Introduction to eFACTS Logging
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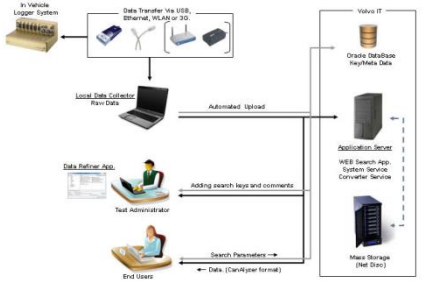
Agenda



- Background
- What is Truck Function Validation ?
- Way of working (Yesterday/Today)
- The data logger
- How to use the logger system
- Installations
- How to handle logged data
- Data Management Applications
- Demo of applications
- (PC installations)

Evolution of the E/E-Architecture

TEA

TEA2

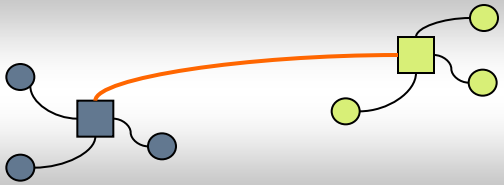
TEA2+

Standalone ECUs

- Function specific ECUs
- Signals shared via splicing

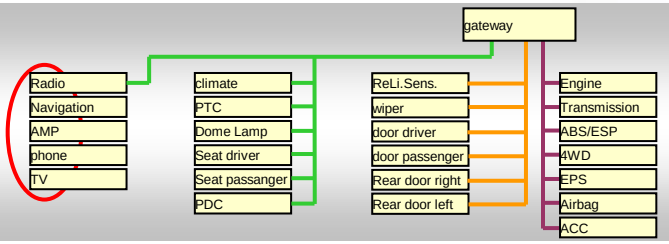
Linked ECUs

- Single BUS system
- Function specific ECUs



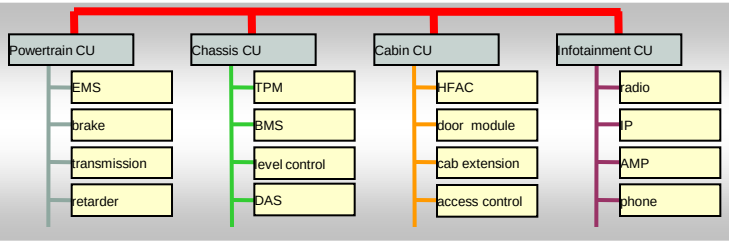
Multi Function ECUs

- Heterogeneous BUS system
- Central Gateway
- Integrated ECUs



Cluster ECUs

- Backbone BUS
- Decentraliced Gateways
- Intelligent Sensors/Actuators



Architectural Differences

TEA2

- **Vehicle Architecture**
  - The J1587 data link has reached its limitation.
    - No support for old platform component from suppliers
    - Not an industry std.
    - Very slow SWDL (not meeting GM/AM reqs)
  - Limitations for added functionality.
    - Pass Through
    - Infrastructure
- **Cab Architecture**
  - Centralised EE architecture in CAB (IC, LCM)
  - All Switches Hard wired (~5pins/switch)
  - Two pass through (~600 pins)
- **Chassis architecture**
  - Sensors and actuators on chassis
  - W/H routed on both right and left (mixed with pneumatics)
- **Manufacturing**
  - Current product is not modularized and the assembly has a huge complexity in the area of clipping and routing
  - Every truck are more or less unique and the assembly quality is to a very high extent operator dependant

