

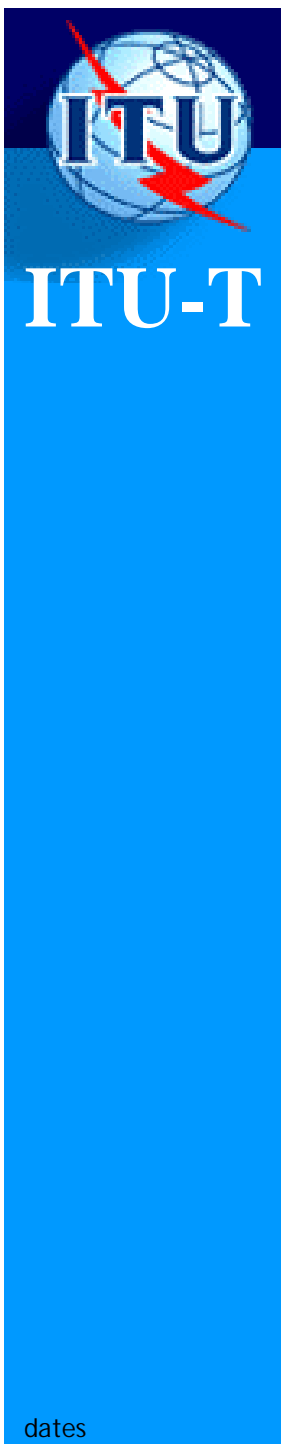


International Telecommunication Union

Unified Diagnostic Services Remote Use Cases

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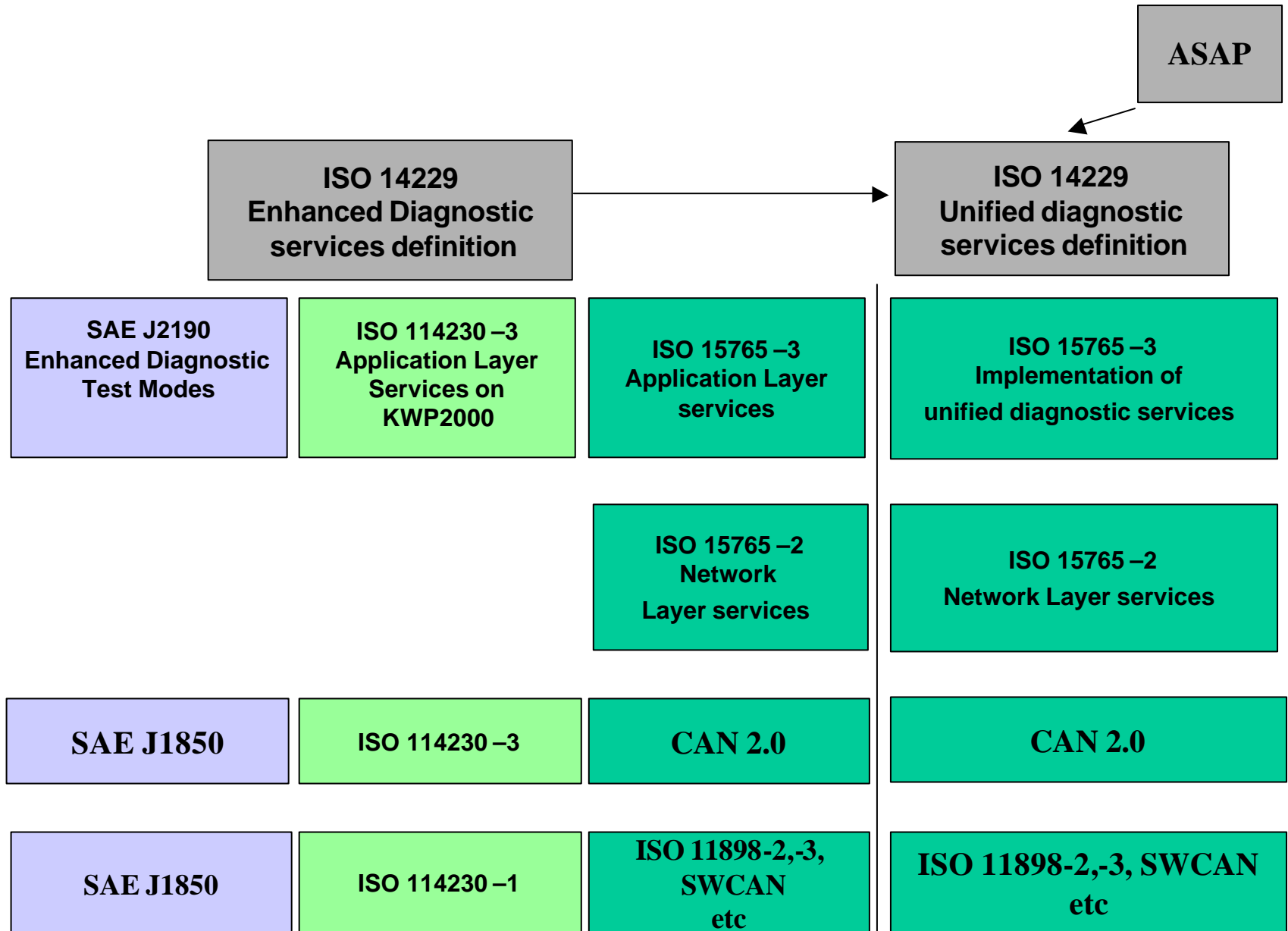
"The Fully Networked Car, A Workshop on ICT in Vehicles"
ITU-T Geneva, 2-4 March 2005

