VOLVO CAR	
SERVICE AND PARTS BUSINESS	

Service Manager Bulletin

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VIDA Workshop Systems Requirements and Guidelines

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"Right first time in Time"

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1   INTRODUCTION

This document describes the technical specifications and standards that need to be incorporated in the dealership network and IT infrastructure for running VIDA in a workshop process and environment.

All areas and parking spaces used by customers visiting the workshops shall be covered by Wi-Fi. This document is prepared as a technical guide to assist authorized Volvo dealers, importers, harbors and national sales companies to build wired and wireless infrastructure for workshops and other VIDA users.

In VIDA, the vehicle communication methods differ depending on what diagnostic protocol a vehicle model is using. Also, the diagnostic protocols provide different possibilities in terms of how the vehicle model can be diagnosed in VIDA. There are two main groups of vehicles in VIDA, based on vehicle communication methods:

- VDS protocol-based vehicle models (used in all vehicles on the new electrical platform, starting with XC90 model year 2016).
- D2 and GGD protocol-based vehicle models (used by all vehicles on all other existing platforms).

VDS protocol-based vehicles support diagnostics over wireless LAN and by Ethernet cable. This delivers faster communication and a simplified connection procedure compared to previous vehicle communication methods.

2   HOW TO CONNECT VDS PROTOCOL-BASED VEHICLES TO VIDA

VDS protocol-based vehicles support diagnostics over Ethernet and Wi-Fi.

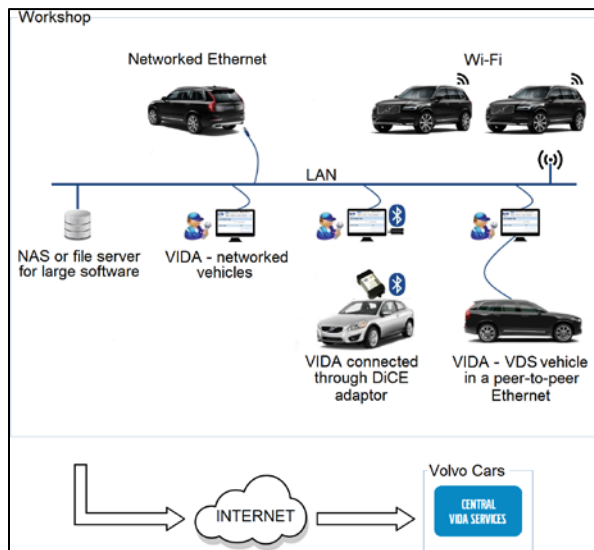Below diagram depicts the vehicle connectivity scenarios at the workshop.

Fig. 1 Workshop diagnostic connection types

There are three different ways of connecting a VDS protocol-based vehicle to VIDA:

- Wi-Fi connection between the vehicle and the workshop network, where the vehicle is accessible from any VIDA workstation in the workshop.
- Networked Ethernet, using an Ethernet cable to connect the vehicle to a LAN infrastructure directly, from where the vehicle is accessible from any VIDA workstation in the workshop.
- Peer-to-Peer, using an Ethernet cable between a VIDA workstation and a vehicle.

3 CONNECTING VEHICLES FOR INFOTAINMENT USAGE (SENSUS CONNECT)

3.1 VDS protocol-based vehicles

It is important to keep in mind and distinguish that VDS protocol-based vehicles can be connected wirelessly in two different ways for two different purposes:

- The vehicle can connect wirelessly (or by wire) to the VIDA workstations in order to load software. This connection is used in the workshop for diagnostics and software download purposes.
- Also, the vehicle can connect wirelessly to a customer device such as a smartphone to provide connectivity functionality for infotainment purposes. This connection is primarily intended for the customers. The latter will however also be applicable for workshop technicians in the following cases:
  - Usage of the remote update service to download apps or map increments.
  - Connecting the vehicle for fault tracing of connectivity related customer functionality. If diagnostic communication is required in these cases, VIDA cannot reach the vehicle over a wireless connection (as the same chipset is shared between these two functionalities). VIDA will in this case have to be connected by Ethernet cable.

