

Tracking



COGNITO MOBILE WORKFORCE MANAGEMENT

In this paper we will cover the following topics:-

1. Approaches to the resource location challenge
2. How tracking works
3. Tracking the man, the van or an asset?
4. Benefits realised from tracking your resources
5. Combining location data with maps
6. Choosing maps
7. The value of flexible reporting
8. Integration with other enterprise systems and databases
9. Data requirements
10. Other IT issues to consider
11. Summary

Vehicle telematics and real-time location data are commonly used business tools, their use is expanding from fleet management to smaller vehicles and cars. The reasons are several including the need to monitor private use of company vehicles due to changes in Tax law as well as the requirement to reduce fuel bills and gain business efficiency from the effective scheduling of resources which relies on location data. When integrated with other business systems location based information can provide significant value add to the business.

Knowing the location and status of company resources, be they people, vehicles or other assets allows a business to make decisions that can improve service, minimise cost, as well as satisfying Corporate Social responsibility obligations.

There are different products and approaches from which to choose when implementing location-based solutions, with varying price and degrees of complexity. The purpose of this white paper is to discuss the various options available on the market today and to facilitate an informed choice of the best balance of function and cost.

I. Approaches to the resource location challenge

The simplest, and most accurate, form of location tracking involves a Global Positioning System (GPS) receiver, either installed in a vehicle or asset, or available as a part of a Personal Digital Assistant (PDA). The GPS unit supplies position fixes on a regular basis via a communications network such as a mobile phone data service (GPRS). Increasingly, suppliers are providing dedicated telematic boxes which, in addition to the GPS receiver, collect a range of other information from the vehicle, or asset to which they are attached such as speed, acceleration and other statistics and report them attached to the time and location data.

Telematics or simple location data is sent to a central database where set reports are generated for customers, these can be accessed using a web browser. These reports will summarise activity and also incorporate mapping software to display current and historical location information. In this way, the telematics supplier can provide a basic but scalable service to any number of customers.

Such simple solutions can be cost effective and provide basic insight into the business. It may be the case that the standard reports don't tell a user everything that they need to know. In this case suppliers offer the ability to commission specific reports for an additional fee. If the supplier allows, it may be possible for the business to have access to the raw data directly and to write its own custom reports.

The tracking reports will be of increased value if the user is able to interpret them in the context of other key information for the business, this may include SLA information on customers, HR information on staff, or inventory information from a parts system.

The most value will come from an integrated system that assists decision making based on analysis of data from across the business. This analysis will be built around a set of business rules unique to the businesses that capture key competitive advantages. To implement a full solution of this nature will require additional investment in the back office systems and middleware to achieve the integration and business rules processing, however the returns from the effort will be far superior to those from simple web-based telematics reporting.

As with any new system that affects the working practice of staff, the introduction of tracking solutions needs to be done sensitively, with an equal emphasis on the benefits to the worker in terms of better planned and supported assignments, as well as the company's opportunity for lower costs, higher customer satisfaction and legal obligations.

2. How tracking works

GPS-based tracking relies on satellites launched by the US government that broadcast microwave signals to the earth below that provide information on the satellites' orbit, general health and a clock reference. By detecting signals from several of these satellites, a GPS receiver can calculate its position to an accuracy of approximately 15 Metres or less depending on atmospheric conditions and the distance to the satellites used to generate the position. Several countries have initiatives underway to launch their own satellite networks in order to avoid dependence on the US government in case they elect to turn off the publicly accessible signals when under some form of internal or external threat.

3. Tracking the man, the van or an asset?

Tracking a field engineer

Tracking the man is achieved using a GPS-enabled PDA (using the GPRS data capability to transmit location information), or an external GPS receiver connected to a PDA by Bluetooth or serial connection.

Using a PDA has an added benefit of offering the opportunity for local processing, allowing the development of workflow applications that use real-time location data to improve the quality of the engineers' work.

Because the system relies on the engineer carrying and using the device, it is easier for them to frustrate a tracking initiative if they do not wholeheartedly support it. Effective worker education on the value to both sides is important, for example, underlining the lone worker protection that the solution offers as well as considering providing a satellite navigation application for personal use are examples of approaches, as is having written company policies with regard to the collection and use of any tracking data gathered outside office hours.

Some practical concerns to bear in mind when adopting this approach include the extra battery usage by having Bluetooth enabled, and the importance of removing a device from the cab when unattended to avoid theft. A cradle will be a necessary option for the use of any satellite navigation application such as TomTom, NavMan etc. and it may be advisable for the engineer to be able to cradle a device that has a protective casing. With consumer devices regularly used, this can be important to minimise rates of accidental damage.