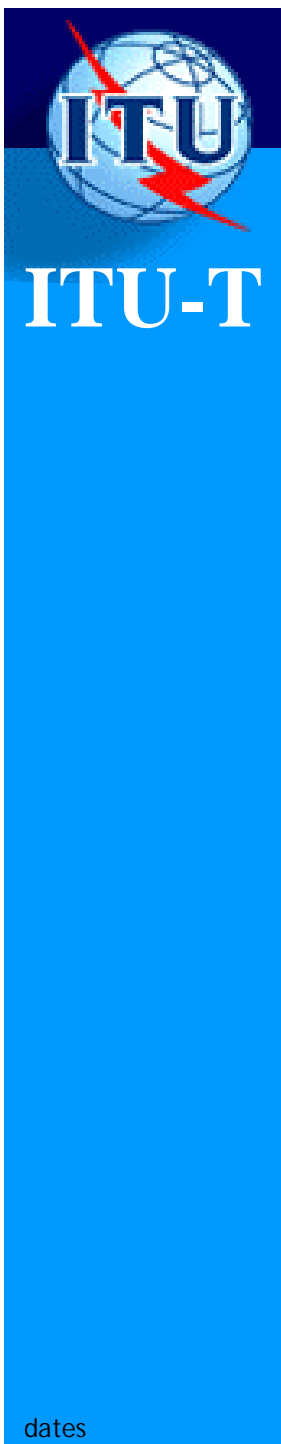


Unified Diagnostic Services

- This is the new title for ISO 14229
- Supports the vehicle manufacturers wider requirements
- A diagnostic service is a specific communication function not required to deliver a systems normal function
- Communication is between systems on the vehicle and external test equipment
- The services are described independently of the communication protocols which will deliver them
- The implementations on specific protocols are or will be described in other standards