3.2 D2 and GGD protocol-based vehicles with Sensus Connect

Vehicles with Sensus Connect can connect wirelessly to a customer device such as a smartphone to provide connectivity functionality for infotainment purposes. This connection is primarily intended for the customers. It will also be applicable for workshop technicians in the following cases:

- Usage of the remote update service to download apps or map increments.
- Connecting the vehicle for fault tracing of connectivity related customer functionality.

4   VIDA REQUIREMENTS

The following are the mandatory infrastructure components for VIDA:

*   Windows 7 Pro/Enterprise (64 bit) or Windows 8.1 Pro (64 bit) or Windows 10

*   Internet connection. An internet connection must be available at all workshops. The internet connection is used for the communication between the VIDA workstations and the VIDA central servers.

*   Network storage of 1 TB

*   A network storage of 1 TB or greater is needed per retailer to locally cache VIDA data. This should be made available either as a NAS drive or a shared folder. A shared drive is a hard drive that can be accessed by every VIDA workstation in the network. A shared drive can be located on a networked computer or a network attached storage (NAS) device. Using a shared drive enables every VIDA workstation in the network to access the data stored on it.

*   Smartphone for mobile internet and fault tracing. The vehicles need mobile internet access in the workshops for the purpose of loading in-car apps, in the same way as the customers would provide internet to their vehicles. Mobile internet is normally supplied to the vehicles by means of a smartphone connected to the vehicles using USB, Bluetooth or Wi-Fi technology (by setting up a Wi-Fi hotspot). USB dongles with 3G/4G-dongles cannot be used. Therefore, the workshop will need a smartphone for fault tracing issues related to connectivity in order to be able to repeat what the customers would do.

Also VIDA needs mobile internet in the case of mobile fault tracing (e.g. while driving the vehicle), where the same smartphone could be utilized. Alternatively a USB dongle could be used for a VIDA workstation.

A smartphone is therefore a minimum requirement for mobile internet. The smartphone shall have USB and Bluetooth tethering capabilities and shall have Wi-Fi hotspot feature for internet sharing.

4.1   Recommended specifications for VIDA workstation

It is the recommendation of Volvo Cars Customer Service that computer equipment bought for VIDA, should be possible to upgrade. If it is necessary to increase computer performance, it should be possible to increase RAM and replace hard drives easily. Furthermore, purchasing more memory will result in better performance since the use of virtual memory is minimized.

VIDA is delivered as a desktop application but an installation package also needs to be installed on the computer to get the necessary software components.

For using the full version of VIDA, including diagnostics and software download, the workstation requirements are as presented in the table below.

Specification for VIDA used for diagnostics and software download

Processor	Core i3 or above
Memory	4GB or more
Local free disc space	10 GB
Connections	2 x USB 2.0 or higher * Additional USBs may be needed for other equipment, such as mouse and keyboard.
Operating System	Windows 7 Professional/Enterprise (64 bit), Windows 8.1 Professional (64 bit) or Windows 10 *Windows Update must be enabled and all available updates from Microsoft need to be installed.
Browser	Microsoft Internet Explorer 10 or 11
File system	NTFS
Display resolution Aspect ratio Minimum resolution	16:95 1280 x 720 16:105 1280 x 800 *The application is optimized for wide screen format. However, the application design is"fluid" based, i.e. the application stretches to completely occupy available screen space. This makes it possible to use smaller screens but bear in mind that it can be difficult to read wiring diagrams and other features that contain a lot of information.
Internet bandwidth	A minimum of 5mb/s available, at all times, for each VIDA client in the workshop.

4.2   Additional software requirements

There are different plug-ins that are needed and software prerequisites that need to be fulfilled for VIDA to work properly. These are described in the sections below.

4.2.1   IsoView

IsoView is an image viewing plug-in, automatically started together with VIDA. IsoView is included in the VIDA installation and there is no additional license fee.

4.2.2   Adobe Acrobat Reader

Adobe Acrobat Reader is included in the VIDA installation.

