

TransXChange

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TransXChange is the UK nationwide standard for exchanging bus schedules and related data. It is used both for the electronic registration of bus routes (EBSR) with Vehicle and Operator Services Agency (VOSA) and the Traffic Area Networks (TAN), and for the exchange of bus routes with other computer systems, such as journey planners and vehicle real-time tracking systems.

The format is a UK national *de facto* standard sponsored by the UK Department of Transport. The standard is part of a family of coherent Transport related XML standards that follow GovTalk guidelines.

Version 2.0 of the TransXChange standard was released in April 2005. Version 2.1 was released in February 2006. Version 2.4 was released in Feb 2011. TransXChange is an approved Govtalk schema.

Summary

- The latest version of **TransXChange** is [Version 2.5](#). A version of the Publisher is not yet available for it.
- The previous version of **TransXChange** is Version 2.4.
- The earlier version of TransXChange Version 2.1, is still in widespread use.
- The current version of the **TransXChange Publisher** is [Version 2.4_5](#). The 2.4_4 version will work on TransXChange v2.4 and v2.1 documents and contains additional fixes. This new version works with the Microsoft Bing map tile set which supercedes the previous MultiMap tile set. The MultiMap service has ceased operation and the Publisher 2.4_1 or later version must be used if route maps are required.
 - Note that the replacement Bing map service uses a new url so you may possibly need to change your fire wall configuration. Your new configuration should allow all requests from http://*.virtualearth.net See `../config/bing.properties`
 - The Bing maps are on a smaller scale (approx 1:9000 and 1:39000) than the MultiMap maps so increase the memory requirements for publishing maps. If you publish large maps you may need to change your Java memory settings for the publisher and/or add physical memory.
- The current version of the **TransXChange Schema Guide** is v2.5-v59.

Recent

- 2014/01/31 TransXChange 2.5 released with TransXChange Schema Guide v59.

Previous

- 2012/06/27 Updated version of TransXChangePublisher Version 2.4_5 released with corrections to 2.4 function and Bing Maps Support.
- 2010/05/27 [TD National Codes Project - Holidays and Schools 2010 - Executive Summary v2](#) - See also TXC 2.4.
- 2010/05/27 [TD National Codes Project - National Operator Codes - Executive Summary v3](#) - See also TXC 2.4.

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Overview

What is TransXChange for?

TransXChange provides a means to exchange bus routes and timetables between different computer systems, together with related operational data. Stops are identified using the [National Public Transport Access Node Standard \(NaPTAN\)](#). It is used in particular for the Electronic Submission of Bus Registrations to [VOSA](#).

TransXChange comprises the following main components:

1. A registration and a general version of the TransXChange XML Schema.
2. The TransXChange [Publisher](#): a tool for publishing TransXChange XML documents from TransXChange format into tabular PDF files.
3. [Documentation](#) on the TransXChange schema and the processes to use it.
4. [Examples](#) of schedules encoded as TransXChange XML documents.

The TransXChange Schemas

There are two different TransXChange XML schemas, identical except for a few constraints as what fields are required:

- A **Registration** schema for registering a bus timetable with VOSA. This includes mandatory elements for statutory registration.
- A **General** schema for exchanging bus timetable and ancillary data between systems of all sorts.

The TransXChange schemas are modularised into functional packages and share a common set of base modules with [NaPTAN](#).

What Sort of Information Does TransXChange Exchange?

TransXChange schemas can be used to exchange the following information:

- Bus **schedules** including stops, routes, departures times / frequencies, operational notes, and maps. Routes may have complex topologies such as circular routes, cloverleaf and lollipops, and complex workings such as short working and express patterns. Connections with other services can also be described
- The **days** on which the services run, including availability on **public holidays** and other **exceptions**.
- **Term times** and **holidays** of Schools, Local Educational Authorities and other **organisations** serviced by a bus service.
- Details of the statutory **Registration** of the Service with a Traffic Area Office, including any **Short Notice Registration** details.
- Information about the Bus **Operators** providing the service.

- Additional operational information, including **fare stages, positioning runs, garages, layovers, duty crews**, useful for AVL and on-board ticketing systems.
- Information about **accessibility** of stops and services for wheelchair and other users

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Data & Process

TransXChange schedule data is produced as TransXChange XML documents by the originators of bus schedules, in particular bus operators and public Transport Authorities.

Creating Schedules

Schedules can be created as TransXChange XML documents using tools from a number of different suppliers, for example. These tools typically draw on other reference data such as NaPTAN stops and operator codes.

Simple TransXChange schedules can also be created using the VOSA online Electronic Bus Service Registration tool which produces TransXChange XML documents as its output.

TransXChange XML documents may also be edited directly using XML Editing tools.

Submitting Schedules for Electronic Registration Of Bus Services

For information on how to submit TransXChange schedules to VOSA, contact EBSR Support.

Publishing Schedules

- Schedules encoded as TransXChange XML documents may be published at any time using the TransXChange [Publisher](#). The Publisher carries out a number of validation checks as well.

Exchanging Schedules

- Schedules may be exchanged as TransXChange XML documents using FTP, email or other electronic transfer protocols.

Importing Schedules

Schedules can be importing using tools from a number of different suppliers, for example.

