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TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

# F.510

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SERIES F: NON-TELEPHONE TELECOMMUNICATION  
SERVICES

Directory services

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## **Automated directory assistance – White pages service definition**

ITU-T Recommendation F.510

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**NON-TELEPHONE TELECOMMUNICATION SERVICES**

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# ITU-T Recommendation F.510

## Automated directory assistance – White pages service definition

### Summary

Given the rapid multiplication and expansion of telecommunication services, there is a growing need for subscribers to those telecommunications services to be able to communicate with each other. In order to facilitate such intercommunications for the subscribers of the various services, operator assisted and public Directory Services will be required. The Service Definition in this Recommendation supports the provision of those Directory Services.

### Source

ITU-T Recommendation F.510 was revised by ITU-T Study Group 17 (2001-2004) and approved under the WTSA Resolution 1 procedure on 13 February 2003.

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## FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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## Introduction

This Recommendation details a service definition for the provision of electronic access to an International number information service by cooperating ROAs.

This service is suitable for use both by the operators of ROAs providing a DQ service to their customers, and by direct access of authorized customers.

The service addresses not only the provision of fixed-line telephone numbers, but also the provision of the number information of other communications media – facsimile, mobile, videotelephony, etc. The service can also provide other communications address information such as electronic mail and application process addresses.

The service definition meets the current and foreseeable future needs of the service and is designed for worldwide use if required.

The service definition provides the basis for the progressive delivery of a constantly improving DQ service. The definition allows for the functional capabilities of systems (all or individual) to be expanded, and continually evolved, within but not limited to the constraints set by the definition.

The service definition enables, and should encourage, the implementation of cooperative systems through which an efficient International DQ service is provided.

The service includes, but is significantly different from that defined by ITU-T Rec. E.115, in that it defines services for both operators, end-users and processes, provides telecommunications addresses in addition to telephone numbers.

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# ITU-T Recommendation F.510

## Automated directory assistance – White pages service definition

### 1 Scope

This service definition is the basis for the establishment of a truly International DQ service through the standardized interworking of numerous individual DQ information services.

This service definition provides a general framework for the provision of electronic access to international Directory Services. It defines the requirements for, and the service features associated with the provision of such Directory Services. It specifies the requirements to support Directory Services that may be offered to both Directory Service operators and to end-users. It encompasses the operational aspects of the service and includes Quality of Service and Charging and Accounting.

This service definition defines the White Pages Directory Service. However, the services and elements specified herein may be used to define other services, such as Yellow Pages.

A DQ service might have more than one access point available for retrieving information from another country. At each of these access points information might be retrieved from one or more national service or information providers. There may be various types and levels of service quality provided. This service definition does not define any mechanism for selection of provider and of any explicit mechanism for selection of quality of service.

This service definition assumes that information is retrieved from a single country at a time. The name of the country must be included in the request parameters. Removal of the single country restriction is for further study.

This service definition does not specify the method of implementation which may use any appropriate protocols (or combination of protocols). The terms used in this Recommendation adopt their conventional meaning (dictionary definition), and the meaning of terms, such as "attribute", should not be assumed from other (standards) documents in which they may be defined.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- ITU-T Recommendation D.37 (1996), *Accounting and settlement principles applicable to the provision of public directory services between interconnected Directory Management Domains*.
- ITU-T Recommendation E.104 (1995), *International telephone directory assistance service and public access*.
- ITU-T Recommendation E.115 (1995), *Computerized directory assistance*.
- ITU-T Recommendation E.123 (2001), *Notation for national and international telephone numbers, e-mail addresses and Web addresses*.
- ITU-T Recommendation E.160 (1993), *Definitions relating to national and international numbering plans*.

- ITU-T Recommendation T.51 (1992), *Latin based coded character sets for telematic services*.
- ITU-T Recommendation T.51 (1992)/Amd.1 (1995), *Latin based coded character sets for telematic services – Amendment 1*.
- ITU-T Recommendation T.52 (1993), *Non-Latin coded character sets for telematic services*.
- ITU-T Recommendation X.509 (2000) | ISO/IEC 9594-8:2001, *Information technology – Open Systems Interconnection – The Directory: Public-key and attribute certificate frameworks*.
- ISO 3166-1:1997, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*.

