

INTELLIGENT ACCESS PROGRAM: UPDATE ON HEAVY VEHICLE MONITORING

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Abstract

This paper reports on the progress of the Intelligent Access Program (IAP) which is used for monitoring of heavy vehicles in Australia. Earlier conference papers (2005, 2006 & 2008) reported on the development of this program which became fully operational across Australia from mid-2008. The IAP program utilises GPS technology to remotely monitor heavy vehicles against access conditions imposed on them by Australian governments. This program is administered by Transport Certification Australia (TCA).

The IAP is based on national model legislation and open, performance based specifications. The IAP program has IAP Service Providers, certified by TCA, who install type-approved telematics units and operate a certified back office service that monitors heavy vehicles and notifies jurisdictions in the event of non-compliance to defined conditions.

Keywords: IAP, GPS, certification, audit, EWD, OBM

INTRODUCTION

The IAP became operational and available on 10 April 2008 when Sigtec was announced as the first IAP Service Provider (IAP-SP) by TCA.

Transtech Driven, Minorplanet Asia Pacific Pty Limited, Omnistar Pty Ltd and Transport Compliance Services Pty Ltd became IAP Service Providers on 23 July 2008, 12 December 2008, 14 April 2009 and 5 June 2009 respectively.

On 11 November 2008, TCA announced the withdrawal of Sigtec from being an IAP Service Provider with a smooth transition of Transport Operators from Sigtec to another IAP Service Provider. This has resulted in IAP having 4 successful IAP Service Providers providing competitive IAP Services and additional commercial services that provide choice and options to transport operators throughout the nation.

Off-the-shelf IAP Applications are typically offered through schemes, gazettal notices, etc. A number of off-the-shelf IAP Applications are available in multiple

states and the number has steadily increased with the increase in understanding and the commercial benefits being offered through participation in IAP.

IAP initial enrolment figures were released in September, 2009. These figures indicated 1,785 vehicles representing nearly 300 transport operators were registered as of August 2009. There has been steady industry uptake of IAP which continues to see growth in enrolments in existing and new IAP Applications.

CURRENT APPLICATIONS

IAP is a compliance tool which allows authorities to use within their own policy setting, giving them the flexibility to incorporate IAP as they see fit. The strength of IAP is seen with the variety of IAP Applications being deployed across the nation.

New South Wales, Queensland and Victoria currently have IAP Applications which have been embraced by industry. South Australia has recently enacted IAP Legislation and IAP will provide a way to obtain improved access arrangements leading to productivity improvements. From 1 July 2010, transport operators will be able to enroll in a voluntary Higher Mass Limits (HML) scheme. South Australia will continue to provide HML access for operators not enrolled in IAP however extension to the existing HML network or removal of the requirement for route compliance documentation to be carried will require enrolment in an appropriate IAP HML scheme. Further schemes will be developed in consultation with the transport industry.

In 2006, prior to the commercial availability of the Intelligent Access Program (IAP), the Roads and Traffic Authority of NSW offered transport operators the opportunity to operate their vehicles at Higher Mass Limit (HML) on certain routes, with IAP pre-enrolment as a pre-requisite. The initial pre-enrolment period was available between July 2006 and May 2008 for transport operators to register their interest and to benefit from the transitional arrangements that ended on 30 June 2009. Pre enrolled operators were able to retain the transitional HML access entitlements until full enrolment to IAP was made mandatory from 1 July 2009.

The IAP introduces a new way of managing heavy vehicle access and compliance, providing transport operators with the opportunity to obtain improved access arrangements, while providing the community with greater assurances that the right trucks operate on the right roads. The RTA is automatically notified of specific vehicle non-compliances. Thus the availability of the IAP gives the RTA greater confidence in opening up access in NSW for Higher Productivity Vehicles.

As part of the NSW Road Train Modernisation Program, and with the availability of the IAP, B-Triple and AB-Triple combinations up to 36.5 metres in length can now operate in the western region of New South Wales. These new combinations have been introduced in Western NSW to provide a modern, safer, more productive option for freight transport. These vehicle combinations provide a number of benefits, including:

- increased payload capacities in comparison to existing Road Train combinations;

- significantly greater deck space for livestock carriers and general freight carriers (B-Triples);
- the ability to transport increased payloads of higher density loads such as minerals and grains (AB-Triples).

A range of industry vehicles are currently operating with the IAP in NSW and discussions continue with interested operators, including the crane industry.

In NSW and for today's modern trucking industry, the IAP offers a great opportunity to utilise professional and accountable compliance management tools.