Van

If vehicle tracking is the primary objective, an in-vehicle GPS receiver can be used. This can be paired with a PDA carried by the engineer, or it can be equipped with its own SIM, making it fully independent.

This approach has several advantages. As well as being more reliable and tamper-proof, the unit can be connected into the vehicle systems, such as the CANbus¹ to gather detailed vehicle telematics which can support the measurement of vehicle wear and tear to help planned maintenance, and monitoring excessive idling and driving style to satisfy Corporate Social Responsibility requirements.

¹ Controller Area Network (CAN or CAN-bus) is a serial network protocol and bus standard used by manufacturers to allow microcontrollers and devices to communicate without a host computer.

The unit can have its own data buffer, allowing it to collect information, even if there is no GPRS signal, to be sent on when the vehicle returns to an area with coverage.

Some units also include accelerometers, which allow them to provide accurate information in case of an accident, or to provide an alert if the vehicle is moved when the ignition is off.

Asset

As long as the item you want to track is capable of delivering power, or you have a battery-powered GPS receiver/SIM combination, you can track larger assets, such as trailers or other containers as well as valuable equipment.

4. Benefits realised from tracking your resources

Once the tracking information is collected, the business is positioned to derive value from it. There are two broad categories of business benefit to be gained:

Using location data to gain value

Accurate and innovative use of telematics data can provide valuable management information when presented visually in the form of reports or a dashboard display, in many cases combined with mapping software. Reports will have best potential value to the business if they integrate several data sources from different relevant areas of the business in addition to the location and telematics data.

- Proof of service delivery
- Improved customer service, through better managed resources.
- More competitive service offerings
- Provide up to date location information for real-time scheduling to improve customer service
- React to an evolving day, new deliveries, better routing (for example avoiding) traffic jams
- Better planned vehicle maintenance based on wear and tear and monitoring of engine management system
- Lone worker alert systems (Panic button and scheduled check in timers with back up emergency support services)
- Analysis of historical data to improve systems and practice

Corporate Social Responsibility (CSR)

Businesses have a legal duty of care to their staff, as well as other statutory requirements for the conduct of their business, especially where it may affect members of the public. Many businesses are seeking to measure and report on their environmental impact.

- Know where all key human and physical resources are all the time
- Build Geofences to get alerts when people go places they should or shouldn't
- Report on and reduce Carbon footprint through better routing and logistics planning, providing data to Scope 1 and 3 carbon emission audits
- Lone Worker support, knowing where staff are if they get into trouble or stop responding
- Meeting legal obligations – Duty of care, driver rest, traffic violations and driving style
- Routes travelled by drivers, especially with respect to residential complaints
- Managing private use of company vehicles

Tracking and carbon footprint

Although a standalone vehicle tracking solution can go some way to assisting in identifying activity that contributes to excessive CO2 emissions but it is the synergy of several workforce management systems that will deliver the most effective solution.

Tracking for carbon footprint: means distance travelled as well as driving style. Also making sure that your vans are full when they move longer distances to maximise efficiency. Collect reports and deliver to your carbon officer, as part of your CSA report your efforts, possibly link directly into a carbon offsetting service.

5. Combining location data with maps

It is important to remember that maps can be large graphical files and require constant updating if they are to be used for accurate routing. For this reason, the location and number of map servers will need to be considered. In the case of local maps residing on multiple workstations or handhelds, performance will be good, but updating more complicated, and possibly subject to higher per user licensing. Where maps are held and updated centrally and delivered on demand to the display, performance may be reduced, especially where bandwidth is restricted, for example with a GPRS-base PDA, and if there is no coverage for any reason then a mobile mapping application will not work.

A web client application has the benefit that you can access from any workstation with an Internet connection, but there may again be performance issues (i.e. with the downloading of map tiles), plus it will have limited customisation capabilities

A local application may be more customisable depending on supplier, but you have to consider the development, support and maintenance costs paid to the supplier or incurred internally.

Because roads are in a constant state of flux, any mapping solution should have some form of subscription service for updates with reasonable regularity and cost.

6. Choosing maps

Maps are available from a variety of sources to different levels of accuracy. GPS is accurate to 15 metres or less which means it could be used down to individual house or postcode level. Alternatively a more general sector postcode may be sufficient. The type of map required will affect the cost and size of mapping files. There are a finite number of active mapping suppliers.

Licensing terms for maps can vary, and this may have a significant impact on the overall solution costs. For example it may be licensed by asset tracked or per user workstation, and there will be some form of charge for map updates.

Whatever mapping solution is selected, it is best if the maps come from one server. This means only one update stream.