4.3   Other software and software interfaces

4.3.1   Electronic Wiring Diagram

Electronic wiring diagrams is integrated with VIDA.

4.3.2   TIE

TIE is used to report errors/discrepancies and to distribute information. To access TIE, Microsoft Internet Explorer 10 is required.

4.3.3   VIDA Menu Pricing

The VIDA Menu Pricing information (Operations and Packages) is used as part of the content in the work list creation in VIDA. VIDA Menu Pricing is integrated with VIDA and there are no separate system requirements for VIDA Menu Pricing users.

5   LAN AND WI-FI REQUIREMENTS

5.1   Mandatory components

To form a local area network that works for the vehicles, the following components are mandatory for the setup:

*   Access points provided by Volvo Cars through the Volvo Cars Global Wi-Fi service; in order to connect vehicles wirelessly to the LAN.
*   Switch/routers; to build the infrastructure and provide wired access for vehicles to the LAN.
*   DHCP server; to provide access points and vehicles with IP addresses.

5.2   Volvo Cars Global Wi-Fi service

The Volvo Car Global Wi-Fi service is a service developed by Volvo Cars. It provides up to three wireless networks:

*   Volvo Cars Diagnostic Wi-Fi
*   Volvo Cars Vehicle Connectivity Wi-Fi
*   Volvo Cars Guest Wi-Fi

A detailed description of requirements is available in Service Manager Bulletin 00-355

5.4   Switches and switch ports

The dealership needs to have switches with available Ethernet sockets to plug in access points as well as any networked Ethernet connected vehicle. It is highly recommended, for simple installation and maintenance, that the switch features PoE802.3af standard as the access points are powered this way.

* Ports to which Volvo Cars Global Wi-Fi services access points are connected must be configured as access ports and without authentication. For example be open without requiring IEEE 802.1x authentication.

5.5   Port performance

Router, switches and network interface cards speed must support at least 100 Mbit/s.

5.6   IP address assignment

The VIDA Wi-Fi access points, as well as the vehicles connecting to the network through the access points are dependent on IP addresses. These are assigned by DHCP when connecting to the selected switch ports. Therefore each network segment where these devices are connected shall provide a DHCP service. The DHCP-server must also provide IP-addresses to the default-gateway and the DNS server.

The DHCP must also provide a sufficient range of IP-addresses to be used by the vehicles that connect to the access points.

Also peer-to-peer connected vehicles need to get IP addresses. These vehicles are assigned IP addresses through address auto configuration ("auto-IP"). For IPv4, the vehicle and computer will get an address in the 169.254.0.0/24 range. Make sure any VIDA computers used to connect peer-to-peer to a vehicle are set such that auto-IP is enabled (i.e. that a static IP address is not set on the Ethernet port.

5.7   Other network components

Other network components such as firewalls, routers, switches, proxy servers may exist in the network as long as the above component and topology requirements are fulfilled. Also make sure that necessary firewall rules are applied that allow internet and vehicle communication in accordance with chapter 6.1.2 Internal gateway firewall ports and chapter 6.1.3 Internal router firewall ports of this document.

5.8   Ethernet connectivity requirements

VDS protocol-based vehicles can be connected directly to a VIDA workstation with a standard Ethernet cable using network connectors for a peer-to-peer connection for diagnostics and software download.

The vehicles will also (together with the introduction of wireless access) have the possibility to connect by Ethernet to the LAN. In this case the vehicle is connected to a LAN switch, usually by means to a network socket provided for this purpose. In this connection any VIDA workstation connected to the LAN can reach this vehicle.

Volvo Cars recommends to install dedicated Ethernet sockets at suitable places in the workshop where a vehicle needs to get wired access to the LAN network.

