AUSTRALIA'S INTELLIGENT ACCESS PROGRAM

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Abstract

Australia's road freight transport task is growing rapidly and is expected to almost double by 2020. Demand for access is already outstripping supply across much of the road network, resulting in increased traffic congestion and reduced transport productivity. As a consequence there is a very real need for the development and implementation of innovative technologies and solutions to more effectively manage Australia's road network. The Intelligent Access Program (IAP) answers this need. The IAP delivers increased productivity by better managing the continually growing demands of road freight transport. It strategically blends existing and new technologies to address the growing freight task and support Australia's continued economic growth and international competitiveness.

Keywords: Vehicle telematics, Intelligent transport systems, Heavy vehicle, Road infrastructure protection, Compliance, Freight.

Résumé

Le transport routier de marchandises croît rapidement en Australie et doublera probablement d'ici 2020. La demande de capacité dépasse déjà l'offre sur une grande partie du réseau routier, d'où une augmentation des bouchons et une réduction de la productivité du transport. Il y a donc vraiment besoin de développer et mettre en œuvre des technologies et solutions innovantes pour gérer plus efficacement le réseau routier australien. Le programme d'accès intelligent (PAI) répond à ce besoin. Il offre une productivité accrue par une meilleure gestion de la demande croissante de transport routier de marchandises. Il combine d'une façon stratégique les technologies existantes et émergentes face à des tâches plus importantes pour le fret et il soutient la croissance économique continue de l'Australie et sa compétitivité internationale.

Mots-clés : Télématique des véhicules, systèmes de transport intelligent, poids lourd, protection des infrastructures routières, conformité, fret.

1. Background

The availability of vehicle telematics technology provides the opportunity for higher levels of compliance with road transport laws, hence higher levels of safety and road use efficiency with lower enforcement costs. This technology provides a means for road authorities to better match individual vehicles to the differing capabilities of the road network. As a result road authorities can grant improved access to selected parts of the road network, confident that the conditions of this access will be adhered to.

Consequently, the IAP provides a 'win-win' outcome for all parties. The transport industry can negotiate improved access to the road network in return for demonstrated compliance with the conditions of that access. Road authorities can optimise the use of the existing road network. Finally, the community can have increased confidence in the safe management of heavy vehicle activities.

2. The Intelligent Access Program (IAP)

The IAP provides a new and innovative way for managing heavy vehicle access to the Australian road network through the use of vehicle telematics. Participating vehicles are monitored using the Global Navigational Satellite System to demonstrate that their movement on the road network complies with the access arrangements granted. This allows road authorities and local governments to grant tailored access arrangements, giving transport operators flexible access to the road network to suit their specific business and operational needs. In return, the road authorities and local governments gain greater confidence that heavy vehicles are complying with the agreed road access conditions. A detailed explanation of the IAP is provided in (TCA 2005).

2.1 How the IAP works

In summary, the IAP operates as follows:
- A transport operator applies to join a particular IAP Application through a road authority.
- This IAP Application includes a set of road access conditions designed by the road authority and agreed to by the transport operator.
- The transport operator engages an IAP Service Provider on a fee-for-service basis.
- The IAP Service Provider fits participating vehicles with an in-vehicle-unit (IVU) which enables the monitoring of a number of vehicle parameters, including vehicle identity, position, time, speed and self-declaration of information.
- The IAP Service Provider provides vehicle compliance monitoring services. Ideally, the service provider combines these services with other services they currently provide to transport operators, i.e. fleet management services.
- The IAP Service Provider notifies the road authority in a Non-Compliance Report (NCR) whenever the transport operator's vehicle is non-compliant with the IAP conditions they have agreed to operate within. A Non-Compliance Report does not necessarily mean an offence has occurred.

2.2 IAP Applications

IAP Application is the term used to describe a specific use of the IAP. IAP Applications are determined by individual road authorities and vary according to the specific needs and transport policies of their jurisdiction. A vehicle can operate under any number of different IAP Applications, granted by one or more road authorities.

Two examples of IAP Applications are as follows.

New South Wales Higher Mass Limits (HML) IAP Application

The New South Wales Government is using the IAP to monitor route compliance of vehicles operating under Higher Mass Limits (HML) in that state. Prior to the introduction of the IAP, vehicles were only permitted to operate at HML on a single route. With the introduction of the IAP, the Government has been able to progressively extend HML access to provide a network of major highways and key arterial routes across the state.