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Documentation

The following documentation about TransXChange is available free:

- This **TransXChange Web Site** provides a brief overview and information on the available TransXChange schema versions and where they can be found.
- **TransXChange Schema Guide** An electronic document providing a high level guide to TransXChange and its use. The guide has content suitable variously for both users and implementors. It provides an overview of the TransXChange model, a detailed description of the schema element, worked examples, and technical annexes, including specification of the integrity rules used in TransXChange.
 - [Download the latest version of the guide.](#)
 - Earlier versions can be downloaded from the TransXChange Downloads & Schema page.
- **TransXChange Schemas** the TransXChange XML Schemas provide W3C .xsd schema definitions. They include detailed comments describing all the elements and their intended use.
 - [Download the latest version of the schemas.](#)
 - Other versions of the schema can be downloaded from the TransXChange Downloads & Schema page.
- **Documentation for Related Standards:** See documents for [NaPTAN](#), and the National Public Transport Gazetteer.
- **Licensing & IPR:** See Terms of Use.

Training Materials

- EBSR Training Materials are available.

EBSR News

- EBSR newsletters provide a roundup of EBSR activities, along with handy tips on TransXChange data management.

Additional tools

- **TransXChange Publisher** A tool for publishing TransXChange format XML instance documents.
- **TransXChange Technical FAQ** Notes and cautions for implementors including some discussion of using available software tools.

Third Party Tools

- Google Transit Converter

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Implementations

Some implementations of TransXChange in the UK				
TransXChange Data management				
	Electronic Bus Service Registration		Atos Origin for VOSA	www.uk.atosorigin.com
TransXChange Export				
	1.2		Trapeze	www.trapezesoftware.com
	2.1		Journey Plan Ltd	www.journeyplan.co.uk
	2.0, 2.1	EF A	Mentz Datenverarbeitung GmbH	www.mentzdv.de
	2.1, 2.4		Omnibus	www.omnibus-systems.co.uk
	1.2, 2.2		ACIS	www.acis.uk.com
	2.0, 2.1, 2.2, 2.4		Trapeze	www.trapezesoftware.com
TransXChange Import				
	1.2		WS Atkins	www.atkinsglobal.com
	2.0 Import			
	2.1 Import & Export		Journey Plan Ltd	www.journeyplan.co.uk
	2.0, 2.1, 2.2, 2.4	EF A	Mentz Datenverarbeitung GmbH	www.mentzdv.de
	2.1, 2.2, 2.4		Omnibus	www.omnibus-systems.co.uk
	1.2, 2.1, 2.2, 2.4		Trapeze	www.trapezesoftware.com
TransXChange Utilities				
	TransXChange Publisher 2.1, 2.4		Kizoom for DTI	pti.support@trapezgroup.co.uk

History

The following is a log of significant changes to the TransXChange site content. See [Schema](#) and [Publisher](#) for details of changes to downloads.

April 2013

- Draft 2.5a schema with accessibility support

June 2012

- Updated version of TransXChangePublisher Version 2.4_5 released with minor fixes and revised Bing Map Support.

Dec 2011

- Revised TXC 2.4_0 Publisher released with change over to Microsoft Bing Maps Support.

April 2011

- Revised TXC 2.4_0 Publisher released.

Jan 2011

- Revised TXC 2.4 published.

August 2010

- Revised Draft TXC 2.4b published.

Mar 2010

- Draft TXC 2.4a published.

Oct 2009

- Site reformatted for dft.gov.uk

June 2009

- EBSR news sections added.

June 2007

- Information on Google Transit Converter Added.

May 2007

- New version of 2.2a_1 Publisher added.

Dec 2006

- Approved as Govtalk schema.

Sept 2005

- Added Release 2.1
- Added Publisher 2.1_1.

April 2005

- Published on GovTalk for review.

Mar 2005

- Added Release 2.0.
- Added Publisher 2.0-1.

Nov 2004

- Added Technical FAQ.
- Added Publisher 2.0f-2.

Oct 2004

- Added Examples 2.0f.
- Added Publisher 2.0f-1
- Added TransXChange Schema 2.0f (schema, schema guide).

Sept 2004

- Revised Examples 2.0e.
- Added Publisher 2.0e-1

July 2004

- Added Draft Examples 2.0e.

- Added TransXChange Schema 2.0e (schema, schema guide).

June 2004

- Added Publisher Beta 1 and Draft Examples.
- Added TransXChange Schema 2.0d (schema, schema guide).

May 2004

- Added TransXChange Schema 2.0c (schema, schema guide and change notes).

Feb 2004 [kizoom](#)

- Added TransXChange Schema 2.0a (schema and change notes).

Jan 2004

- Created site structure to support TransXChange. versioning scheme etc.

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Contact

TransXChange Hosting

For help or comments about the hosting or access to this web site, please contact:
pti.support@trapezgroup.co.uk

Schema & Documentation

For help or comments about the TransXChange schema & Documentation, including content of this website, please contact: pti.support@trapezgroup.co.uk

Designated Owner of Schema

The designated owner of the TransXChange schema for GovTalk is

TransXChange, Transport Direct Project
Department for Transport,
2/17 Great Minster House,
33 Horseferry Road,
London, SW1P 4DR

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Terms of use

The purpose of this site is to enable the Public Sector, Industry and other interested parties to work together to develop and agree policies and standards for the exchange of public transport information for public transport timetables and their related systems. It is also aimed at promoting the production and management of centrally agreed, freely available XML schema, supporting the public sector data interoperability requirements of the UK Government's e-government strategy.

