



One Touch Switch Matching

A best practice guide

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1 Introduction

This document is one of a series of best practice guides related to One Touch Switching. This document focuses on the matching stage of the One Touch Switch process. The lead author was a member of the original design drafting group (OTS-DDG), and the content has been reviewed by the Industry Process Group which is co-chaired by TOTSCo and OTA2.

The intended audience of this document is personnel responsible for the technical implementation of One Touch Switching in retail communications providers and MAPs, including business analysts, solution architects, and implementation and testing teams.

It is assumed that readers are familiar with both the OTS Industry Process and the OTS Message Specification which can be found at <https://totsco.org.uk/process-technical-documents/>. If you are not familiar with the content of those documents, you are strongly encouraged to download and read them before reading this document.

It is also recommended that the reader download the latest version of the OTS Response Codes and OTS Request and Response Scenarios, both available from the link above – you may find these useful to refer to as you read this document.

1.1 Change log

Version Date Changed by	Reason for change
V0.1 First draft 26/07/2023 Niall Gillespie	First draft for discussion and review by the OTS Industry Process Group.
V0.2 draft 06/08/2023 Niall Gillespie	Update following working sessions of the OTS Industry Process Group, and reviews by Group members.
V0.3 draft 06/09/2023 Niall Gillespie	Further update following working sessions of the OTS Industry Process Group, and reviews by Group members.

1.2 Contributing authors

Author	Organisation
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1.3 Abbreviations and definitions

Abbreviation / term	Meaning / definition
TOTSCo	The One Touch Switching Company www.totsco.org.uk
TOTSCo Hub	This is the formal name used by TOTSCo to refer to the hub which will provide services to CPs in support of OTS and GPLB processes, and possibly for other industry processes in the future. TOTSCo have chosen Tech Mahindra to implement and operate the TOTSCo Hub.
CP	Communications provider This is a term defined by Ofcom in their General Conditions of Entitlement as a “means a person who provides an Electronic Communications Network or an Electronic Communications Service”.

Abbreviation / term	Meaning / definition
RCP	Retail CP. This term was first defined in the OTS Industry Process (and re-used in the GPLB documentation) to define those CPs who provide services at the retail level to end-users, both consumer and business.
MAP	Managed Access Provider This is the term used by TOTSCo to refer to providers of “Managed Access Solutions” for RCPs who do not wish to interact directly with the TOTSCo Hub, and who wish instead to use the services of a TPI to interact with the Hub.
TPI	Third party integrator This is a commonly used term within the UK telecoms industry to refer to parties who provide integrations services to CPs, but are not themselves CPs.
OTA2	The Office of Telecommunications Adjudicator. The OTA2 was established as a follow-on to the original OTA Scheme, and is independent of Ofcom and of industry.
Openreach gold, silver and bronze addresses	Gold, silver and bronze are address qualifiers (or classifications) used by Openreach: <ul style="list-style-type: none"> • A gold address is one where Openreach understand the network topography (e.g. closest copper distribution point, or fibre equivalent), and are aware of any existing working or stopped copper or fibre services. Most gold addresses are linked to a quality address source, but not all. • A silver address is originated from a quality address source, but is not mapped to the network topology. • A bronze address is one created by an Openreach CP (using the “add address” dialogue service, but Openreach did not find any matching gold or silver address, so instead create a temporary bronze address key for use with a subsequent order). When a CP places an order using a silver or bronze address, Openreach will conduct survey and planning activities. If the order completes, a gold address will be created (e.g. to support a future transfer) – the address elements of the gold address may be the same as the bronze address, or may have corrections based on automation or manual update.
BLPU LPI DPA UPRN	See §3.3 for an explanation of these address related terms and abbreviations.

2 Reminder of the steps for a switch under the OTS process

The OTS Industry Process defines three steps for switching:

1. Matching, including dispatch of implications of switching by the LRCP.
2. Switch order initiation, using an SOR (switch order reference) returned from an earlier match.
3. Switch trigger, sent by the GRCP when they are ready for the LRCP to cease existing services.

Additionally, a switch order may be updated (to change the proposed migration date) or cancelled.

The most complex stage (from an OTS perspective) is matching. The information in a match request includes:

- RCPID of the losing retail CP – mandatory for the TOTSCo Hub to route the match request to the relevant RCP (or a MAP operating on their behalf).
- Customer surname – mandatory to send, though can be ignored by the LRCP in some circumstances.
- Service address as held by the LRCP – the subject of major sections of this guide.
- Services to be switched – mandatory. The possible services are IAS (internet access service, aka broadband) and NBICS (number based interpersonal communications service, aka voice)¹.
- Service identifier – optional. For NBICS, the service id is the telephone number, which is mandatory if the customer wishes to retain their number (by porting or any other form of number retention). For IAS, the service id might be a subscription id where this is visible to a customer, e.g. on their bill.
- Note the addition in August 2023 of the ability to provide an NBICS service identifier only for the purposes of achieving a successful match, but requesting the LRCP to retain the NBICS service if possible (action = “identify”).

¹ Ofcom’s term NBICS includes all forms of voice service which have a number, including fixed, mobile and services such as WhatsApp. Ofcom’s General Conditions limit the OTS rule to fixed IAS and NBICS only (mobile voice is covered by the Auto Switch (PAC and STAC) process). Effectively this means voice services with numbers starting 01 and 02 which are primarily marketed as fixed services (the ability to access a VoIP service with an 01 or 02 number via an app on a mobile device does not remove it from OTS).

3 Background on Addresses in the UK

The largest section of this document covers how address matching is recommended to work as part of the matching stage of OTS, with impacts on RCPs as both gaining and losing provider. However many people are not familiar with the detail of addresses in the UK, so this section provides background for all readers.

Please note that some of this background is a heavy read. The author has attempted to distil some complex information into a few sub-sections that call out the important information in relation to matching of addresses for the purposed of OTS.

3.1 Royal Mail and postal addresses

The introduction to Royal Mail's Postcode Address File (PAF®) Code of Practice² includes:

"Every house and business in the UK falling under Royal Mail's Universal Service Obligation has been given a postal address by Royal Mail. Its use enables Royal Mail to deliver items quickly and accurately. The postal address is a sorting and routing instruction to Royal Mail's staff and not always a geographically accurate description of where a property is located. As mail is circulated via Post towns it may, for example, include the name of that town which could be several miles away, as that is where your mail is processed."