The IAP commenced in Victoria in November 2008. The use of IAP as a condition of access is being used by Vicroads to mitigate risks to safety or road infrastructure. As a result, IAP Applications in Victoria include nominated mobile cranes, nominated concrete pump trucks, High Productivity Freight Vehicles (HPFVs) which are participating in the "Green Triangle" trial recently announced under the Victoria Freight Network Strategy Freight Futures and nominated Performance Based Standard (PBS) Vehicles.

In Victoria, some operators of heavy mobile cranes and large freight carrying vehicles have previously been required to install GPS monitoring devices to prove access compliance. Certainly IAP is an enhancement of this requirement, providing a standard system for operators to demonstrate compliance with access requirements.

Since 1 July 2009 in Queensland, operators wishing to operate at Higher Mass Limits (HML) on the Queensland HML network are required to be enrolled in IAP. As of January 2010 there are 500 vehicles enrolled in IAP for HML in Queensland. In mid 2010 IAP will also become a requirement for specified Performance Based Standards (PBS) vehicles. The application of IAP to HML and specified PBS vehicles enables a balance between achieving greater freight efficiencies for operators and maximising the productive use of road infrastructure without compromising vulnerable road assets or road safety. Policies to apply IAP to Special Purpose Vehicles including specified large cranes and concrete pump trucks are currently being developed.

EXPERIENCE AND LEARNINGS

There are a number of areas covered in this section which include the following:

- Approach used for the IAP Functional and Technical Specification and realised benefits;
- Ongoing maintenance of the IAP Functional and Technical Specification;
- Back Office infrastructure;
- IAP Service Provider System Evolution; and
- Benefits of IAP to transport operators.

Approach used for the IAP Functional and Technical Specification and realised benefits

The IAP Functional and Technical Specification was developed using the philosophy of focussing on required outcomes without being overly prescriptive or solution

oriented. By following this approach, each IAP Service Provider has been able to meet the requirements of the IAP using varying approaches.

By allowing an IAP Service Provider to consider how they might deliver a required outcome, they have been able to provide a variety of solutions which in turn allows a transport operator to select an IAP Service Provider that best meets its business requirements.

Another benefit of the approach used for IAP is that IAP Service Providers can maintain their own solutions in an evolving and advancing technology environment but still be able to meet the requirements of the IAP Functional and Technical Specification. This benefit ensures transport operators can implement an IAP solution today which may evolve without having to continuously monitor the solution for compatibility as this is done by TCA in the role of certification, auditing and ongoing management of the IAP.

Ongoing maintenance of the IAP Functional and Technical Specification

The IAP Functional and Technical Specification received 3 addendums since release, and there are currently 2 further draft addendums in place. The structure allows for modular and ongoing enhancements which, due to the outcome based approach, ensures the IAP Functional and Technical Specification is maintained and addendums can be implemented in a complex, many-to-many environment. Our experience has led to efficient and effective updates to ensure the currency of the IAP Functional and Technical Specification is maintained in a high technology environment and a changing regulatory environment.

It is through the robustness of the IAP and the lessons learned that the IAP Functional and Technical Specification has been enhanced. This maintenance has been driven by the interaction and integration of the operational environment responsible for delivering IAP and the development services environment which is responsible for maintenance of the IAP Functional and Technical Specifications and future applications.

Back Office infrastructure

Through the operational management of IAP and experience working with IAP Service Providers and transport operators, the strength of IAP lies in its ability to accommodate non-IAP applications and non-IAP requirements by transport operators. One such requirement has been the need for an IAP Service Provider to integrate data from a vehicle into the back office of the transport operator without the need for a transport operator to make major changes to their existing systems. This has been made possible through the design of IAP to not only allow but in fact proactively consider and accommodate non-IAP Applications.

IAP Service Provider System Evolution

An IAP Service Provider may propose changes to their IAP system which TCA reviews and then performs the task of re-certifying the IAP Service Provider which allows them to incorporate those proposed changes into their IAP system.

Proposed changes may address some of the following:

- Non-compliances;
- Non-IAP related (commercial) enhancements; or
- IAP Service Provider initiated improvements to the system.

TCA performs the task of re-certifying an IAP Service Provider. As a result of this process, IAP systems have continued to evolve as new technologies, business processes and other factors influence the growth of IAP. The evolution of the IAP Service Provider is not limited simply to technology. The operational management has indicated that as IAP has grown, the IAP Service Provider has continued to evolve their business processes, procedures, sales strategies and other activities in order to remain competitive and deliver the customer service levels expected from transport operators.

