

## ONE-ITS: A platform for Online Network-Enabled Intelligent Transportation Systems

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ONE-ITS is an ICT platform that creates an unprecedented multi-disciplinary research cluster in Intelligent Transportation Systems (ITS). ONE-ITS is a cost effective approach to creating a national critical mass that will transform ITS stakeholders into a unified premier virtual centre for ITS research worldwide. ONE-ITS will lay the foundation for an increased level of cooperation among ITS stakeholders to include business process synchronization, knowledge sharing, and support for a community of practice among human actors. ONE-ITS stakeholders include researchers; decision making government agencies; local operators; vehicle manufacturers; service providers of traveler-information; media outlets; and police, fire, and emergency services, as well as individual travelers. ONE-ITS is seen by Transport Canada as fully consistent with its strategic national direction of “En Route to Intelligent Mobility” that promotes stakeholder participation and ITS technology integration.

The core concept behind ONE-ITS is to allow ITS stakeholders to establish and capture business and application *logic* in business *models*, which are realized in the form of foundational, task, and application *services*. These services will integrate ITS data and services provided by different stakeholders. ONE-ITS allows its stakeholders to define logic and build models and services in a collaborative manner. The ONE-ITS platform is a double sided coin with a *Virtual and Social Organization (VO)* side and a service-oriented technological side:

- On the VO side, ONE-ITS will create a “socio-technical” VO that brings together ITS stakeholders. We envision the use of ONE-ITS as an environment involving multiple stakeholders with dynamic availability and a large number of heterogeneous information sources. Under the umbrella of the ONE-ITS VO, stakeholders may dynamically directly create temporary VOs for business partnerships between multiple stakeholders and maintain the VO only for the required business duration before dissolving it. The Virtual organizations will be established through linking the work processes, product, data and decision makers in various organizations in order to synchronize and integrate the elements of ITS projects.
- On the service-oriented technological side, ONE-ITS power ITS lies in providing novel applications in response to changes in application requirements in a flexible and scalable manner. Service Oriented Computing (SOC) deploys services that are usable by others to build applications that manipulate data and other services. ITS business applications are composed of executing a set of services. This changes the focus of ITS application development from algorithm implementation to service discovery and composition. An ITS stakeholder can replace one service with another that was recently developed and discovered. Such flexibility allows ITS

stakeholders to handle substantial changes in their IT infrastructure with relative ease and at low cost. SOC is flexible enough that it allows ITS stakeholders to take advantage of existing applications through “wrapping” them as services.

Combining SOC and VO is the height of what IT promises in terms of flexible application integration in response to changes in requirements. To implement this, ONE-ITS depends on proven principles of IT production, namely, collaborative web 2.0, social networking and service-oriented computing technologies to support VO and to build such participatory and integrative environment. Using open portals and interfaces allows member stakeholders to exchange and share ITS information, knowledge, resources, expertise and services. Since successful deployments of comprehensive ITS require computationally intensive applications applied to massive amounts of traffic information in real-time, ONE-ITS will rely on using the computational resources provided by Compute Canada Inc. and CANARIE’s high-bandwidth optical networks. The collaborative efforts of communities of practices and the sharing of resources coupled with information and communications management services, provided by ONE-ITS, will help establish a national Canadian ITS community. ONE-ITS will help ease traffic congestion, enhance travel safety, reduce traveller stress, reduce fuel consumption and pollution, protect the environment, and promote urban sustainability.