SIDN Whois interface

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1 Introduction

This paper describes the interface of the 'is' and 'whois' functionality provided by SIDN. The most recent version of this document is available from `http://rxsd.domain-registry.nl`

RFC3912 describes the *whois* protocol. That standard describes how user applications automatically discover the right whois server on internet; the server of the registry of the specified domain name. However, the standard does not prescribe the syntax of the output. Each domain registry has developed its own output format.

In a private extension on the whois protocol, SIDN provides a way to request solely for the domain status without any additional details. This 'is' feature is much less demanding on the SIDN infrastructure, and therefore someone may use 'is' much more often than the usual 'whois' queries.

Anno 2010, domain registration has become of political importance. For 'whois', privacy regulations demanded a large reduction in the amount of information displayed by default. New 'whois' services are developed to provide registrars with additional information, only available to participants (members) of SIDN. Members also have much higher limits on 'is' and 'whois' query frequencies than the unregistered public.

In the new situation, there are four levels of *whois* output defined. Requesters without special status (public) are limited to a very reduced number of facts. Besides, there are various groups of registered users.

1. whois command-line for public access;

2. whois HTML output for public access;

3. whois for registrars; and

4. whois for special users.

The output in each case may contain more or fewer details, but the layout is kept as similar as possible. Especially the XML specification detailed in this document, contains many detailed facts which you may never find back as answer.

2 Protocol

Users of the public 'whois' and 'is' service will address either port `43/tcp whois` or port `80/tcp http` of server `whois.domain-registry.nl`. You may use the widely available `whois` command or commands like `telnet` or `netcat`. Only `whois` will automatically find the public server of SIDN.

Registrars who wish to receive more whois details address the server named `rwhois` (so an additional leading 'r' in the hostname). For registrars, ports `43` and `80` are made available for a list of pre-registered IP-addresses.

Access to whois data for other special purposes is provided via a server named `xwhois` (leading 'x') via an SSL client certificate on port `443/tcp https`.

Both registered and un-registered users will get the same interface available eventually. On the moment of this writing (January 2010), the public whois does not support XML. Special users do not have access via the command-line interface yet.

Whois questions can be posed in three ways: plain-text traditional whois-style, as HTTP-GET, or as HTTP-POST. For HTTP, protocol version `1.1` is supported, which means that multiple queries per connection are accepted.

2.1 Requests via whois-style plain text

RFC3912 describes the whois protocol; the domain-name is simply sent as byte-string to port 43 of the server. There are various ways to achieve that:

```
whois sidn.nl
echo "whois sidn.nl" | netcat whois.domain-registry.nl 43
echo "sidn.nl" | netcat whois.domain-registry.nl 43
echo "is sidn.nl" | netcat whois.domain-registry.nl 43
```

The first three commands will result in a plain-text answer of a whois request. The last one demonstrates the SIDN 'is' extension, which can be used with a much higher frequency. With additional keywords, you specify that the output syntax should be HTML, XML, or PLAIN. The language can be EN (UK English) or NL (Dutch). You do not need to use HTTP to get an HTML or XML answer:

```
echo "sidn.nl HTML NL" | netcat whois.domain-registry.nl 43
```

For 'whois'-style questions, the defaults are `PLAIN EN`.

2.2 Requests via HTTP-GET

To simplify integration with web-interfaces, SIDN's whois implementation offers a HTTP/HTML service. Two examples:

```
http://whois.domain-registry.nl/whois?domain=sidn.nl
http://whois.domain-registry.nl/is?domain=sidn.nl
```

Registrars use the `rwhois` server, other registered users access `xwhois` via `https`. For access via HTTP, the default output format is `HTML`. There are a few tunable parameters:

domain is a require parameter: a top-level domain-name in the `.nl` zone;

format is output syntax: `HTML` (default), `PLAIN` or `XML`,

lang is output language: `EN` (default) of `NL`.

css contains the 'Cascading StyleSheet' link used by the HTML output. When this parameter is not provided, the global SIDN stylesheet will be used.

The values of these parameters are used case-insensitive.

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2.3 Requests via HTTP-POST

The third transport option is to be used when the query uses XML. Send an HTTP-POST message to `http://whois.domain-registry.nl/whois`. The content of the request is an `whois-query` XML message, as defined by 5.1. The `Content-Type` of the request message must be `text/xml¿`

To ask for an 'is' response in XML, use access address `http://whois.domain-registry.nl/is`, with an `is-query` XML message in the body. That message is defined in 4.1. Be careful to combine the right body content with the related access address.

