UTMC Suppliers Forum

Meeting Notes

Subject: **UTMC Suppliers Forum – Data Objects Working Group – Meeting 1 – Session 2**

Date: 03.09.2003

Attendees:

Gary Umpleby	(Mott MacDonald)	UTMC29 Lancashire CC	(Chair)
Jim David	(Mott MacDonald)	UTMC29 Lancashire	
Brian Robinson	(Peek)	UTMC29 York	
Denis Tate	(Peek)	UTMC29 York	
[Tim Cooper	(PIPS Technology)	UTMC29 Stratford and Lancashire CC]	(Written Comment)
Mark Bodger	(Siemens)	UTMC29 Reading BC / Stratford / Lancashire CC	
Janet Ansell	(Siemens)	UTMC29 Reading BC / Stratford / Lancashire CC	
Brendan Mason	(Tenet)	UTMC29 Stratford / York	
Stephen Corlett	(Thales)	UTMC29 Reading BC	
Gareth Tilley	(Centaur Consulting)	Representing UTMC Programme Management	

Notes:

Aims of Meeting

The aims of the meeting were to:

(1) Establish the different interpretations and number of 'commercial' implementations of the Network and UTC Data Object made by six suppliers playing a major role in the delivery of the 4 UTMC29 Demonstrator Projects;
(2) To identify an agreed set of Data Objects (wherever possible based on existing Data Objects) to resolve the identified inconsistencies that have developed in the implementation of Common Databases (CDBs);
(3) To conduct an 'off-line' analysis of the commercial implication of moving to the agreed set of Data Objects
(4) To present the findings, together with the output from Meeting 1-Session 1, as a baseline to the USF Technical Working Group for review at Meeting 2 of the Technical Working Group on the 1st October 2003.

Key Issues identified

A number of 'key issues' have developed through the different interpretations made by each supplier:

(1) Ambiguity now exists when "link references" are made within data objects;
(2) Does a "Link Reference" refer to a UTC Data Object or to a Network Data Object ?
(3) The term "Link" in each case means different things to different suppliers;
(4) New suppliers will not know how other suppliers have interpreted a particular "Link Reference". This will lead to inevitable incompatibility in systems and therefore severely detract from the benefits of implementing a UTMC solution.

Key Points considered

The following key points needed to be considered:

(1) The importance of the "Network Link" is that it is needed not just for visualisation but also for analysis – for example, "I am at X,Y and therefore associated with Network Link Z which has the following attributes for speed, flow, pollution .....";
(2) However, if a customer does not want a geographical approach (for example he wishes only to implement a SCOOT-based UTC system with no geographical referencing which in the past has often been the starting point for many Local Authorities) then enforcing Network Objects may result in a lot of unnecessary work;
(3) But ... there is a growing need in new "systems" for a method to relate non-traffic data (eg. bus data) with traffic data (for example journey times);
(4) Ordnance Survey have introduced the ITN Data Network based on their Master Map initiative – this includes waterways and may in the future include rail networks – this may become a foundation on which Local Authorities will wish to build future solutions.

Individual Supplier Views and 'Commercial' Implementations

The individual views of each of the six suppliers were reviewed, including the 'commercial' implementations made.
In alphabetical order:

(1) ***Mott MacDonald***

- OSCAR approach adopted – using shape file to hold geometry ....;
- The decision taken was that the 'Link definition' in the CDB would be OSCAR – this is used, for example, in the Incident Management System;
- Problems were met with the SCOOT Link
- To overcome these problems a separate table was created to convert the SCOOT Link to an OSCAR Link – this enabled congestion to be

pinpointed on a map, for example;
- The same problem was encountered in the Lancashire Demonstrator – again a SCOOT to OSCAR mapping was used;
- In the Lancashire Demonstrator, SCOOT data was needed for CORDEN. However, at the moment there is no need for a tie-up between the SCOOT and OSCAR data;
- Only the UTC Link Data Object has been used;
- The Route Data Object has been used for the PIPS Journey Time System;
- Everything is linked to OSCAR Links;
- Systems implemented or being implemented = 5.

(2) *Peek*
- The UTC Link Data Object, Detector Data Object, and Traffic Signals Data Object have been implemented;
- The Link references made are to Network Links;
- The nomenclature used for Links is as for the UTC Data Objects, but the Link References made are to the underlying Network;
- A point was raised that the cost of a UTMC solution must not be more than that for a traditional UTC system approach (in principle);
- Systems implemented or being implemented = 1.

(3) *PIPS*
- The PIPS Journey Time Systems need 'Location' and 'Validity';
- Should there be a separate ANPR Object ?
- Do we need to see all the raw data ?
- Systems implemented or being implemented = 2.