Use of Schema

The TransXChange Schema is Crown Copyright. It may reference other Schemas that are also Crown Copyright, or that are owned by Associate Members of the UK Government GovTalk initiative. It may be used on a non-exclusive, non-transferable, royalty-free Licence.

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Samples of Real TransXChange documents

The following are examples of real EBSR registrations. Data courtesy of UK Bus Division Stagecoach Group plc.

TXC Sample Document	Example of	TXC	TXC
		2.1	2.4
3_VI_PF_3_20071028	Lollipop "route; frequent interval covering part of length of route so described in an attachment. Co-ordinates in WGS84.	xsd pdf map	xsd pdf map
7_SSS_PB_78_20080727	Frequent intervals assigned to trips and also timetable described as frequency, Holiday timetables, circular services. Co-ordinates in WGS84.	xsd pdf map	xsd pdf map
86_STA_PD_R86_20070903	Co-ordinates in Eastings/ Northings.	xsd pdf map	xsd pdf map
X5_ST_PF_785_20080426	Limited stop service; attachment showing alternative routes (not affecting stopping places). Co-ordinates in WGS84.	xsd pdf map	xsd pdf map
S5_SOX_PH_S5_20090125	Complex service with route variations. Monday-Friday timetable split into Monday-Wednesday/Thursday/Friday reflecting operational requirements. Bank holiday operating profiles.	xsd pdf map	xsd pdf map
U10_SOX_PH_U5_20090701	Cancellation. Multiple lines within the service; timetables marked with comments defining operating periods (university term/vacation). Co-ordinates in WGS84. Daily variations.	xsd pdf map	xsd pdf map

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Technical FAQ

This page provides various items of technical information to assist TransXChange implementors. It assumes a technical knowledge of XML software.

Information on available technology is provided strictly on an 'as is' basis and without warranty, and no endorsement is intended of any platforms, components or proprietary tools mentioned.

TransXChange Implementors are invited to contribute their experience and information about XML implementation technologies to this page. Please send comments and questions to pti.support@trapezgroup.co.uk.

Tools

What tools are available to read and navigate the Schema?

The *TransXChange* xsd schema files may be viewed as formatted text in a web browser or text editor. There are in addition a wide range of [free](#) and [proprietary](#) tools available to view and edit XML schemas in graphical editors. *TransXChange* is a large complex schema and the use of such a tool is strongly recommended, even just to read a schema.

Graphical XML editors

A current list of graphical; XML editors can be found at [Open Directory Project](#). These all include validators. Some are shareware some are available under a commercial license.

The following are some popular XML editors that support graphical editing of both XML schemas and XML instance documents. No endorsement is implied by inclusion in this list.

Commercially Licensed tools

- [XML SPY](#) tool from [Altova Gmbh](#) - see www.Altova.com/XMLSpy
- [oXygen](#) XML editor
- Stylus Studio from Sonic software www.stylusstudio.com/
- Edit X from <http://www.editix.com/>

Shareware

- <http://xmlwriter.net/>

What tools can I use to read a TransXChange Schema from my own Applications?

TransXChange uses standard XML technologies and can be parsed using off- the-shelf XML validators and parsers. /p>

Please note however, that the TransXChange schema models a complex problem domain, and so requires a relatively large, complex schema that uses XML's features in a fairly sophisticated fashion. It is modularised into smaller sub-schemas for maintainability and reusability; TransXChange is part of a unified set of UK Public Transport standards and it therefore references standard types and elements that are shared with other UK PT and government schemas such as NaPTAN (these are found in the /napt and /apd directories). Separate namespaces are used for various subschema. Keyref constraints, a new feature of XML, are also used, including xpath expressions for elements. *It is therefore necessary to use fully featured tools that implement modern XML features to process the schema and instance documents.*

- The schema and the examples have been validated using the following validators
 - Xml Spy 2008 validator
 - Java [JAXB validator](#).
 - [Microsoft MSM 4.0 validator](#).
 - Sun [multi-schema validator](#).
 - The [TransXChange Publisher](#) uses the [JAVA JAXB bindings](#) and JAXP DOM parser to validate and parse the schema. These were obtained as part of the [Java Web Services Developer Pack](#) (which bundles the JAXB and JAXP code, amongst other things), and testing was done on on versions 1.3 and 1.4 2. The Publisher provides an example of complex processing of TransXChange schema and documents using open platform technologies. Java and open source technology for processing XML has been available for some time and the JAXB, JAXP and Xerces tools are all mature technologies with good feature coverage.
 - **Some shortcomings have been noted in the support of certain XML features in the Microsoft .net XML parsers**, in particular in the support of MS XSD.exe parser for processing schemas imports and multiple namespaces (as of Dec 2005). The following paper provides some useful comparative discussion of issues with MS .dot net. technology. Please note that XML technology continues to develop fast and this will change over time. (A workaround for the xsd.exe shortcoming may possibly be to create an inline copy of the schema).

Can I convert TransXChange documents into other formats?

Yes, a number of suppliers provide tools to migrate legacy formats such as RJIS CIF into TransXChange.

The following tool allows conversion into Google Transit Feed Specification format.

Document Use

How do I check that my TransXChange document is correct?

To be valid a TransXChange document, xml documents must satisfy two levels of validity criteria:

1. **Well-formedness and validity:** Documents must parse and validate against the corresponding version of the TransXChange schema at the specified level - Registration or General - including all the integrity constraints coded within the schema, such as for key uniqueness and reference. Any document that does not satisfy the XML syntactic rules cannot be processed and will be rejected for Registration with [VOSA/ESBR](#). It is likely also not to be accepted or understood correctly by other users of the General Schema.