3 HTML output

When the 'is' or 'whois' produces HTML, that output will contain `class`-labels on the elements, which can be used in CSS (Cascading Style Sheets) to beautify the presentation. All possible labels are listed below.

When the HTML output is request via HTTP, you may use the `css` parameter to have your private CSS to be included in the output document. By default, SIDN will insert its CSS.

Common labels		
class	**element**	**purpose**
lang_nl	BODY	output in Dutch
lang_en	BODY	output in English
status_active	TD	
status_requested	TD	
status_inactive	TD	
status_withdrawn	TD	
status_quarantine	TD	
status_excluded	TD	
status_free	TD	
error	TD	mistake in request

Labels specific to 'is'		
class	**element**	**purpose**
is	BODY	page contains 'is' answer
is_result	TABLE	the answer structure

Labels specific to 'whois'		
class	**element**	**purpose**
whois	BODY	page contains 'whois' answer
whois_adminc	TR	administrative contact
whois_copy_not	SPAN	copyright text header
whois_copy	TD	copyright text
whois_date_change	TR	date last change in facts
whois_date_reg	TR	date domain registration
whois_domain	TR	domain name
whois_domicile	TR	domicile text
whois_maint	TR	'registry maintained by'
whois_ns_host	TD	name-server name
whois_ns_ip	TD	ip-address of name-server
whois_ns	TR	name-server
whois_public	BODY	whois public version
whois_reg	BODY	whois for registered users
whois_registrant	TR	registrant information
whois_registrar	TR	registrar information
whois_result	TABLE	the answer structure
whois_techc	TR	technical contact
whois_update	TR	date of last change

4 IS in XML

The "is" command is a simplified "whois" request: only the status of a domain is requested.

To automate the 'is'-queries, you can use the Perl module `Net::Whois::SIDN`, available from `http://search.cpan.org/~markov/Net-Whois-SIDN`

4.1 IS request

is-query
    Request the status of a single domain.

```
1    <element name="is-query" type="whois:isQueryType" />
2
3    <complexType name="isQueryType">
4      <complexContent>
5        <extension base="whois:anyQueryType">
6          <sequence>
7            <element name="domain" type="whois:domainRefType" />
8          </sequence>
9        </extension>
10     </complexContent>
11   </complexType>
```

anyQueryType
    Both 'is' and 'whois' queries can contains an explicit language and format, used to simplify the production of a user interface.

    In the current implementation, any `lang` string which starts will `nl` will be interpreted as a request for an answer in Dutch. The answer will explicitly state that the answers are in "Dutch as spoken in the Netherlands" (`nl-NL`). In all other cases, the answers will be in UK English (`en-UK`). These texts may get changed without notification.

    When an program has no user output, then there shouldn't be a need to address fields which are influenced by language or format settings: all information is also available in more stable alternatives.

```
1    <complexType name="anyQueryType">
2      <sequence>
3        <element name="lang" type="language" default="en-UK" />
4        <element name="output-format"   type="whois:outputFormatType"
5          default="xml" />
6        <element name="usertext-format" type="whois:textFormatType"
7          default="plain" />
8      </sequence>
9    </complexType>
```

outputFormatType
    To be consistent with other ways of requests to the whois-server, also the XML request can be used to produce some other kind of output.

```
1    <simpleType name="outputFormatType">
```

```
2      <restriction base="token">
3        <enumeration value="plain" />
4        <enumeration value="html"  />
5        <enumeration value="xml"   />
6      </restriction>
7    </simpleType>
```

textFormatType

    The 'is' and 'whois' responses may contain pieces of text, like a copyright statement. When pieces of information get displayed to end-users, then you must also show these accompanying texts. To avoid the need for client applications to reformat these texts, you can specify the preferred format in the query.

```
1    <simpleType name="textFormatType">
2      <restriction base="token">
3        <enumeration value="plain" />
4        <enumeration value="html"  />
5      </restriction>
6    </simpleType>
```

4.2 IS answer

is-response

    The 'is' query results in a short answer, only showing the status of a single domain.

```
1    <element name="is-response" type="whois:isResponseType" />
2
3    <complexType name="isResponseType">
4      <choice>
5        <element ref="whois:fault"     />
6        <element ref="whois:is-status" />
7      </choice>
8    </complexType>
```

is-status

    Reports the status of a domain.

```
1    <element name="is-status" type="whois:isStatusType" />
2
3    <complexType name="isStatusType">
4      <complexContent>
5        <extension base="whois:whoisObjectType">
6          <sequence>
7            <element name="available" type="boolean" />
8            <element name="code"    type="whois:statusCodeType"/>
9            <element name="explain" type="whois:userTextType"  />
10          </sequence>
11          <attribute name="domain"  type="whois:domainRefType" />
12        </extension>
13      </complexContent>
14    </complexType>
```

statusCodeType

Each domain has a status, expressed as a SIDN-DRS specific code. For ease of use, a readable translation of the code is added in the selected language.

