Remote Vehicle Diagnostics
OBDII↔Ethernet gateway

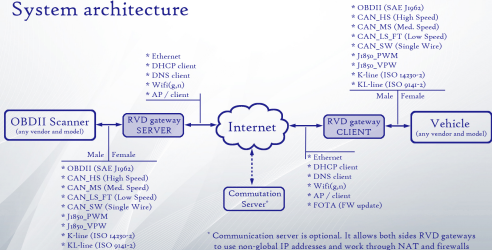# Conception

«Transparent» OBDII.Subs ↔ TCP/IP gateway

Vehicle#1
(any brand and model)

OBDII Scanner
(any brand and model)

Internet

Vehicle#2
(any brand and model)

. . .

Vehicle#N
(any brand and model)
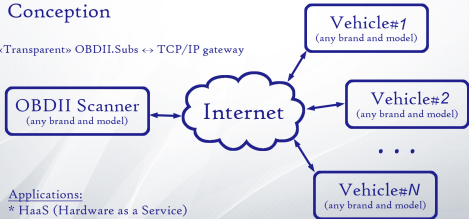
Applications:
* HaaS (Hardware as a Service)
* Remote diagnostics online service

System architecture

* Ethernet
* DHCP client
* DNS client
* Wifi(g,n)
* AP / client

* OBDII (SAE J1962)
* CAN_HS (High Speed)
* CAN_MS (Med. Speed)
* CAN_LS_FT (Low Speed)
* CAN_SW (Single Wire)
* J1850_PWM
* J1850_VPW
* K-line (ISO 14230-2)
* KL-line (ISO 9141-2)

Male   Female

OBDII Scanner
(any vendor and model)

RVD gateway SERVER*

Internet

RVD gateway CLIENT*

Vehicle
(any vendor and model)

Male   Female

* OBDII (SAE J1962)
* CAN_HS (High Speed)
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* Ethernet
* DHCP client
* DNS client
* Wifi(g,n)
* AP / client
* FOTA (FW update)

Commutation Server*
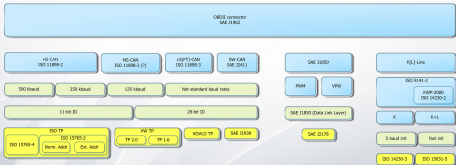
* Communication server is optional. It allows both sides RVD gateways
to use non-global IP addesses and work through NAT and firewalls

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Remote Vehicle Diagnostics
OBDII-Ethernet gateway
www.zoomex.org

RVD gateway common functions

* All OBDII.Subs messages and metadata packing & unpacking to/from UDP/TCP datagrams;

* Providing guaranteed delivery and data integrity (ACKs, Resend and others);

* Network connection status & quality control (echo, PTT measurement test and etc);

* Protocol recognition till the lowest level which provides flow control for all OBDII.Subs;

* «Request-response» time control for all possible OBDII.Subs' protocols. Handshake routine in cases, when network latency does not fit protocol requirements.

Main feature: «Transparency» - Just plug & start. No gateway configurating is needed.

OBDII.Subs and protocols tree

OBDII connector
SAE J1962

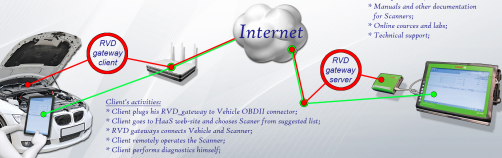| HS-CAN ISO 11898-2 | HS-CAN ISO 11898-2 (?) | LS(FT)-CAN ISO 11898-5 | SW-CAN SAE J2411 | | SAE J1850 | | KJ1-Line |
500 kbaud	250 kbaud	125 kbaud	Not standard baud rates		PWM	VPW	ISO 9141-2
	11 bit ID		29 bit ID				KWP-2000 ISO 14230-2
ISO TP	VW TP	VOLVO TP	SAE J1939		SAE J1850 (Data Link Layer)		5 baud init	fast init
ISO 15765-4	ISO 15765-2	TP 2.0	TP 1.6		SAE J2178		ISO 14230-3	ISO 15031-5
Norm. Addr	Ext. Addr							

RVD gateway covers all stated branches.

Alternatives review

* Proprietary systems (Vovlo system for Trucks, Launch Golo, etc);
- work only with manufacturer's vehicles/scanners.
- a lot of specific, not universal, solutions.

* SAE J2534 (API) based systems;
- ignored by vehicle vendors. As a result - narrow applicability.

* Industrial CAN-Ethernet gateways;
- do not support OBDII.Subs' protocols. May be used only in
  reliable network, not in Internet.

Application example#1

«Virtual scanner»

HaaS (Hardware as a Service)

HaaS *service provider supplies:*
* Pool of Scanners;
* Manuals and other documentation for Scanners;
* Online courses and labs;
* Technical support;

Internet

RVD gateway client

RVD gateway server

Client's activities:
* Client plugs his RVD gateway to Vehicle OBDII connector;
* Client goes to HaaS web-site and chooses Scanner from suggested list;
* RVD gateway connects Vehicle and Scanner;
* Client remotely operates the Scanner;
* Client performs diagnostics himself;

Application example#2
Online Remote Vehicle Diagnostics Service

* Pool of Scanners;
* Professional staff;
* Voice and video conference services;
* Recommendations and consultations;
* Documented diagnose report as a result;

RVD
gateway
client

Internet

RVD
gateway
server

In case of diagnostics tasks
Client does not need a high technical qualification.
He just performs navigator functions,
completing simple voice commands like engine starting.
For service routines like units adaptation
Client's participation is needless.

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