

## Requirements, Hardware and Software Description of Server AVL Triola (AVLT) for Tracking from the Distance and Managing the Transportation Vehicle Float for Passengers and Goods

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### Abstract:

*We take into consideration the need for construction of a controller center which through a considered number of servers gives us option to manage and track transportation vehicles from the distance. On this project there are data offered that would identify a hardware and software requests, architecture and the structure of these servers.*

*The project also treats the support to accomplish a server that would serve as controller center, offering a knowledge that will be enough to accomplish a similar goal.*

*This kind of controller center for tracking of vehicle from the distance works within the N.T.S.H. "Triola" which operates in Republic of Kosovo. It is shown in practice that the use of such applications by the transporting companies brings financial profits by saving transport costs up to 20 % and improving the quality of management on a high level.*

**Key words:** DB – Data Base, IIS – Internet Information Services, RDC – Remote Desktop Connection, SMPP – Short Message Peer-To-Peer Protocol, SMTP – Simple Mail Transfer Protocol, VPN – Virtual Private Network, WS – Web Services

### 1. Requirements

AVL Server requires hardware and software minimum configuration listed below.

<b>1.1 Minimum hardware requirements</b>	Server motherboard (Intel or other) with 1 free COM port and/or 1 free USB slot
Processor	Xeon Dual-Core 2.0GHz (could be x86 or x64 architecture)
HDD .....	1 physical drive for avlT server software (min 100GB). RAID 1 is recommended. 1 physical drive for DB, minimum 200GB (in average 1 device stores 0.5MB/day1). RAID 1 is recommended. 1 physical drive for backups, minimum 500GB. RAID 1 is recommended.
RAM .....	4GB DDR2
NIC .....	10/100/1000 Mbit/s Ethernet
Gsm Modem .....	Modem COM/G10
Other .....	Hot Swap, DVD-RW

**1.2 Minimum software requirements**

Server must meet software requirements listed below. OS .....	Microsoft Windows Server Standard Edition 2003, 2008, 2012 (could be x86 or x64 versions) <b>It must be primary Operating system.</b> Can't be installed on Virtual PC software.
Database engine .....	Microsoft SQL Server Standard Edition 2000, 2005, 2008, 2008 R2, 2012; (could be x86 or x64 versions) <b>Microsoft SQL Server management Studio</b> Windows Authentication login to SQL Database engine!
Web server .....	Microsoft Internet Information Services (IIS) 6.0, 7.0, 7.5 Should be installed before AVL Server Install.
Microsoft .NET Framework .....	4.0 and 3.5 SP1
Oracle Java Platform (JDK) .....	Standard Edition 6 Update 14 or higher <b>Version for x86 (32bit) software</b>

Internet connection .....	At least 10Mbits <b>Static IP address</b>
Ports must be available from outside ....	TCP: 80 – for Server Management web interface and AVLT tracking program connection. TCP/UDP: 4000 – for incoming data from tracking units. TCP: 4001 – for units remote configuration.
Remote Desktop Connection (RDC) ....	Must be enabled and following information provided to Triola export manager: IP, Account user name, Password

### **1.3 Before installation:**

#### **Email warnings**

Create SMTP no-reply account.

Information needed:

- SMTP server host
- SMTP server port
- User name and password for login

Connection to SMTP server must be unencrypted (no SSL, no TLS).

#### **SMS sending and warnings**

If Triola ModemCOM/G10 will be used to send SMS from server, modem with SIM card inserted must be connected to one of the server COM ports.

If you plan to use SMPP service instead of Triola modem you must provide information for its configuration before installation.

#### **Google maps**

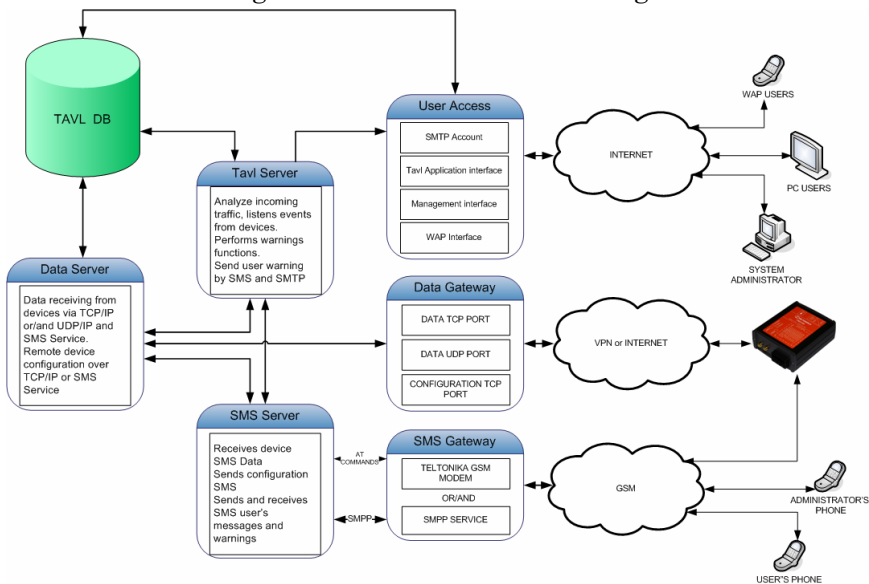
If you will use Google maps we need that you would acquire Google API code. Instruction can be received from Triola export

manager.

