



Software System Technical Description

This document serves to describe the software components that comprise the Track Star AVLS system and the interaction between each.

The Track Star software architecture is a client / server architecture and the system is comprised of three elements: a Gateway / Server application, a Client application and a DB Processor application. A complete system requires the presence of all three components. How the components are provided and where each resides are choices that are made for each particular installation, allowing for a very broad range of system configurations tailored to the needs of each individual customer.

Gateway / Server Application

The Gateway / Server application acts as the recipient of AVL packets from devices installed in vehicles. The application accepts packets in UDP datagram format on a specific port number. The Gateway application must be installed on a computer provisioned with a fixed IP address.

The function of the Gateway / Server application is to receive these packets of information from the vehicle devices, to determine through interaction with the database the specific vehicles to which the data is related and then to forward the packets to those copies of the client with rights to view that specific vehicle. Communication between the Gateway / Server and the Client software is by TCP/IP as is the communication between the Gateway / Server and the database.

Any vehicle data that arrives at the Gateway / Server for which no authorized receiver (Client or DB Processor) exists at the time of arrival is stored in a temporary file on the hard drive of the Gateway / Server. This temporary file is called a Swap File. The contents of the swap file will be delivered to the first instance of a client or DB processor with rights to view that vehicle.

Each instance of the Client and DB processor provides to the Gateway / Server at the time the connection is established a list of the vehicles to which that instance has visibility rights. The Gateway / Server application uses these lists to determine the destinations to which vehicle location data is to be forwarded.

The Gateway / Server application also provides responses to location packets sent by the equipment in the vehicles where such responses are required. This mechanism provides the interaction necessary to support the various store and forward acknowledgements and delivery guarantee handshaking required by the vehicular devices.

DB Processor

This component of the Track Star software system is provided to receive packets from the Gateway / Server application and store the information contained in them into a SQL database. Regardless of the configuration of the system (hosted or autonomous), the database is always resident on the customers computer systems. When started, the DB Processor presents to the Gateway / Server a list of all vehicle identities existing in the database. The Gateway / Server then forwards, by TCP/IP, the packets relating to the vehicles in that list to the DB Processor.

The DB Processor writes the contents of each incoming packet into the proper place in the database. It is this database that the system uses as the source for reports and vehicle activity playbacks. The SQL database is structured according to the database schema available from Track Star, allowing for generation of reports from the database using report generation products.

The DB processor is the point in the data flow within the system where the location data is related to a specific vehicle, making it the place where integration with external applications is most often performed. Integration efforts to date have involved sending vehicle identity and location information to external applications using API's provided in those applications. Integration with external applications can also be accomplished by having the external application query the SQL database on periodic intervals for updated location data.

The DB Processor can be installed coincident with the Gateway / Server on the same computer, on the computer that hosts the SQL database or on any computer that has TCP/IP connectivity to the SQL database and to the Gateway / Server application.

Client Application

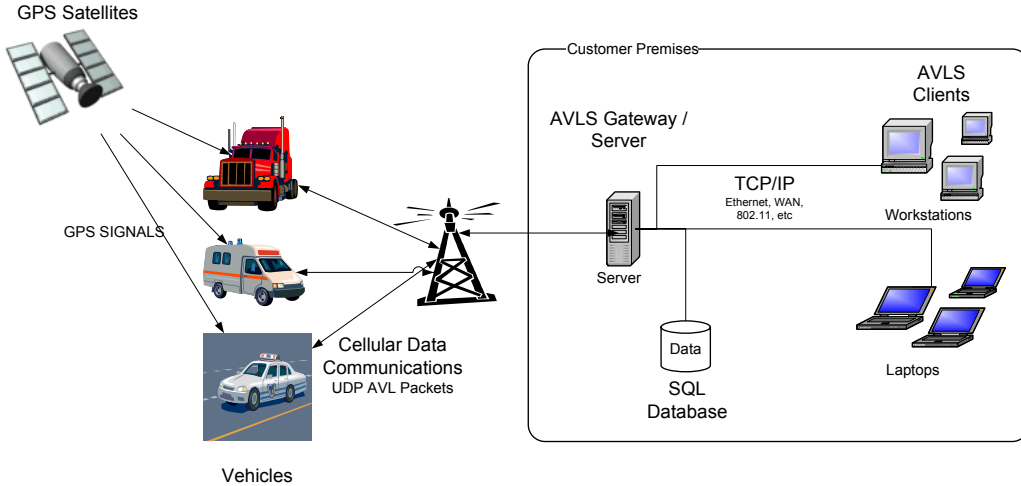
The Client application is the graphic environment in which vehicle location data is translated into map views and where users can execute reports and vehicle activity replays. The Client receives location data from the Gateway / Server based on the vehicle view permissions for the user logged in to the program. Data received from the Gateway / Server is geo-coded to resolve location data, compared against local speed limit data and then displayed on the map at the appropriate location.

