HCLT TeleFrame

Telematics for Service Providers

M2M Applications
Location Based Services
Traffic Management
Security

A common Framework for New Developments

HCL Technologies White Paper
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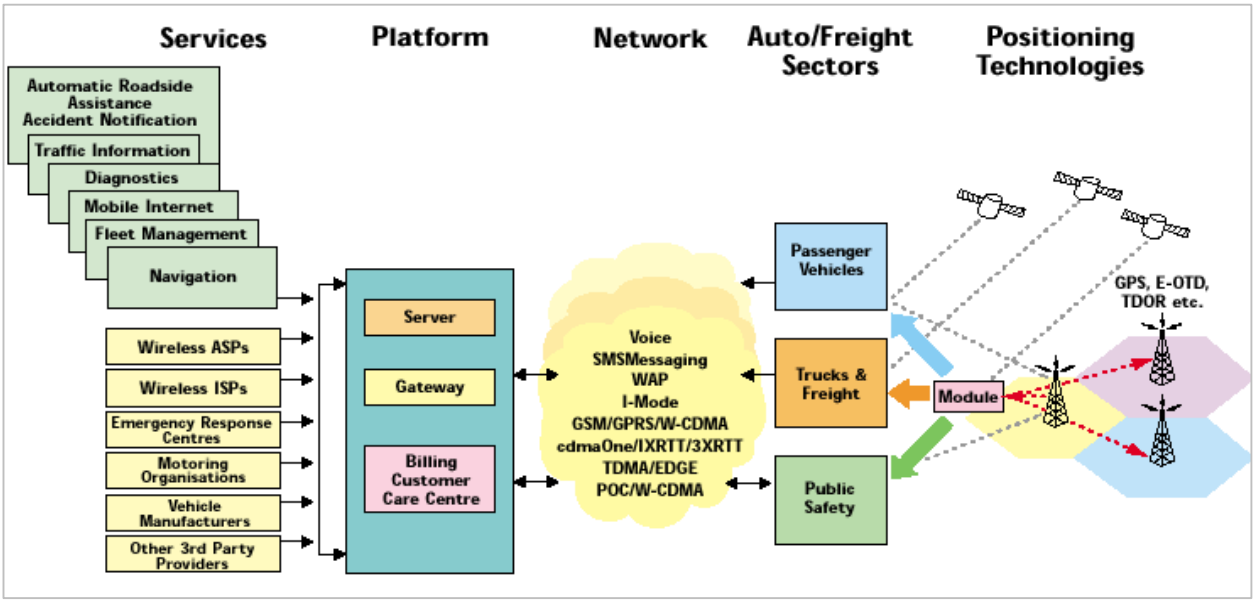
A. TELEFRAME INTRODUCTION

1 What is TeleFrame?

1.1 Introduction

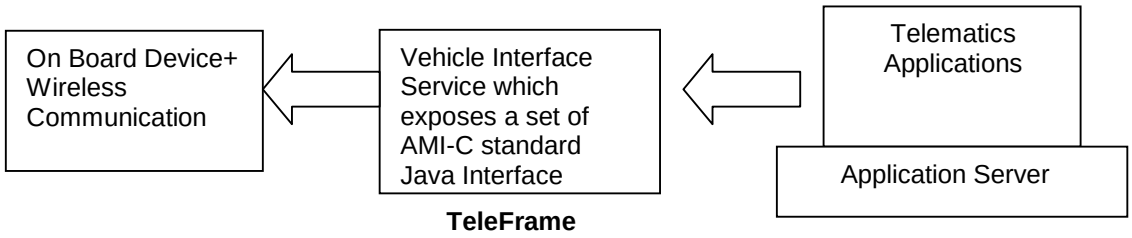
HCLT TeleFrame is a Telematics Infrastructure Platform, which would enable delivery of Telematics solutions to the end users. It would act as a broker between the back end user and the application. The platform allows the TSP's (Telematics Service Providers) to build deploy and operate services over the ready to use framework. This platform is based on service delivery architecture as shown:



TeleFrame would provide key enabling components on the server. These components would be available as Java API classes and interfaces that applications would be built upon. A rich set of library would be built just for Telematics to enable rapid application development of Telematics services.

TeleFrame would be AMI-C standards compliant and would support Telematics standard message formats. This essentially means that the Framework provides a mechanism whereby Telematics Applications would be able to request for messages by subscribing to events. Such a framework would thus find use by Telematics Service Providers and Telematics Application Developers.

Conceptual Representation of TeleFrame



In Phase I, TeleFrame would be developed as a Vehicle Interface Service. This service would allow Telematics Application running on a server to request for Telematics specific messages from the device. This would be possible by subscribing to certain events. Teleframe in-turn would provide features such as event management, profiling, user management and network interface management as a value add to potential customers.

