# THE CO-CITIES PACKAGE

## INTRODUCTION TO VERSION 1

### STATUS NOVEMBER 2014

This Document provides a short description of the "Co-Cities package", a data interface called CAI (Commonly Agreed Interface) which was developed by the project partners in the EU co-funded Project Co-Cities and was planned from the beginning to be published as an open source resource to facilitate data exchange between cities/(regions and traffic information service providers in Europe.

The package consists of the following elements, a data model description, a service model description and the respective XML application schemas which can be used for integrating these technical elements into the existing IT environments to serve mobile applications.

Please be aware that this introduction is the basic information only and that additional documentation is available also from the project deliverables of the CO-Cities Project.

The Co-Cities project finished in April 2014, but partners decided to extend the cooperation and funded the Co-Cities Forum in June 2014 at ITS Europe in Helsinki with the obiective to exchange traffic data and provide real Time Traffic Information services in Europe.

The Forum is open to new partners please come back to the Co-Cities Forum Coordinator alexander.froetscher@austriatech.at.

# THE CO-CITIES PACKAGE

The main objective of the Co-Cities project is to facilitate the **Cooperation** between the different actors, in the provision of enhanced, value-added, multi-modal RTTI services to travellers.

In a basic view the actors involved in the Co-Cities infrastructure are:

a) **Local content/service providers** (e.g. Local Authorities, Transport Service Operators) operating typically at regional level and providing base services. These can be independent ones or grouped together to form a **Regional Data and Service Server (RDSS)**
b) Independent **Travel/Traffic Information Service Providers** (TISPs) offering Value-added services in typical application scenarios where both pre-trip and on-trip information can be obtained and combined by the end users for their needs.
c) The end users who consume the provided services and provide feedback via the TISPS' applications.

The Co-Cities architecture can be seen as an evolution of the technical infrastructure developed during the European eMOTION and In-Time Projects focusing on Multi-modal Real-time Travel & Traffic Information services for improved:

- Reliability (up to date information about delays, etc…)
- Comfort (short transit, reduced waiting time, etc…)
- impact on travel behaviour: co-modality
- pan-European multimodal Real-Time Travel Information

For the achievement of the cooperative behaviour, the Co-Cities operates in a Service Oriented Architecture (SOA) whose core element is a **Common Interface (CAI: Commonly Agreed Interface)** ensuring interoperability between local providers and TISPs with respect to data and services available in different sites and related to different travel and transport domains and systems.

The CAI offers a unique, well known point of access of heterogeneous content and services but also defines how **Feedback Information** can be exchanged between TISPs and Local Sites to provide the Cooperative elements and behaviour enabling the enhancement of the information provision itself. By means of mobile services the end user first obtains the information and then provides feedback using a number of "feedback functionalities". These, using the CAI, can send feedback data back to the local systems. Locally all feedbacks can be processed and used to improve the associated information and this, eventually, can be re-introduced into the loop.

Any organisations that is able to provide information or services in the domain of traffic and transport for a specific region (such as Traffic Control Centres, Public Transport operators, etc. ) can become a ***Co-Cities follower*** as long as the Co-Cities CAI is used for such provision of data and services as well as for feedback data exchange.

Traffic Information Service Providers, on the other hand, can decide to become Co-Cities followers by building fixed/mobile application using the available Co-Cities services/data.

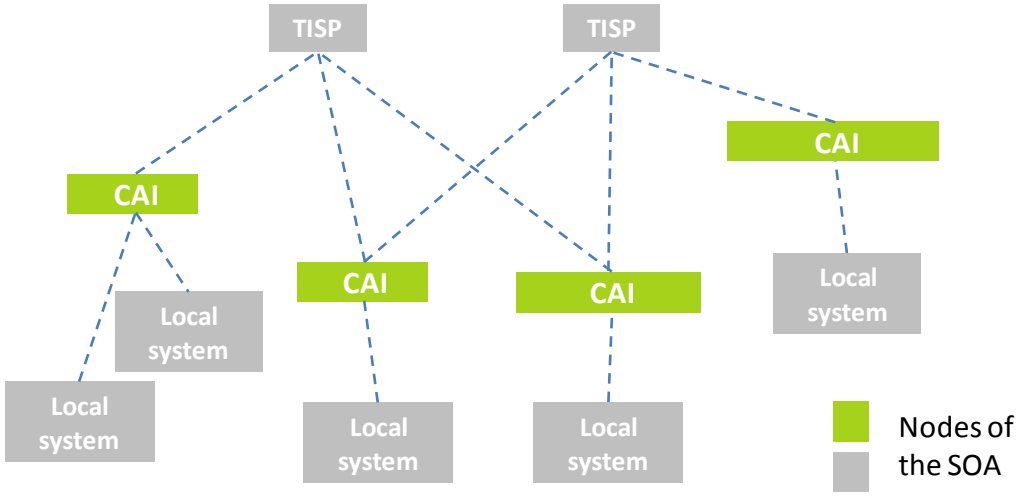
The CAI is built "on top" of local systems/services: there is no need of internal modifications of existing systems. The system infrastructure is modular and scalable: components for the management of specific content/services (e.g. traffic information, parking information, etc…) can be built in different phases. Further contents/services can be added progressively, when available/needed.