The Royal Mail Programmers' Guide³ is the technical guide to Royal Mail's raw data products based on PAF. It is a highly recommended read for anyone who is new to the detail of UK addresses.

However, there are a number of concepts in it which are somewhat out-of-date and/or are not applied within some commercial address management products. The notable ones are:

- The split of thoroughfare into name and description – this was an extreme normalisation of the data (from the days when "every byte costs a million pounds" and data was shared on magnetic tapes which had limited capacity). Modern products with XML or JSON based APIs usually have name and description together.
- The restriction that building numbers are purely numeric, so example such as "110-114" and "1A" must be held as building name. Some commercial products permit these examples as building numbers.⁴ Others, such as the Ordnance Survey APIs, maintain this restriction.

The Programmer's Guide remains a useful introduction with the above caveats.

Best practice

Familiarise yourself with the Royal Mail Programmers' Guide, especially if you are new to the detail of UK postal addresses. Note that it documents how an address should be laid out on an envelope – the "addressLines", "postTown" and "postCode" elements of an OTS match request are based on this Royal Mail guidance.

One point of note in relation to OTS matching is the Royal Mail mandate to include the post town in a postal address, which means that the name of many small towns is relegated to the locality field. This also explains the prevalence of the term "post town" in many APIs that transport an address (including the OTS Message Specification).

3.2 Local authorities, Geoplace and Ordnance Survey

The foreword to the Geoplace Data Entry Conventions and Best Practice for Addresses (DEC-Addresses)⁵ reads:

"GeoPlace® LLP is a public sector limited liability partnership between the Local Government Association and Ordnance Survey and is responsible for compiling and maintaining GeoHub as the unification of all the core address and streets datasets GeoPlace maintain. GeoHub is a system that provides a single source for all addressing and street data requirements. GeoPlace's role is to work with local authorities and other organisations to create and maintain GeoHub and the National Street Gazetteer (NSG for England and Wales), providing

² Royal Mail, May 2010. [Postcode Address File \(PAF®\) Code of Practice](#)

³ [Royal Mail Programmers' Guide](#)

⁴ For example, Openreach's address matching dialogue service returns building numbers which contain letters and hyphens.

⁵ GeoPlace. GeoPlace Data Entry Conventions and Best Practice for Addresses (downloadable from [Data creation manuals | GeoPlace LLP](#))

definitive sources of publicly-owned spatial address and street data. Ordnance Survey markets a range of address and street products delivered from GeoHub.”

DEC-Addresses is a heavy read unless you have some familiarity with address management in the UK. A few points of interest that the author learnt from this document and GeoPlaces’s website include:

- Every local authority has a Street Naming and Numbering Officer (SSN), who is responsible for the naming and numbering of new and existing streets and properties within their area.
- In England and Wales: county councils are responsible for updates on street (i.e. street naming); district councils are responsible for address updates (i.e. numbering); and unitary authorities⁶ cover both.
- Unfortunately, the GeoPlace website and DEC-Addresses are focussed on England and Wales, and make little mention of Scotland or Northern Ireland. The lead author of this guide engaged directly with GeoPlace during the development of the OTS Industry Process in early 2022 – the GeoPlace representatives confirmed that their datasets include data from relevant bodies in Scotland and Northern Ireland.

In summary:

- Local authorities control street naming and numbering, and feed data to GeoPlace. Each local authority is assigned a range of UPRNs by GeoPlace, to allocate within their own area.
- GeoPlace collate the data from all local authorities into various datasets, including input from Ordnance Survey and Royal Mail.
- Ordnance Survey market these datasets under their AddressBase brand:
 - AddressBase Premium covers England, Wales and Scotland.
 - AddressBase Islands covers Isle of Man, Channel Islands and Northern Ireland – the latter is important in the context of OTS.
- There are many commercial solutions available which are based on AddressBase data.

3.3 Key terms and abbreviations

The following terms and abbreviations are used by GeoPlace, Ordnance Survey and others, and may be useful to recognise and understand:

Basic Land and Property Unit (BLPU)

DEC-Addresses defines:

“A BLPU is defined in BS 7666-2:2006 as a real world Object which is an ‘area of land, property or structure of fixed location having uniform occupation, ownership or function’. The BLPU is the core element of the data and is the Object to which Records are linked via reference to the Unique Property Reference Number (UPRN). In essence a BLPU associates a real world Object on the ground to a UPRN.”

The concept of a BLPU covers commercial premises, land, military sites, property shells⁷ and street records, but most importantly for OTS it includes residential dwellings where customers could have fixed IAS and NBICS which they wish to switch under the OTS process.

Openreach’s address matching dialogue service returns a site classification (e.g. RD04 “Terraced”, or RD06 “Self Contained Flat (Includes Maisonette / Apartment)”). Appendix C of DEC-Addresses document these as BLPU Classifications.

Land and Property Identifier (LPI)

DEC-Addresses defines:

“An LPI is a Record containing structured data that identifies a BLPU with a simple identifier or description. The richness of the data structure provides a way of describing a BLPU by more than one LPI.”

⁶ Authorities with London Borough, Metropolitan, Unitary or Welsh Unitary status.

⁷ In a residential context, a typical property shell is a block of flats or apartments. Each flat has its own UPRN, with a parent UPRN for the property shell.

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Note that the LPI record is similar to the postal address, but with a couple of notable differences:

- LPI does not use post town and instead contains a geographic town name.
- LPI includes an “administrative area” (i.e. the local authority / council).
- LPI sometimes includes an “area name” (e.g. a townland in NI).

Unique Property Reference Number (UPRN)

Each BLPU has a UPRN.

DEC-Address includes:

“Each SNN Authority is assigned a range of UPRNs by GeoPlace. A UPRN is a persistent unique integer value that must be taken in sequence from the SNN Authority number range. A UPRN must not be reused.”

Delivery Point Addresses (DPA)

Ordnance Survey have the following definition of DPA:

“Delivery Point Addresses (DPA) are addresses sourced from Royal Mail data and consist of addresses to which post can be delivered. As such, all residential properties and most commercial properties are included in this dataset.”⁸

3.4 Addresses in Northern Ireland

At the time of writing (August 2023), Ordnance Survey’s [Overview \(os.uk\)](#) for their OS Places API includes the statement:

“OS Places contains addresses located within Northern Ireland; however they have a few unique characteristics due to not being derived from Address Base Premium. Addresses within Northern Ireland will not have a UPRN or status, and coordinates will be ‘0.0’ due to falling outside of the British National Grid.”