1.2 TeleFrame Characteristics

1.2.1 Reusable

The enterprise components built on top of the framework would be by design reusable. They can be plugged into an existing system with minimal effort. Also the framework sub components would be reusable.

1.2.2 Extensible

The enterprise components designed with the framework will be easily extensible. The framework guidelines state that the design should use the session façade pattern and that the business components should not interact with each other directly. This pattern allows pluggable business components as the façade layer controls the interaction.

1.2.3 Portable

The framework can be ported to any platform without any development overheads as it will be based on J2EE standards which makes it inherently platform independent.

1.3 TeleFrame Underlying Components

The Teleframe Framework in turn is composed of a set of components and sub-components. Some of these are illustrated in the table below:

Component	Description
Event Management	The proposed framework will support an elegant Event Management system to allow users to receive notification when events subscribed to occur. This component will allow service applications to define event categories (traffic alerts, sales events etc.). The list of event categories a user is subscribed to is maintained as part of the user profile
User Tracking	This component resides on the server and tracks subscriber information and subscriber information and application usage profiles under various demographic categories

Component	Description
Profile Management	Ability to create and manage user profiles. Should be able to transport the preferences of a user between vehicles.
Network Interface Management	Required to facilitate rapid development of service applications for the automobile, it is important to transparently handle the complexities of the underlying mobile communication A simple API abstracts the underlying wireless interfaces and takes into account QoS and security issues. The mobile network interface manager deals with: • High Bandwidth, short-range interfaces like Bluetooth, 802.11, IRDA • Low Bandwidth, long-range cellular interfaces (CDMA, AMPS, GSM) • High Bandwidth, long-range interfaces like satellite channels, 3G, GPRS

2 TeleFrame Features Overview

2.1 Target Telematics Applications

Following kinds of Telematics Applications would be able to make use of TeleFrame

2.1.1 Real-time profiled traffic

In the desktop environment, end-users logon to an Internet web site that allows them to select various regular routes (e.g., from home to work) and view current traffic conditions and incidents along that route. While driving, the system continuously monitors current traffic conditions along the end-user's route. If an incident occurs, the user is notified of the incident and suggestions for possible navigation rerouting are provided. Future developments will allow feature rich traffic information, including predictive traffic modeling, flow analysis, and speed trap alerts.

2.1.2 Turn-by-turn navigation

End-users of Telematics enabled operators will receive real-time navigation from their current location to a destination of their choice. Users input a destination in one of four ways:

- Selecting an address in their MS Outlook or Palm OS contacts list
- Selecting a pre-loaded point-of-interest or saved addresses
- Highlighting an address from a "find me" search (e.g. "find me the closest gas station")
- Inputting an address manually using the input mechanism of the telematics platform

Once a destination is selected, the system will allow the end-user to select a route based on preferred route type (fastest, scenic, highway, shortest, etc.) In addition, end-users are able to highlight waypoints to visit along the route. The system will then provide an ETA based on distance, type of route, and current traffic conditions. After a route is determined, the system navigates the end-user from their current location to the destination, using real-time graphical and audio commands.

The navigation system will constantly alert the driver of upcoming navigation events and will dynamically reroute the driver in the event the driver goes off-route or if a traffic incident along the selected route encourages a new route to be selected.

2.1.3 Vehicle Diagnostics Monitoring

Tied into a vehicle's on-board diagnostic database, the Telematics application will be able to constantly monitor a vehicle's diagnostics, storing the information on web servers so that the end-user has an accurate record of maintenance problems with their vehicle. In addition, Telematics enabled operators will be able to provide detailed in-vehicle information about real-time vehicle problems directly to their end-users. Information the system will be able to provide to end-users includes:

- Translation of error codes into an understandable explanation of what is wrong with the vehicle and what needs to be done to complete a repair
- Ranking of urgency of repair
- Parts needed to complete repair and estimated time and cost to complete repair

In the future, operators will be able to take error codes from the vehicle and send them wirelessly to the end-user's preferred repair facility. The repair facility could then order parts, make appointments, etc. to better serve the end-user.

2.1.4 Vehicle Location and Community Services

Telematics technology allows end-users to remotely locate their vehicle via a desktop web site, as well as locate and communicate with other vehicles that are part of an end-user's fleet or community. Business users can use this service to keep track of their assets and coordinate activities among a mobile workforce. Consumers can make use of solution provider’s community services to feel connected to family and for communicating with friends.