(4) *Siemens*
- Siemens common databases are implemented with UTC Objects;
- Limited support is provided for some of the Network Objects in the Stratford system – a cross-reference has been made between the UTC Route Object and the Network Route Object;
- The Siemens primary requirement is that it must be easy to implement a UTC system with a CDB;
- It was noted that Local Authorities will need an easy (cost effective) path to take up UTMC – therefore there must be a strong correlation between UTC and the CDB;
- Within the UTC Link Data Object, Siemens have used the Link Travel Time attributes for both SCOOT and ANPR links;
- Systems implemented or being implemented = 15 + all UK Siemens UTC systems implement the UTMC Data Objects to enable future connection to a UTMC CDB & Parking Guidance System.

(5) *Tenet*
- Tenet hold the view that UTC is one part of a whole system – on its own a UTC system does not support sufficiently the rest of the network and its possible functions;
- Objects can be easily associated with a network link;
- UTC Links are associated with the underlying network even if this is not implemented in SCOOT-based system;
- In Tenets view, the UTC Link is a topological unit;
- Tenet reference UTC links to the underlying network;
- The Traffic Signal Object is used – there are no issues with this specific Data Object;
- Tenet hold the view that the UTC Link is both a dynamic real source of information but is also trying to be topological at the same time;
- The Traffic Signal Object is a valid object but should it be used as a Node ?
- Tenet hold the view that the Route Data Object is attempting to do too much – should it really be a Journey Time Object ? Is it wrongly named ? To define a Journey Time you need a Route;
- Systems implemented or being implemented = 4.

(6) *Thales*
- The Reading CDB is implemented using only the UTC Objects – the network is defined by Traffic Signal Objects and the UTC Links between them – the network is mapped to the UTC database;
- No Geographical Network Data Objects are used;
- At present in the Reading UTMC System there is no requirement for a geographic front-end;
- There is, however, now a requirement to incorporate bus and train information into the CDB – in particular the bus routes do not map onto the SCOOT network easily. A requirement has been identified to map onto the geographic network both bus and traffic information for correlation (eg. to enable bus running times to influence traffic management measures);
- Thales therefore see the benefit of having an underlying topographical network defined;
- Thales link references are to UTC Links;
- Systems implemented or being implemented = 4.

Decision

It was agreed that a way forward needed to be sought based on the following key facts:

- We cannot leave the situation as it is – there is too much ambiguity in the Data Objects as currently defined which will lead to growing confusion between existing and new suppliers with inevitable and growing incompatibility existing between systems;
- We cannot drop either the UTC Link Data Object or the Network Link Data Object – both Object types are needed;

Proposed solution for discussion

It was agreed that we are therefore faced with "merging" the two "Link Types".

This could be achieved through the introduction of a new "Functional Link" (to be called the "Transport Link"). This would be used, for example, to define ANPR-based Journey Time Networks and Public Transport networks.

Agreed Definitions

To aid discussions the following definitions and changes were established (the coloured text indicates "equivalencies" between the UTC and Geographic Network Object types – (**Purple**) (**Red**) (**Green**)):

(1) ***UTC Objects consist of:***

- UTC Link is defined as = The Link in the CDB that has UTC as the source (may or may not be SCOOT enabled) – ***this will be replaced by the Transport Link;*** (**P**)
- Traffic Signals Data Object = Node Object (**R**)
- Route Data Object = Route Object – ***this will be replaced by the Transport Route Object***; (**G**)
- Link Type Object (Support Object) – ***this will be replaced by the Transport Link;*** (**P**)

(2) ***Geographic Network Objects consist of:***

- Network Node Object = Node Object (**R**)
- Network Link Object = Topological units that can be used to define a network (eg. transport network, road network) (**P**)
- Geometry Object
- Network Junction Object
- Network Road Element Object
- Network Turn Object
- Network Zone Support Object
- Network Junction Type Support Object
- Network Road Support Object
- Network Route Support Object (= Route Object) - **to be replaced with the Network Path Object** (**G**)
- **Network Path Object** – is made up from an ordered list of n Network Links (**P**) (a path between 2 co-ordinates) in a sequence (**G**)

(3) ***Transport Objects (see "The Agreed Solution) consist of:***

- Transport Link (**P**)
- Transport Route (**G**)

The Agreed Solution

Overview

It was agreed that the way forward was to:

- Introduce a new 'Link Type' called the *Transport Link* as defined above;
- The Transport Link has a 1:1 mapping to a (Geographic) *Network Path* (see below);
- The Transport Link replaces the (UTC) *Link Data Object*;
- The *Transport Link* will retain the existing 'geographic data' fields of the (UTC) *Link Data Object* but ...
- ... if there are (Geographic) *Network Path* references (new fields that will be added to the redefined object) then these references will be used in preference to any data held in the 'geographic data' fields (this allows for those systems that have (UTC) *Link Data Objects* already populated with geographic data because they have no underlying network reference or for systems where the customer does not wish to have an underlying network defined);
- (Generic) *Link Types* will now be defined in the *Transport Link* and will therefore be removed from the *Network Path Object* (which replaces the (Geographic) *Network Route Support Object*) and the (UTC) *Link Type Support Object* (which will be 'retired').