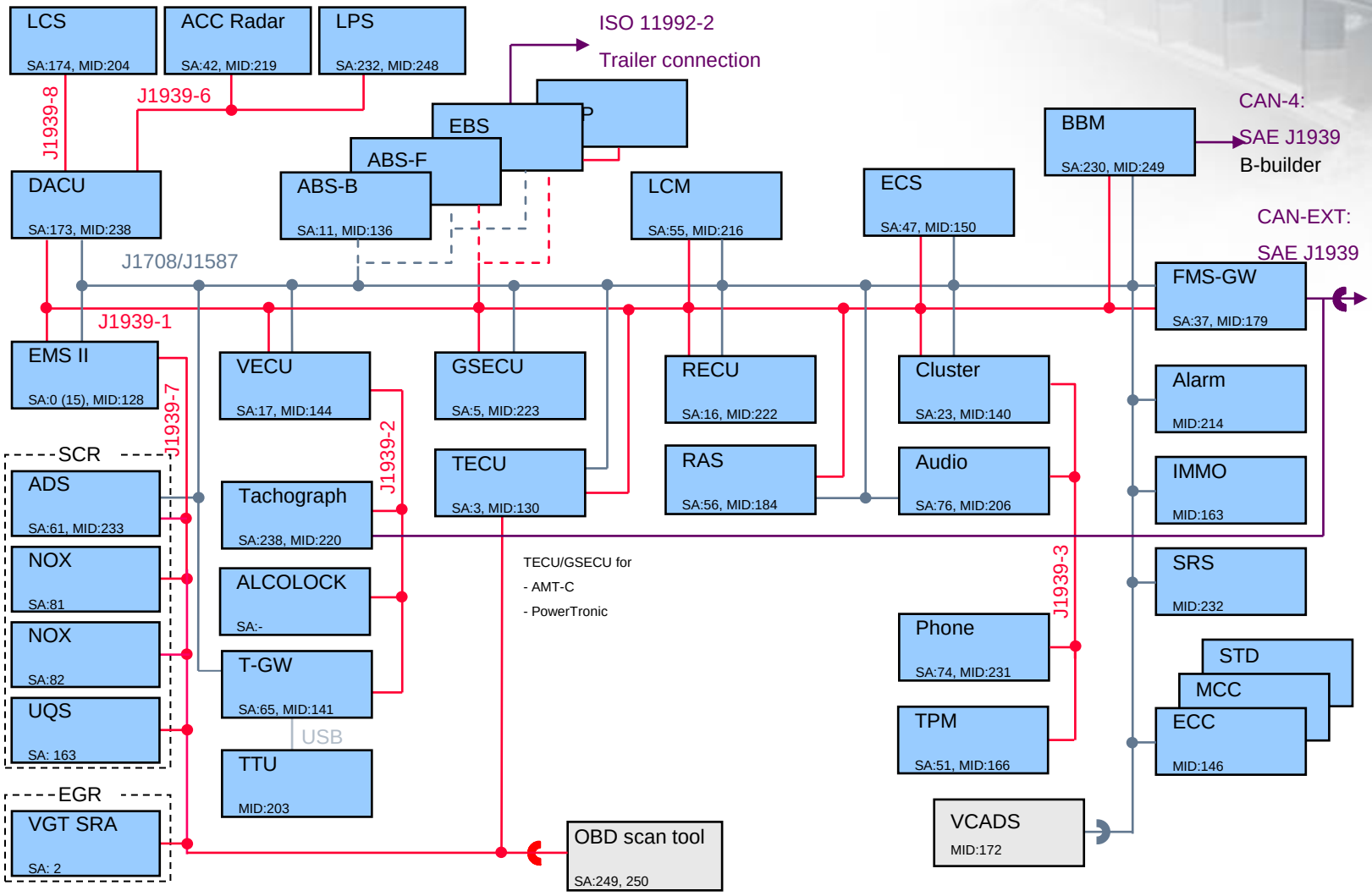
TEA2+

- **Vehicle Architecture**
  - J2284 500kbit Volvo proprietary net (CAN)
  - Separation of infrastructure and application (Autosar)
  - Following industry standards and interfaces
    - ISO Diagnostics, Std protocols, A-interfaces GIC
- **Cab Architecture**
  - Distributed EE architecture in CAB (Gateways)
  - Flexible Switch concept (3pins per 4 switches)
  - One pass through (155pins)
- **Chassis Architecture**
  - ECUs on chassis
    - Less W/H part no and less terminals
  - W/H always mounted on the right side of the frame, avoiding mixing with pneumatics
- **Manufacturing**
  - Modularized product with easier clipping and routing
  - Assembly time. Faster communication needed to reduce assembly time. Since software sizes will increase this will be even more important