Enhanced Service Structure





Diagnostic Service Functionality

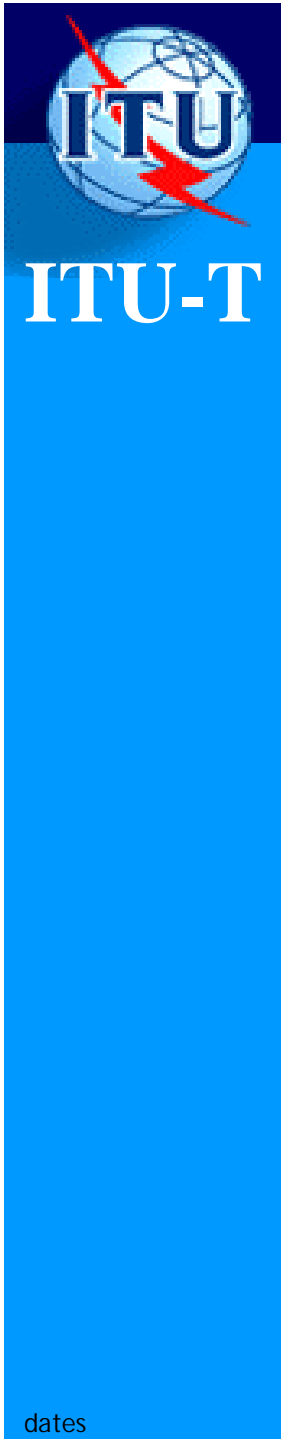
- We may wish to see data stored within a system - such as Trouble codes - or some form of identifications
- We may wish to see live data - such as Engine or vehicle speed
- We may want to transfer large amounts of data - for example reflashing a module
- We may wish to take direct control of a modules I/O - for example disabling individual cylinders to identify a fault.
- We may wish to run specific routines already in a module - such as some form of self calibration
- We may wish to apply security locks to certain services, or to allow the normal function of a system to be disturbed to varying degrees.