2. **Correctness:** Documents must satisfy additional processing rules and constraints that are not enforceable in the XML of the schema, but which are specified in the [TransXChange Schema Guide](#) as named rules. Each rule is assigned a severity and a type: **intrinsic** (only require internal consistency within the document) or **extrinsic** (i.e. would require checking against an external database of allowed values).

- *Intrinsic Severity 1 & 2 rules must be satisfied in order register a document with [VOSA](#).* Any document that is not correct may be rejected for Registration and may not be accepted or understood correctly in uses on the General Schema.
- Other applications are free to make their own interpretation of the semantic rules according to their purpose, but it is strongly advised that severity 1 rules are met.

The [TransXChange Publisher](#) includes a diagnostic checking function to perform a number of the intrinsic checks and produces a report as part of the published document.

The enhanced publisher available in 2007 allows you to run just the diagnostic report.

How do I know which version of the TransXChange Schema to use?

TransXChange follows a strict versioning scheme so that developers can manage differences in the schemas with each new release, and in particular detect the level of any given instance document so as to support the exchange of documents at different levels from different systems. Change notes are provided with each release of the schema..

- Once frozen and released, schema versions will not be changed. You should develop against the latest stable release if you want to be sure there will be no further changes.
- On occasion, preview versions of the schemas under development may be offered -- *for informative purposes only* -- in advance of being officially released; these

will be labelled as work in progress (with a letter suffix on the version number e.g. 2.2a) and may be changed to add in further modifications without notice. *You should not develop against a preview version unless you are prepared to mend breakages due to schema changes as and when they occur.*

At any given time the Publisher will support one or more levels of the schema, e.g. as of Jan 2008 it supports 2.1 and 2.2a. Documents submitted to VOSA for EBSR may be in one of the supported levels.

What is the difference between the TransXChange Registration schema and the General schema?

There are two slightly different versions of the TXC schema: a **registration** schema, used for submitting Electronic Bus Service Registrations (EBSR) to VOSA, and a **general** schema that can be used for general purpose exchange of all or part of a timetable. The two variants are almost identical, except that in the EBSR registration version certain fields are mandatory. The general schema in contrast allows TXC to be used to exchange arbitrary subsets of TXC elements, without all the mandatory details required by the registration schema.

A TXC document that conforms to the registration schema will always also conform to the general schema. A document that conforms to the general schema may conform to the registration schema, but is not guaranteed to do so - it may be lacking some mandatory elements in which case it will not.

Documents that conform to either schema may be published with the TXC publisher.

Where should the XML schemas reside for my Application?

You may either:

1. Reference an online version of the *TransXChange* schema at www.dft.gov.uk/transxchange/ using a URL given by the versioning schema. ***No guarantee can be given as to the availability or performance of the site providing the URL. Or***
2. Reference your own self-contained copy of the schema extracted from the *TransXChange* schema zip file. ***This is the recommended approach for production systems*** as it removes external dependencies and external scaling constraints on your application.

Please note the following points about schema location references:

- If you are making a reference to the on-line schemas, you should always use the www.dft.gov.uk/transxchange/ domain as the root domain, as this will be the domain used in the long term, and is the domain used in the TransXChange

- namespaces. (On mirror sites this URL is sometimes aliased in links to <http://dft.gov.uk/transxchange>)
- Each version of the [TransXChange Publisher](#) ships its own copy of the TransXChange schema, which it references *regardless of any schema named in a document being published*. The schema version corresponds to that of the publisher. (This override was added in version 2.0f-2 to overcome difficulties some users had in typing the correct path to their own local copy of the schema.). You should not alter these schema copies or you may break the publisher.
 - If you are using a validation tool such as XML spy to validate your own documents, you still need to ensure that the path indicated by the **schemaLocation** parameter points to the correct version of the schema for the document. The TransXChange examples provide an illustration of how to reference the on-line schema.
 - **Catalogs** provide a standard for specify the location of XML schemas to applications - see <http://www.oasis-open.org/committees/entity/spec-2001-08-06.html>, and for how to use with Java here: <http://www.xml.com/pub/a/2004/03/03/catalogs.html>. A suitable catalog is supplied with the publisher.

How do I use TransXChange efficiently to reduce the document size?

The *TransXChange* schema includes a number of mechanisms to reduce the size of instance documents. These are described in detail in the [TransXChange Schema Guide](#). In particular:

- Many elements may be **reused** in many different timetables, in particular stops, journey patterns and vehicle journeys and it is important to encode schedules to reference shared definitions, rather than to repeat identical information.
- **Inheritance** semantics are used in a number of places to reduce the amount of information that needs to be exchanged. For example within a vehicle journey, only those vehicle timing links that are different from the underlying journey pattern need be specified. Operational dates and periods may also be specified by difference.

Applications that export TransXChange documents should be aware of these mechanisms and in particular (i) encode schedules so as to reference common definitions wherever possible, and (ii) encode schedules by difference wherever appropriate using the inheritance mechanism described in the TransXChange Schema Guide. This is important not only for reducing document size, but also so that information about common structure is not lost.