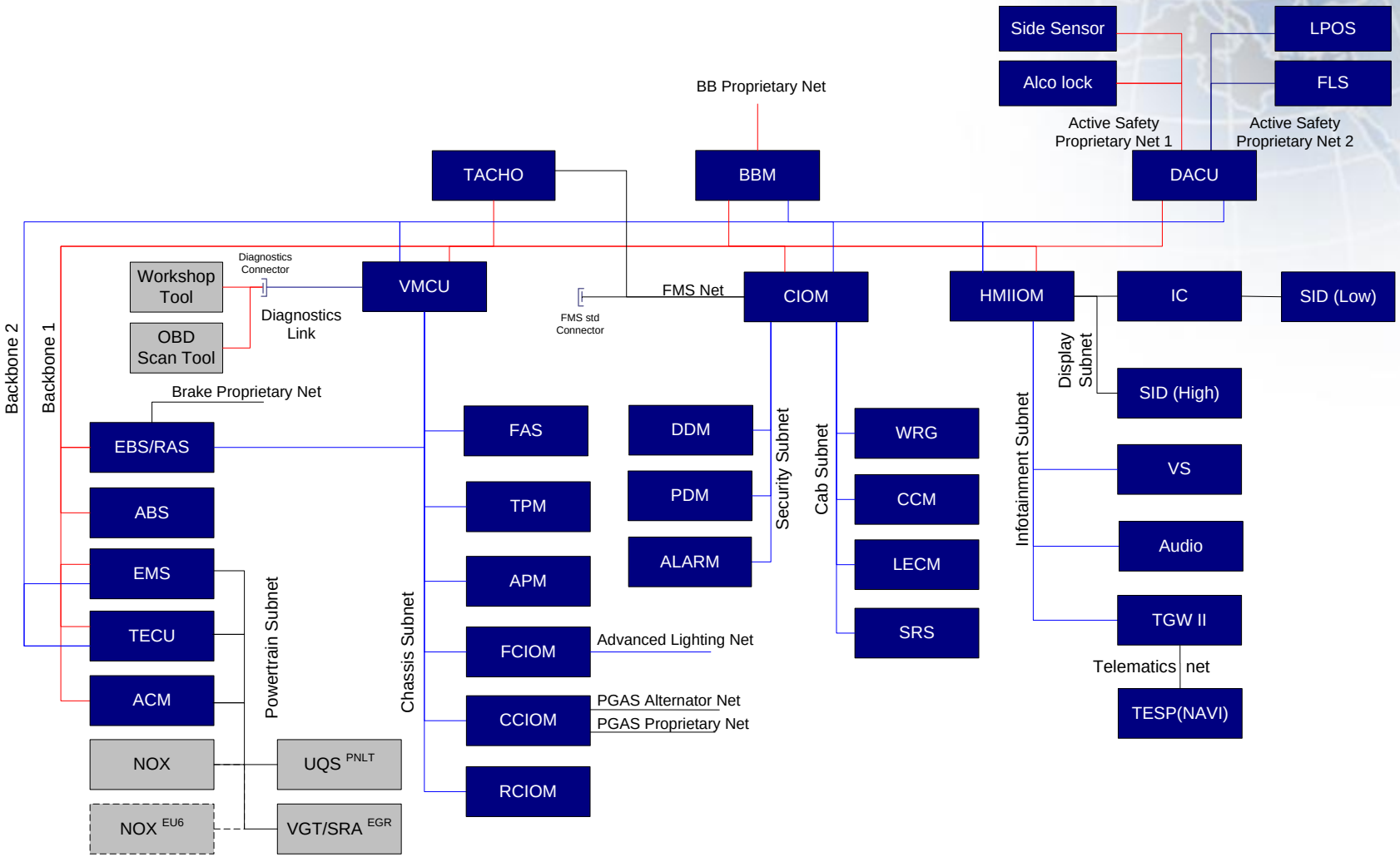
Add-on Features with TEA2+

- **New Enhanced Diagnostics**
  - Support of new Soft Offer demands thanks to enhanched diagnostic capabilities.
  - New aftermarket tools (improved GD)
- **New Power Management Strategy**
  - Enhanced batteries lifetime
  - Optimized power consumption thanks to several vehicle modes
- **New communication strategy**
  - Faster Software downloads
  - Allows distributed system to be able to modularize the EE architecture
- **New processes and development tools**
  - Faster time to market
  - Portability