Suppliers may also charge depending on the type of views available, for example the ability to group users and display

individual groups on the map. When an administrator rolls their cursor over an asset, information relating to the asset may be displayed. The depth of this information will depend on the level of integration of the tracking solution with other software systems in the business.

7. The value of flexible reporting

There are a wide variety of basic tracking services advertised for less than 75 pence per day. These entry level services typically send data to a central server where basic reports can be run on it and made available from a web services interface.

However, the value of tracking to a business increasingly comes from a move beyond this basic approach. If more or different data and extra reports are required to achieve this it is necessary to pay for them to be developed by the supplier. At this service level, the raw data is not made available by the tracking vendor.

Alternatively a company can host the data server itself as well as a licensed map server. This gives the greatest control, and a report building tool can work on creating unique business intelligence from the raw data. With customised reports, a company can be responsive to requests from managers within the business to enable them to make better decisions relating to both cost and quality of service delivery, as well as Corporate Social responsibility.

Reporting can be used for post-activity analysis to look at compliance issues with company policy and statutory requirements, or it can be used as a dashboard in real time to improve customer service, both through reaction to evolving events, either service calls or traffic issues, in addition to the ability to give an up to date status to the customer who is waiting for the delivery or service calls. In many industries, an accurate time of delivery or service call is as valuable as the speed of response.

8. Integration with other enterprise systems and databases

The full value of a tracking solution is realised when the information gathered is integrated and interpreted alongside other key data from the business. An example of this would be the ability to mouseover a particular asset and to see key information relating to the job such as customer name, CRM data, traffic conditions etc.

Integration is achieved using some form of middleware services and communications layer. This is often referred to as an Enterprise Service Bus, and the architecture as a Service Oriented Architecture. Examples of data sources that can be integrated are:

Back-end systems

HR and training for skill levels and time assignments of staff to various jobs

Point Of Interest

Depots

Home

Drop points

Preferred hotels and rest stops

Geofences (alert raised on entry to or exit from an area)

Resources

- Driver ID
- Stock and location of required parts
- Tools (or equipment like a digger)
- Assets (container, trailer)
- Driver availability (shifts, holidays, sickness)

Tasks

- To do
- Collection
- Delivery
- Duration
- Skills required
- Service Level Agreement

Status

- Against task
- Versus resources available
- Telemetry
- Event data
- Live traffic information
- Average route transit times
- Other alerts

9. Data requirements

When implementing a tracking solution it is important to plan for the custom of the movement and storage of data that will be generated. Consider the key information required to achieve business objectives. Transmitting more may be expensive and will take up network storage.

There are two broad categories of data, transactional (i.e. lat/long speed and timestamp) and volume (acceleration, braking more fix points, ignition on and off). The former will need to be reported in real time, whereas the latter can be retried back at the depot, for example when a PDA is cradled.

Tracking potentially involves transit of a lot of transactional data across a corporate firewall. It is important to involve IT in the capacity planning as well as addressing concerns about the security of the data, and its entry to the company network.

Another factor is how long the data need to be kept. In cases where the information may need to be forensically examined because of litigation or criminal investigation under an act such as the corporate manslaughter act, these periods could be quite long.

In the case where an outside service is used and holds tracking data, the supplier should be asked for their storage capabilities and charges.

10. Other IT issues

Is the system scalable? If it is successful, are there further assets that the system may be required to track. It is important to estimate the cost of the additional resources required initially and possibly in the future across the whole range of reports, data transfer, storage, manpower, training and IT equipment as well as software licensing costs.

11. Summary

Location and tracking of resources, be they people or assets has the potential to provide a wealth of valuable information that the business can use to increase the efficiency of its operations. There are several key areas to consider, from the data captured in the field, to its transport, storage and display, as well as the interpretation in the context of other information sources within the business.

Although quick and effective tracking solutions are available from a multitude of vendors, there are very few who can work with a company to deliver the full value of integrated and interpreted information. Comprehensive tracking solutions will be most valuable when they become part of an overall strategy for mobile workforce and asset management, integrated in real-time with existing and new back-end systems and processes.



About Cognito

With over 150 successful solutions in place and more than 19,000 subscribers, Cognito is the leading expert in Mobile Workforce Management systems and practice.

Cognito is the only company with the experience to tie together the key components of tracking, real-time data and scheduling and to deliver them to organisations as a powerful mixture of consultancy, design, delivery and support. Our Solutions impact directly on business performance by improving efficiency, reducing costs and increasing profitability.

Cognito Ltd
Benham Valence
Newbury
Berkshire
RG20 8LU
UK

www.cognitomobile.com
Tel: +44 (0)1635 508200
Fax: +44 (0)1635 550783