In some cases, additional information related to the status is contained. On the moment, a domain release date will be included when the domain is in quarantine.

```
1   <simpleType name="statusCodeType">
2     <restriction base="token">
3       <enumeration value="active"    />
4       <enumeration value="requested" />
5       <enumeration value="inactive"  />
6       <enumeration value="withdrawn" />
7       <enumeration value="quarantine"/>
8       <enumeration value="excluded"  />
9       <enumeration value="free"      />
10    </restriction>
11  </simpleType>
```

userTextType

The components of the answer which are of this type, are texts directed for people who read the whois response.

```
1   <complexType name="userTextType">
2     <simpleContent>
3       <extension base="string">
4
5         <attribute name="lang" type="language"
6            use="required" />
7
8         <attribute name="format" type="whois:textFormatType"
9            default="plain" />
10
11      </extension>
12    </simpleContent>
13  </complexType>
```

fault

Error message as answer. The fault codes are the samen as in use by the HTTP protocol. The explanation is always in English.

```
1   <element name="fault" type="whois:faultType" />
2
3   <complexType name="faultType">
4     <complexContent>
5       <extension base="whois:whoisObjectType">
6         <sequence>
7           <element name="code" type="unsignedShort" />
8           <element name="explain"
9              type="whois:userTextType" />
10        </sequence>
11      </extension>
12    </complexContent>
13  </complexType>
```

4.3 IS examples

An is-query. The default language is en-UK, English as spoken in England.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <is-query xmlns="http://rxsd.domain-registry.nl/sidn-whois-drs50">
3    <lang>en-UK</lang>
4    <domain>sidn.nl</domain>
5  </is-query>
```

And the matching is-response example.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <is-response xmlns="http://rxsd.domain-registry.nl/sidn-whois-drs50">
3    <is-status domain="sidn.nl">
4      <date>2011-03-21T09:03:33.00113Z</date>
5      <available>true</available>
6      <code>free</code>
7      <explain lang="en-UK">sidn.nl is vrij</explain>
8    </is-status>
9  </is-response>
```

An error response. Error explanations are always in English.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <is-response xmlns="http://rxsd.domain-registry.nl/sidn-whois-drs50">
3    <fault>
4      <date>2011-03-21T09:03:33.00735Z</date>
5      <code>400</code>
6      <explain lang="en-UK">Error: permission denied</explain>
7    </fault>
8  </is-response>
```

5 WHOIS in XML

The EPP server offers a way to access each component of the whois output separately. However, the whois output provides an SIDN specific overview on all facts about a domain at once.

To automate the 'whois'-queries, you can use the Perl module `Net::Whois::SIDN`, available from `http://search.cpan.org/~markov/Net-Whois-SIDN`

5.1 WHOIS request

whois-query

> Request for detailed information about a domain.

```
1   <element name="whois-query" type="whois:whoisQueryType" />
2
3   <complexType name="whoisQueryType">
4     <complexContent>
5       <extension base="whois:anyQueryType">
6         <sequence>
7           <element name="domain" type="whois:domainRefType" />
8         </sequence>
9       </extension>
10    </complexContent>
11  </complexType>
```

5.2 WHOIS answer

whois-response

> The top-level response object which answers a `whois-query`.

```
1   <element name="whois-response" type="whois:whoisResponseType" />
2
3   <complexType name="whoisResponseType">
4     <choice>
5       <element ref="whois:fault" />
6       <sequence>
7         <element ref="whois:domain" />
8         <element ref="whois:registrar"
9             minOccurs="0" />
10        <element ref="whois:contact"
11            minOccurs="0" maxOccurs="unbounded" />
12        <element ref="whois:nameserver"
13            minOccurs="0" maxOccurs="unbounded" />
14        <element ref="whois:signature" />
15      </sequence>
16    </choice>
17  </complexType>
```

whoisObjectType

> All *top-level* elements in the responses are extensions of this type, so all report when the data was collected from the administration.