## 2. Architecture

AVLT server architecture is shown on figure below. AVLT server contains of avlT DB, avlT Data Server, avlT SMS Server, avlT Server, application and user interfaces.

Modules connect to server over TCP or UDP ports. GPRS data from modules is being processing by avlT Data Server. AvlT SMS server reads all data from devices transferred by SMS and redirects it to avlT Data Server. AvlT Server analyzes incoming traffic and performs warning functions. Warnings could be sent to user using SMS or Email.



## 3. Avl Server Components

### 3.1 Databases

#### Avl2T

Avl2T database stores objects, modules, SIM cards, APNs, avlT accounts information. Avl2T also stores messages from objects (devices).

## **GeoDB**

GeoDB stores geographic location text information (Reverse GeoCoding). GeoDB stores country, city and district information. AvlT application uses GeoDB information in Object list to display current object position. GeoDB information also used in AvlT Trip Stops reports.

## **3.2 Services**

### **AVLT Data Server Service**

Data server service receives data from TCP and UDP channels from modules: handles connections, decoding data and inserting it to Avl2T database. This service is responsible of remote module's configuration. Data Server interacts with SMS Server Service and AvlT Server Service. Data Server Log can be viewed in <disk>:\AvlServer3\logs\dataserver2.log.

### **AVLT SMS Server Service**

SMS Server Service is responsible of SMS sending and receiving. SMS Server Service is an interface between server and GSM modem (AT Commands) and/or SMPP service. Logs can be viewed in <disk>:\AvlServer3\logs\SMSServer2.log.

### **AvlT Server Service**

AvlT Server Service analyzes incoming data packets, captures events, processing – processes SMS and Email warnings. It processes serverside geofencing and other warnings. Logs can be viewed in <disk>:\AvlServer3\TavlServer\logs\.

### **Service Watchdog Service**

It is reliability service. In case if any of AvlT server services is stopped for unknown reason or any error, Service Watchdog service automatically restart stopped service and informs server administrator about problem over SMS.

Modules can be set to send data using SMS. In case of SMS flood from modules or other sources, system administrator

also will be informed by SMS about flood.

### 3.3 Interfaces

#### AvlT WebService Interface

AvlT interface provide secure access for Client AvlT Application. Located in <disk>:\AvlServer3\WebServices\AvlTWebService. Accessible from <http://<serverIpAddress>:<port>/avl/ws3.0/Service.asmx>.

#### Management

Management is web interface and it is used to manage accounts, register objects, modules, SIM cards and other by server administrators and integrators. Full management description is described in “AVLT Management User Manual”. Located in <disk>:\AvlServer3\Management. Application is accessible from [http://<serverIpAdress>:<port\(optional\)>/management](http://<serverIpAdress>:<port(optional)>/management).

#### AvlT Web

AvlT Web is simplified AvlT Client solution accessible through web. Application is accessible from [http://<serverIpAddress>:<port>\(optional\)/avl/web3](http://<serverIpAddress>:<port>(optional)/avl/web3).

#### Google Maps

AvlT application supports Google Maps to display objects on it. To enable Google Maps on AVL server, you should sign up for Google Maps API. Visit <http://code.google.com/apis/maps/> to sign up for Google API code.

During registration, you will be asked to enter server IP or DNS address. Note that Google Maps will be available only from IP address **OR** DNS.

Google Maps Webservice located in <disk>:\AvlServer3\WebServices\GoogleMaps.

## 4. Support

### 4.1 Installation

Before AVL Server installation client must prepare hardware and software meeting requirements described in REQUIREMENTS section and information listed below:

- Current hardware and software configuration
- Server External IP, VPN IP (if used), Network architecture
- SMTP “avlt-noreply@somehost” type account information: server IP, port, login, password etc. (if used)
- SMPP service (if used) account information: server IP, port, login, password etc.
- Google Maps API code (if used), see Interfaces section.
- RDC connection with administrator login, password
- Server administrator contacts (direct phone number, email address, etc).

**Data, configuration, and RDC ports should be opened before server installation!**

### 4.2 Administration

- Server AVL automatically performs Avl2T database back up jobs. It runs Full and Differential back up and store back up on one of Logical Disks on server.
- Server logs must be cleared regularly from <disk>:\AvlServer3\logs\ directory

## BIBLIOGRAPHY:

- Eichler, C. 2009. *Solutions for Scalable Communication and System Security in Vehicular Network Architectures*. Technische Universität München Lehrstuhl für Kommunikationsnetze.
- Miller, H. and Shaw, S. 2001. *Geographic Information Systems for Transportation*, Oxford University Press.

Stojanović, D., B. Predić, I. Antolović, and S. Đorđević-Kajan. 2009. “Web Information System for Transport Telematics and Fleet Management.” *Telsiks, IEEE & FEE* 1(7-9): 314-317.

Xiaonan Liu, Y., Fang, Z. 2008. *An Agent-Based Intelligent Transport System*. In Shen, W., Yong, J., Yang, Y., Barthès, J.-P.A., Luo, J. (eds.) *CSCWD 2007. LNCS*, vol. 5236, 304–315. Springer, Heidelberg (2008)

### **Website links**

<https://github.com/steffenz/php-gtfs-mysql>

<http://www.connectionstrings.com/Providers/mysql-connector-netmysqlconnection>