The expansion of New South Wales' HML network is delivering major productivity gains for transport operators. Under the IAP, 25/26 metre (9 axle) B-Double vehicles which were limited to 62.5 tonnes can now operate at 68.0 tonnes, which equates to a 13% increase in payload.

Tasmanian School Bus IAP Application

The Tasmanian Government is using the IAP to manage school and route bus services in regional and rural areas of the state. The Government funds 653 contract bus services provided by more than 200 bus operator contractors and is using the IAP to monitor route and timetable compliance.

In this instance, the IAP is being used as a contract management tool to provide a better measure of performance and improved auditability.

2.3 Benefits of the IAP

The IAP provides road authorities with a means to optimise the use of the existing road network to better manage and provide for the growing transport task.

Transport operators gain improved access to the road network resulting in more efficient operation and improved productivity.

For the telematics industry the IAP provides an opportunity to expand existing and access new markets through the development of software and hardware systems specifically geared towards monitoring compliance.

An initial assessment of the actual benefits and savings achieved through the IAP will be conducted after the first 12 months of operation. A summary of the projected benefits is provided in the following table.

Cost Benefit Analysis (Summary)				
	PV benefits ($m)	PV costs ($m)	Net present value ($m)	Benefit Cost Ratio
Road authorities	89.7	8.8	80.9	10.2
Transport operators	235.1	51.8	183.3	4.5
Total	324.8	60.6	264.2	5.4
PV: Present value (totalled over two implementation years and five operating years)				

A detailed assessment of the benefits and costs of the IAP is provided in (NTC, 2005).

In summary, the IAP maximises the utilisation of the road network and:

- provides for safer, more productive and compliant heavy vehicle operation;
- promotes sustainable road infrastructure;
- increases road transport industry efficiency and productivity;
- supports an increased range of access concessions to heavy transport operators;
- optimises road freight policy, including on-road enforcement activities;
- broadens the collaboration between government and industry, fostering better co-operation;
- reduces compliance costs through more efficient administrative procedures;
- promotes the use of leading-edge innovation and technology;
- promotes the use of Intelligent Transport Systems and the growth of the telematics industry, and
- improves public perceptions concerning the management of heavy vehicle activity.

3. IAP Operating Model

In developing the IAP operating model it was necessary to address a number of critical issues and challenges:
- In contrast to traditional roadside enforcement activity where the frequency and level of scrutiny of an individual vehicle's movements are relatively low, telematics monitoring provides a means of achieving continuous 'around-the-clock' compliance monitoring of that vehicle.
- Transport operators were reluctant to allow governments unrestricted access to details of their vehicles' movements, as this would require them to disclose confidential and commercially sensitive information about their business and the conduct of their operations.
- Road authorities were reluctant to allow transport operators (or their privately contracted telematics service providers) to monitor and report on the movements of their vehicles through a 'self-assessment process' due to the significant risks this could pose to safety and vulnerable infrastructure (even assuming a low-level of non-compliant activity).

It was considered the most appropriate and effective response to these issues was to allow monitoring to be provided by an independent third party, an IAP Service Provider, required to monitor all movements of a participating vehicle, and reporting only non-compliant activity to the relevant road authority.

The following factors were also taken into consideration:
- The telematics industry was (and continues to be) an evolving and rapidly changing industry. In order to avoid being tied to or constrained by a particular proprietary solution or product, it was critical the monitoring system allowed for multiple service providers as well as the adoption of new and emerging technologies.
- The use of telematics for commercial fleet management purposes was becoming more widespread and it was highly desirable that both regulatory and commercial telematics services were able to be delivered in parallel by a single telematics service provider.
- Australia has a federal system of government, comprising the national Australian Government, and six state and two territory governments. Under this system it is the state and territory governments who are primarily responsible for providing and maintaining road infrastructure and for regulating and managing the use of and access to the road network.
- State and territory road authorities required a system that could meet both common national and separate local monitoring needs.

- Road authorities and the transport industry identified the need for a quality assurance system to ensure that vehicle monitoring was accurate and reliable.
- Much of Australia's freight transport activity involves travel across more than one state or territory and many transport operators conduct operations in several (if not all) states and territories.
- It was essential for commercial viability and practicality, that vehicles could be monitored nationally through either a single or integrated system and were not required to be fitted with different equipment and/or be monitored by different service providers in different jurisdictions.