```
1   <complexType name="whoisObjectType" abstract="true">
2     <sequence>
```

```
3        <element name="date" type="dateTime" />
4      </sequence>
5   </complexType>
```

5.3 `domain` **information**

The domain structure mainly contain references to objects which are included in the same `whois-response` structure.

domain

The domain is described by a few specific fields and some references to objects which may be returned in the same `whois-response` structure. The data is split-up in objects the same way as EPP does: separate contact and name-server objects are produced.

Every `contact` element defines one relationship. It is very well possible that the same contact is listed multiple times for different roles.

The `nameserver` elements each refer to a unique host name.

Dates represent a day, in Central European Time (CET). Example values are `2010-01-22+01:00` (normal time) and `2010-05-05+02:00` (daylight savings time).

```
1   <element name="domain" type="whois:domainType" />
2
3   <complexType name="domainType">
4     <complexContent>
5       <extension base="whois:whoisObjectType">
6         <sequence>
7           <element ref="whois:status" />
8
9           <element name="registrar"
10             type="whois:registrarRefType"
11             minOccurs="0" />
12
13           <element name="contact"
14             type="whois:contactRefType"
15             minOccurs="0" maxOccurs="unbounded" />
16
17           <element name="nameserver"
18             type="whois:nameserverRefType"
19             minOccurs="0" maxOccurs="unbounded" />
20
21           <element name="contact-details"
22             type="whois:contactDetailsType"
23             minOccurs="0" />
24           <element name="registered"  type="whois:timestampType"
25             minOccurs="0" />
26           <element name="last-change" type="whois:timestampType"
27             minOccurs="0" />
28         </sequence>
29
30         <attribute name="name" type="whois:domainRefType"
31           use="required" />
32
33         <attribute name="view" type="whois:domainViewType"
34           use="required" />
```

```
35
36        </extension>
37      </complexContent>
38    </complexType>
```

domainRefType

In `.nl`, there are are no domain names with a single character in use. For some years, there were personal domain names in use, for example `piet.123.nl`. These names do not exist anymore.

```
1    <simpleType name="domainRefType">
2      <restriction base="token">
3        <pattern value="[a-zA-Z0-9-]{2,63}\.nl" />
4      </restriction>
5    </simpleType>
```

domainViewType

It depends on your access rights how much detail is produced by the whois server. The restrictions do influence the amount of content in the `domain` structure directly. The restrictions affect the other objects of the whois response indirectly.

```
1    <simpleType name="domainViewType">
2      <restriction base="token">
3        <enumeration value="ca"     />
4        <enumeration value="csi"    />
5        <enumeration value="public" />
6        <enumeration value="isp"    />
7      </restriction>
8    </simpleType>
```

status

The status codes which are currently shown. Only domains with the `VRIJ` (free) status are available for registration.

```
1    <element name="status" type="whois:statusType" />
2
3    <complexType name="statusType">
4      <sequence>
5        <element name="code"    type="whois:statusCodeType" />
6        <element name="explain" type="whois:userTextType"   />
7        <choice minOccurs="0">
8          <element name="domain-release-date"
9                              type="whois:timestampType"  />
10       </choice>
11     </sequence>
12   </complexType>
```

contactDetailsType

The registrant may have asked for `optout`, which means that less information is shown for the public whois output. Some text which explains the situation is added, and should be shown to end-users.

```
1    <complexType name="contactDetailsType">
2      <complexContent>
3        <extension base="whois:userTextType">
```

```
4        <attribute name="restriction"
5            type="whois:contactViewType" />
6       </extension>
7     </complexContent>
8   </complexType>
```

signature

This structure contains some facts which are required to be displayed to people when (parts of) this whois response are displayed.

```
1   <element name="signature" type="whois:signatureType" />
2
3   <complexType name="signatureType">
4     <sequence>
5       <element name="maintainer" type="whois:userTextType" />
6       <element name="copyright"  type="whois:userTextType" />
7     </sequence>
8   </complexType>
```

An example of the whois:domain structure. Be aware that this fragment can only be used inside a larger whois:whois-response object, never separately.

