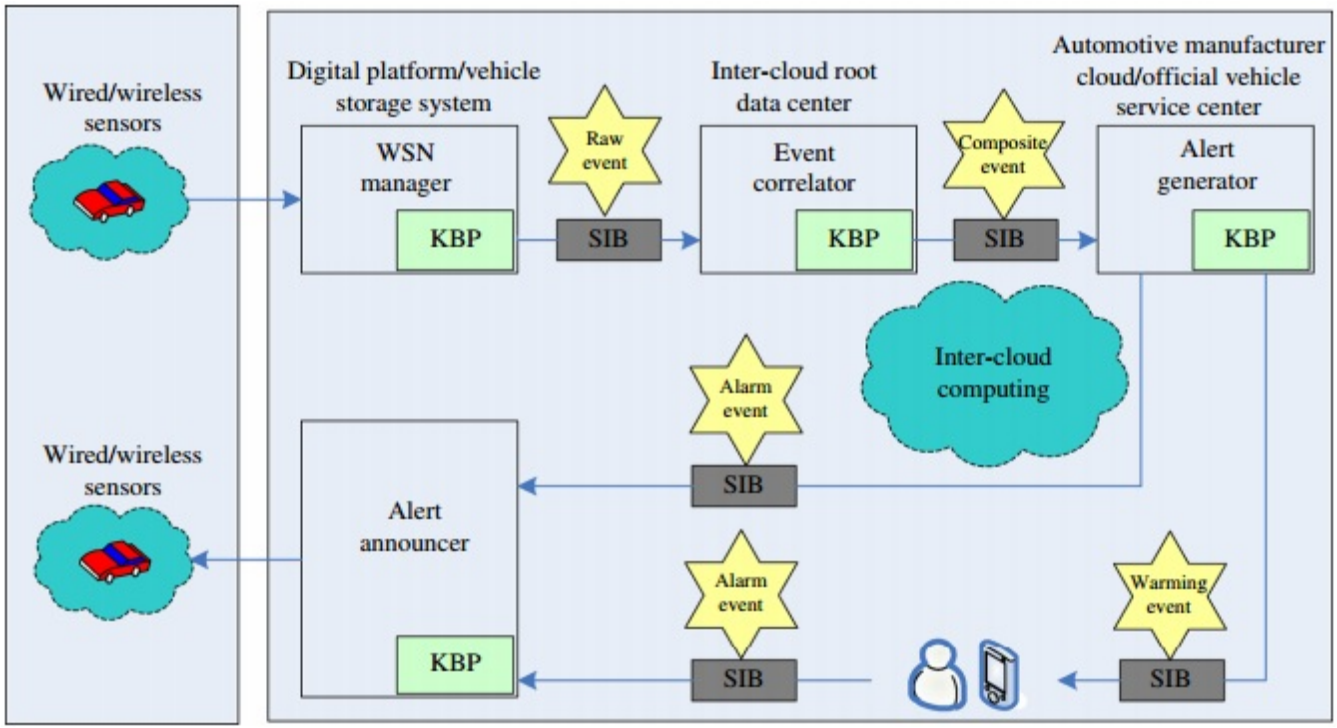
Inter-cloud Architecture



[1]

VMS EVENT PROCESSING FLOW



[6]

Conclusion

- Tried to give social networking form to VNA.
- Needed more explanation on included diagrams
- Promotional paper

REFERENCES

1. Wan, Jiafu, et al. "IoT sensing framework with inter-cloud computing capability in vehicular networking." Electronic Commerce Research 14.3 (2014): 389-416.
2. Wan, Jiafu, et al. “Fig. 2 Basic vehicular networking architecture”,"IoT sensing framework with inter-cloud computing capability in vehicular networking." Electronic Commerce Research 14.3 (2014): 389-416.
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Thank you!