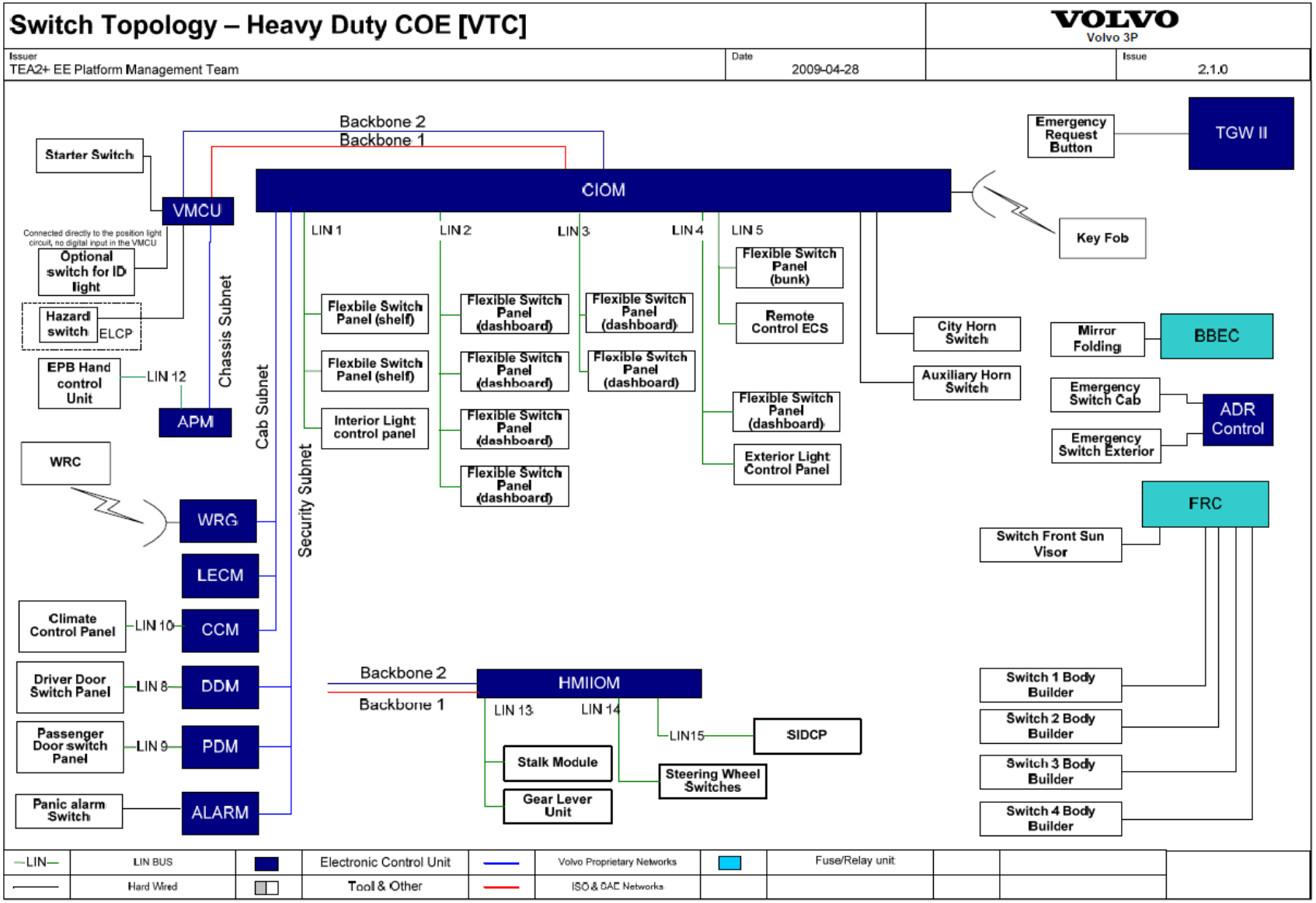
TEA2 Architecture



TEA2+ HD COE Architecture



LIN (Local Integration Network)



”Truck Function Validation” Background

- Historically, Complete Vehicle / FVV has focused on mechanical testing.
- For the new electrical architecture TEA2+, a new structured way of working is needed to include EEE in the complete vehicle testing from a driver perspective.
- Earlier, no logging was made when a electrical faults appeared. You have simply reported the error in Protus and left to EEE to handle the fault tracing.
  - The lead time for solving electrical problems needs to be shortened.
  - Occasional errors are hard to recreate. Logging always needed.
  - Earlier, electrical testing has mostly been ”happy testing”.PVT testing and integration of electrical testing in RT/AET/FT codes needed.

What has Truck Function Validation accomplished?

- New test code - Performance Validation Test (PVT)
  - Translated functional specifications into test code.
  - Tested PVT and logger equipment in vehicle.
- Updated the test codes for RT/AET/FT
- Provided a new data logging system including:
  - New hardware
  - Developed a ”back office” solution for data management.
  - New way of storing data files (cheaper)
- Upgraded Protus to support web-links
- Improved the network against EEE
- Ensured TEA2+ education for CV
- New TeamPlace

Old way of working

”I got a problem !”

PROTUS

No logged data

EEE Rescue Team

In vehicle fault tracing

(not always successful)

Software update

The new way! RT/PVT/FT (AET)

Update

Logged data

CAN trafic,
Audio / video,
GPS, snapshot

PROTUS

QUEST/ (EEE)

SW Release
Function
Package FP

I have logged an error !

The driver perspective!

Why do we need a new system?

Then:

Earlier, measurements have been focused on separate functions.

You have known which signals to log.

The functions have been more or less unique for each ECU.

Now:

We don’t know which errors that will appear = we don’t know what to log.

Functions distributed over several ECU’s = we don’t know which data buses to connect to.

We don’t always know what is the cause and effect = we don’t know which signals to log.

Conclusion:

Connect everywhere and log everything!

Consequence:

Large amount of data that have to be sorted by fault types and made accessible to the end users.

Solution:

1. **New logging equipment that meets the new demands.**
2. **New ”Backoffice” solution for data management.**

DEMO

System Installations

- Must have:
  - Breakout cables CAN
  - Power cables +24V, Gnd, ignition
- What to connect ?
  - CAN, Power
  - Place the microphone + GPS (+ video)
- To verify the installation CANalyzer is needed.
- To test the installation on a later stage, use CVEL_MLOG_Tester.
  - Run the application on the USB-stick to verify CAN-traffic (CVEL_MLOG_Tester) – if you have log files from several loggers you have to choose which logger to test
    It is always the latest log file that is being cheked, snapshot data included.
  - Regarding video, use the PC to configure the camera.
- NOTE: You have to register in the database in which vehicle the logger is installed. Use the Collector application the configure.
  - In a near future this action becomes obsolete. The logger will read information from vehicle.