```
1   <domain name="sidn.nl" view="isp">
2     <date>2011-03-21T09:03:33.00775Z</date>
3     <status>
4       <code>active</code>
5       <explain lang="en-UK">actief</explain>
6     </status>
7     <registrar>AAA123456-SIDN2</registrar>
8     <contact role="registrant">STI044010-SIDN2</contact>
9     <contact role="admin">HAM003802-SIDN2</contact>
10    <contact role="tech">PIJ001675-SIDN2</contact>
11    <nameserver in-zone="true">ns1.sidn.nl</nameserver>
12    <nameserver in-zone="false">open.nlnetlabs.nl</nameserver>
13    <nameserver in-zone="true">ns2.sidn.nl</nameserver>
14    <registered>1999-11-18+01:00</registered>
15    <last-change>2009-09-14+02:00</last-change>
16  </domain>
```

Another example, but now showing only minimal knowledge about the domain:

```
1   <domain name="hidden.nl" view="public">
2     <date>2011-03-21T09:03:33.01656Z</date>
3     <status>
4       <code>quarantine</code>
5       <explain lang="en-UK">in quarantaine</explain>
6       <domain-release-date>2010-12-12+01:00</domain-release-date>
7     </status>
8     <registrar>AAA123456-SIDN2</registrar>
9     <contact-details lang="en-UK" restriction="optout">
10  Registrant details protected. Please contact the registrar.
11  </contact-details>
12    <registered>2000-02-03+01:00</registered>
13    <last-change>2009-06-15+02:00</last-change>
14  </domain>
```

13

5.4 `registrar` **information**

registrarRefType

Refers to a registrar.

```
1   <simpleType name="registrarRefType">
2     <restriction base="token" />
3   </simpleType>
```

countryCodeType

An ISO 3166 standardized country code. Only the two character wide codes are used.

```
1   <simpleType name="countryCodeType">
2     <restriction base="token">
3       <pattern value="[A-Z]{2}" />
4     </restriction>
5   </simpleType>
```

registrar

Describes a registrar, an Internet Provider which participates in SIDN.

```
1   <element name="registrar" type="whois:registrarType" />
2
3   <complexType name="registrarType">
4     <complexContent>
5       <extension base="whois:whoisObjectType">
6         <sequence>
7           <element name="name"    type="string" />
8           <element name="address" type="whois:addressType" />
9         </sequence>
10       </extension>
11     </complexContent>
12   </complexType>
```

addressType

The address is a detailed description of a living or company address. All address lines are language independent, except the country name.

For historical reasons, addresses of foreign registrars do not contain separate city and postal-code information; those are include in the `street` lines.

In the currect verion of DRS5, the `organization` name is missing, even when a `department` may be provided. In that case, the contact probably belongs to the company of the registrant but you cannot be sure.

```
1   <complexType name="addressType">
2     <sequence>
3       <element name="organization" type="string" minOccurs="0" />
4       <element name="department"   type="string" minOccurs="0" />
5       <element name="street"       type="string" maxOccurs="3" />
6       <element name="postal-code"  type="string" minOccurs="0" />
7       <element name="city"         type="string" minOccurs="0" />
8       <element name="country-code" type="whois:countryCodeType"/>
9       <element name="country"      type="whois:userTextType"   />
10     </sequence>
11     <attribute name="format"       type="whois:textFormatType"
12        fixed="plain" />
13   </complexType>
```

timestampType

> Originally, the timestamps were only showing the date not the time of the event. Somewhere during 2011, this will change.
>
> SIDN will show either the `date` or `dateTime`. Once the server has moved to output `dateTime`, it will never show simple dates again.

```
1  <simpleType name="timestampType">
2    <union memberTypes="date dateTime" />
3  </simpleType>
```

```
1  <registrar >
2    <date>2011-03-21T09:03:33.0172Z</date>
3    <name>St. Internet Domeinregistratie Nederland</name>
4    <address>
5      <street>Utrechtseweg 310</street>
6      <postal-code>6812AR</postal-code>
7      <city>Arnhem</city>
8      <country-code>NL</country-code>
9      <country lang="nl-NL">Nederland</country>
10   </address>
11 </registrar>
```

```
1  <registrar >
2    <date>2011-03-21T09:03:33.02233Z</date>
3    <name>EuroDNS S.A.</name>
4    <address>
5      <street>2, rue Leon Laval</street>
6      <street>L-3372</street>
7      <street>LEUDELANGE</street>
8      <country-code>LU</country-code>
9      <country lang="en-UK">Luxembourg</country>
10   </address>
11 </registrar>
```

5.5 `contact` information

The following data-structures describe a contact person, company or organization.

contactRefType

> Refer to a contact person and his/her responsibility with respect to the domain. It is very well possible that the same person has more than one role. In that case, the same contact id will appear multiple times in the `domain` structure.