Functional Units

The services are organised into functional units.

There are several services defined in each unit

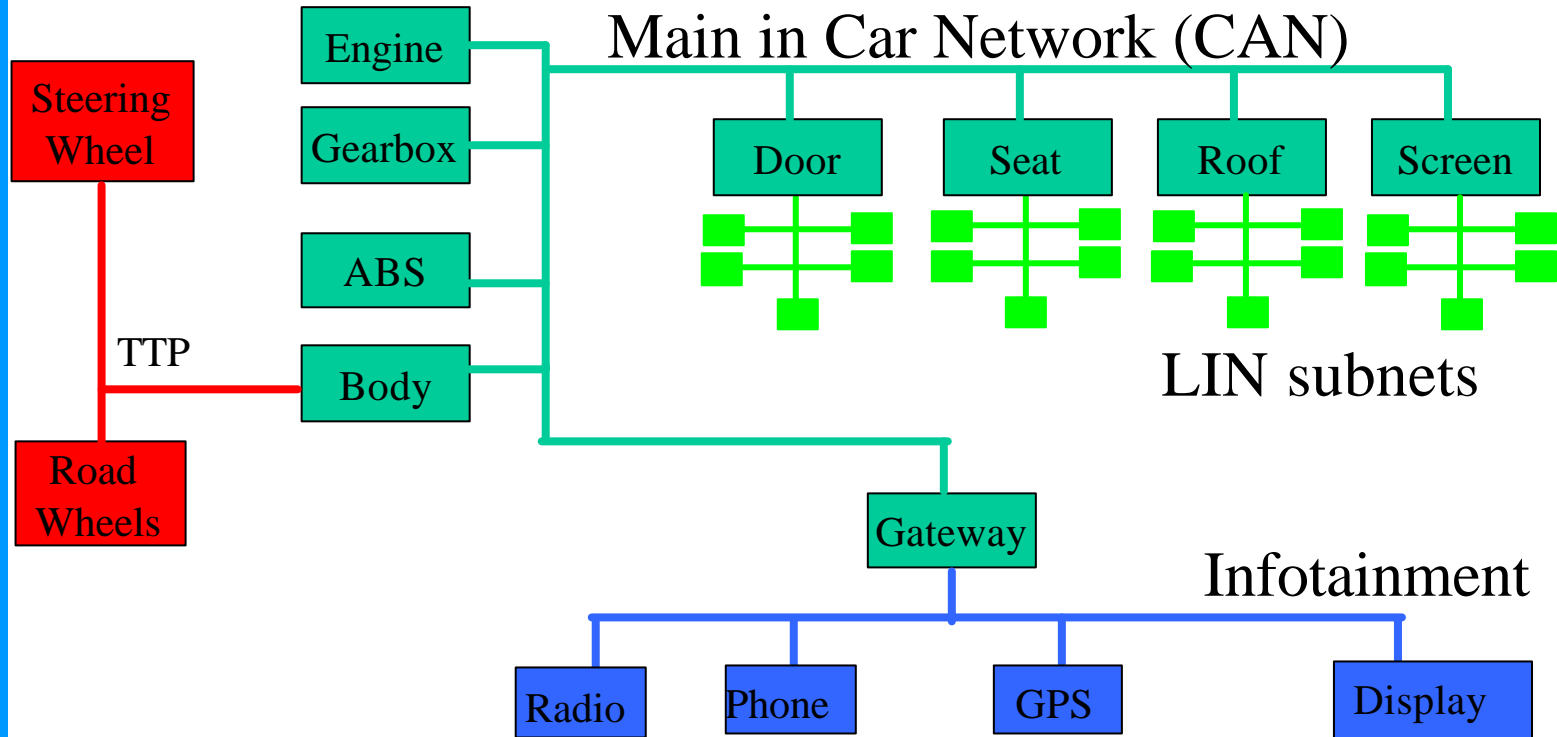
Unit Name	Use
Diagnostic and Communication Management	Controls a diagnostic communication session. Determines which services may be accessed
Data Transmission	"Live" data transmission
Stored Data Transmission	Recovery of fault data
Input / Output Control	The tester controls a modules inputs or outputs
Remote Activation of Routine	Run and recover results of a systems in built test
Upload / Download	Transfer of large data packets