How to start the logger manually?

- The microphone LED shows a blue light → system is ready

- An error occurrs → the driver presses the button→ logging starts
  → LED shows a yellow light
  - Traffic is logged on up to 12 CANbuses
    (25 s BEFORE and 15s to 2 min AFTER the button is pressed)
  - Audio Commentary is recorded 15s-2 min AFTER the button is pressed
  - Video/picture (e.g. cluster/road information), 10s before button is pressed and 15s to 2 min after.

/!\ Wait 1 minute between 2 successive logs

Pressing the button while yellow LED extends recordings

How to turn off the vehicle?

- The logger is activated when ignition is turned on.
- The logger closes down 30 s AFTER ignition off.
- The microphone LED quickly flashes red/blue when packing files.
- WAIT until no microphone LED light is turned on, before you turn off the vehicle main power switch/lock with the remote.
  - In effect, wait about 30 s after you have switch the ignition off.
  - This is a general rule for all measurement systems.

How to transfer data from the logger using a USB memory stick?

- I possible, only use CORSAIR Voyager USB-memory (16GB)
  - They have a faster transfer rate, recommended by the supplier.
- Insert the memory stick.
- Look at the microphone LED
  - It will change from blue to red and after a while flash fast between red and blue (the data is being zipped)
  - It will change from blue to red and after a while flash slowly red and blue (the data is being transferred to the stick)
  - NOTE ! No data remains in the logger ! (configurable)
- After the LED showed STEADY red light at least 10 s, the transfer is ready. Check also that the USB stick LED is off.
- Pull out the memory stick
  - The LED will turn blue again.
- If nothing happens when the stick is inserted, check the extension cable!

How to get data from several loggers?

- You can get data from several loggers in the same way as one.
- The data structure on the USB-stick will be:
  - 8000xxxx
  - 8000yyyy
  - 8000zzzz
    (one folder per M-LOG datalogger serial number)
- You can also provide the stick with a security key – without the right key you are not able to transfer data.
- (If you want to change the logger configuration you can use the memory stick.).

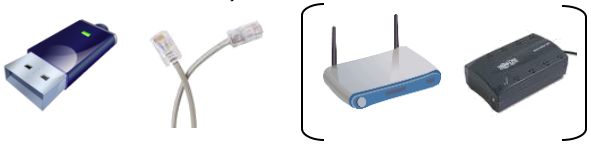
Extra: Log file structure

- 8000xxxx
  - **DATA**
    - LOGxxx.zip (information about the device, a new file is created for every ignition on/off, always remains)
    - MEAxxx.zip (a new file is created for every ignition on/off, only remains if there is logged data)
      - **T**raffic (one for each event)
      - **A**udio (one for each event)
      - **V**ideo (one for each event)
      - **D**ata (”external data” or snapshot data)
  - **DEVICE**
    - Current configuration

CVEL Data System

In Vehicle Logger System

Data Transfer Via USB, Ethernet, WLAN or 3G.



Volvo IT

Oracle DataBase
Key/Meta Data

Local Data Collector
Raw Data

Automated Upload

Application Server

WEB Search App.
System Service
Converter Service

Data Refiner App.

Adding search keys and comments

Test Administrator

Mass Storage
(Net Disc)