### 3 Definitions

**3.1** This Recommendation defines the following terms.

**3.1.1 directory information:** The information held within a directory associated with, and for the purpose of identifying, a communications address, as described in 7.5.2.

**3.1.2 directory entry:** Information associated with a particular type of real world object. An object consists of one or more attributes. This Recommendation defines the objects and the information required to support the service.

**3.1.3 attribute:** An attribute has a type and a value. A particular attribute type may be used in one or more directory entries. A new attribute may also be formed by the combination of (simpler) attribute types.

**3.1.4 key attribute:** An attribute parameter in a search request that is required to match a real-world attribute, e.g., a locality, but not to be ambiguous to a level determined by local considerations.

**3.1.5 service provider:** A Service Provider is the function, supported by an ROA, that supplies a Directory Service to one or more Query Service Agents.

**3.1.6 query service agent:** The Query Service Agent issues physical search requests to and receives responses from one or more Service Providers. The Query Service Agent may perform Service Provider selection, query modification (or rejection) on the basis of knowledge of the Directory Services offered by Service Providers to which it has access.

**3.1.7 directory service:** A Directory Service is a service which supports the following functionalities.

- 1) Standardization of directory objects and attributes and their interpretation and utilization.
- 2) Defined Directory Information.
- 3) Unambiguous definition of the enquiries that have to be supported by the Service Providers.
- 4) Resilience to requests specifying search attributes and matching types which are not supported by the Service Provider.
- 5) Means of communicating to the Directory Service user what is required in order to fulfil request, i.e., definition of services on offer.
- 6) Defined matching rules and character sets, including its conversion and interpretation rules.
- 7) Defined handling of language translation.
- 8) Ordering of returned entries.
- 9) Definition of information returned for unsuccessful or failed searches.

**3.1.8 hierarchical group:** A set of directory entries which form the hierarchical external view of a larger body or organization.

**3.1.9 named service:** A Named Service is a Directory Service which comprises a specific set of Directory functions and Directory data that provide a coherent service. The only Named Service that is defined to date is the White Pages Directory Service defined in this Recommendation.

**3.1.10 service specification:** A service specification defines a specific Named Service. The specification includes the elements, which form part of all Directory Services, defined in clause 8 and the specification utilizes, where appropriate, common terminology and definitions which are defined in clause 9.

**3.1.11 service data model:** The Service Data Model defines the specific directory information required to support a Named Service. The Service Data Model is defined using object modelling techniques (see Annex D) and defines the data object, attributes and relationships between object types.

**3.2** The following definitions are used to define directory searches in clause 10:

**3.2.1** Parameter classifications (used in clause 10):

**3.2.1.1 mandatory (M):** A request parameter or response parameter that is mandatory shall be present.

**3.2.1.2 optional (O):** A request parameter or response parameter that is optional may be present.

**3.2.1.3 omitted (X):** A request parameter or response parameter that is omitted shall not be present.

**3.2.1.4 not applicable (–):** The use of this request parameter or response parameter is not applicable for the search in question.

**3.2.2 predicate:** A predicate (Pn) describes the conditions where a request parameter or response parameter may be mandatory, optional or omitted.

**3.2.3 target object:** The primary object that contains the information to which the search request applies.

**3.2.4 search request parameters:** The items of information including attributes that form the search request.

**3.2.5 search response parameters:** The items of information including attributes for the entries returned in the search response.

**3.2.6 search parameters:** The items of information including attributes that form both the search request and the search response.

**3.2.7 SearchType:** A SearchType uniquely identifies each of the searches defined in 10.5 and 10.6.

**3.2.8 message:** Information in the search response which is identified by a code and includes, when necessary, precise information, such as attribute types, attribute values or other identifiers, that relate to problems detected. Messages are listed in Annex A.

**3.2.9 matching rule:** A matching rule defines the relation between a request and the entries returned in the corresponding response. A matching rule is applied to each request parameter by the Service Provider to select entries, that satisfy the matching rule, to be contained in the response. Only entries that satisfy the matching rules for all the parameters in the request shall be contained in the response. Matching rules are indicated as MR1, MR2, etc. and are defined in 9.2.2, 9.2.3 and 9.2.4.