Remote Use Cases

- We are going to look in a little more detail on two uses of the services where the client is remote.
- The first case looks at performing some remote diagnostics to identify which component needs replacing
- The second case allows an OEM to reprogram a module in a vehicle bought in for service
- We will look at the overall architecture and which services might be used.
- In each case we require a telematic module connected to the vehicle

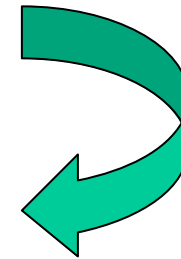
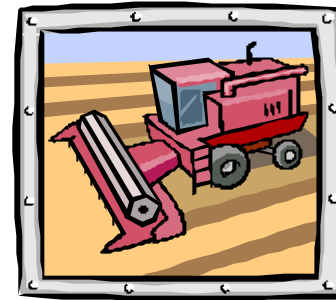
Possible Vehicle Architecture



Remote Diagnostics Use Case

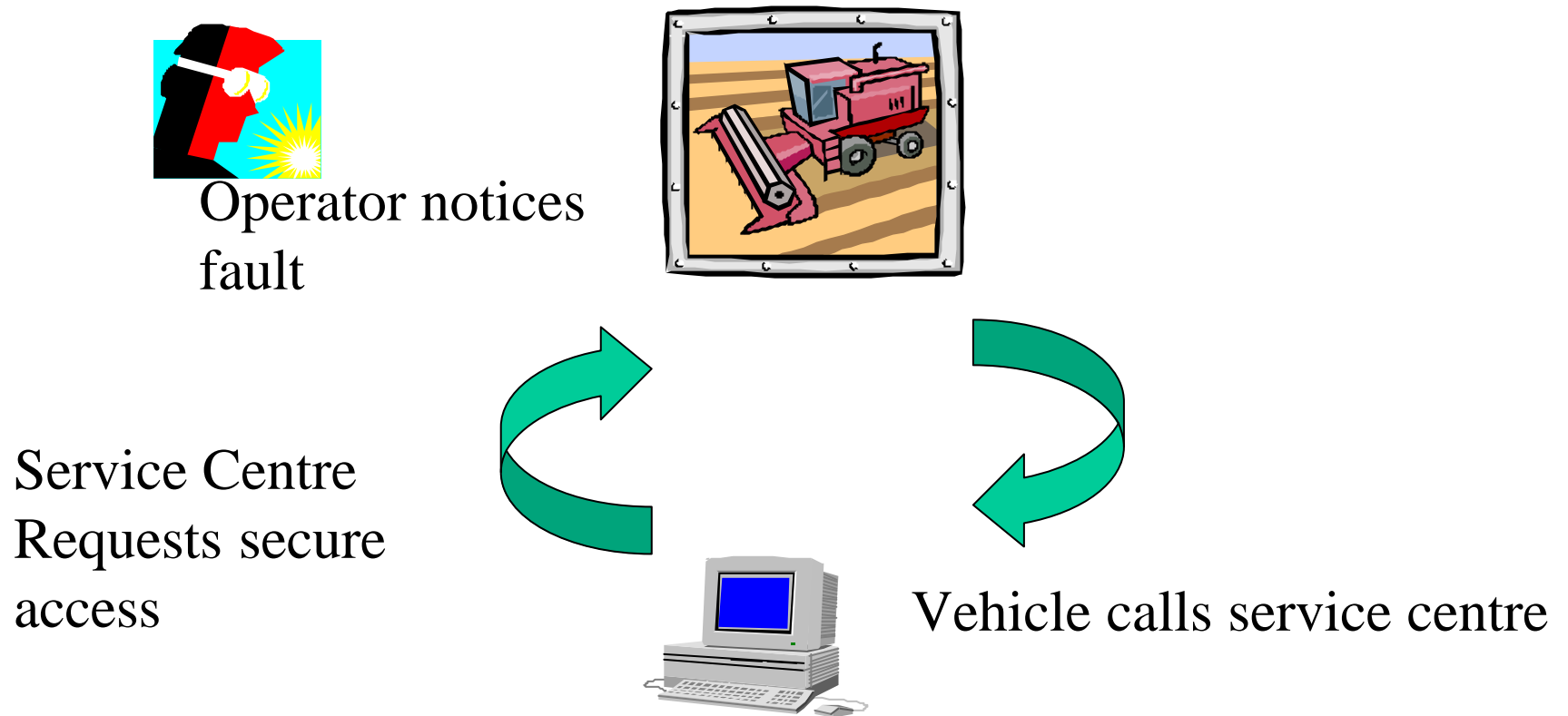


Operator notices
fault



Vehicle calls service centre

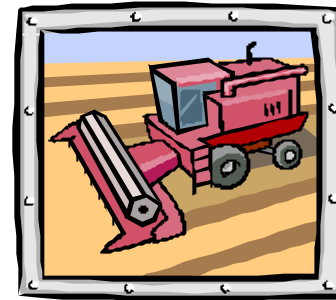
Remote Diagnostics Use Case



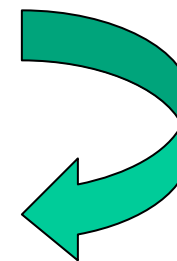
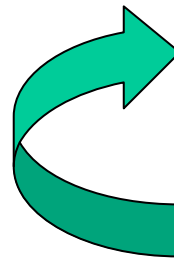
Remote Diagnostics Use Case