Search Parameters →

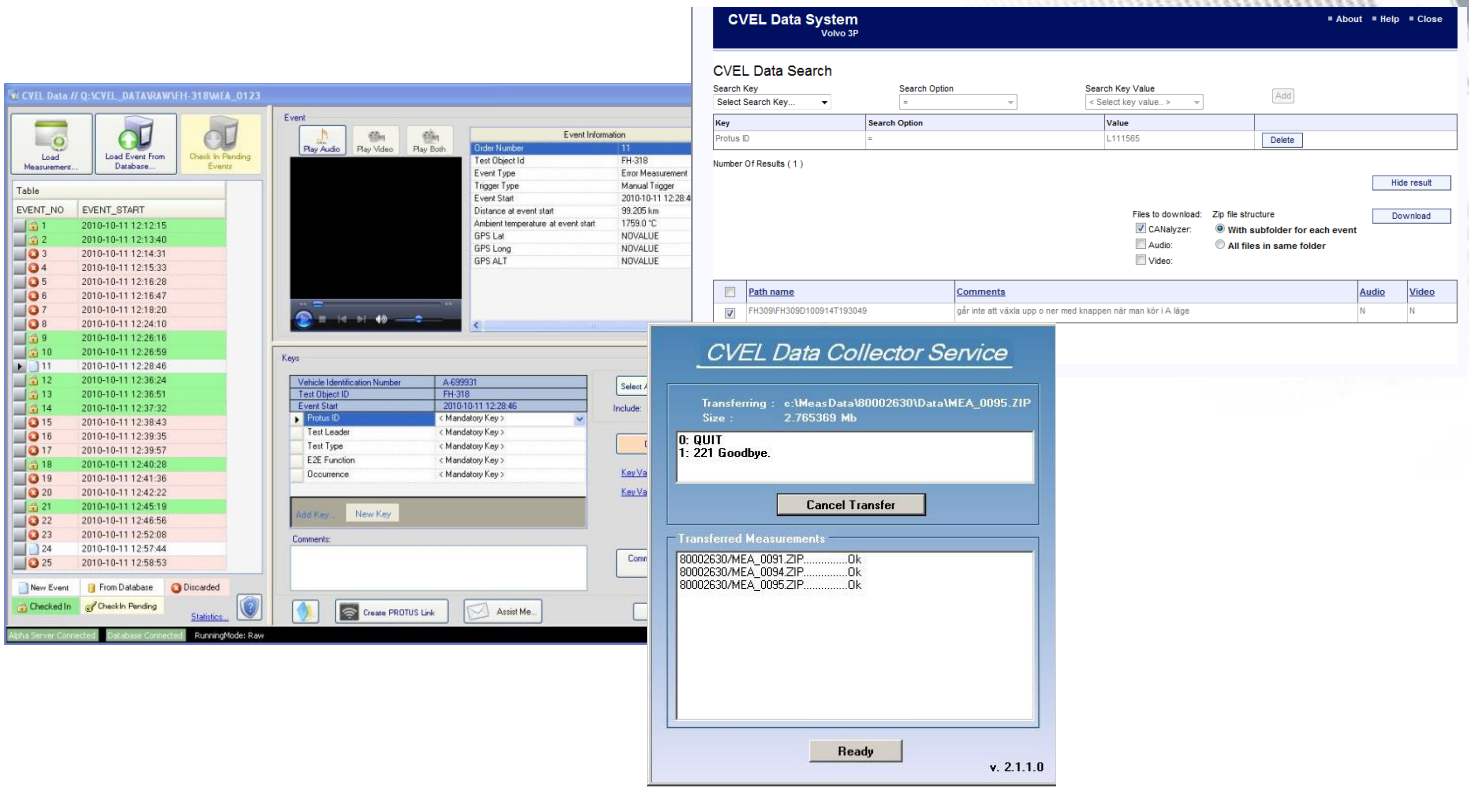
← Data. (CANalyzer format)

End Users

My responsibilities as TE/TL

1. Check/update - logger/vehicle binding in Collector
2. Transfer the data from the logger to the server.
3. Check-in *Events* to the database with appropriate keys attached. 30 day limit from when event was recorded!!
4. Discard non-valid Events
5. Link the data to a PROTUS report.

Application Demo



PROTUS link

Link name: Link: Upload Link

Uploaded By	Uploaded Date	Link Name
Thommy Karlsson	2010-10-12	L112078

Number of Links: 1

Encrypted PROTUS Id

http://cveldata.got.volvo.net/Default.aspx?ProtusGUID=7d521104-a737-4e68-9f74-924d098b0a4b

CVEL Data System
Volvo 3P

About Help Close

Measurement data

	Path name	Comments	Audio	Video
☐	FH-318\FH-318D101012T085825		N	N
☑	FH-318\FH-318D101012T085925	Several functions runnig, ignition off key out	N	N