**3.2.10 essential:** The attributes that are required to support the minimum service (defined in clause 10) are identified as essential attributes.

**3.2.11 additional:** The attributes that may be provided, in order to support higher levels of service (defined in clause 10), are identified as additional attributes.

## 4 Abbreviations

This Recommendation uses the following abbreviations.

|      |                                                        |
|------|--------------------------------------------------------|
| DQ   | Directory Enquiry                                      |
| FTP  | File Transfer Protocol                                 |
| HTTP | Hypertext Transfer Protocol                            |
| ISDN | Integrated Services Digital Network                    |
| NACE | Nomenclature des Activités de la Communauté Européenne |
| NDC  | National Destination Code                              |
| PSTN | Public Switched Telephone Network                      |
| ROA  | Recognized Operating Agency                            |
| RWL  | Real World Locality                                    |
| SIC  | Standard Industry Code                                 |
| SMS  | Short Message Service                                  |
| SMTP | Simple Mail Transfer Protocol                          |

## 5 Conventions

The symbols, such as MR1 to indicate WordExact matching, which are defined in clauses 7 and 9, and used in clause 10 are listed in Annex B.

The Service Data Model described in clause 10 is formally defined in Annex C using the Object Modelling notation described in Annex D.

## 6 Directory Services model

This clause describes the organization of components of the service for both the delivery of Directory Services to users and the management of those services by administrators.

### 6.1 Directory Service use

The public Directory Service shall be accessible not only to professional Directory Service enquiry operators but also to end-users, which can be human users and application processes.

The service must allow for different facilities to be made available to different classes of user, e.g., available to operators, but not end-users. This F.510 Service supports a number of facilities but does not define specific classes of user or the combination of facilities appropriate to, or the functionality offered to, any particular class of user.

The F.510 Service supports a set of query functions that may be utilized by a local agent in order to offer appropriate facilities to different types of end-users, as shown in Figure 1.

The delivery of the service is subject to legal and privacy rules which are outside the scope of this Recommendation.

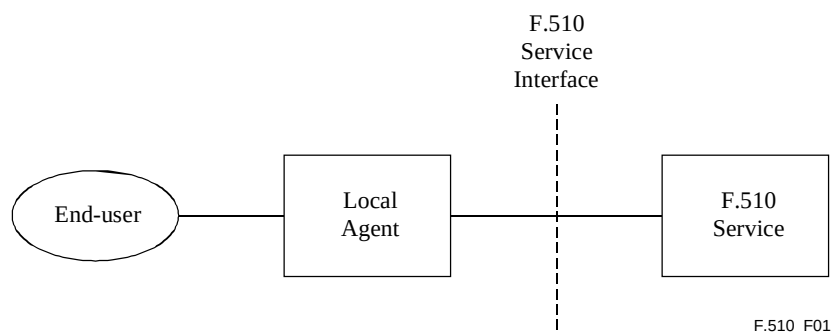


**Figure 1/F.510 – F.510 Service Interface**

### 6.1.1 Local Agent

A Local Agent provides access to a Directory Service on behalf of an end-user. The Local Agent is a person, such as an enquiry operator using computerized facilities (i.e., PC or telematic terminal), or a function (or both) that utilizes the services at the F.510 Service Interface.

A Local Agent acts on behalf of the end-user in the usage of one or more Directory Services. Typically, the Local Agent has detailed knowledge of specific Directory Services in terms of their definition, physical location and accessibility. The Local Agent provides enhanced service usability and physical data location transparency to Directory Users.

The Local Agent may also provide and control access to a range of Directory Services that provide different data and quality of service. The choice of service may also be subject to regulatory, legal or commercial considerations. This service definition does not define any parameters relating to service selection and the choice of service is outside the scope of this service definition.

### 6.1.2 End-user

An end-user is the ultimate consumer of Directory Services and can be a human user or application process. The end-user utilizes the services of a Local Agent in order to interact with Directory Service Providers.