Operator notices fault



Service Centre
Requests secure
access

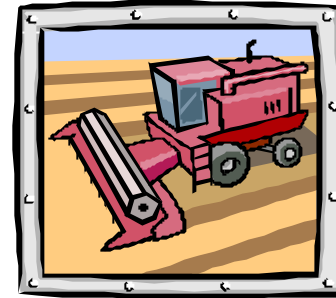


Vehicle allows access

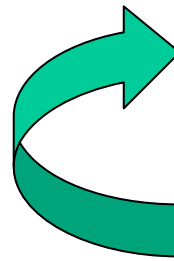
Remote Diagnostics Use Case



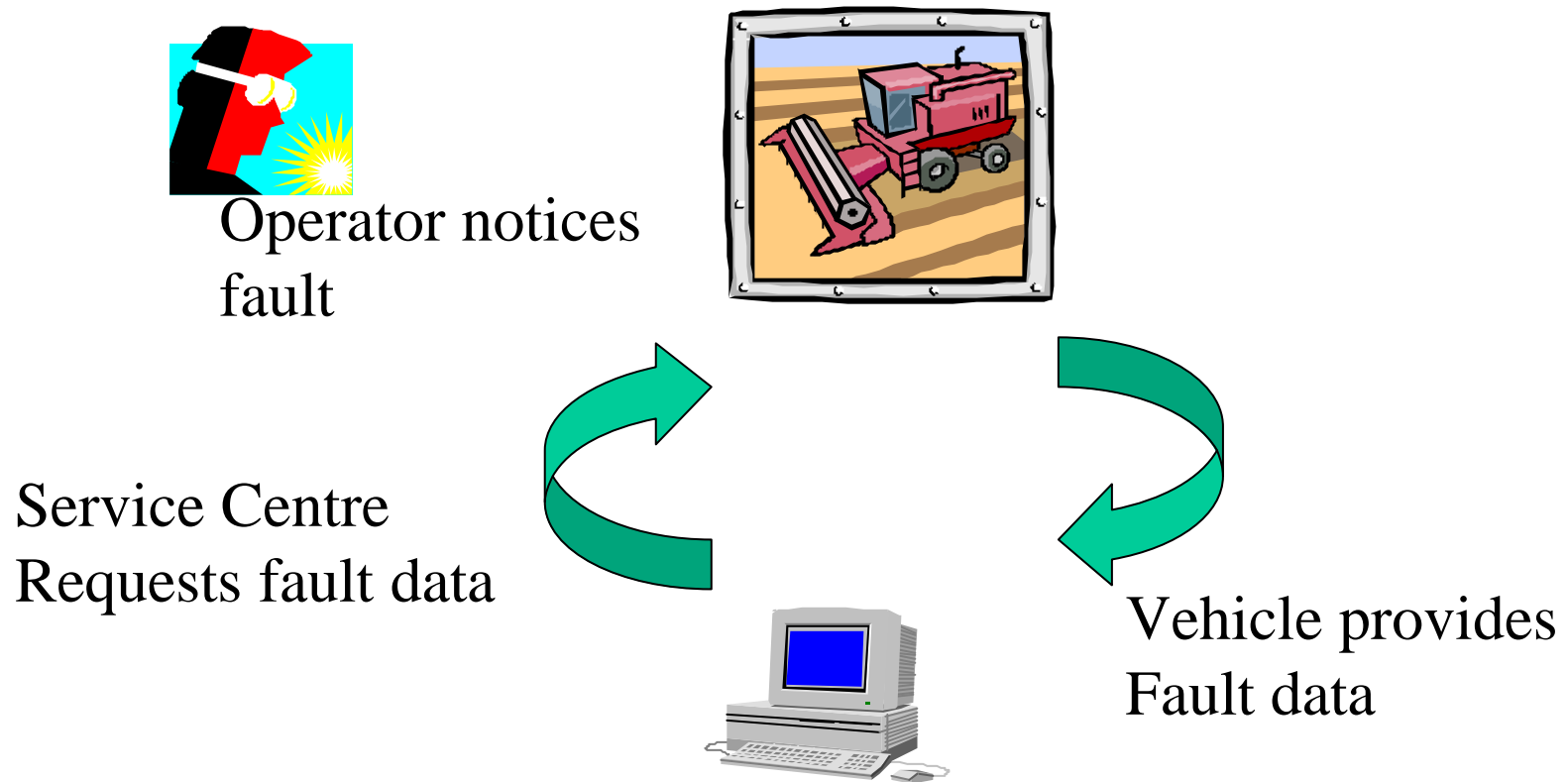
Operator notices
fault



Service Centre
Requests fault data

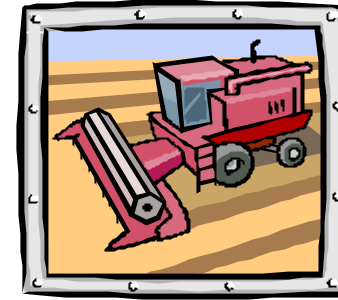
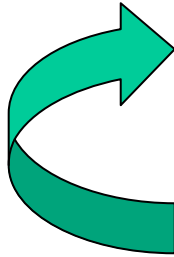