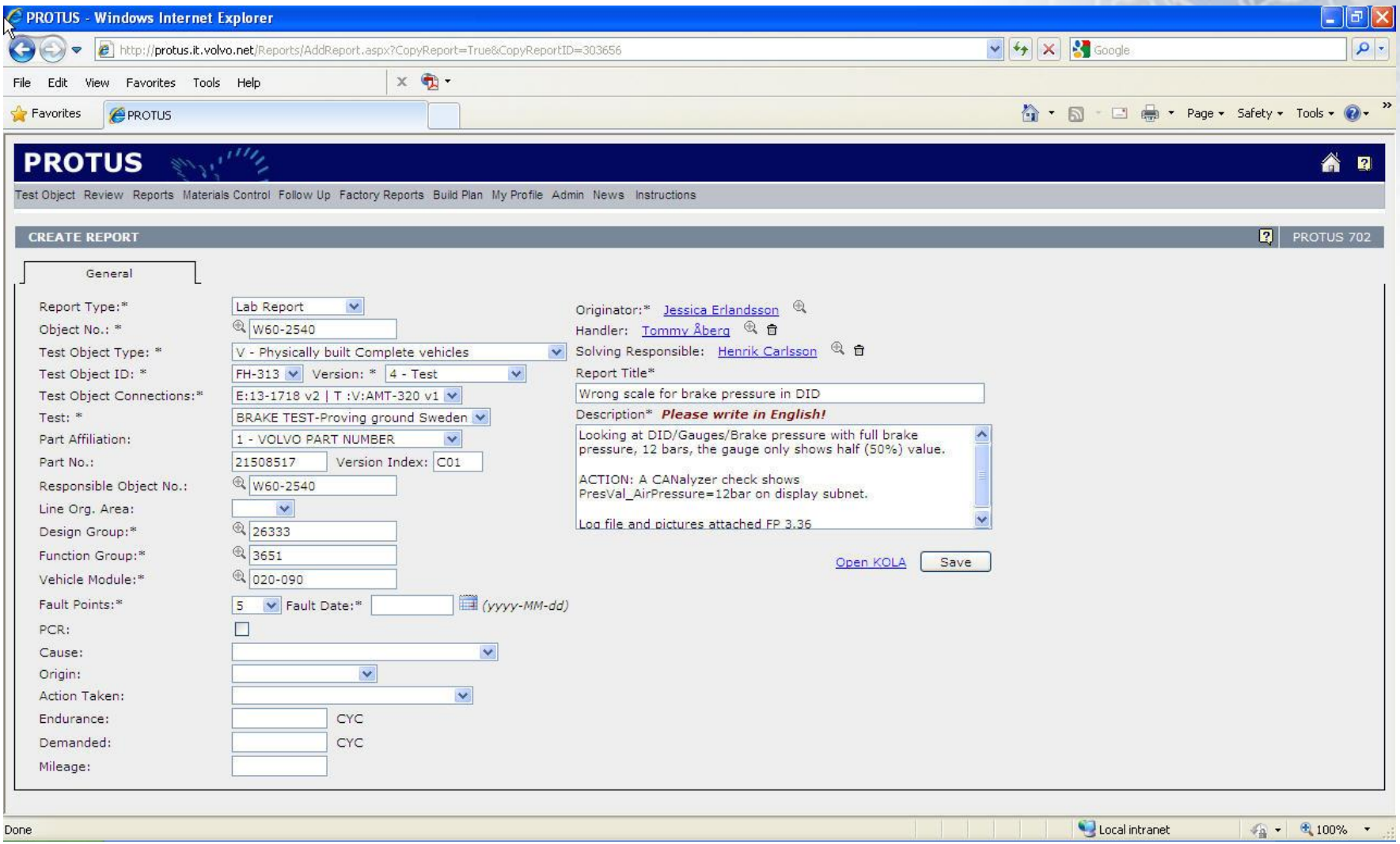
Files to download: Zip file structure
☑ CANalyzer: ◉ With subfolder for each event
☐ Audio: ○ All files in same folder
☐ Video:

Download
Hide Details

Path name	Keys	
FH-318\FH-318D101012T085925	Vehicle Identification Number	A-699931
	Test Object ID	FH-318
	Event Start	2010-10-12 08:59:25
	Protus ID	L112078
	Test Leader	Thommy Karlsson
	Test Type	PVT
	E2E Function	Vehicle Modes Application
	Occurrence	Often

- Vehicle Identification Number
- Test Object ID
- Event Start
- Protus ID
- Test Leader
- Test Type
- E2E Function
- Occurrence

PROTUS


PROTUS - Windows Internet Explorer
http://protus.it.volvo.net/Reports/AddReport.aspx?CopyReport=True&CopyReportID=303656
File Edit View Favorites Tools Help
Favorites
PROTUS
Page Safety Tools
PROTUS
Test Object Review Reports Materials Control Follow Up Factory Reports Build Plan My Profile Admin News Instructions
CREATE REPORT
PROTUS 702
General
Report Type:* Lab Report
Object No.: * W60-2540
Test Object Type: * V - Physically built Complete vehicles
Test Object ID: * FH-313 Version: * 4 - Test
Test Object Connections:* E:13-1718 v2 | T :V:AMT-320 v1
Test: * BRAKE TEST-Proving ground Sweden
Part Affiliation: 1 - VOLVO PART NUMBER
Part No.: 21508517 Version Index: C01
Responsible Object No.: W60-2540
Line Org. Area:
Design Group:* 26333
Function Group:* 3651
Vehicle Module:* 020-090
Fault Points:* 5 Fault Date:* (yyyy-MM-dd)
PCR:
Cause:
Origin:
Action Taken:
Endurance: CYC
Demanded: CYC
Mileage:
Originator:* Jessica Erlandsson
Handler: Tommy Åberg
Solving Responsible: Henrik Carlsson
Report Title*
Wrong scale for brake pressure in DID
Description* Please write in English!
Looking at DID/Gauges/Brake pressure with full brake pressure, 12 bars, the gauge only shows half (50%) value.
ACTION: A CANalyzer check shows PresVal_AirPressure=12bar on display subnet.
Log file and pictures attached FP 3.36
Open KOLA
Save
Done
Local intranet
100%