From within the Client application, users also have the ability to execute the reports available in the application, replay vehicle activity and perform configuration of the devices in the vehicles.

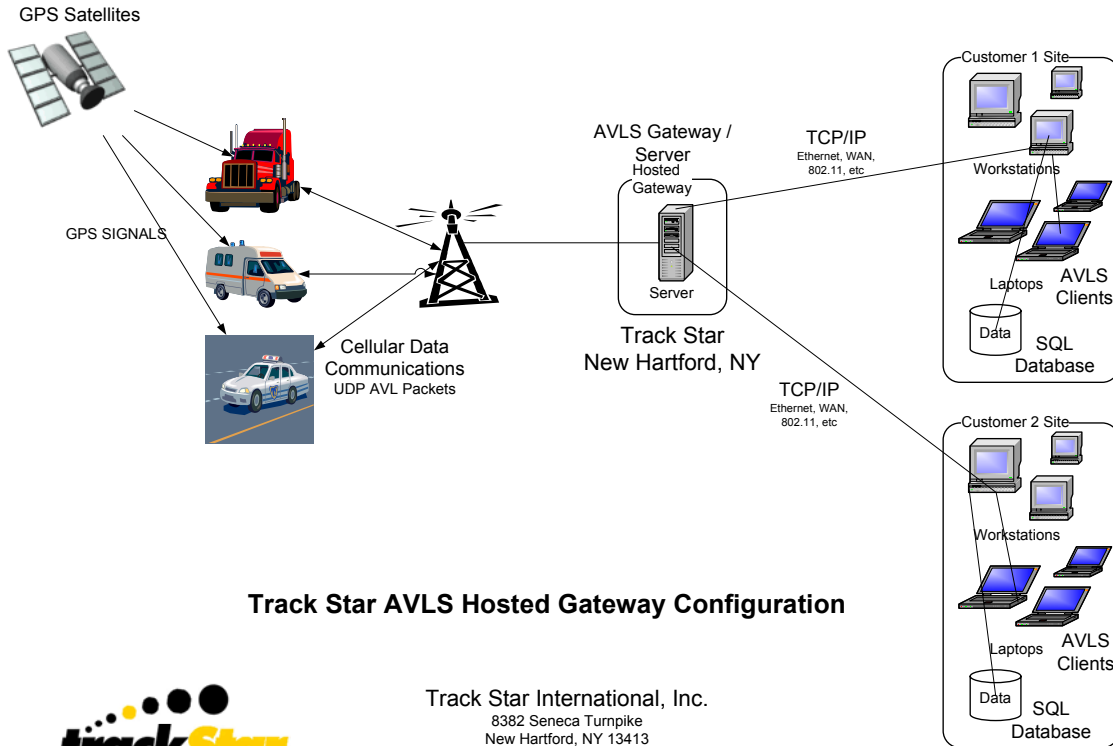
The Client application requires TCP/IP connectivity to both the Gateway / Server and the SQL database and such connectivity is configurable within the client. Connectivity can be established through wired or wireless LANs, WANs, cable modems, DSL or even wireless WANs using air cards or wireless modems. The compact dataflow model used in the system minimizes the bandwidth requirements of the system, permitting even mobile deployments.

DIAGRAMS

The following diagrams illustrate the hosted and autonomous configurations of the Track Star software products.



Track Star AVLS Autonomous Configuration



Track Star AVLS Hosted Gateway Configuration



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