Applications that parse and import TransXChange documents need to aware of these mechanisms and in particular (i) re-establish the reuse references when importing documents, and (ii) correctly implement the inheritance rules described in the TransXChange Schema Guide when processing content.

Can I compress TransXChange Documents?

Yes. XML is a verbose representation designed to afford some level of human readability. The *TransXChange* XML documents may be compressed significantly for storage and/or exchange: the compression process is completely independent and external to TransXChange itself and there are a number of well know open source approaches, such as gzip. See for [example](#). Compression is still a topic of discussion and development, for example, see the W3 working group <http://www.w3.org/XML/Binary/>.

Publisher

Which version of the TransXChange Publisher should I use?

From time to time new versions of teh publisher are released with new features and fixes. Each version of the publisher has its own version number and supports only a specific version or versions of the schema. Publisher version numbers indicate the latest schema level supported. There may be more than one version of the publisher for a given schema level. For example for TransXChange schema level 2.1, there may be versions 2.1_1, 2.1_2 etc of the Publisher. Publisher versions 2.1_1 and earlier only support a single schema version. If a version of the Publisher does not support the version level of a particular TransXChange it will issue an error.

The publisher is packaged for two separate environments:

- TXC Publisher for the Desktop, as downloadable from this site. This can be used to publish documents from a PC using a choice of options
- TXC Publisher for **EBSR embedded workflow**. This uses the same publishing engine, but invokes it with a fixed set of Publishing options - see below.

Can I run the TransXChange Publisher from the network?

No, the publisher install and run environment is not currently supported for running it from a network. At the moment it should be installed on the desktop of each user. This may be possible be addressed as a future enhancement.

What is the difference between the desktop version of the publisher version and the EBSR embedded version?

The two versions of the publisher use the same publishing engine to read a TXC document, process it and render it as a pdf. The versions differ as follows

1. Options & Defaults
 - The EBSR version uses a fixed set of Publishing options.

- The desktop publisher has an addition GUI that allow different output options to be set.
- Formatting
 - The EBSR version uses different title headings.
 - The EBSR version uses a different background to 'watermark' the official document.

What are the standard defaults for the publisher?

The EBSR version of the publisher uses a particular set of default values for the output options, as shown in the table below. These are fixed.

The desktop version of the publisher allows different options to be specified, but defaults to a set of initial values. Since version 2.2a_6, these are the same as for the EBSR version. Prior to that they were as shown in the right hand column.

		Defaults		
Tab	Option	EBSR	Desktop	
			Current (after 2.2a_6 +)	Old up to (2.2a_5)
Main	Particulars	<i>Basic</i>	<i>Basic</i>	Full
	Timetable	<i>Full</i>	<i>Full</i>	<i>Full</i>
	Diagnostic Report	<i>Full</i>	<i>Full</i>	<i>Full</i>
	Stop Points	<i>PTP</i>	<i>PTP</i>	All
	Merge Similar Frequency Journeys Journeys	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
	Include embedded image	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Route Track Map	Route Track	<i>Full</i>	<i>Full</i>	None
	Scale	<i>Auto</i>	<i>Auto</i>	<i>Auto</i>
	Tiling	<i>A4</i>	<i>A4</i>	<i>A4</i>
	Combine Route Directions	<i>No</i>	<i>No</i>	<i>No</i>
	Stop Data Source	<i>Web</i>	<i>Web</i>	<i>Web</i>
	Stop Data Source	<i>Web</i>	<i>Web</i>	<i>Web</i>
Advanced	Validate XML	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
	Stop Data Source	<i>PDF</i>	<i>PDF</i>	<i>PDF</i>

What are the Prerequisites for the TransXChange Publisher?

The TransXChange publisher runs in a windows environment - see [Publisher documentation](#).

Note that in order to run the publisher on your machine, you must first have installed the required version of the *Java Runtime Environment (JRE)* version. as described in the installation instructions. If you do not have the correct version of the JRe you may get an error message when you try to run the publisher such as "An error occurred while starting the application".

To Publish maps, the TransXChange publisher normally needs at least 1024MB of heap memory memory. The memory can be increased - see Publishing

Can I call the Publisher from my own Applications?

Yes. The TransXChange Publisher is can be invoked in three different ways

1. By using the desktop user interafce component provided this collects and validates the various inopuyt parameters and then calls a publisher service API.
2. By using a command line procedure which accepts a number of parameters. This incurs an overhead to start the Java environment and process the TransXChange schema every time the Publisher runs. This use is deprecated.
3. By calling the web service API directly. An XMLma is available tt describe the required parameters.

Can I use the TransXChange Publisher to publish Transxchange documents other than registrations?

Yes, the publisher can be used to publish TXC documents that conform to both the **general** and the **registration** schema. However in order to produce a document, sufficient data needs to be present to populate the required elements. It is possible to populate a TXC general schema document very sparsely, say with just operator or route data, in which case the publisher will not produce meaningful results, or in some cases may crash.

Where can I find the TransXChange Publisher Logs?

The Publisher outputs a log to a file as it proceeds. This will incude more detailed messages about any failure, for example an "out of memory" error. The log should be sent when reporting a problem. The logs are located in the `../logs` subdirectory of the publisher.

- `../logs/application.log`
- `../logs/jetty.log`

What do I do if I get an out of heap Memory Error: Can I control the amount of heap memory used by the TransXChange Publisher?