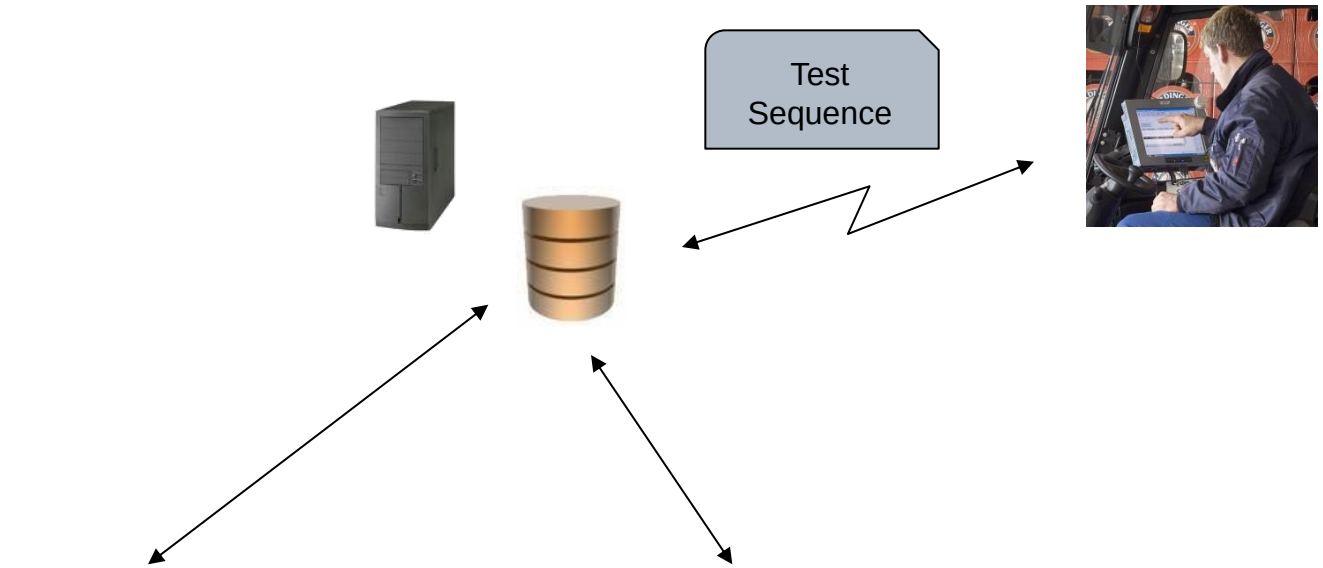
Work flow - repetition

- Upload data from logger
- Check Logger/Vehicle binding in Collector
- Copy data from USB to C:\MeasData (everything incl 8000xxxx)
- Also save a copy somewhere on your local HDD
- Wait until all data on USB is in the MeasData folder
- Upload data to server using Collector (Transfer window)
  - Note! Transfer rate, when working outside Volvo
  - ”Show Log-file..” (if correct MEA_xxxx and usually LOG_xxxx)
- Refine data –(add metadata+Check-in) or Discard, using Refiner
- Create PROTUS link in Refiner, identical info in PROTUS id as you entered, when creating the link
- Upload the link in PROTUS
- Check that the PROTUS link works.

Future Developments

- Readout of the vehicle id (VIN)
- Diagnostics readout
- Remote communication (WLAN)
  - ”Hotspots”
- Display
  - RT-testing (brake temp/warning, …)
- Multiple LIN
- Readout of the ECU HW/SW id
- Remote communication (GPRS/3g)
  - Transfer data
  - Change configuration
- Futher camera implementations
  - Max 4 , against the light, darkness

Future Workflow



- **Import Test Sequences**
- **Export Results**

- **Editing Test Cases**
- **Managing Test Sequences**
- **Creating Reports**

PC Prerequisites

- ”Open Client” for myPlace computers (FAROS)
  - First mail to Martin (GOT users)
  - When confirmed, use motivation sent by Martin (GOT users)
- Oracle client version 11 or newer (FAROS)
- Contact TFV team for installation or use
  - eFACTS Data Refiner
  - eFACTS Collector
  - CVEL USB Applications (if needed)
    - CVEL_Data_Copy, CVEL_MLOG_Tester, CVEL_USBauto

Introduction to eFACTS Logging

Questions?

Mail to: support.efacts@volvo.com

Logger problem (GOT): +46 31 32 73090

https://teamplace.volvo.com/sites/3p-EEE-CV/default.aspx