The lead author of this guide lives and works in Belfast, and has tested many NI addresses, which all return UPRN, status and coordinates. So the above statement appears to be out-of-date (it may precede the introduction of AddressBase Islands, which includes addresses in NI).

However, it should be noted that [Address finder & UPRN lookup online - FindMyAddress](#) does **not** include NI addresses, nor do a number of other free online address lookup tools.

Best Practice

If you offer services in Northern Ireland (or expect to in the future), ensure that any source of address data you consider **does** include NI addresses, as OTS applies to NI.

3.5 Structure of a UK postal address

The structure of a UK postal address consists of the following elements (as defined by Royal Mail in their [Programmers’ Guide](#)³):

Element	Comments
Sub building name	E.g. ‘Flat 1’, ‘Apartment 1’ Also known as “sub premises”.
Building name	E.g. ‘Rose Cottage’, ‘Mandela House’ Also known as “premises”.
Building number	E.g. ‘1’, ‘123’ Also known as “street number” or “thoroughfare number”. Note that the PAF specification defines that buildings such ‘1A’ and ‘101-102’ must be held as building name. ⁴

⁸ Ordnance Survey. [DPA Output](#)
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Element	Comments
Dependent thoroughfare	Only required where the thoroughfare name is not unique within the locality information.
Thoroughfare	Aka street name
Double dependent locality	
Dependent locality	The name of a small town which is not a post town will appear here. Also known as simply "locality".
Post town	Mandatory – Royal Mail defines which towns are considered to be post towns. ⁹
Postcode	Mandatory

Note that county is intentionally omitted from the above list, as it is not required as part of a correct postal address (Royal Mail removed it from PAF in December 2000).¹⁰ The OTS Message Specification does not include any element for country, which must not be included in match requests.

PO Box, organisation name and department name are also omitted, as they are not relevant to residential addresses where OTS applies.

See also [DPA Output \(os.uk\)](https://os.uk) for Ordnance Survey's definition of the output from their DPA dataset.

3.6 Structure of an LPI record

Ordnance Survey has documented the output from their LPI dataset at [LPI Output \(os.uk\)](https://os.uk). The elements making up an address and of relevance to OTS are:

Element	Comments
UPRN	Unique property reference number
SAO start number	The concepts of primary and secondary addressable objects (PAO and SAO) are similar to Royal Mail's definition of building and sub building, e.g. an SAO can only be present if a PAO is present.
SAO start suffix	
SAO end number	
SAO end suffix	
SAO text	
PAO start number	Start number and end number are used when there is a range (e.g. '1-3'), and suffix when the numbers is followed by a letter (e.g. '1A').
PAO start suffix	
PAO end number	
PAO end suffix	
PAO text	A sub-building such as "Flat C" would be held as SAO text, and a house or building name as PAO text.
Street description	Name of the street
Locality name	An area within a town – optional
Town name	The geographic town name (which may differ from Royal Mail's post town)
Postcode locator	Postcode

Some LPI records include an area name (e.g. townland for NI addresses). This element is omitted from the above list, and should not be included in an OTS match request.

⁹ Royal Mail Programmers' Guide³ documents that there are 1661 post towns.

¹⁰ The Royal Mail Programmers' Guide documents that the former postal country was removed from PAF raw data products in December 2000 (page 18). It also documents three county types: Former Postal, Traditional and Administrative (page 70) – the different types of county are the main reason why it is no longer required in a correct postal address.

3.7 “address” element in OTS match request

The Royal Mail Programmers’ Guide³ defines how the above elements of an address should appear on an envelope. The “address” JSON element defined in the OTS Message Specification includes a set of address lines, post town and post code. The address lines should be formatted as per the guidance in the Programmer’s Guide for layout of an address on an envelope – in summary, starting from a DPA address:

- Sub-building, if present, should appear as the first address line.
- If the building name starts with a number (e.g. ‘1-3’ or ‘1A’), it should be treated as for building number below.
 - Else the building name, if present, should appear as the next address line.
- Building number, if present (or building name if it starts with a number) should appear as the first element of the next address line, separated by a single space from either:
 - Dependent thoroughfare, if present. The thoroughfare would then be the next address line.
 - Else, thoroughfare.
- Double dependent locality, if present, should appear as the next address line.
- Locality, if present, should appear as the next address line.
- Post town should appear as the postTown element (and not as an address line).
- Postcode should appear as the postCode element (and not as an address line).

If starting from an LPI record:

- SAO elements, if any are present, should appear as the first address line.
 - Start number should be concatenated with start suffix, and same for end number and end suffix.
 - End number, if present, should be separated from the start elements by a single hyphen with no spaces.
 - Alternatively there may be only SAO text.
- PAO text, if present, should appear as the next address line.
 - Street description should then appear as the next address line.
- PAO start and end numbers and suffixes, if present, should be concatenated as for SAO, and should appear as the first element of the next address line, separated by a single space from street description.
- Locality, if present, should appear as the next address line.
- Town name should appear as the postTown element (and not as an address line)
- Postcode locator should appear as the postCode element (and not as an address line).

Note that the use of “postTown” as a JSON element is an outworking of the prevalence of the Royal Mail influence on addressing standards in the UK. Openreach have announced that they moving to LPI format addresses, and will return the LPI geographic town name in their existing “post town” field of their address matching dialogue service.

Best practice

GRCPs may populate the postTown in a match request with either the post town from a DPA address or the geographic town name from an LPI address.

LRCPs must implement matching that support either post town or geographic town name. If you follow the recommended methodology documented in §8 below, you will be compliant with this best practice.

3.8 Common reasons why an LRCP may have a poor service address

This section collates several reasons volunteered by representatives of various RCPs as to why they have a certain service address recorded for existing fixed broadband and voice services.

3.8.1 Address with plot number

In the past, it was common for Openreach to build “gold addresses”¹¹ using plot numbers of a new development of houses. The only practical way to order service for the first occupant was to use the plot number (some customer would helpfully know their plot number).

In some cases the thoroughfare would be the correct (long-term) name; in others of the form “Development by <XYX builders> off <main road>”. In some cases, the eventual building number would match the plot number, but sometimes not (and it can vary within a single housing development).

In most cases, the “new sites” team within Openreach would eventually update the gold addresses to have the correct building numbers and throughfare, but there are examples of developments from 20 years ago which still have some addresses with plot numbers. However, Openreach have never had a quality feed of such address updates for their CPs to consume, so an RCP may continue to record the service address with plot number.