The publisher is a portable application that runs on the Java Virtual Machine (VM). A Java VM can be configured to run in a certain amount of **heap** memory. If this is exceeded an "out of memory" error will occur and will be reported in the application log. The actual amount of memory needed depends on the size of the timetable document to be published, and the options selected; additional memory is used to produce a route map, and even more to publish at a large scale. By default, the Java VM heap memory limit is set to a sensible default appropriate for publishing an average sized TransXChange timetable document. However, for large TransXChange documents you may need to increase the memory allocation. If you have additional memory available increasing the heap size can also improve performance. You can increase the available memory simply by editing the appropriate setting in the *publish.bat* file (for the command line version), or the *TransXChangePublisher.l4j.ini* file (for the GUI version). These files can be found in the base directory where you unpacked the publisher distribution.

In either file you need to change the setting that begins `-Xmx`. using 'k' (KB), 'm' (MB) or 'g' (GB) as a suffix to indicate the units. For example, to change the heap from 512MB to 1024MB, edit the relevant line `-Xmx512m` to change it to be `-Xmx1024m`. You must exit and restart the publisher for the change to come into effect. If you try to increase the memory beyond what is available on your machine you will get an error message when you try to restart the publisher.

If you get an "out of memory" error at startup you should reduce the memory size.

What do I do if I get an out of stack memory error (e.g. "Error occurred in RequiredModelMBean while trying to invoke operation publish" - more information may be found in the application log.)?

This error can be caused by a configuration limit on Java VM **stack** memory when publishing documents with large numbers of particulars - for example lots of working days. A Java VM can be configured to run in a certain amount of stack memory. By default the Java VM stack memory limit is set to a sensible default appropriate for most timetables. However, for large TransXChange documents you may need to increase this allocation. You can do this simply by editing the setting in the *publish.bat* file (for the command line version), or the *TransXChangePublisher.l4j.ini* file (for the GUI version). These files can be found in the config directory where you unpacked the publisher distribution.

In both files you need to add or change the setting that begins `-Xss`. For example, to change the stack from 256k to 3072k, edit the relevant file and change `-Xss256k` to `-Xss3072k`.

If there is no explicit setting add `-Xss3072` just before the `-Xmx1024m` (or other `-Xmx` value). The file should look like this when done:

```

# Launch4j runtime config.
# Launch4j runtime config.
# Add any JVM arguments to this file.
# Restrict network connections - useful for debugging catalog
resolution issues.
#-
Djava.security.manager=com.kizoom.transxchange.parser.RestrictedNetwork
AccessSecurityManager
-Dcom.kizoom.transxchange.publisher.config.location=config
-
Dcom.kizoom.transxchange.publisher.timetableMatrix.maxTimeColumnsPerPag
e=14
-
Dcom.kizoom.transxchange.publisher.timetableMatrix.maxStopWidthPoints=2
00.0
-Dcom.kizoom.util.HttpUtil.MaximumConnectionsPerHost=500
# Default Java Stack Max Memory per thread -Xss3072k
-Xss3072k
# Java Heap Initial memory pool: -Xms256m
-Xms256m
# Java Heap Maximum Memory. -Xmx1024m
-Xmx1024m
# Debug options
-Xdebug -Xnoagent -
Xrunjdpw:transport=dt_socket,address=8000,server=y,suspend=n

```

Can I limit the number of threads the publisher uses for http requests?

Yes. To speed up publishing of maps, the publisher will attempt to fetch many map tiles in parallel from the map service. You may limit the number of requests made at a time using the `webservice.maxpreloadthreads` value in the `bing.properties` file. The publisher is shipped with this value set to a sensible default appropriate for an average machine.

```

webservice.url=http://dev.virtualearth.net/REST/V1/Imagery/Metadata/Road/
webservice.retries=5
# timeout increased from 5 to 10
webservice.timeout.seconds=10
webservice.images.retries=5
webservice.images.timeout.seconds=10
# maxpreloadthreads reduced from 100 to 20
webservice.maxpreloadthreads=10

```

Can I control the column sizes in the matrix timetables produced by the TransXChange Publisher?

Yes. The publisher has sensible defaults which are appropriate for most timetables. However, for timetables that have very long stop names, it may be desirable to override the settings which control column sizes. The settings are in `publish.bat` (for the command line version), or `TransXChangePublisher.l4j.ini` (for the GUI version) in the base directory where you unpacked the publisher distribution.

To control the maximum number of time columns that appear on each page, edit the setting

```
com.kizoom.transxchange.publisher.timetableMatrix.maxTimeColumnsPerPage
```

For instance, to change it to be 10, the following should appear in *publish.bat* and/or *TransXChangePublisher.l4j.ini*:

-

```
Dcom.kizoom.transxchange.publisher.timetableMatrix.maxTimeColumnsPerPage=10
```

To control the maximum width of the stop name column, edit the setting

```
com.kizoom.transxchange.publisher.timetableMatrix.maxStopWidthPoints. For instance, to change it to be 150 points, the following should appear in publish.bat and/or TransXChangePublisher.l4j.ini:
```

-

```
Dcom.kizoom.transxchange.publisher.timetableMatrix.maxStopWidthPoints=150.0
```

Can I control the order in which stops appear as rows in the matrix timetables produced by the TransXChange Publisher?

Yes. By default the stops will be listed in the order in which they appear in the journey pattern. Where there are route variants represented by different alternative route sections, the stops will be further grouped within each section.