Benefits of IAP to transport operators

TCA has conducted a series of consultations and discussions with transport operators since the commencement of IAP. From this, a number of case studies have been released which outline the benefits transport operators have identified from their participation in IAP.

While the IAP Applications detail the use and objective of IAP from a jurisdiction's perspective, it is important to note the benefits for the transport operator and how IAP has assisted them in their competitive, commercial business environment.

Some benefits identified by transport operators include:

- Assisting in speed and fatigue management through the use of IAP integrated with a non-IAP back office environment.
- Reduced environmental footprint per tonne/kilometre.
- Significant reductions in truck trips resulting in reduced operational costs for the transport operator (through reduced fuel consumption for example).
- Increased productivity through reduced container truck movements.
- Increased access for truck types to road networks not previously allowed resulting in greater transport loads and hence improved productivity, efficiency and cost reductions.
- Reduced noise levels and improved greenhouse gas emissions levels.
- Improved customer service resulting in better customer retention.
- Improved safety.

It has been evident from the industry support that the use of IAP as a compliance tool by jurisdictions, offering greater levels of confidence in transport operators, is delivering significant financial and non-financial benefits to participating transport operators. The fact that participation in IAP is a commercial decision for a transport operator also has ensured that IAP is delivering the benefits.

THE IAP BUSINESS MODEL AND ARCHITECTURE

General

The IAP operation involves four key stakeholders: Transport Certification Australia Limited (TCA), Jurisdictions, IAP Service Providers (IAP-SPs) and transport operators.

Figure 1 shows the participants in the IAP operating model along with their broad interactions.

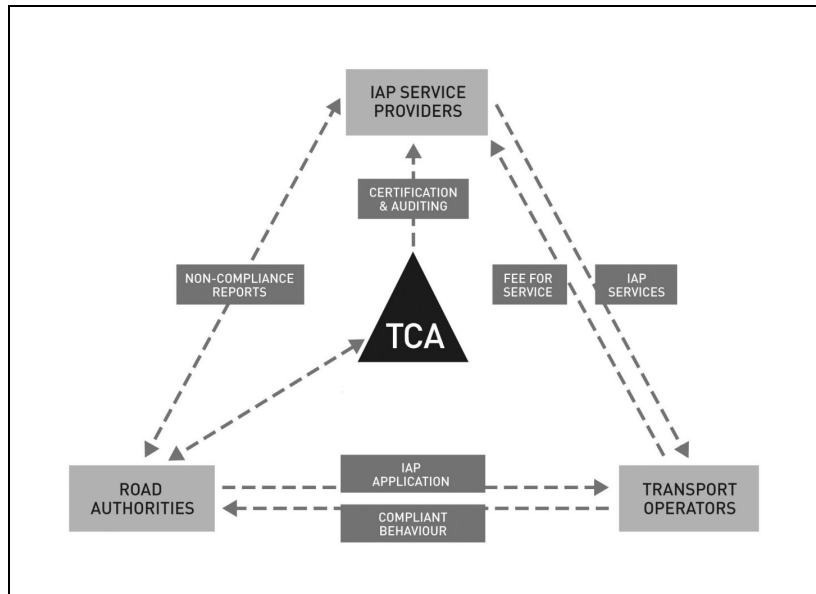


Figure 1: The IAP Business Model

A TO may negotiate with and apply to the relevant Jurisdiction to participate in an IAP Application developed and made available by that Jurisdiction, or propose a unique IAP Application that suits their particular business needs.

Details of the TO s application to join the IAP are contained in an Intelligent Access Condition (IAC). An In-Vehicle Unit (IVU) is installed in the vehicle to monitor and store GNSS and vehicle data which provides the Jurisdiction with a compliance tool for monitoring heavy vehicle access. The IVU is supplied by an IAP-SP which is engaged by the TO. The role that TCA plays is in ensuring that IAP-SPs are certified and audited.