Remote Diagnostics Use Case

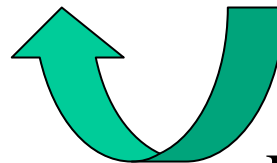


Remote Diagnostics Use Case

Operator told
How to repair

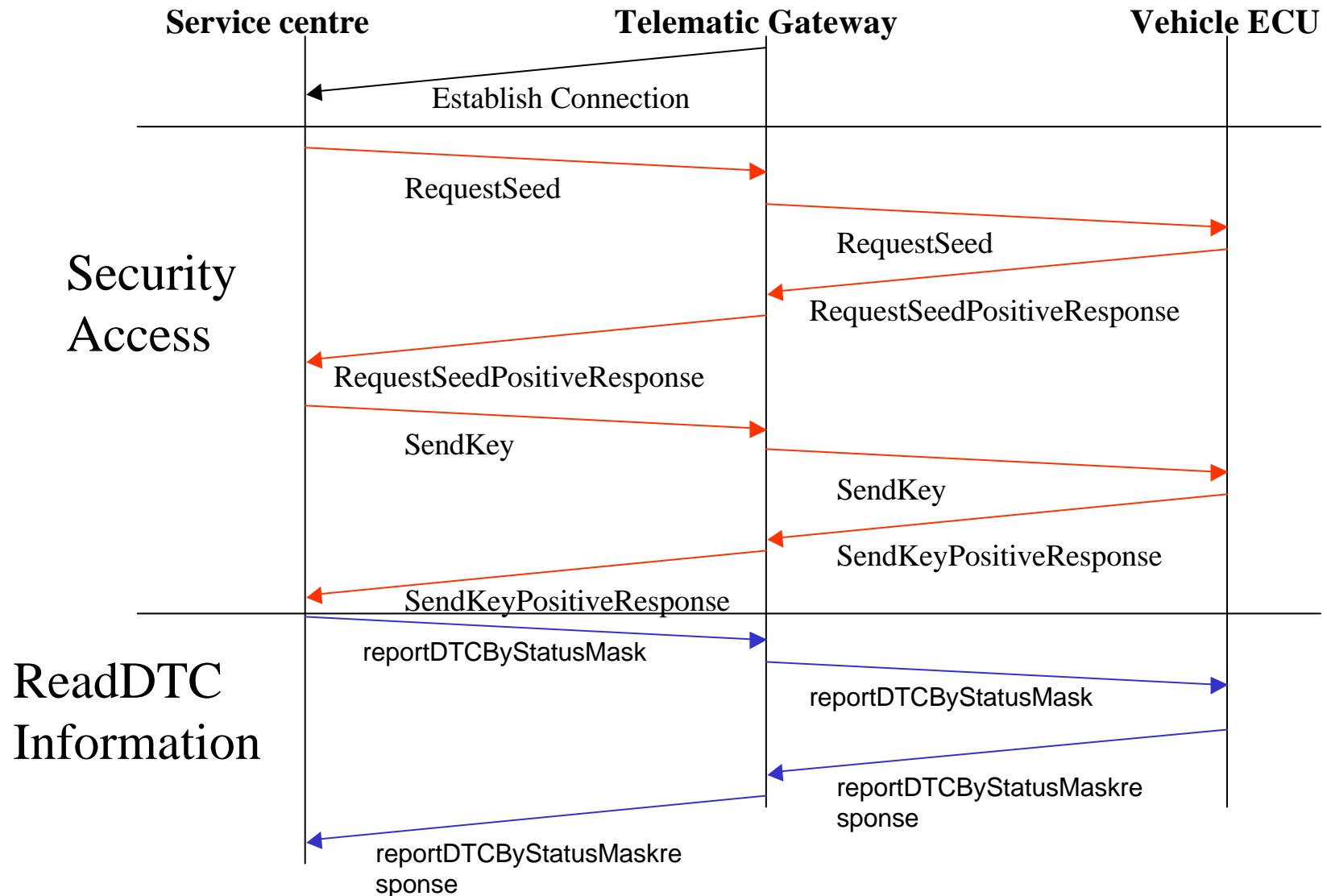


Experts determine fix



Data provided to experts

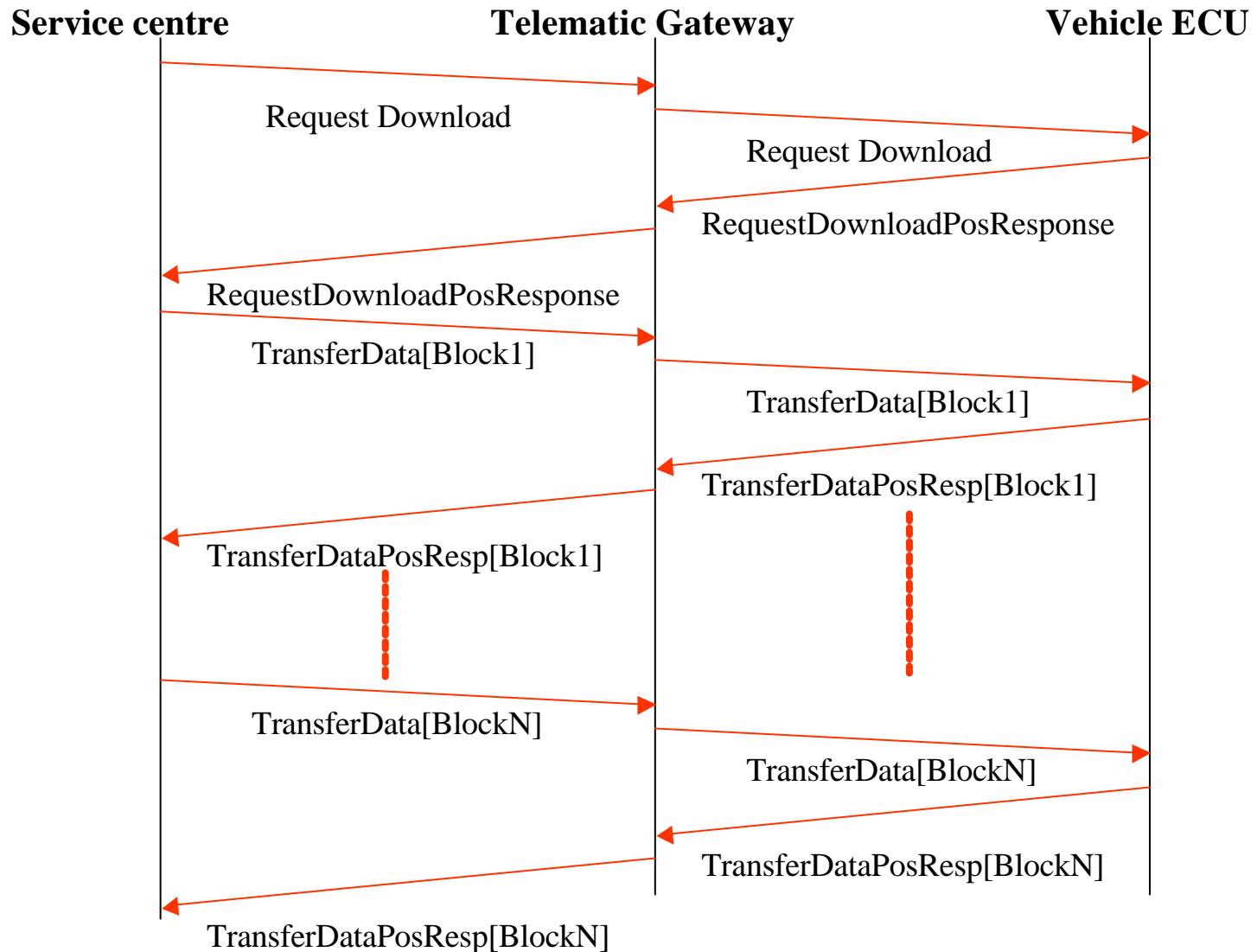
Remote Diagnostics Message Flow



Calibration Download Use Case



Remote Calibration Download Use Case Message Flow





Summary

- Automotive Industry has defined a set of common diagnostic services
- When implemented on vehicles with a telematic capability they provide the opportunity to implement a number of remote functions