You can override the default order by specifying a **sequenceNumber** attribute on the stops of the journey pattern, using the *JourneyPatternTimingLink/From* and *JourneyPatternTimingLink/To StopUsage* elements. If any stops of a journey pattern are numbered, *all* the stops in the journey pattern should be numbered uniquely and monotonically, otherwise unpredictable results may occur.

What coordinate reference system does the TransXChange Publisher use?

For stop point and track point coordinates, a TransXChange document may contain geospatial references in OS Grid Eastings and Northings, WGS84 latitude and longitude, or both. In Eire Irish Transverse Mercator (ITM) may be used (+TXC +2.5) When plotting route tracks on maps the Publisher chooses coordinates as follows:

1. If OS Grid Easting and Northing coordinates are available for a point, it uses them directly
2. If only WGS84 coordinates are available for a point it converts them to OS Grid using a standard transform.

For the positions of Stop Points on the Route Map, the Publisher normally fetches the stop coordinates from the NaPTAN database which holds them in OS Grid Eastings and Northings.

Can I publish Flexible Services?

The TransXChange publisher currently only provides limited support for flexible services

- Only the basic service details and stops are shown in the Particulars
- Flexible route specific details such as timebands not published.
- Timetable matrix and route track are not supported

To Publish a Flexible route you should use the following options

- **Particulars:** Either *Full* or *None*
- **Timetable:** *None*
- **Diagnostic:** Either *Full* or *None*
- **Route Track Map:** or *None*

How do I tell which version of the Publisher was used to produce a pdf?

The version of the publisher used to produce a document is printed at the end of the matrix section of document

Inbound, Monday to Friday

	L1		L1	L1
Egham, Golden Lion	07:30	Frequent service at least every 10 mins until	19:30	20:00
Barford, Red Lion	07:40		19:40	20:10
Robridge, Plough, o/s	07:50		19:50	20:20
Suborn, Garden Village Shops, o/s	08:10		20:10	20:40
Suborn, Suborn Bus Station	08:30		20:30	21:00

Created by TransXChange Publisher 2.1_9 on Tue Mar 04 16:56:17 GMT 2008 from source document linear.xml using schema version 2.1.

Why when I start the publisher do I sometimes get a "An error occurred while starting the application"?

This error can arise in different circumstances:

- If you start the publisher by clicking on the desktop icon, and then, before the publisher has finished initialisation, click again, this error can appear. Because only a single instance of the desktop publisher is allowed at a time, the second attempt will result in an error.
- If the prerequisite J2RE components are not present.
- If you attempt to invoke the publisher indirectly using a mechanism (for example a shortcut link) that does not set required environmental variables such as the path correctly.

What are the known issues with the TransXChange Publisher?

Issues can be categorised into three groups.

1. Features that **cannot yet be supported** because the *TransXChange* schema does not contain the necessary information elements. There is a consultation process for enhancing the *TransXChange* schema, and also suggesting any necessary concomitant support in the publisher.
2. Features that are possible using the current schema, but are **outside** of the *TransXChange* Publishers' current **scope**. (For example, the Publisher is intended to support the ESBR registration process and does not include operational data). There is a consultation process for making suggestions to add new features. Please contact us if you have suggestions for adding elements.
3. **Known issues** in specific versions of the publisher
 - See the release notes for each version of the publisher on the [publisher download](#) page

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Training materials introduction

What to do?

Before seeing the detailed training resources you will need to read the Toolkit Guide which gives an overview of the training and advice on how to use the resources.

You should also review the Resource Matrix. This .xls document lists all of the resources that are available and recommends which resources are targeted at which type of user. You will note that there are some documents which appear to be common between categories of user, but which differ in their content dependent on the level of detail/understanding that is required of that category of user.

A description of the Training Resources

There are links from these documents into the Resources themselves. In these you will find a series of sub-folders containing the various resources available for use either in training courses or for self-training:-

- **User Needs Analysis** For use by those running a course to determine the level of knowledge amongst attendees and then the most appropriate material to use. Although the Resource Matrix suggests the material that is most relevant to each type of user, individual needs may vary, so this analysis will help trainers to scope out what they should use in their courses
- **Courses** These resources provide an overview of the course structure recommended for the different types of user (Manager, Practitioner (EBSR Introduction), Advanced user and Technical user)
- **Resources** this sub-folder contains the detailed material that is being made available for users. It is split into three sections:-
 - **Guides** These include various documents that provide an overview of EBSR & TXC. Some of them are the detailed documentation for various elements of EBSR & TXC, but they have been pulled together into one single place for those who need to use them
 - **Help Sheets** provide straightforward advice about some of the concepts that underpin EBSR & TXC including NaPTAN, the TXC Publisher, what needs to happen when making the transition to EBSR etc.
 - **Presentations** A series of PowerPoint presentations on the main concepts of EBSR, TXC, the Publisher etc., for trainers to use when running training sessions
 - **Evaluation** contains a self-completion questionnaire to obtain feedback from attendees following a training course. This will be helpful to trainers, but any significant comments should also be reported back to TD for their consideration. Please use the link provided below in the next section to feedback comments to Transport Direct.

Before downloading EBSR Training Material

Before downloading any resources, please ensure you have reviewed the Toolkit Guide and the Resource Matrix.