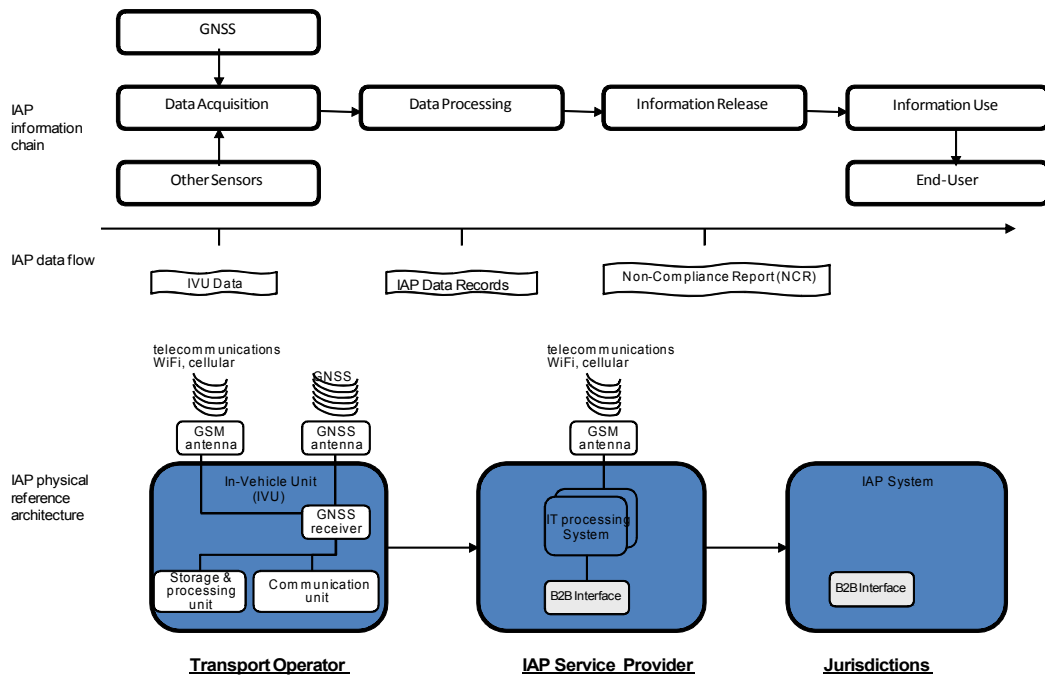


Figure 2: The IAP data flow

In order to provide an NCR to the Jurisdictions, a number of parameters are considered including:

- Location;
- Time; and
- Speed.

The GNSS allows for accurate positioning of the vehicle together with time and speed. In other words, GNSS data including position, time and speed provides important elements which can be used for assessing the spatial, temporal and speed compliance. In addition, the GNSS data can also be used for evaluation of the performance of the IVUs and IAP-SP systems in order to ensure that the IAP service is achieved and maintained at the required level. The following sections will introduce the IAP certification, audit and on-going audit methods by using measurements created by GNSS data.

Certification and Audit

One of the key functions undertaken by TCA is to certify applicants and audit IAP-SPs. Certification is the process by which TCA determines whether the applicants have satisfied all the requirements for being an IAP-SP. This process ensures that applicants meet all the IAP standards. After certification, audit monitoring continues to ensure that IAP-SPs maintain the same level of IAP service so that Jurisdictions can have the confidence in the on-going quality of the IAP during operation. Certification is the qualification process through which the certification authority determines whether a device or applicant for certification meets the requirements as defined in the TCA/IAP Service Provider Certification Agreement and IAP Functional and Technical Specification.

A full description of the certification process and a sample of the TCA/IAP Service Provider Certification Agreement can be found at the TCA website (www.tca.gov.au). The process of certification comprises five stages (Figure 3):

- the Application Stage
- the Checklist Stage
- a risk focussed review
- the Testing Stage
- the Certification.

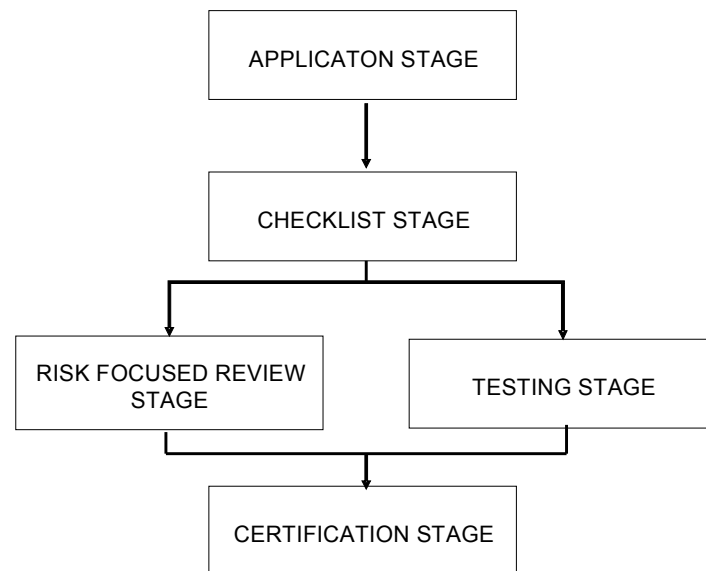


Figure 3: Certification process

FUTURE APPLICATIONS BASED ON THE IAP PLATFORM

Electronic work diary (EWD)