```
1  <complexType name="contactRefType">
2    <simpleContent>
3      <extension base="whois:contactLabelType">
4        <attribute name="role" type="whois:contactRoleType"
5            use="required" />
6      </extension>
7    </simpleContent>
8  </complexType>
```

contact

> Refers to a 'contact', which can either be a company/organization or a private person. In

case the company or organization is located in the Netherlands, you may find additional
information attached.

The information presented here is strongly influenced by the restrictions which apply to
your accessors class, the `optout` requested by the domain owner, and company rules
of SIDN.

```
1   <element name="contact" type="whois:contactType" />
2
3   <complexType name="contactType">
4     <complexContent>
5       <extension base="whois:whoisObjectType">
6         <sequence>
7           <element name="name"    type="string" />
8           <element name="email"   type="string"
9               minOccurs="0" />
10          <element name="voice"   type="whois:phoneNumberType"
11              minOccurs="0" />
12          <element name="address" type="whois:addressType"
13              minOccurs="0" />
14          <element name="company" type="whois:companyType"
15              minOccurs="0" />
16          <element name="domicile-sidn" type="whois:userTextType"
17              minOccurs="0" />
18        </sequence>
19        <attribute name="id"      type="whois:contactLabelType"
20            use="required"  />
21        <attribute name="view"    type="whois:contactViewType"
22            default="no"    />
23      </extension>
24    </complexContent>
25  </complexType>
```

contactLabelType

Describes how the unique identifiers for contacts are formatted in DRS.

```
1   <simpleType name="contactLabelType">
2     <restriction base="token">
3       <pattern value="[A-Z]{3}[0-9]{6}-[A-Z0-9]{5}" />
4     </restriction>
5   </simpleType>
```

contactRoleType

The role of the `contact` with respect to the `domain` at hand.

```
1   <simpleType name="contactRoleType">
2     <restriction base="token">
3       <enumeration value="registrant" />
4       <enumeration value="admin" />
5       <enumeration value="tech"  />
6     </restriction>
7   </simpleType>
```

contactViewType

Explains the restrictions applied to the `contact` information. Information about the
same contact but for a different domain may show less or more details.

```
1    <simpleType name="contactViewType">
2      <restriction base="token">
3        <enumeration value="no"     />
4        <enumeration value="all"    />
5        <enumeration value="csi"    />
6        <enumeration value="public" />
7        <enumeration value="optout" />
8      </restriction>
9    </simpleType>
```

phoneNumberType

The telephone number is in e164 notation, for instance +31.26123456 . Blanks, dashes and other typical phone number mark-up are not allowed. This e164 notation may cause confusion for non-technical end-users.

```
1    <simpleType name="phoneNumberType">
2      <restriction base="token">
3        <pattern value="\+[0-9]{1,3}\.[0-9]{1,14}" />
4      </restriction>
5    </simpleType>
```

companyType

Only when the registrant is a Dutch company or organization, there may be additional information about its type and registration code for the Dutch Camber of Commerce.

```
1    <complexType name="companyType">
2      <sequence>
3        <element name="type-of-business"
4            type="whois:businessTypeType" />
5        <element name="trade-register-number" type="string" />
6      </sequence>
7    </complexType>
```

businessClassType

The category of the business, as defined by DRS. These fields are mainly conform the list of the Dutch Chamber of Commerce, but there are some extensions.

```
1    <simpleType name="businessClassType">
2      <restriction base="token">
3        <enumeration value="ANDERS"      />
4        <enumeration value="BGG"         />
5        <enumeration value="BRO"         />
6        <enumeration value="BV"          />
7        <enumeration value="BVI/O"       />
8        <enumeration value="COOP"        />
9        <enumeration value="CV"          />
10       <enumeration value="EENMANSZAAK" />
11       <enumeration value="EESV"        />
12       <enumeration value="KERK"        />
13       <enumeration value="MAATSCHAP"   />
14       <enumeration value="NV"          />
15       <enumeration value="OWM"         />
16       <enumeration value="PERSOON"     />
17       <enumeration value="REDR"        />
18       <enumeration value="STICHTING"   />
```

```
19        <enumeration value="VERENIGING"  />
20        <enumeration value="VOF"          />
21     </restriction>
22   </simpleType>
```

businessTypeType

The "type of business" is defined by an internal DRS code and en string which translates the code in the selected language and format.