3.8.2 Wrong postcode

Consider a large house which has a building number on a main road, and a postcode that corresponds to a property on that road. A developer buys the land, demolishes the large house, and begins a new development of multiple houses or apartments.

Typically Royal Mail will assign a new postcode to the development, and typically the new postcode will be in the same postcode sector¹² – i.e. only the last two letters (postcode unit) will differ. But in the past, Royal Mail took some time to allocate the new postcode.

The initial gold addresses created by Openreach would sometimes use the postcode of the former large house (perhaps in addition to using plot numbers). Services installed in the early stages of the overall development, e.g. show house¹³, lift lines¹⁴, are more likely to be impacted.

3.8.3 Changes triggered by creation of GeoPlace and related agreements and processes

DEC-Addresses documents that LPI records and UPRNs should be created either when planning approval is granted or construction starts (i.e. long before the first occupant moves in). The author’s empirical experience is that the incidence of plot numbers and incorrect postcodes have both reduced, at least in Openreach data.

3.8.4 Reluctance of RCPs to “muck about” with service addresses

Some RCPs support billing and contact addresses in their CRM systems which can differ from the service address. The intended usage would be for scenarios such as a holiday home where the customer wants their bills sent to their main home, or where the billing address is an accountant.

Operations teams may find it easier to update billing and contact address when requested by a customer, and the service address may remain with an historic plot number or postcode. The customer may only have visibility of their

¹¹ An address qualifier of gold is returned by Openreach when the address is linked to the network topology, e.g. is the property served by copper or full-fibre or both; are there any existing copper lines or fibre ONTs, whether previously used (working or stopped service) or pre-provisioned for a new build property.

¹² See Royal Mail Programmers’ Guide³ for definitions of postcode area, district, sector and unit.

¹³ Before mobile became so common, a show house would often have a landline service for use by the employees showing the house. These days it might have a broadband service, to support the employees, or to demonstrate the speed of full-fibre to prospective purchasers. In an ideal world, the “new sites” teams would correct the postcodes, but this has not always happened, and current occupants of a former show house may still have an incorrect postcode.

¹⁴ Safety rules require that a lift has an emergency phone from when it is installed, even when the only users are the builders. So lift lines are often installed long before any residential occupants move in.

billing / contact address, and may have no knowledge that the service address held by the LRCP uses historic information.

3.8.5 RCP's CRM system does not have a strong address structure

Whilst many CRM systems support address elements with close match to either DPA or LPI format, some CRM systems only support a much simpler address structure, e.g. house, street, town and postcode. There may be multiple conventions about how elements such as sub-building and building name are stored in a simple address structure, including some variance due to manual input.

3.8.6 Changes to postcodes and addresses by Royal Mail

Royal Mail may sometimes make changes to existing postcodes, either for their own operational reasons, or in conjunction with the local authority.

One example of the latter quoted in Appendix 3 of the OTS Industry Process: "the Fermanagh Rural Addressing Project was launched in 2013 to officially name and number over fifteen thousand rural properties and fifteen thousand urban properties within the district."¹⁵ ¹⁶ Prior to 2013, some properties had no official postcode, and suppliers like Openreach were forced to make a best guess based on known (and guessed) postcode boundaries. Some of these postcodes persist in both Openreach data and the CRM systems of Openreach CPs.

3.8.7 Services ordered using an Openreach bronze address

Openreach support provision orders using a bronze address – this is used when a customer requires service at a location that is not found via the address matching dialogue service. Such orders typically have a longer lead time to allow time for survey activities. The quality of the address depends on the skill of the user, including entry by the customer in a self-service (digital) channel.

Openreach will feed back their version of the address where service was provided (in their order completion message), which they will generally attempt to make a quality address. However the RCP may not update their CRM records with this Openreach address (see also §3.8.4 above).

3.8.8 Mergers and acquisitions

The UK telecoms industry has a history of mergers and acquisitions, and this is likely to continue.

Current RCPs may have inherited multiple CRM systems; even where they have migrated customers to a strategic CRM system, the quality of the inherited address data may vary.

3.8.9 BB added on top of existing WLR, or BB added for an existing TV/utility customer

ADSL/VDSL forms of broadband may have been ordered using the directory number of the underlying PSTN service, and the service address captured by the broadband provide may not match the service address of the PSTN provider (e.g. Openreach).

In other case, the broadband provider may have had a pre-existing relationship with the customer, perhaps for a TV service or another utility service, with an existing service address that they may have then associated when they added broadband for the customer.

3.8.10 Transfers using service identifier

Transfers in the Openreach network use the service identifier of the line (e.g. ALID) as the primary identifier of the asset to be transferred. Typically the process starts with matching an Openreach address, retrieving the list of line(s) at that location, and then picking which line to transfer. But the service address held by the gaining provider may not match the service address held by Openreach.

¹⁵ [What's my address – Fermanagh & Omagh District Council \(fermanaghomagh.com\)](#)

¹⁶ [New Fermanagh address system ready to roll | Impartial Reporter](#)

3.8.11 Trials

Many RCPs run trials using friendly customers (including employees). The service addresses for trial services may use made-up data, e.g. main elements of the address represent a real address, but the sub-building information indicates a trial service.

Openreach operate a “customer verification facility” (CVF) environment in Swansea telephone exchange for use by their CP customers. The Swansea CVF uses a large number of postcodes, many of which are not real postcodes recognised by Royal Mail.

3.9 Address Examples

The most useful examples of addresses are real addresses. Technical representatives of RCPs can look to see how they store these addresses in their CRM systems or other data stores, and we can quote how Ordnance Survey expose these addresses on their APIs.

However, there are concerns around using real addresses in a document such as this, which is intended to be publicly available on TOTSCo’s website for anyone to download.

We have thus created a separate “OTS Address Examples” document which will not be publicly available for download. Authorised representatives of RCPs and MAPs who have registered with TOTSCo can request access to this document, by sending an email to enquiries@totsco.org.uk.

4 OTS Matching – LRCP help pages

The TOTSCo Directory API will return a list of resources for each RCPID. At the time of writing, only two resource names have been specified:

- customerAssistURL
- salesAssistURL

Each RCP is strongly encouraged to create a pair of help pages, one with content suitable for customer self-service, and the other with content suitable for sales agents for assisted sales journeys. It is acceptable to have a single page with content suitable for both audiences – the RCP should populate both resources with the same URL.