2.1.5 Entertainment and Information Services

Beyond its core suite of telematics specific application services, technology also enables an array of entertainment and information services that are functional to an end-user while driving. While the bulk of the entertainment and information services will be developed by third parties and integrated into solution provider’s solution, companies are already in development of a select suite of services customized for the driving experience with its partners, including: News, sports, weather, stocks E-mail Audio content (books, magazines, newspapers, radio programs, etc.)

International Data Corporation has estimated that the telematics market will grow to $42 billion by 2010 from $1 billion in 1998

2.1.6 Safety & Security

- Emergency Notification and SOS
- Roadside Assistance
- Remote Door Unlock
- Vehicle Tracking
- Vehicle Diagnostics
- Hands-Free Voice Driven Services

2.1.7 Railroad Solutions

By increasing the efficiency and productivity of remote workers, wireless technology can help railroads and mobile railroad professionals be quicker to respond and more competitive. For instance, wireless spread spectrum systems can be particularly useful in car repair billing, maintenance, and inspection applications. Wireless satellite-based systems can help you monitor sensitive refrigerated rail car fleets by providing data on GPS location, internal cargo space temperatures, compressor fuel and pressure status, freon levels, voltage and other diagnostic indicators. The technology allows mobile, handheld and desktop computers to communicate with both corporate networks and the Internet without requiring a direct wire connection. Wireless systems also reduce the need to hardwire new networks and therefore can decrease costs since pulling wire or fiber optic cables under tracks can be very costly in a railyard.

2.1.8 Fleet Management Solutions

- Increased Productivity
- Greater Efficiency
- Better Asset Utilization
- Higher Customer Satisfaction
- Lower Operating Costs

System is designed to track large, geographically dispersed vehicles or fleets. Access to the system is through a web browser over the Internet, which minimizes interfacing issues, software support, and training. The system is flexible enough to communicate over various wireless systems (CDPD, BSWD, Cellular, Satellite, and Private RF) through the use of a communication Gateway. The application can be tailored, enabling a company to identify and monitor key cost drivers related to the fleet.

Onboard the vehicle, several configurations exist, ranging from a simple GPS receiver/ radio unit that only reports position, to complete onboard ruggedized notebooks and PDAs, which move corporate data to and from the field.

B. USER OVERVIEW

1 User Audience

The following section describes target users and the business processes that TeleFrame is designed to address.

1.1 Target User Audience

The following are the user roles and typical needs for which TeleFrame is designed:

1.1.1 Telematics Service Providers (TSP's)

Telematics Service Providers are the companies, which provide and/or host Telematics services to potential customers. These companies may or may not be Telematics application developers themselves.

1.1.2 Original Equipment Manufacturers (OEM's)

OEM's are the Automobile makers like Daimler Chrysler, BMW, Volkswagen, FORD, GM, Volvo etc. Most of the OEM's have their own internal Telematics divisions. These internal divisions like OnStar for GM will be the target/potential customers of TeleFrame.

2 Telematics Market Segmentation

Vehicle Market	Front Seat Market	Rear Seat Market
Remote Diagnostics	Universal Hands Free	Streaming Video
Remote Engine Tuning	Safety and Security	Streaming Audio
Automated Servicing	Voice User Interface	Networked Games
Vehicle Tracking	Navigation	Internet Access

2.1 Universal Customer Requirements

The following are universal customer requirements based on market study:

Technology reliability

Customers want technology that is reliable and consistent. The more mission critical the software, the more this becomes the key criterion. TeleFrame MUST exhibit the utmost in uptime stability and application response time.

Application ease of use

Customers want an easy and intuitive user interface and experience.

Integration with existing software packages

Customers need integration with existing Telematics software or hardware like:

A. Integration with device/module
B. Wireless infrastructure provider
C. Billing and customer care applications
D. Application like Fleet Management or AVL

Technology Independent

TeleFrame should be independent of technology. It should be able to work with any kind of existing technical infrastructure and combinations of software and hardware. It should be based on open standards and should be interoperable.

3 Why Java Technology for TeleFrame

The automobile is increasingly becoming home to a plethora of divergent systems, services and applications that address key consumer requirements such as driver assistance and emergency, navigation, infotainment and wireless communications. This convergence opens the door for Java technology to be the cross-platform solution that ties together these heterogeneous systems.

Another reason Java technology is poised to become a fundamental part of next-generation automotive telematics systems is that the Automotive Multimedia Interface Collaboration (AMIC) has chosen the Java platform as a key software component for its host controller to meet their specifications. AMIC is also working on defining a Java API for telematics solutions. Another key standards body that is influential in the definition of next-generation automotive telematics systems, the Open Services Gateway Initiative (OSGi), has also advocated the use of Java technology in its specifications.