

# Spirent UpperTester

## Overview

The UpperTester (UT) enables the implementation of a simple client for testing TCP stacks on a Device Under Test (DUT). After implementation, it provides several functionalities (like opening and closing communication sockets) that can be triggered by the user via UDP commands called ServicePrimitives (SP).

## Adapting the UpperTester

Sources of the UpperTester consist of clearly structured C89. For controlling network functionalities of the stack to be tested, the BSD Sockets API (published 1983) is used. This API is supported by common UNIX systems, by Windows systems (slightly modified), and by most TCP/IP stacks for the embedded domain.

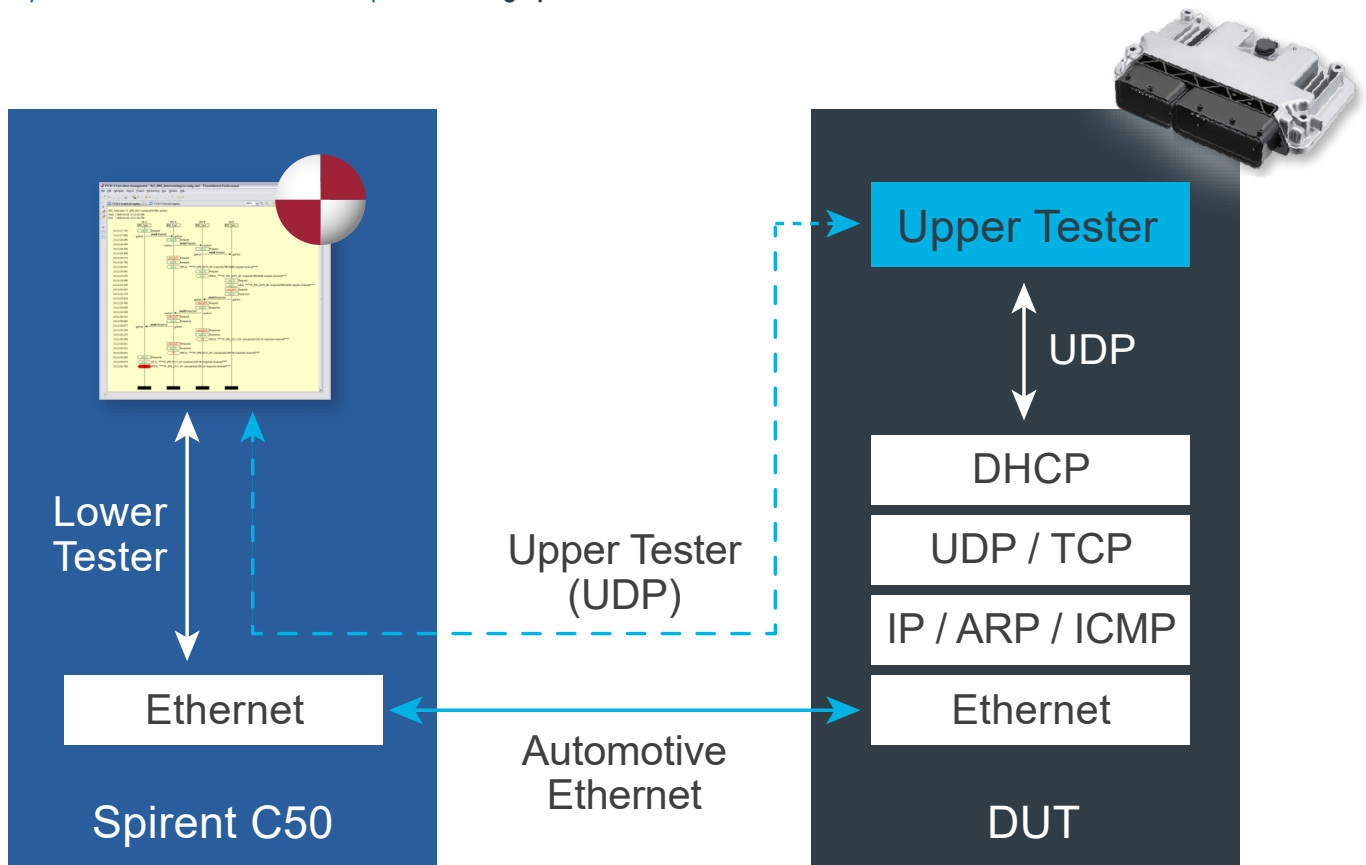
In case the Sockets API is not available, it usually can be recreated quite easily. The UpperTester generally spares threads to simplify the porting, and it does not allocate cache dynamically if requested.