When the user selects the brand of their losing provider, the GRCP will display a link to the appropriate page. The GRCP may also display the link when a match response failure is received from the LRCP.

?????

Need to write some guidance on the content of these help pages – to be completed for a subsequent version of this doc.

Possible points include:

- Avoid use of cookies (and all the annoying cookie pop-up questions).
- Population of serviceIdentifier for IAS – e.g. subscription identifier
- Format of account numbers, e.g. leading zeros or not.
- Alternative name – e.g. if asked for account number, use your customer id or username.

?????

5 OTS matching – gaining provider perspective

This section covers OTS matching from the perspective of a gaining provider.

5.1 Positioning of OTS matching relative to the rest of the sales journey

This is covered in the OTS Industry Process, but is important enough to re-iterate here.

Most (perhaps all) RCPs permit customers to check availability and prices before they provide any personal details, especially in self-service (aka digital) channels. This permits customers to shop around when considering switching away from their current provider.

When a GRCP makes a successful match for a customer, their current RCP is obliged to send “impacts of switching” directly to the customer, using the fastest available communications method. This will typically be email, but could be letter for some customers. It is important that customers are not overloaded with communications from the current provider if they are simply exploring switching / shopping around. The Industry Process permits LRCPs to apply rate limiting to their impacts of switching communications (e.g. max of 1 letter per fortnight).

But the best form of rate limiting is if GRCPs only attempt a match when they believe the customer is somewhat serious about switching to them. So steps such as location where the customer wants service, technical availability (e.g. whether full-fibre is available), and configuration / price point (e.g. choice of speed, choice of broadband only or also voice) should be completed before OTS matching.

Many RCPs have some form of credit check in their sales journey. This involves capture of personal information from the customer, and expenditure with a credit bureau. This could be considered a point where the GRCP believes that the customer is serious about taking their services, and is a good point to consider adding the OTS matching step to existing sales journeys.

Best practice

Read §2.2 of the Industry Process and the guidance above, and consider carefully where OTS matching should be added to your existing sales journeys.

5.2 Initial address capture for matching

Providers generally ask the customer to provide the address where they would like service to be provided, early in the sales journey. Providers generally allow customers to choose a quality address (e.g. enter a postcode and then select from a list of addresses) based on either data within their retail systems, or based on their supply chain (e.g. Openreach’s address matching dialogue service). See §3 above for more information on quality addresses in the UK.

GRCPs are encouraged to use this address for the initial matching attempt, but it must be formatted into a series of address lines, town and postcode, as defined in §3.7 above.

Best practice

If the address you capture for provisioning purposes is based on a quality source, you are encouraged to use this address for the initial attempt at matching, suitably formatted.

5.3 Ability to edit the address used for OTS matching

It is feasible that the LRCP has a recorded service address that is significantly different to the valid address captured for provisioning purposes.

E.g. there are areas where Royal Mail in conjunction with the local council have changed addresses and postcodes. See §3.8.6 above for examples.

If the initial match is a failure, the user may be permitted to type in an address in an attempt to match the address held by the LRCP as the service address. Note that the initial match in a sales journey may not be the first match

attempted by the customer – e.g. if a customer encounters a match failure in a self-service (digital) sale journey, they may return some time later armed with extra information, but may start what is considered to be a completely new sales journey, either another self-service journey or perhaps an assisted sales journey. It might be an obtuse user experience to force the user to have another failed match before being permitted to modify the address. So the guidance here is more about encouraging user behaviour (e.g. the default is to use the quality address) rather than prohibiting entry of a typed address.

The initial quality address may have an associated UPRN, which may not be displayed to the user. If the user changes the address, care should be taken to drop the UPRN, as the UPRN is likely to be misleading (or just plain wrong) for any “typed address”.

Note also that capture of account details may provide an easier path to a match, as long as the GRCP address would be considered a close match of the LRCP address.

Best practice

GRCPs should permit the address used for OTS matching to be changed from that captured for provisioning, either for the initial match, or as a response to a failed match. GRCPs should also take care not to include a misleading UPRN when the user enters a “typed address”.

Note however that providing account number to enable a close address match may be easier for many customers.

5.4 Ability to capture serviceIdentifier values for a match request

The match request supports specification of a serviceIdentifier against both NBICS and IAS.

For NBICS, there is an obvious serviceIdentifier – the directory number (telephone number) of the voice service, which is mandatory when the customer wishes to retain their existing number (action = port).

For IAS, GRCPs need to be aware that some LRCPs support multiple IAS on a single billing account, and will expect the GRCP to be able to capture a serviceIdentifier against IAS to achieve a successful match for a customer with multiple IAS on a single billing account. LRCPs who choose to support such matching should include appropriate guidance in their help URL page (e.g. “use the subscription identifier visible on the customer bill or online portal”) – so GRCPs should ensure that users have an easy mechanism to view the relevant help page published by the LRCP.

See §6.1 below for more explanation of the different ways that LRCPs may manage their customers, accounts and subscriptions/services, and why they may require extra information to make a unique match.

Best practice

GRCPs should be aware that an LRCP may require the customer to provide a suitable identifier for a single subscription (on a billing account with multiple services) in order to make a successful match.

Where the service to be switched is NBICS, the directory number (telephone number) can act as the serviceIdentifier (and is mandatory when the customer wishes to port their existing number).

Where the service to be switched is IAS, GRCPs should provide a mechanism for a customer to provide a serviceIdentifier against IAS, and to view the relevant help page of the LRCP (e.g. which might prompt to use a subscription id from the bill as the serviceIdentifier).

5.5 Intra-network switches

??Need to write something on line selection ??

One of the claimed benefits of One Touch Switching is a further reduction in instances of erroneous line transfer. The former NOT+ process relied exclusively on selection of the correct address and line without any customer identification, so there were instances where a line (both copper line and full-fibre connection) was targeted for transfer, but was not the correct line for the customer requesting to switch.

The response to a successful OTS match request includes the network operator (CP providing the physical access) plus line identification details corresponding to the terminology of that network operator. The expectation is that if the GRCP uses the same network operator as the LRCP, they will be aware of that terminology and thus understand the line identification details.

Consider a scenario where Openreach is the network operator. Where the LRCP has an existing copper line, they will return the ALID (access line ID) or partial DN; where the LRCP has an existing full-fibre connection, they will return the ONT reference and port number.