The following components are required:

Mandatory components

*   VOE (Volvo OBD to Ethernet Adapter) Volvo special tool 33300050.
*   Ethernet network input for each VIDA workstation for peer-to-peer connection. It can either be a PCI network card or a USB Ethernet adapter.
*   Ethernet cable type CAT5, CAT5e or CAT6. Volvo special tool number 9513095.
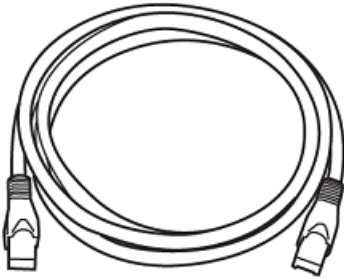
Optional components

*   An Ethernet cable tester (not a Volvo special tool) is not mandatory but strongly recommended.
*   USB Ethernet adapters (not a Volvo special tool) for internet connection when a peer-to-peer connected vehicle occupies the VIDA workstation's Ethernet port.

NOTE: The connection may differ and depends on the manufacturer of the USB Ethernet adapter.

There may be other adapters with similar properties, but since they are not tested by Volvo Cars they are not recommended.

NOTE: The peer-to-peer option needs to remain available and the necessary equipment will remain mandatory, in case of malfunctions in the connection services.

5.9 Vehicle internet connectivity requirements and general procedures

This chapter outlines the requirements and general procedures to enable connection of vehicles to the internet in order to handle customer in-car, online functionalities.

This makes it possible for workshops to access and work with in-car online functionalities such as remote update to restore in-car apps and map increments.

NOTE: In-car, online functionalities, e.g. apps and map increments cannot be managed from VIDA.

5.9.1 Alternative 1: Smartphone with internet sharing

For this alternative, the workshop must use the smartphone mentioned in chapter 4 VIDA requirements.

General procedure:

1. Make sure the smartphone has internet connectivity.
2. Bring the smartphone into the vehicle.
3. Connect the smartphone using USB, Bluetooth or as Wi-Fi hotspot.
4. Connect the vehicle to the hot spot using Sensus Connect.

5.9.2   Alternative 2: Through workshop internet gateway

For this alternative, the workshop must have a Volvo Cars Vehicle Connectivity Wi-Fi, mentioned in chapter Volvo Cars Global Wi-Fi service.

Requirements for the Volvo Cars Vehicle Connectivity Wi-Fi:

 • Has WPA2-PSK with AES-CCMP security, similar to a guest or home network.

 • Provides a gateway to the internet.

 • Does not require web proxy settings for connected clients.

NOTE: This Wi-Fi network is a separate network. The one that VIDA uses to connect to vehicles cannot be used.

General procedure:

1.   Park the vehicle within reach of an access point providing the network.

2.   Connect the vehicle to the Wi-Fi network using Sensus Connect.

NOTE: The antenna is located on the inside of the vehicle; therefore the range might be limited. For better reception, roll down one or several windows.

5.10 Remote Update Services requirements

Workshops can perform downloads and install updates on in-car, online functionalities using Remote Update Services from within vehicles. This requires that the vehicle is connected to the internet.

6   CONFIGURATION SPECIFICATIONS

6.1   Proxy and firewall configuration

6.1.1   Universal Resource Locators and DNS

VIDA will use several URLs - all will be on *.volvocars.biz. Make sure *.volvocars.biz is not blocked by a proxy or firewall.

Service URL Ports

VIDA Prerequisites	http://vidainstaller.volvocars.biz/ client-installer 80
VIDA Production	http://vida-prod.volvocars.biz 80
VIDA Admin	http://vidaca.volvocars.biz/AdministrationWeb 80
TIE	https://tie.volvocars.biz 443
VIDA Services	http://vidaresources.volvocars.biz 80
Volvo Cars password server	https://vcamlogin.volvocars.biz 443

The Wi-Fi solution requires the ability to open external URLs by DNS.

6.1.2 Internal gateway firewall ports

Both VIDA workstations and access points will have a gateway IP address configuration to reach the internet. It is recommended that vehicles connected by Ethernet to the network also have a possible route to the internet*.

The access points need to have a direct route through the internet firewall and will not be able to handle a proxy configuration.