### 6.1.3 Possible service scenarios

Figures 2 and 3 show different possible arrangements for the provision of operated assisted and direct access services. Services and mechanisms, such as access control, user preferences and help (assistance) may be provided by a human operator, terminal application or access service function, possibly in combination. The definition of these services and mechanisms is outside the scope of this Recommendation.

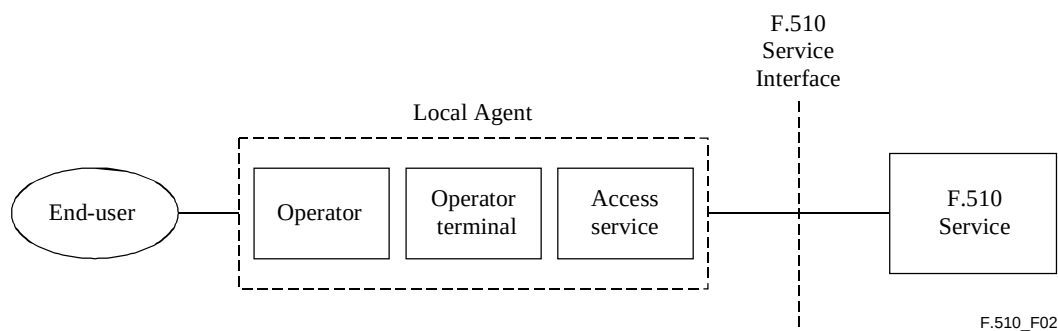


**Figure 2/F.510 – Operator assisted (dial-up) Service**

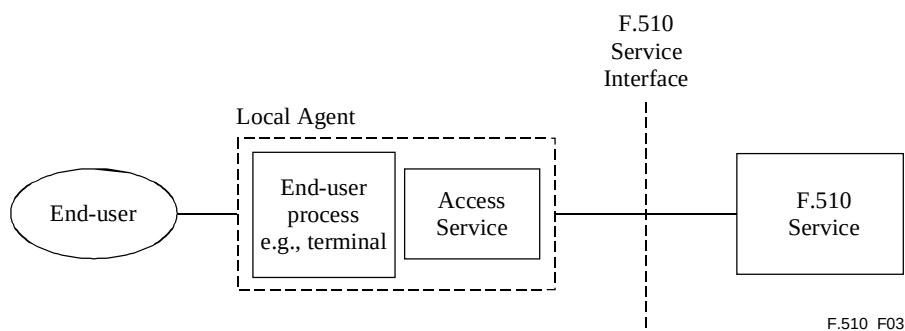


**Figure 3/F.510 – Direct customer (computerized) access service**

## 6.2 Directory Service Provision

The F.510 Service is refined into two components, as in Figure 4: the Query Service Agent and the Service Provider which interact to provide directory query services that satisfy regulatory, geographical and language differences between Directory Service users and Directory Service Providers in different domains.

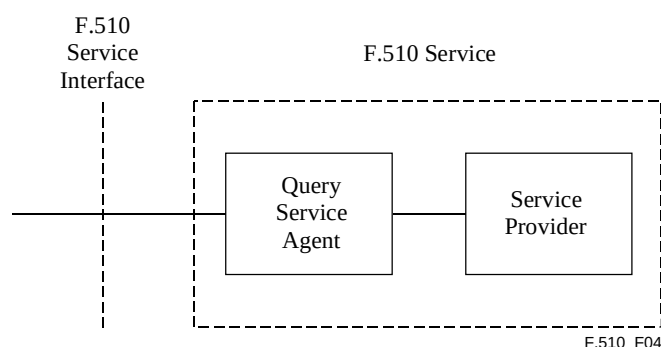


**Figure 4/F.510 – F.510 Service Provision**

### 6.2.1 Service Provider

A Service Provider is the function that supplies a Directory Service to one or more Query Service Agents. Additionally, the Directory Service Provider may regulate access to the service against a set of known legitimate Query Service Agents.

A Service Provider may utilize the services of one or more other Service Providers in order to provide a Directory Service.

### 6.2.2 Query Service Agent

The Query Service Agent issues physical requests to and receives responses from one or more Service Providers. The Query Service Agent may perform Service Provider selection and query modification (or rejection) on the basis of knowledge of the Directory Services offered by Service Providers to which it has access.