In order to place a provision order with Openreach which targets an existing line for transfer¹⁷, the GRCP must first select a gold address and then check for existing lines (copper or full-fibre). In the context of OTS, there are several possibilities:

- The line returned in the OTS match response carries the same identifiers as one of the lines available at the gold address. For most residential addresses, there will only be a single existing line. The handling of addresses with multiple lines will vary between RCPs.
- The line returned in the OTS match response does not match any of the lines available at the gold address. This likely means that the wrong address has been chosen.

¹⁷ Openreach consider an order to transfer an existing service from another CP as being a provision. This also includes a transfer with change of technology from copper to full-fibre.

6 OTS matching – losing provider perspective

This section covers OTS matching from the perspective of a losing provider.

§6.4 of the OTS Industry Process documents that the LRCP must use the information supplied in the match request to try to find a single matching customer with broadband and/or voice services. It also documents the concept of a “strong point of contact” and that a successful match requires two strong points of contact and no negative points of contact.

The section provides some best practice recommendations on “points of contact”.

6.1 Matching of customer v account v subscription

The Ofcom documents and the OTS Industry Process mostly reference switching by customers, and thus matching of “a customer”. However many RCPs have more of a focus on account or subscription.

Consider a household who require two broadband services at the same residential address:

- The household may want both services in the same name, or in different names (e.g. husband and wife / partners).
- Some RCPs only permit one broadband service per billing account, and will mandate two billing accounts even when they are in the same name. In this case, providing an account number in a match request would lead to a unique match.
- Other RCPs permit multiple broadband services on a single account. In this case, providing an account number would still leave the multiple broadband services in focus of the potential match and switch.
 - Some RCPs who permit multiple broadband services on a single account provide a customer visible reference (often termed a “subscription identifier”) for each service, e.g. included on invoices, visible in self-service portals.
 - The RCP may choose to support matching when their subscription identifier is supplied as the serviceIdentifier on an IAS in an OTS match request. They should provide appropriate guidance in their help URLs if they choose to support such matching.
 - Other RCPs may not provide a customer visible reference – when a match request sets focus on a billing account which carries multiple IAS, the LRCP must return a list of SORs, one for each service that could be switched, along with “ServiceInformation” that should help the customer choose which one they wish to switch.

Best practice

Each RCP should consider how they support households with multiple broadband services at a single location.

It is valid for an LRCP to focus their matching algorithms on setting focus on a single account, and thus to require account as a matching input when a unique match cannot be achieved without account number.

It is equally valid for an LRCP to focus their matching algorithms on setting focus on a single subscription, and thus to require a suitable serviceIdentifier for the subscription as a matching input when a unique match cannot be achieved event with account number.

LRCPs who support multiple broadband services on a single account (and thus providing an account number would not lead to a unique match) , but do not have a customer visible subscription identifier, must support returning a list of services in the match response, along with ServiceInformation to help the customer make a choice of which to switch.

6.2 Precedence of inputs for matching

The following table lists the valid combinations of input, and the best practice precedence of matching criteria (Y means that a valid value is supplied in the match request, N means it is omitted, Y/N means don't care, address is mandatory so only Y).

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It is expected that for most (if not all) RCPs, searching for a matching customer by account or service identifier will be much more efficient than searching by name and address. The precedence of account or service identifier (if both are supplied in the match request) is the choice of each LRCP:

- For those LRCPs who support only a single IAS per billing account, having account as the highest precedence might make most sense. The comments in the table below reflect this choice.
- For those LRCPs who support multiple IAS on a single billing account, and have a customer visible “subscription identifier”, having servicelIdentifier as highest presence might make sense (and the comments in the table below are less appropriate).

account	service Identifier	name	address	Comments
Y	Y/N	Y/N	Y	If the account number is supplied, the account should take precedence for matching – the account number will either be found or not found. If found, there should be a specific check that the account is active – if the account is closed (or any other non-active state), there is a specific response code. There is also a possibility of finding an account with no fixed line services (e.g. an account with mobile services), which has another specific response code.
N	Y	Y	Y	If account number is not supplied, but a servicelIdentifier is, the servicelIdentifier should take precedence for matching - the servicelIdentifier will be either found as a working service or not found.
N	N	Y	Y	If neither account details nor any servicelIdentifier is supplied, the address should take precedence for matching. The address could find multiple candidate billing accounts.

When searching for customers by address, the match on address should be an “exact match” as described in the next section. When other information has been used to find the customer (e.g. account), then the address needs only be a “close match”.

Best practice

Consider the guidance above, and make the most sensible decision about your own precedence rules for matching.

6.3 Request and response scenarios

A separate Excel document “One Touch Switch Request and Response Scenarios” includes a table of combinations of input values in the match request, whether they match or not, and what the response should be for each scenario.

You should find this Excel document at the same source as this Word document and are strongly encouraged to download and utilise the Excel document.

7 OTS matching and addresses

It is mandatory for the GRCP to capture and send the service / installation address in the match request. Typically the GRCP will have asked the customer where they want service at the start of the sales journey (e.g. to verify service availability, e.g. whether full fibre is available), and will use that address for the initial match request with the LRCP.

There are two ways in which the address in the match request can be used:

Exact match

If the match request omits both account number and service identifier, it will be necessary to search for a matching customer where the address is an exact match.

If the match request includes account number or service identifier, it may also be necessary to have an exact match of address to act as the second strong point of contact, depending on whether or not the surname is a match.

“Exact match” does not mean a literal string match, it instead means a logical match, e.g:

- “1 Acacia Ave” is an exact match of “1 Acacia Avenue”.
- “Flat A, 1 High Street” is an exact match of “1A High Street”.

One way to think is: “would a pizza delivery driver treat both forms of address as being the same”?

See the next section 8 below for more details on exact match of addresses.

Close match

If the match request includes an account number, the initial search will use the account number to find the corresponding customer account. The LRCP can then extract their service address and consider is it is a close enough match to the address in the match request.

It is important to note that the GRCP may have attempted an initial match without account number, and when that was not an exact address match, requested the customer to provide their account number and made a second match request. So it is important that the LRCP does not enforce exact matching when the account number is provided, along with either a matching surname or serviceIdentifier to act as the second strong point of contact.

Best practice

Personnel in RCPs / TPIs with responsibility for specifying, designing and implementing match algorithms as LRCP must pay attention to the concept of exact and close address matches, and implement them as defined in the Industry Process and the detailed guidance in this document.