## ServicePrimitives (SPs)

The SPs are implemented according to the following AUTOSAR documents.

**AUTOSAR TC Release 1.1.0** - [https://www.autosar.org/fileadmin/user\\_upload/standards/tests/1-1/AUTOSAR\\_PRS\\_TestabilityProtocolAndServicePrimitives.pdf](https://www.autosar.org/fileadmin/user_upload/standards/tests/1-1/AUTOSAR_PRS_TestabilityProtocolAndServicePrimitives.pdf)

**AUTOSAR TC Release 1.2.0** - [https://www.autosar.org/fileadmin/user\\_upload/standards/tests/1-2/AUTOSAR\\_PRS\\_TestabilityProtocolAndServicePrimitives.pdf](https://www.autosar.org/fileadmin/user_upload/standards/tests/1-2/AUTOSAR_PRS_TestabilityProtocolAndServicePrimitives.pdf) including Spirent extensions.



## ServicePrimitives

- **GET\_VERSION**  
Queries the version of the UpperTester.
- **START\_TEST**  
Used for logging purposes only, not for test relevant actions.
- **END\_TEST**  
Used for logging purposes only, not for test relevant actions.
- **CLOSE\_SOCKET**  
Closes a socket (usually when ending a test).
- **CREATE\_AND\_BIND**  
Creates a socket and possibly attaches it to a local port or a local IP address.
- **SEND\_DATA**  
Causes the UpperTester to send data to a permitted address.
- **RECEIVE\_AND\_FORWARD**  
Sets the UpperTester to a certain mode to forward incoming telegrams to the test system.
- **LISTEN\_AND\_ACCEPT**  
Prepares the UpperTester to accept incoming connection requests.
- **CONNECT**  
Performs the typical TCP handshake.
- **CONFIGURE**  
Sets diverse parameters in the TCP stack (for instance the TTL). Please note: Since the access to such low level parameters may be cause problems.
- **SHUTDOWN**  
Performs a shutdown with the given socket.
- **ADD\_STATIC\_ARP\_ENTRY**  
Adds a static IP address to the ARP table entries.
- **REMOVE\_STATIC\_ARP\_ENTRY**  
Removes a static IP address from the ARP table entries.
- **SET\_ARP\_TIMEOUT**  
Sets ARP dynamic cache timeout in seconds.
- **CLEAR\_ARP\_TIMEOUT**  
Clears previously set ARP timeout.
- **CLEAR\_DYN\_ARP\_ENTRIES**  
Clears all dynamic ARP table entries for given IP address.
- **SEND\_ICMP\_REQUEST**  
Makes DUT to send an ICMPv4 request over the given network interface to a specific IP address.
- **CONFIGURE\_DHCP\_CLIENT**  
Initializes the Client to use given network interface and port.
- **DECONFIGURE\_DHCP\_CLIENT**  
Shutdown client using given network interface and port.
- **SEND\_DHCP\_INFORM**  
Requests Client to send DHCP inform.
- **RELEASE\_ADDRESS**  
Makes DHCP Client to release the address for the given network interface.
- **RENEW\_ADDRESS**  
Makes DHCP Client to renew the address for the given network interface.
- **SET\_OPTION**  
Sets DHCP Client options.
- **RESET\_ALL\_DEVICE\_CONFIGURATIONS**  
Resets DHCP client configurations for all configured interfaces on the DUT.
- **DEVICE\_UP**  
Starts the network interface.
- **DEVICE\_DOWN**  
Stops the network interface.