## 6.3 Directory Service Management

Directory Service Management provides the mechanisms to supply information for management decisions and the procedures to execute those decisions. Management functions are associated with the Query Service Agent and Service Provider to implement the Directory Service offered by a Service Provider and consumed by a Query Service Agent. The information and procedures required to manage the Directory Service that operates between the Query Service Agent Manager and Service Provider Manager (see Figure 5) are specified in 11.3.

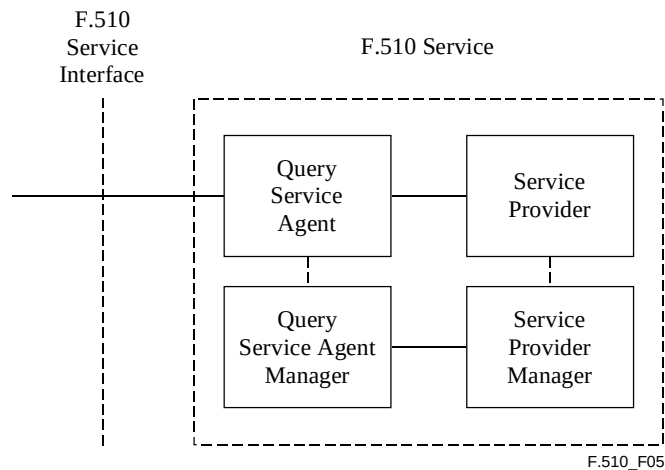


**Figure 5/F.510 – F.510 Service Management**

### 6.3.1 Service Provider Manager

A Directory Service Provider Manager performs a number of functions which cover management of Directory Services offered by a Directory Service Provider negotiated by Directory Service Administration. Typically these include operational aspects of the service provision, such as distribution of availability and physical access information. Service Provider Managers will operate in cooperation with Directory Query Service Agent Managers.

The Directory Service Provider Manager will have the capability to create, and subsequently monitor and configure, Directory Services, disseminate knowledge of the existence of Directory Services to other Directory Service Managers (both Directory Query Service Agent Managers and peer Directory Service Provider Managers) and establish usage of Directory Services through the configuration of system and communications resources.

### 6.3.2 Query Service Agent Manager

A Query Service Agent Manager performs a number of functions which cover negotiations of usage of Directory Services offered by Directory Service Providers and performing the configuration of the Directory Query Service Agent needed to use offered Directory Services. Query Service Agent Managers will exist for Query Service Agents and will work in cooperation with Directory Service Provider Managers.

## 7 Directory information model

### 7.1 Information structure

The purpose of this clause is to describe the inherent structure and relationships for the information contained in subscriber listings and to provide definitions of object types for that information.

It is important that there is a common understanding and unambiguous definition of the information in order to develop specific services using that information. The information contained in subscriber listings **does not define** the services but does limit the overall scope and capability of any service.

Many items of information **could** be used to identify a particular subscriber listing (and ultimately the communications addresses and associated information for the subscriber) such as subscriber name, house number and street name.

Where information is available that is sufficiently distinguishing **and** the service provider supports a search function using that combination of attributes, then identification of the subscriber may be achieved directly.

Where such information or search function is not available, then it is usually necessary to identify information that can be used reliably to select smaller sets of subscriber *listings*. The information that is of this type, which is generally useful (commonly known), is Geographic Location, Business Classification and Organization Structure. This type of information may be used to aid identification of the actual attribute values held in the directory from alternate information available for searching such as alias and synonym values. For example, with reference to Figure 6, a real world locality (a) Heathrow may be used to identify the actual locality (b) London Airport that is the value (c) held in the subscriber listings.

NOTE – The terms Geography and Geographic Location Information are intended to be equivalent.