8 Recommended methodology for exact address matching

As described above, certain combinations of input data in the match request require an “exact match” of the input address with the service address as held by the LRCP.

This section describes the recommended methodology for verification of an exact match. This methodology was derived by the TOTSCo Industry Process Group in calls during August 2023.

8.1 Identification of potential candidate matching customers (or accounts)

When the match request does not contain either account details nor any service identifier, the LRCP should first identify potential candidate matching customers (or accounts or subscriptions) by looking for active fixed broadband or voice services, where the recorded service address has the same postcode as in the match request, and then checking if the surname is a match. The outcome of this will be 0, 1 or more than 1 candidate customer/account. If none were found, this is an immediate failure response.

Where the match request does include either account details or a service identifier, these will be used to identify a single potential candidate matching customer (or account or subscription), but the LRCP may still need to verify if the address is an “exact match” (in scenarios where a “close match” is not sufficient).

8.2 Processing of each candidate customer (or account or subscription)

If one or more candidates were found, the LRCP should then apply the following algorithm to both the address in the match request and to **each** candidate service address in the LRCP records:

1. If both addresses include a UPRN and they are the same value, then the addresses can be regarded as an exact match without any further checking of other address elements.
 - a. The LRCP may also want to consider searching for candidate customers/accounts by UPRN.
 - b. If there is no UPRN in one or both of the addresses, the LRCP should continue with the steps below.
 - c. If both addresses have a UPRN, but the value differs, the LRCP should consider the accuracy of their own UPRN data. Most LRCPs (and recommended all MAPs) will want to continue with the steps below, to avoid the risk of inappropriate failures which Ofcom might consider to be frustrating the OTS process.¹⁸
2. The LRCP should extract any numeric elements from the address lines in the match request. (A similar algorithm will be applied to each service address held by the LRCP, so the steps below mention both GRCP and LRCP address.)
 - a. If the numeric element is followed by a single letter, also extract that letter.
 - b. If the numeric element is followed by white space¹⁹, a single letter, and then white space, also extract that letter, but drop the white space. (This logic is optional – the LRCP should consider if they have enough instances to warrant the extra implementation effort. It is expected that GRCPs should not send such data.)
 - c. If there are numeric elements in multiple address lines, separate them by a colon.
 - d. If numerics appear separated by a slash, hyphen or full stop, also extract the slash, hyphen or full stop, discarding any white space around the separator character. Some examples for explanation:
 - i. In Scotland, “Flat 2/3” means the 3rd flat on the 2nd floor.
 - ii. “Flat 4.2” might represent the second flat on floor 4 (though “Flat 402” would be more common).
 - iii. “111-113 High Steet” might be the street address of a block of flats. But this might appear as “111 - 113 High Street” – the white space characters around the hyphen should be discarded, leading to extract of just “111-113”. LRCPs should also consider whether any of

¹⁸ MAPs (TPIs) will probably want to assume that any UPRN provided by their LRCP customer is not guaranteed to be correct (e.g. UPRN of a property shell instead of an individual flat), and will thus want to “trickle through” to applying the remaining checks to see if the address can be regarded as an “exact match” despite the difference in UPRNs. LRCPs may also want to consider whether the UPRN provided by the GRCP will be correct. So “trickle through” is **recommended for all LRCPs**.

¹⁹ “White space” includes single and multiple spaces and tab characters.

their historic addresses use an “en-dash” or “em-dash”²⁰ and convert these to hyphen – it can be assumed that the GRCP should only send hyphen.

3. Some examples:
 - a. “71 Acacia Avenue” would give “71”.
 - b. “73A Acacia Avenue” would give “73A”.
 - c. “73 A Acacia Avenue” would give “73A”.
 - d. “Flat 1”, “22 Acacia Avenue” would give “1:22”.
 - e. “Flat 2C”, “11 Acacia Avenue” would give “2C:11”
 - f. “Flat 2/3”, “55 Acacia Avenue” would give “2/3:55”
 - g. “Flat 1.4”, “66 Acacia Avenue” would give “1.4:66”.
 - h. “Flat 402”, “111-113 Hight Street” would give “402:111-113”.
4. If the first address line is for a flat or apartment identified by a single letter, and the second address line starts with a numeric, extract the letter and append it to the numeric to create an alternative version for subsequent matching.
 - a. If the first address line starts with “Flat”, “Fl”, “Apartment”, “Apt” or “Appt” and is followed by a single letter²¹, the address can be considered to meet this criterion.
 - b. E.g. “Flat C”, “11 Acacia Avenue” would give “11” as the first version, and “11C” as the second version.
 - c. The intention is to enable a GRCP address of “Flat C”, “11 Acacia Avenue” (LPI format) to match with an LRCP address of “11C Acacia Avenue” (common in DPA format), or vice versa.
5. If there are no numeric elements in the address lines, the LRCP should extract any house or building name from the address lines:
 - a. If the first address line is for a flat or apartment, the second address line can be considered to be the building name, and the flat letter should be concatenated as per step 4 above.
 - b. Else, the first address line can be considered to be the house name.
6. Some examples:
 - a. “Flat C”, “Nelson Mandela House” would give “Nelson Mandela HouseC”
 - b. “Rose Cottage”, “Acacia Avenue” would give “Rose Cottage”.
7. The LRCP should apply a similar algorithm to the service addresses for each of the candidate customers/accounts.
 - a. The exact algorithm will depend on how the LRCP stores its service addresses.
 - b. E.g. if the LRCP has an explicit field for building name, they can use that if there are no numerics for the address (rather than the guess at line 1 / line 2 in step 5 above).
8. The LRCP should then compare each version of the data extracted from the address in the match request with each version of the data extracted from its own service address.
 - a. If there is a match of any version with any version, then this customer/account/subscription is confirmed as an exact match of address.
 - b. If there is no match of any version with any version, this candidate customer/account/subscription can be discarded.
 - c. Note that if the LRCP identified more than one candidate customer/account/subscription with a matching postcode and name, they will need to repeat step 8 for each candidate.
9. If at the end of this processing, the LRCP has identified a **single** customer/account/subscription as an exact match of address, this is a successful match (unless any other checks fail).
10. If at the end of this processing, the LRCP has discarded all candidates, this is a failure to match.
11. If at the end of this processing, the LRCP has retained more than one candidate customer/account/subscription, this is either:

²⁰ When a user types space, hyphen, space, next word, space into Microsoft Office and other products, the hyphen is automatically converted into a em-dash (e.g. “1 - 3” is converted to “1 – 3” – the width of the long dash is the same as the letter m, hence the term em-dash. There is also an en-dash which is the width of the letter n. It is then possible that an address with an em-dash is copied and pasted to be stored as a service address.