Generic Link Object discussion and decision

The introduction of a *Transport Link* provides the opportunity for several different 'types' of link to be established for each of the different transport modes (for example, bus, road (including SCOOT), Journey Time ...). The question arises – "Do we have a generic *Transport Link Object* that supports all transport modes or separate *Transport Link Objects* for each mode of transport ?". The options are:

(1) One 'generic' data object is used for all transport modes;

- This would require the whole data object to be updated if one mode needed to change – this is creating unnecessary baggage;

(2) Have a 'generic' data object + support objects for each mode type;
- This may have a performance implication in terms of database implementation since it would be necessary to make 2 'database writes' when submitting data to or changing data in the database;

(3) Define a Transport Link Object for each type of mode (for example, Transport Link-Journey Time, Transport Link-SCOOT ...);
- This would lead to a multitude of Transport Link <type> data objects that would need to be understood and maintained – undesirable;

(4) A combination of (2) and (3) based on a Transport Link definition, which would include a Link Type reference which would point to a separate Configuration Table and Dynamic Table for the Link Type.

It was agreed that Option (4) would be adopted.

Revised existing Data Object definitions based on the introduction of the Transport Data Objects

The following redefinitions of existing data objects were agreed:

(1) *Transport Link Object:*
- Replaces the *UTC Link Data Object;*
- A Transport Link is a path between two transport measurement points;
- A Transport Link has a 1:1 mapping to a (Geographic) Network Path;
- Is defined by a *Network Path Object* reference, or 'internal' geographic references;
- Consists of a 'Link Definition' which contains a 'Link Type' which in turn points to a 'Link Configuration' Table and a 'Link Dynamic' Table;

(2) *Transport Route Object*:
- Replaces the *Route Data Object;*
- Defined by a collection of unidirectional *Transport Links* ;
- Consists of a 'Definition', a 'Type' and a list of associated *Transport Links* (the list may contain different *Transport Link* 'types');

(3) *Network Path Object*:
- Replaces the *Network Route Object*;
- Some fields will need to be redefined / removed.

Identified 'knock-on' consequences of agreed changes

The following consequences of the agreed introduction of the Transport Data Objects were identified as needing action:

(1) *Transport Route* – what will the introduction of this data object mean in terms of the Route Journey Time and the impact on the *Journey Time Object* ? Should the *Journey Time Object* be killed ? Should the *Journey Time Object* become an optional part of the *Transport Route Object* ?

(2) Consideration needs to be given to 'normalising' the *Transport Route Object* and *Transport Link Object* with the *Network Path Object* and the *Network Link Object*;

(3) 'Link References' in other Data Objects will now need to have <u>two</u> references
- Network Link Reference;
- Transport Link Reference.

The current 'Link Reference' will need to be 'killed';

(4) For naming convention consistency, the *Geometry Object* should be renamed *Network Geometry Object*;

(5) For naming convention consistency, the *Network Zone Support Object* should be renamed the *Network Zone Object*.

Other Identified issues for consideration

(1) It was agreed that the following data objects would remain unchanged:
- Network Junction Object + Network Junction Type Support Object;
- Network Road Element Object + Network Road Support Object;
- Network Turn Object;

although ... the following data objects in this list may be superseded by the *Transport Link* in due course:
- Network Junction Object;
- Network Road Element Object;
- Network Turn Object.

Actions

The following actions were agreed:

(1) *Network Node* and *Network Link* data objects to be reviewed against the agreed re-structuring **A: Mark Bodger, Siemens**
(2) *Network Path* and *Network Geometry* data objects to be reviewed against the agreed re-structuring **A: Brendan Mason, Tenet**
(3) All data objects to be reviewed to ensure no unforeseen consequences of the agreed changes are missed **A: All**
(4) The *Traffic Signal Data* object to be reviewed against the agreed re-structuring **A: Mark Bodger, Siemens**
(5) Siemens to consider the implications of the 'splitting into two' the UTC Link Data Object **A: Mark Bodger, Siemens**
(6) Rationalise the description of *Transport Route* objects as a collection of *Traffic Links* in a similar way to how *Network Routes* are described by a collection of *Network Links* **A: Mark Bodger, Siemens**
(7) Conduct a review of how the new fields will be used **A: Mark Bodger, Siemens**
(8) Consider making the *Journey Time*' object a separate dynamic as for the *Traffic Link* object **A: Mark Bodger, Siemens**
(9) COMMERCIAL IMPLICATIONS OF AGREED CHANGES TO BE REVIEWED BY EACH COMPANY A: ALL

Agreed Way Forward

The following 'Way Forward' was agreed:

(1) Each company to consider the 'commercial implications' of the agreed changes to be made;
(2) Any objections to the agreed changes following the consideration of the 'commercial implications' to be raised as soon as possible to the other suppliers represented in Meeting 1-Session 2;
(3) Subject to full agreement to proceed – the agreed changes to be published to the wider USF Technical Working Group (at Meeting 2) as the baseline for future Data Object development;
(4) Subject to full agreement to proceed – the agreed changes to be proposed to the UDG as the baseline for the Data Objects Registry – Version 2 on which all future systems enhancements and new systems will be based