The IAP operating model represents a unique public private initiative that brings together road authorities, telematics service providers and transport operators in a cooperative arrangement. The IAP operating model is summarised in Figure 1.
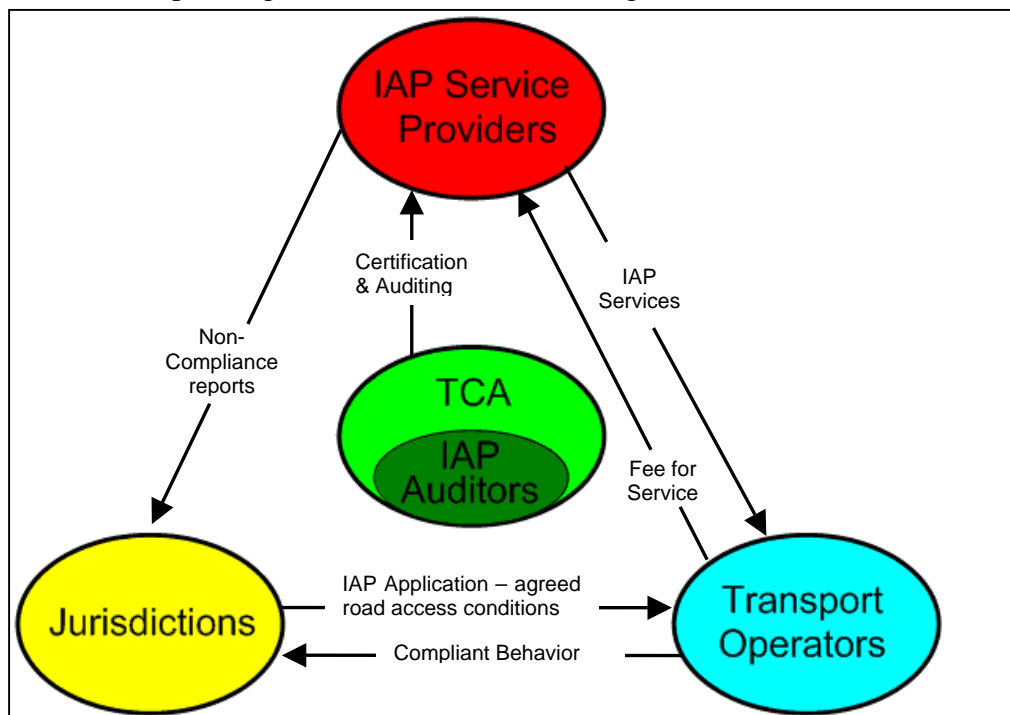

Figure 1 – IAP operating model

The responsibilities of each participant in the IAP are commensurate with their primary functions and capabilities.
- Jurisdictions - State and Territory road authorities that establish schemes, permits or applications that require an IAP compliance solution;
- Transport operator - An operator of one or more heavy vehicles eligible to voluntarily enter a scheme, permit or application requiring an IAP compliance solution;
- IAP Service Providers - Private sector monitoring companies that provide telematics services (i.e. hardware, software and associated processes) certified and audited by Transport Certification Australia Limited;
- Transport Certification Australia Limited (TCA) - The body responsible for the certification and auditing of IAP-Service Providers and administering the IAP, and
- IAP Auditors - companies or individuals that audit IAP-SPs on behalf of TCA.

Key features of the IAP operating model include:

- the establishment of TCA to administer the IAP and certify and audit IAP Service Providers (thereby providing quality assurance for the program);
- adoption of a multiple service provider approach to ensure competition between IAP Service Providers, and hence a competitive market driven environment;
- national model IAP legislation;
- a performance based approach to setting technical requirements;
- a system of nationally consistent Intelligent Access Maps (IAM);
- a nationally consistent system for issuing Intelligent Access Conditions (IACs) (which grant access to the road network under an IAP Application), and
- a nationally consistent system for reporting vehicle non-compliance, that is, through a Non-Compliance Report (NCR).

4. Legal Framework

The IAP is governed by a national legal and policy framework, set out in model IAP legislation, and implemented uniformly by each State and Territory government through local legislation.

The IAP legislation identifies TCA as the entity responsible for administering the IAP, and confers a range of functions and duties for this purpose. TCA's responsibilities include the certification and audit of IAP Service Providers and their systems.