Downloadable EBSR Training Material

User Needs Analysis

For use by those running a course to determine the level of knowledge amongst attendees and then the most appropriate material to use. Although the Resource Matrix suggests the material that is most relevant to each type of user, individual needs may vary, so this analysis will help trainers to scope out what they should use in their courses. [Download the EBSR Training Needs Assessment Form .pdf](#)

EBSR Training Courses

These resources provide an overview of the course structure recommended for the different types of user: Practitioner (EBSR Introduction), Manager, Advanced user, and Technical user).

Description	Downloadable .pdf files	Downloadable .zip files
Introduction to EBSR	Introduction to EBSR v1.0 .pdf	Introduction Package .zip
EBSR for Managers	EBSR for Managers v1.0 .pdf	Managers Package .zip
EBSR for Advanced users	EBSR for Advanced Users v1.0 .pdf	Advanced Users Package .zip
EBSR for Technical users	EBSR for Technical Users .pdf	Technical Users Package .zip

EBSR Training Resources	
Description	Downloadable files
<p>Help sheets</p> <p>Help Sheets provide straightforward advice about some of the concepts that underpin EBSR & TXC including NaPTAN, the TXC Publisher, what needs to happen when making the transition to EBSR, etc.</p>	<ul style="list-style-type: none"> • Managing the Transition to EDT .pdf • Introduction to XML & TXC .pdf • Getting Started with TXC Publisher .pdf • Setting up the TXC Publisher v2 .pdf • Simple TXC Publisher Issues .doc • Getting NaPTAN Right .pdf • EBSR and Stop Naming .pdf • Stop Status in NaPTAN .doc • NaPTAN Viewing Tools .doc

	<ul style="list-style-type: none"> • Pending NaPTANs .pdf • EBSR and Archiving NaPTANs .pdf • EBSR Web Resources .pdf • Acting as a EBSR Agent .pdf
<p>Guides</p> <p>These include various documents that provide an overview of EBSR & TXC. Some of them are the detailed documentation for various elements of EBSR & TXC, but they have been pulled together into one single place for those who need to use them.</p>	<ul style="list-style-type: none"> • EBSR Brochure, v1.0 .pdf • Overview of the TXC Stops & Localities Model, June 2009 .pdf • EBSR Operator advice note, v2.8 .pdf • Local Authority EBSR Guide, v1.0 .pdf • ITO Guidance Notes .pdf • Functions of the new NaPTAN Viewer, v1.1, November 2009 .pdf • Guidance Notes for new NaPTAN Viewer, September 2004 .pdf • TransXChange Schema Guide, 2.1, v4.44 .pdf • TXC Schema, 2.1 .zip (Contains the technical descriptions of the TXC Schema - recommended for Technical Users only) • Advanced TXC Publisher Guide, v1.0 .pdf • User Guide to Archiving NaPTAN Stops, v1.0 .pdf
<p>Presentations</p> <p>A series of PowerPoint presentations on the main concepts of EBSR, TXC, the Publisher etc., for trainers to use when running training sessions.</p>	<ul style="list-style-type: none"> • Introduction to EBSR & EDT, v1.0 .ppt • Introduction to TransXChange, 1.0 .ppt • Introduction to the TransXChange Schema, v1.0 .ppt • A Short Tour of the TransXChange Schema, v1.0 .ppt • Overview of the TransXChange Model, v1.0 .ppt • Managing the Transition to EBSR, v1.0 .ppt • Advanced NaPTAN Issues, v1.0 .ppt • Introduction to TXC Publisher, v1.0 .ppt • Advanced Publisher Options .ppt

Evaluate the Training

Evaluation contains a self-completion questionnaire to obtain feedback from attendees following a training course. This will be helpful to trainers, but any significant comments should also be reported back to TD for their consideration. Please use the email link

provided below to feedback comments to Transport Direct. [Download the EBSR Training Event Evaluation Form, v1.0 .pdf](#)

Feedback, comments & queries

If you wish to make any comments or ask a question on the EBSR Training Material, [please email us](#).

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Other Tools & Studies

NeTEx

[NeTEx \(NETwork EXchange\)](#) is a [CEN](#) project to develop a standard Transmodel based XML format for exchanging PT data.

NeTEx provides a more general model for describing timetables and other aspects of passenger information.

See www.netex.org.uk

FareXChange

The 2006 FareXChange study looked at requirements for supporting the exchange of UK fares. See [here](#) for its report.

General Transit & TransXChange

[General Transit Feed Specification](#) is a format devised by Google used to input data to the [Google Transit](#) engines for simple journey planning.

An open source project, the [General transit data feed](#), aims to provide converters from popular timetable data formats.

These include converters from TransXChange 2.1

Comparison of GTFS & TransXChange/Transmodel

[General Transit Feed Specification](#) (GTFS) is a proprietary format for exchanging basic timetable data using a comma separated variable (csv) format encoding. A timetable is broken down into a series of flat files.

GTFS uses a representation of a timetable as a set of cvs files. GTFS has a simple implicit model of a timetable that lacks some of the distinctions and additional intermediate abstractions that have been found to be valuable in creating reusable models

and datasets in for a wide variety of PT applications in Europe and have led to the development of [TransModel](#).

However the underlying GTFS concepts can be mapped to a subset of the Transmodel based PT model used in TransXChange, as discussed in these short review papers, which states the equivalences (and some of the limitations) of the current GTFS format.

It is then straightforward to extract data from a TXC document into GTFS format.

- [2008/12 TransmodelForGoogle-09.pdf](#)
- [2007/09 GoogleTransitReview-04.zip](#)

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