The specification is based on standards and generic enabling technologies. The implementation process is platform-independent to ensure openness and flexibility.

## THE COMMONLY AGREED INTERFACE - CAI

The Co-Cities Commonly Agreed Interface (CAI) or simply "Common Interface" as it is sometimes called in the following of the document, operates as the main element to flexibly inter-connect local systems and TISPs by providing a set of Data Services in different domains like Static Road Traffic Information, Dynamic Road Traffic Information, etc. and other services for e.g. Routing, Map exchange etc.

The components of the Interface can be physically set up locally (in the same site or infrastructure where the original content/services reside) or as a physical gateway hosted in a remote server and connected to the local provider. In both cases, the CAI enables the access to data and services for the TISPs in a well-known way regardless of the specific technical (platform-specific) implementation.




**Example of distribution of nodes in Co-Cities**

This **interoperability** between the nodes of the SOA is achieved by translating the different (local) offerings from traffic and transport operators in a common format by means of software components called **Adapters.** Once transformed, data is provided via web services. These components are running for local service/data provision. Local Sites can be considered as the "producers" of the CAI services while the TISPs can be considered as the consumers. A reverse process of transformation, in fact, can be ideally seen for the TISPs who read data and eventually use it for the provision of services by means of their custom technology and interfaces.

The provision of user feedback relies on the very same interoperability principles and constraints. Like for the aspects of information provision, the Co-Cities technical specification defines the transformation associated to feedback data with all details about the target data types and the necessary service interfaces.

The main pillars of the Co-Cities technical specification defining the interface are:

- The **data model**, which defines how the common information is structured (e.g. it defines the data structure to describe a traffic message, a parking place etc.)
- The **service model** which defines the services through which the information is exchanged between local sites and TISPs.

The specification, usable for the practical implementation of the services, includes:

- A formal definition of the **format** for **data** and **information exchange** between the interface (CAI) and TISP applications/services. This includes an XML *Application Schema* defined in GML *(Geographic Markup Language).*
- A formal definition – in *WSDL (Web Services Description Language)* – of the (web) **services** enabling access to data and information available using the data model.

The Co-Cities Package contains the element for the development of the Co-Cities Commonly Agreed Interface locally.

For the implementation it has to be noted that while the specification of the CAI is strict in terms of common data and service format, the development of the necessary software components is neutral with respect to the technology used.

The Co-Cities technical specification is described in details in Project Documentation - Deliverable D3.1.

## TECHNICAL ELEMENTS OF THE CAI

The following definitions are given:

1. **End User Services** are services providing traffic and mobility information to the end users, typically via mobile devices. These are defined for a number of **information domains**.
2. **'Feedback functionalities'** are defined for each of the information domains of the end user services.
3. End user services and feedback functionalities belong to the **B2C** side of the service definition. One or more **B2B** services are defined as building blocks of the B2C elements.

All B2B components form the Co-Cities CAI.

Regarding the specific **domains** defined for services and feedback functionalities, these are:

a) Road Traffic

b) Parking

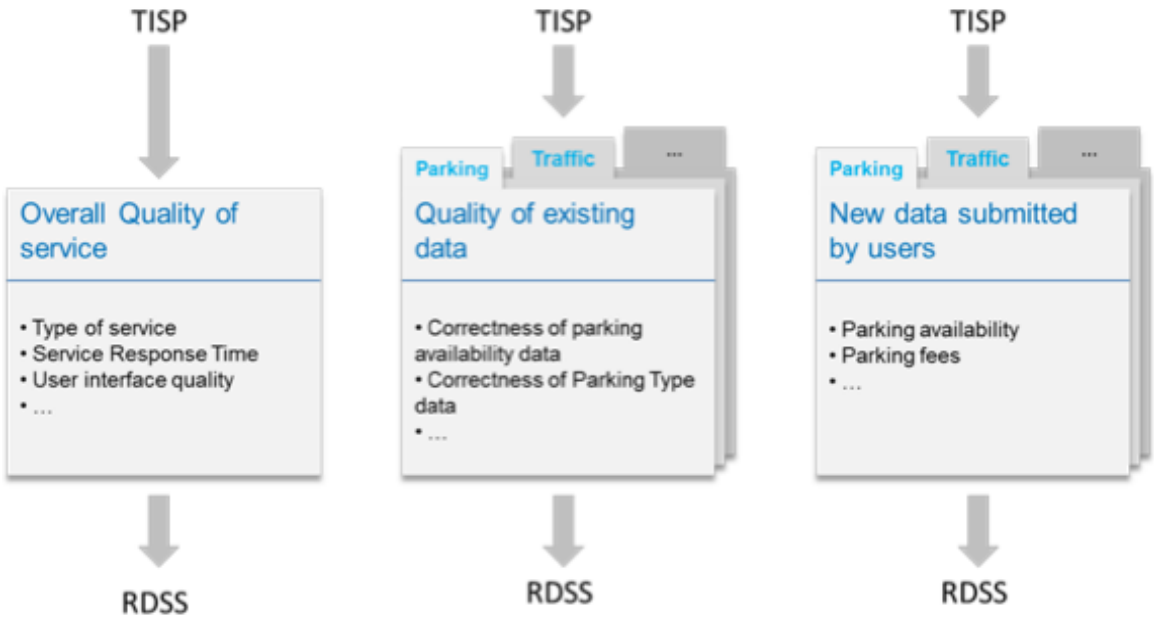
c) Public Transport

d) Multimodal Journey Planning

e) Point Of Interest (for more general feedbacks)

In these domains, B2B and B2C services for the provision of information can be defined starting from the In-Time technical specification. The **Feedback services** associated to these domains, instead are defined according to the following categories:

- One "feedback service" is used to express **the Overall Quality of the end user service** provided by the TISP
- Several "feedback services" (one for each Service Domain) are used to express the **Quality of existing data** service
- Several "feedback services" " (one for each Service Domain) are used to **submit new data**




**Types of 'feedback services'**

The feedback service are defined as a web service "running" (having a URL) on RDSS side. A TISP is able to access it by a PUSH mechanism.

Co-Cities mobile apps (applications) can be designed and developed on top of the Co-Cities Common Interface to offer two basic types of functionalities to the end users:

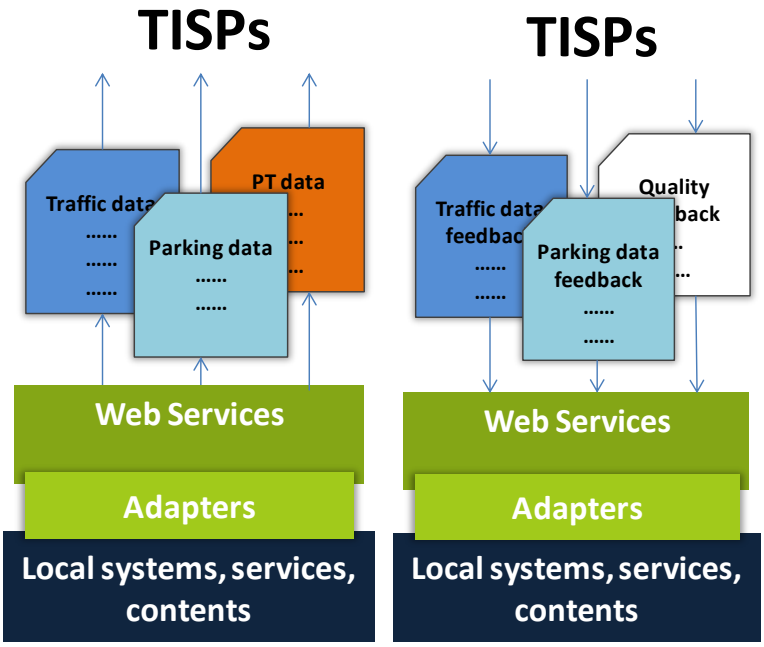
- Provision of information in the travel and traffic domains defined for Co-Cities. The information is generated from the different Co-Cities Sites and provided by them over the CAI.
- Possibility to provide feedback information, from the end user to the local site, over the existing information in the travel and traffic domains defined for Co-Cities and with three feedback types as defined before.

Key feature of each TISP app is the full compliance with the Co-Cities specification which is the condition to develop only one single app and to deploy it as a multi-site solution for all Co-Cities-compliant sites with no further adaptation or change necessary except for referencing a different set of service URLs.

B2B data can be read, used and organized by the TISP regardless of the specific site from which data comes from. Data can be used to:

- Organize the information and build a user interface for its provision (e.g. map-based, list-based etc.)
- Build additional B2C services on top of it (e.g. Journey planning on top of road data, use location based services for parking, traffic, public transport etc. in combination with the Journey Planning, etc.)

In general, TISPs are free to deploy mobile solutions with custom interfaces and functionalities thus looking completely different although using the same B2B interface for data and feedback exchange.




**Interaction of mobile apps with the Co-Cities interface**

## CONTENTS OF THE PACKAGE:

1) The Co-Cities conceptual model:
    - Complete and simplified UML models
2) XSD and WSDL specification:
    - Complete version
    - Simplified Version

All files of the package are in a .zip archive together with the documentation in .pdf format Project Deliverables are the primary source of information to understand and use the Co-Cities specification.