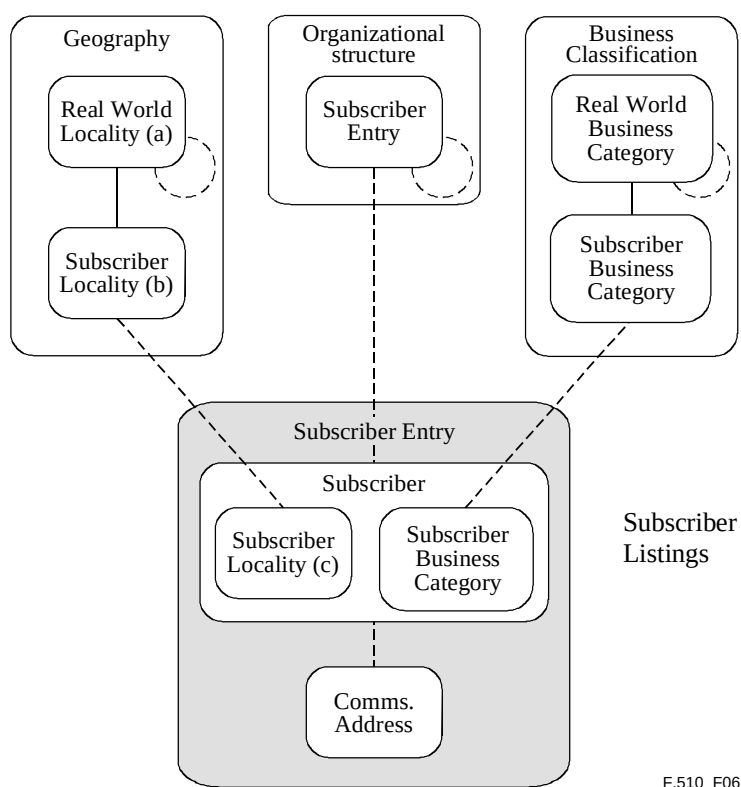
Geography, which can include information of various scope (street, town, county, region, etc.), is generally known and useful for the selection of smaller sets of subscriber listings, but alternate information that identifies the same Geographic Location (place) typically exists.

Business Classification is also generally known and useful for the selection of smaller sets of subscriber listings, but no common system for the classification of business function is generally known or used and alternate information that identifies similar business functions can exist.

Organizational Structure is more complex because there are many ways and different types of information that may be used to describe an Organization. For example, a company may have a structure that is described by location, function, product or activity; an Administration may have a structure that is described by department, region and service; a family may be described by genealogy. For a particular Organizational Structure various relationships may be used to aid in searching. However, within this service definition use is only made of the hierarchical relationship that may exist between directory listings.

The general model, that is appropriate to directory enquiry services, is illustrated in Figure 6. The broken lines represent the optional relationships, while the solid lines indicate mandatory relationships. Formal models, which are subsets of the general model, on which each specific service is based are specified in clause 10.

In Figure 6, information about Geography, Organizational Structure or Business Classification may be used to identify the value (i.e., the actual attribute values for a listing held in the directory) for Subscriber Locality, Subscriber Entry (organizational) and Subscriber Business Category, respectively that may be used to select Subscriber Entries reliably.



F.510\_F06

**Figure 6/F.510 – Directory information model**

Subscriber entries may be associated with structured data relating to a Geographical Location or Business Classification. Within each of these structured data sets, the entry to which a subscriber is immediately related will be related to other "real world" entries within that set. To be most useful these sets should be well structured, well-defined and have widely, generally known values.

Subscriber entries may also be related to each other through an organizational structure based on a combination of geographical, business or other data.

## 7.2 Geography

Structured information regarding "real world localities" enables queries to be translated or resolved into one or more "subscriber localities" to be searched.

### 7.2.1 Real World Locality

This term may be applied to any "named" geographic locality (or area), the name (or identifier) of which is likely to **be known and specified by** a user making an enquiry on the directory. Different types of RWL are likely to be appropriate within different countries, and while the names of such objects are likely to be known abroad, their type often will not. The most common localities will be those used as components in Postal Addresses.

It includes both political and administrative localities (Country, County, State, Province, Department, Region, City, Town, Village, Rural District, etc.) and natural geographic areas (e.g., Dovedale, Peak District). These political, administrative or natural geographic localities (or areas) may be precise, with well-defined borders, or imprecise with somewhat fuzzy borders. They may be officially named places, or local familiarly named places. The exact interpretation of each of these terms is generally fully appreciated only within the countries where they apply.

All such localities may be known by one or more alias names.