The following outbound ports in an internet firewall need to be open:

Protocol Port number Usage		
TCP 80 - For VIDA to reach central	TCP 443 systems	TCP 7734

For access points to reach the cloud controller.		
TCP 7752	UDP 7351	UDP 123	UDP 1812

Volvo Cars is in the process of developing new services in VIDA for the workshops, which will require additional ports or range of ports being open for outgoing traffic. More information about these services will be communicated.

* The vehicles do not currently support reaching the internet this way, but for future services this will be needed.

6.1.3 Internal router firewall ports

Any router used in the network needs to fulfill the following requirements if VIDA and the vehicles shall communicate over the router:

• Allow communication on TCP port 13400 and UDP port 13400 and corresponding traffic between the sub networks.

These two communication ports are essential in the communication between VIDA and the vehicles for diagnostic and software download communication.

Especially ensure that subnet directed broadcast is allowed through routers on TCP port 13400 as this is the way that VIDA discovers vehicles on a different sub network.

• Should for best performance, support subnet directed broadcast for UDP 13400.

NOTE: The subnet directed broadcast for DoIP mentioned above must be limited to the same physical workshop network and not across multiple locations. This is for safety reasons in order to limit the risk that a vehicle is remotely controlled from one location to another with unpredictable consequences. Necessary firewall rules or layer 3-based access list must be enabled to block such traffic between workshops.

NOTE: Many routers have subnet directed broadcast turned off by default. Some cannot even be turned on.

The broadcast IP addresses to use for sub network directed broadcast are configured in VIDA Admin.

6.2   NTP sync

It is mandatory to use NTP synchronization for all the network devices and servers.

6.3   Microsoft Windows user account

In order to install VIDA, the Microsoft Windows user account has to be set to administrator.

NOTE: It is not possible to run VIDA logged in to the operating system on a guest account. Try to avoid having a domain policy that will override the normal rights for the supported user accounts. Some restrictions might make VIDA not work. For example, a user should have rights to change the registry, since VIDA requires that when adding a DiCE. It is strongly recommended that all VIDA users log in as administrators with full admin rights.

7   VEHICLE COMMUNICATION TOOLS

Vehicle communication tools are used to perform diagnostic readouts, diagnostic fault tracing and software downloads on D2 and GGD protocol-based vehicles.

A vehicle communication tool transfers data from a VIDA workstation to the correct receiver in the vehicle. VIDA supports DiCE and J2534 devices. Volvo Car Corporation recommends DiCE for vehicle communication with D2 and GGD protocol-based vehicles.

7.1   DiCE

DiCE uses a Bluetooth connection to transfer information between VIDA and the vehicle. A USB cable can be used as an alternative to the Bluetooth connection.

Please note that no third party Bluetooth dongles can be used with DiCE. Only the Volvo Cars DiCE equipment can be used.

Multiple DiCEs

You can have more than one DiCE connected to VIDA at the same time. This makes it possible to download software to more than one vehicle simultaneously.

8   ABBREVIATIONS

AES-CCMP – AES counter mode CBC MAC Protocol

CAT – Category (cable)

CAN HS – Controller Area Network High Speed

CAN MS – Controller Area Network Middle Speed

D2 – Volvo Diagnostics II

DHCP – Dynamic Host Configuration Protocol

DiCE – Diagnostic Communication Equipment

DMS – Dealer Management System

DoIP – Diagnostics over IP

GGD – Generic Global Diagnostic Specification

IP – Internet Protocol

LAN – Local Area Network

NAS – Network Attached Storage

NTFS – New Technology File System

NTP – Network Time Protocol

OBD – On Board Diagnosis

PoE – Power over Ethernet

PCI – Peripheral Component Interconnect

RADIUS – Remote Authentication Dial In User Service

RAM – Random Access Memory

SSID – Service Set Identifier

TCP – Transmission Control Protocol

TIE – Technical Information Exchange

UDP – User Datagram Protocol

USB – Universal Serial Bus

URL – Universal Resource Locator

VDS – Volvo Diagnostics and Software download

VLAN – Virtual Local Area Network

WPA – Wi-Fi Protected Access