```
1    <complexType name="businessTypeType">
2      <simpleContent>
3        <extension base="string">
4          <attribute name="class"  type="whois:businessClassType" />
5          <attribute name="lang"    type="language" />
6          <attribute name="format" type="whois:textFormatType"
7             fixed="plain" />
8        </extension>
9      </simpleContent>
10   </complexType>
```

Example of the whois:contact structure, showing a person living in the Netherlands.

```
1    <contact id="PIJ001675-SIDN2">
2      <date>2011-03-21T09:03:33.0228Z</date>
3      <name>Jan van Pijkeren</name>
4      <email>support@sidn.nl</email>
5      <voice>+31.263525555</voice>
6    </contact>
```

Example of a whois:contact structure listing a company.

```
1    <contact id="STI044010-SIDN2">
2      <date>2011-03-21T09:03:33.03228Z</date>
3      <name>St. SIDN</name>
4      <email>support@sidn.nl</email>
5      <voice>+31.263525555</voice>
6      <company>
7        <type-of-business class="STICHTING" lang="en-UK">
8            Foundation
9          </type-of-business>
10       <trade-register-number>232902771786</trade-register-number>
11     </company>
12   </contact>
```

Example of a company which represents a registrant located outside the Netherlands. The domicile-sidn message will only appear when the company is used are registrant.

```
1    <contact id="XAS123456-ABCD2">
2      <date>2011-03-21T09:03:33.03275Z</date>
3      <name>Internet Provider</name>
4      <email>support@abcd.de</email>
5      <voice>+32.123456789</voice>
6      <domicile-sidn lang="en-UK" format="html">
7   &lt;p&gt;As the registrant's address is not in the Netherlands, the registrant
```

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```
 8   is obliged by the General Terms and Conditions for .nl Registrants to use
 9   SIDN's registered office address as a domicile address. More information
10   on the use of a domicile address may be found at
11   &lt;a href="http://www.sidn.nl"&gt;www.sidn.nl&lt;/a&gt;.&lt;/p&gt;
12   </domicile-sidn>
13   </contact>
```

5.6 `nameserver` **information**

The following structures describe a name-server. The same name-servers may be used with different domains. For each domain, these records will display the same details.

nameserverRefType

> Refers to a name-server. This reference is used in a `domain`, hence there is a `in-zone` relationship which may be useful in XSLT transformations of the whois output.

```
1   <complexType name="nameserverRefType">
2     <simpleContent>
3       <extension base="whois:hostRefType">
4         <attribute name="in-zone" type="boolean" use="required" />
5       </extension>
6     </simpleContent>
7   </complexType>
```

nameserver

> The `nameserver` object contains 1 upto 13 ip-addresses, where the order has no special meaning (but always sorted alphabetically, to have a reproducible result).

```
 1   <element name="nameserver" type="whois:nameserverType" />
 2
 3   <complexType name="nameserverType">
 4     <complexContent>
 5       <extension base="whois:whoisObjectType">
 6         <choice minOccurs="1" maxOccurs="13">
 7           <element name="ipv4-address"
 8               type="whois:ipv4AddressType" />
 9           <element name="ipv6-address"
10               type="whois:ipv6AddressType" />
11         </choice>
12         <attribute name="host" type="whois:hostRefType"
13             use="required" />
14       </extension>
15     </complexContent>
16   </complexType>
```

hostRefType

> Refers to a system (a host). Currently only used to refer to name-servers.

```
1   <simpleType name="hostRefType">
2     <restriction base="token">
3       <pattern value="[a-z0-9.-]+\.[a-z]{2,}" />
4     </restriction>
5   </simpleType>
```

ipv4AddressType

> Represents an IPv4 address.

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```
1    <simpleType name="ipv4AddressType">
2      <restriction base="token">
3        <pattern value="[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}" />
4      </restriction>
5    </simpleType>
```

ipv6AddressType

Represents an IPv6 address. There are many notations for IPv6 addresses, therefore the field is only restricted to the characters which appear in such address. DRS may have reformatted (normalized) the IPv6 address which were provided via EPP.