Based on its operational and technical telematics experience, a series of evidentiary applications have been investigated by TCA. On 29 September 2008, Australian governments introduced new heavy vehicle driver fatigue model legislation (Cth 2006). The new legislation permits the use of an electronic work diary (EWD) for recording driver's work and rest hours. The main task identified for TCA is the development of functional and technical specifications for a system that will meet the requirements of an evidentiary application. Speed monitoring has also been recommended as part of the development for this project.

On-board mass monitoring (OBM)

Another key development based on the IAP platform is on-board mass monitoring (OBM). Currently the IAP is capable of monitoring the access of heavy vehicles. However, mass has always been a major concern of the jurisdictions since heavy vehicle over loading is the main factor that causes road damage. TCA has been investigating the possibility of adding mass as an additional monitoring parameter to the IAP. From April to October 2008, an extensive testing program was conducted to examine the accuracy of commercial OBM devices. In total, eight Australian vendors participated in this program, and the test was carried out across five Australian states and on five different vehicle classes. A paper which details the findings and implications has also been proposed to the ITS World Congress in Stockholm (Karl et al 2009, paper ID 2869).

Figure 4 illustrates the philosophy behind the development of specifications for both electronic work diary (EWD) and on-board mass monitoring (OBM). The current IAP provides monitoring of heavy vehicle at an evidentiary level, future applications will be able to be achieved by interfacing additional components to the current IAP architecture.

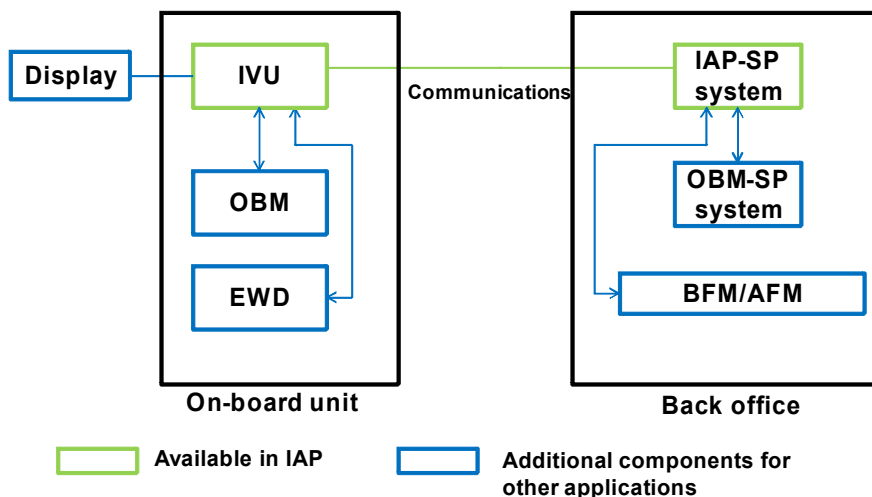


Figure 4: Current and future components of the IAP platform

Other applications

As a tool for compliance assessment, the IAP has been cited as one of the recommendations for improving safety at railway crossing (Parliament of Victoria 2008). The severity of recent train-truck crashes at railway crossings has raised great attention of the Parliament of Victoria. It was found that the main cause of railway crossing accidents is heavy vehicle over speed. After a series of discussions, the IAP was identified as an existing and running program which can be used to assess speed compliance for heavy vehicles at railway crossings.

Further, the IAP was recently mentioned as a potential platform for establishing an incremental pricing scheme (NTC 2009). An incremental pricing scheme will be able to charge heavy vehicles for the mass above mass limits. Distance, location and mass are the possible factors that may contribute to charges calculation. Hence, the values provided by the IAP have been considered extremely valuable to incremental pricing, especially when evidentiary on-board mass measurement becomes available.

SUMMARY

The foundation of IAP allows for the enhancement and expansion of regulatory application requiring an evidentiary level of assurance in a compliance tool. The flexibility of an outcome driven specification, in conjunction with a public/private partnership will continue to offer a framework that encourages innovation, leading to the ongoing adoption of IAP and delivery of new IAP Applications by jurisdictions to meet the ever increasing freight task in Australia.

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