²¹ It is assumed that large blocks of flats (with more than 26 flats) use numeric flat numbering, and letters are only used in scenarios such as a former house split into flats – thus only a single letter needs to be considered.

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- a. A failure to match, e.g. if the LRCP only permits one broadband service per billing account (and thus if the GRPC were to include account details in a subsequent match request, it would become a single match).
- b. If the LRCP supports multiple broadband services on a single account, and the multiple candidate matches are on a single account. There are then two possibilities:
 - i. The LRCP has a IAS service identifier which is visible to the customer (e.g. a “subscription id” which appears on customer bills and online portal) – in this case the LRCP can return an error asking for more information to achieve a singular match.
 - ii. The LRCP does not have any customer visible service identifier – in this case, the LRCP would return a successful match with multiple SORs, one for each broadband service on the account and at the matched address.

9 Non recommended options for exact address matching

This section outlines five alternative options for an LRCP to achieve an exact address match. These are options which RCPs may have considered, but which are not recommended.

9.1 Literal string match

The Industry Process Group has heard that some RCPs are considering that a literal string match would suffice, with the extreme that “1 Acacia Ave” might not be considered to be an exact match of “1 Acacia Avenue”!

The Process Group believe that Ofcom would be very likely to consider a literal string match as not compliant with the spirit of their Statements and their mantra of “quick, easy and reliable switching”.

This guide provides options that should be feasible for every RCP and TPI, allowing the option of literal string matching to be rapidly discarded.

9.2 Home grown full matching algorithm

Some RCPs may be considering implementing their own algorithm for considering whether two addresses would be deemed to be an exact match.

If you are considering this option, have a read at this article from the Office for National Statistics:

[ONS working paper series no 17 – Using data science for the address matching service – Office for National Statistics](#)

Then consider the relative simplicity of the recommend methodology described in §8 above.

9.3 Use OS Match and Cleanse API

One of the data products offered by Ordnance Survey is “OS Match & Cleanse API”.

Product overview: [OS Match & Cleanse API | Data Products | Ordnance Survey](#)

API overview: [Overview | Documentation | OS Data Hub](#)

OSI Match and Cleanse API is a RESTful web service, which accepts a plain text query string, and returns a list of one or more potentially matching addresses, each with a match score between 0 and 1.

Note for information

Ordnance Survey offer a free 60 day trial of their APIs. The lead author of this guide found it very useful to sign up to this free trial and experiment with various real addresses, including addresses of which he has personal knowledge, and examples that had cropped up (especially as addresses that had caused previous problems).

You can then hand-craft a URL such as:

<https://api.os.uk/search/match/v1/match?key=<API key>&minmatch=0.5&matchprecision=10&dataset=DPA,LPI&query=<address to be matched>>

(Gaining access to this OS hosted API was easier than gaining access to internal APIs, so is worth considering even if you plan to go with option 4 below.)

A few tips and suggestions for exploring this API in your 60 day trial:

- Set matchprecision to 10 in your query, so you see the match score with all digits.
- Without a minmatch, you may get lots of “No match” responses – start with something like 0.5.
- Set dataset to “DPA,LPI” to get both DPA and LPI addresses – see below.

One suggested way to use this API is as follows:

1. Take the input address as supplied in the OTS match request, and match it against the OS Match and Cleanse API, using dataset of LPI, and setting minmatch to a reasonable threshold.

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2. Search for potential matching customers in your CRM data, looking for service / installation addresses with the same postcode – consider searching by both the postcode supplied in the match request and any different postcode returned from the OS API in step 1 above.
3. Loop through the service addresses of the potential matching customers (there may be more than one candidate), and match each against the OS Match and Cleanse API.
4. If the address returned by the API for the input match details and for the candidate customer is the same, then this remains as a candidate.

9.3.1 Dataset of DPA v LPI

The OS Match and Cleanse API supports matching against both DPA and LPI datasets – so which should be used in the context of OTS?

Consider 11 Acacia Avenue²² which has Flat A in the basement, Flat B on ground floor and Flat C on the top floor. Flat A has its own letter box and thus Royal Mail delivery point (UDPRN). The front door has a single letterbox serving Flats B and C, so Royal Mail have a single delivery point (UDPRN) for flats B and C.

When matched with 11C Acacia Avenue:

- DPA offers two addresses, one for “11B-11C” as a good match, and one for “11A” as a partial match.
- LPI offers 4 addresses, one for each of Flat A, Flat B and Flat C, and one for the property shell. Unfortunately, all four have the same match score!

However if we split up 11C and separate with a comma, i.e. “11, C, Acacia Avenue, Anytown A10 1AA”:

- LPI now ranks Flat C as a much better score (the property shell is highest, but easily filtered out).

When matched with Flat C, 11 Acacia Avenue:

- DPA offers same two addresses.
- LPI offers Flat C as the highest match, along with Property Shell, Flat A, Flat B and a Street Record.

9.3.2 Summary of lack of recommendation

Matching “Flat C, 11 Acacia Avenue” with “11C Acacia Avenue” appears to be a simple and common example, yet the OS Match and Cleanse API does not provide a simple solution out of the box.

In addition, the fees for usage (notably the Royal Mail PAF element) may be unreasonable for a small RCP.

9.4 Use OS Places API

Another data product offered by Ordnance Survey is “OS Places API”.

Product overview: [OS Places API | Data Products | Ordnance Survey](#)

API overview: [Overview | Documentation | OS Data Hub](#)

OS Places API supports a number of types of request – experimentation with the “find” request shows very similar behaviour to the OS Match and Cleanse API, with no more reason to recommend it.

9.5 Full integration with a commercial solution

This option is similar to the two OS APIs, but using a commercial solution other than direct to Ordnance Survey.

Some RCPs will already have commercial solutions in place for other use cases of address management. These may be “on premises” solutions, solutions hosted in RCP specific cloud hosting, or access to the cloud hosting of the commercial solution provider.

Each RCP will need to evaluate their own chosen commercial solutions, but it is likely that the recommended methodology in §8 above will be easier to implement and more successful.

²² This is a fictional address. The real address appears in the “OTS Address Examples” document referenced from §3.9.

End of document