The IAP legislation also provides important legal presumptions concerning the correctness of data produced by IAP Service Providers' intelligent transport systems. This data is described as being evidentiary in nature or of an evidentiary standard.

5. IAP Functional and Technical Requirements

The functional and technical requirements for the IAP are set out in the IAP Functional and Technical Specification. TCA certifies and audits IAP Service Providers against these requirements.

The requirements of the IAP Functional and Technical Specification are, to the maximum extent possible, performance based. The specification defines required outputs and it is up to each company seeking to be certified as an IAP Service Provider to establish, to the satisfaction of TCA, that its equipment and related back-office systems deliver the required outputs. The specification does not specify the particular equipment and systems required. Thus, competing companies whose equipment and systems differ significantly may be certified, as long as they deliver the required outputs.

This gives IAP Service Providers the flexibility to take full advantage of innovative, cutting edge telematics technologies when designing and developing their equipment and systems. Coupled with market competition between IAP Service Providers, this flexibility will ensure that IAP technology keeps pace with worldwide advances in broader telematics technologies, and guards against the IAP being dependant upon (and potentially restricted by the limitations of) particular proprietary technologies or systems.

The IAP Functional and Technical Specification has been structured to provide the flexibility for other Intelligent Transport Systems to be incorporated into or integrated with the IAP.

6. Common Reporting Formats

A number of prescriptive requirements are imposed under the IAP so that interoperability and compliance can be assured. One of these critical areas concerns the use of common report formats. Road authorities acknowledged and accepted the reasons for cross-jurisdictional consistency and identified the systems and process to deal with a provision of common reports. In reality the need for consistency with respect to the common reports is relatively simple. This is to ensure that a common formatted document is used and interpreted in a similar manner (i.e. consistent interpretation of the business rules) across the participants in the IAP. The use of these common formats ensures a consistent understanding of the intent and purpose of both the access conditions and reports of any non-compliance by heavy vehicles. It is important to stress however that the requirements concern the formatting and style of the common reports, not with their contents.

Documents required to be in common formats include:
- Intelligent Access Conditions (IACs);
- Non-Compliance Reports (NCRs), and
- Participants Reports.

7. The Intelligent Access Map (IAM)

Conversion of vehicle position measured using the Global Navigational Satellite System to an actual location requires spatial mapping data. The Intelligent Access Map (IAM) is the approved and issued electronic road network map providing the 'reference' from which heavy vehicle compliance with their Intelligent Access Conditions (IACs) is determined.

The IAM is provided by Public Sector Mapping Agencies of Australia (PSMA). The use of this single map ensures a one route one map policy, and that the data is the latest available, appropriately checked and reviewed, and interoperable with connectivity across jurisdictional boundaries. It is important to note that PSMA does not collect spatial data. It relies instead on state and territory agencies to collect (directly or via contract) road network data and through inter-governmental arrangements issue this data to PSMA for cleaning, processing and updating of the national road database.

8. Certification of IAP Service Providers

Certification is the process by which TCA determines whether an Applicant seeking to be certified as an IAP Service Provider meets the probity, financial, and functional and technical requirements of the program.

The purpose of these requirements is to ensure that IAP Service Providers are 'suitable persons' to provide IAP services (i.e. do not have any conflict of interest such as involvement in or links to a transport company), that they have sufficient resources to enable them to provide IAP services for the period of their certification, and that their equipment and systems meet the functional an technical requirements of the IAP. Details of the certification process are set out in (TCA, 2006).

Once certified by TCA, an IAP Service Provider's system becomes an approved transport system within the meaning of the IAP legislation. IAP Service Providers are free to provide IAP services to transport operators operating in any State or Territory.

Ongoing reviews and audits are conducted to ensure that IAP Service Providers continue to meet IAP requirements.

9. Conclusion

The IAP is a 'world first' - an initiative that represents a strategic means of utilising existing and new technologies in dealing with Australia's growing freight task, meeting industry demands for greater productivity and more efficient use of infrastructure, and addressing issues of community, government and industry confidence.

The IAP serves as a nexus between the needs of the road transport industry - improved access, reduced trip times, higher permitted loads - and the requirement of road authorities and government to protect their infrastructure assets, and the industry compliance needed to achieve this.

10. References

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