```
1    <simpleType name="ipv6AddressType">
2      <restriction base="token">
3        <pattern value="[0-9a-f:]{3,39}" />
4      </restriction>
5    </simpleType>
```

Two examples of name-server specifications:

```
1    <nameserver host="ns1.sidn.nl">
2      <date>2011-03-21T09:03:33.03317Z</date>
3      <ipv4-address>94.198.152.68</ipv4-address>
4      <ipv6-address>2a00:d78:0:147:94:198:152:68</ipv6-address>
5    </nameserver>
```

```
1    <nameserver host="open.nlnetlabs.nl">
2      <date>2011-03-21T09:03:33.03318Z</date>
3      <ipv6-address>2001:7b8:206:1::53</ipv6-address>
4      <ipv4-address>213.154.224.1</ipv4-address>
5    </nameserver>
```

5.7 Schema wrapper

The schema initiation.

```
1    <schema
2      xmlns="http://www.w3.org/2001/XMLSchema"
3      xmlns:whois="http://rxsd.domain-registry.nl/sidn-whois-drs50"
4      targetNamespace="http://rxsd.domain-registry.nl/sidn-whois-drs50"
5      elementFormDefault="qualified"
6      version="2011-04-01"
7    >
```

The end of the schema.

```
1    </schema>
```

5.8 WHOIS example

All example fragments put together, posing an 'arbitrary' question with realistic answer.

The question:

```
1   <?xml version="1.0" encoding="UTF-8"?>
2   <whois-query xmlns="http://rxsd.domain-registry.nl/sidn-whois-drs50">
3     <lang>en-UK</lang>
4     <usertext-format>html</usertext-format>
5     <domain>sidn.nl</domain>
6   </whois-query>
```

And the answer:

```
1   <?xml version="1.0" encoding="UTF-8"?>
2   <whois-response xmlns="http://rxsd.domain-registry.nl/sidn-whois-drs50">
3     <domain name="sidn.nl" view="isp">
4       <date>2011-03-21T09:03:33.00775Z</date>
5       <status>
6         <code>active</code>
7         <explain lang="en-UK">actief</explain>
8       </status>
9       <registrar>AAA123456-SIDN2</registrar>
10      <contact role="registrant">STI044010-SIDN2</contact>
11      <contact role="admin">HAM003802-SIDN2</contact>
12      <contact role="tech">PIJ001675-SIDN2</contact>
13      <nameserver in-zone="true">ns1.sidn.nl</nameserver>
14      <nameserver in-zone="false">open.nlnetlabs.nl</nameserver>
15      <nameserver in-zone="true">ns2.sidn.nl</nameserver>
16      <registered>1999-11-18+01:00</registered>
17      <last-change>2009-09-14+02:00</last-change>
18    </domain>
19    <registrar>
20      <date>2011-03-21T09:03:33.0172Z</date>
21      <name>St. Internet Domeinregistratie Nederland</name>
22      <address>
23        <street>Utrechtseweg 310</street>
24        <postal-code>6812AR</postal-code>
25        <city>Arnhem</city>
26        <country-code>NL</country-code>
27        <country lang="nl-NL">Nederland</country>
28      </address>
29    </registrar>
30    <contact id="STI044010-SIDN2">
31      <date>2011-03-21T09:03:33.03228Z</date>
32      <name>St. SIDN</name>
33      <email>support@sidn.nl</email>
34      <voice>+31.263525555</voice>
35      <company>
36        <type-of-business class="STICHTING" lang="en-UK">
37          Foundation
38        </type-of-business>
39        <trade-register-number>232902771786</trade-register-number>
```

21

```
40        </company>
41      </contact>
42      <contact id="HAM003802-SIDN2">
43        <date>2011-03-21T09:03:33.03191Z</date>
44        <name>G.J. van den Ham</name>
45        <email>support@sidn.nl</email>
46        <voice>+31.263525555</voice>
47      </contact>
48      <contact id="PIJ001675-SIDN2">
49        <date>2011-03-21T09:03:33.0228Z</date>
50        <name>Jan van Pijkeren</name>
51        <email>support@sidn.nl</email>
52        <voice>+31.263525555</voice>
53      </contact>
54      <nameserver host="ns1.sidn.nl">
55        <date>2011-03-21T09:03:33.03317Z</date>
56        <ipv4-address>94.198.152.68</ipv4-address>
57        <ipv6-address>2a00:d78:0:147:94:198:152:68</ipv6-address>
58      </nameserver>
59      <nameserver host="open.nlnetlabs.nl">
60        <date>2011-03-21T09:03:33.03318Z</date>
61        <ipv6-address>2001:7b8:206:1::53</ipv6-address>
62        <ipv4-address>213.154.224.1</ipv4-address>
63      </nameserver>
64      <nameserver host="ns3.sidn.nl">
65        <date>2011-03-21T09:03:33.03319Z</date>
66        <ipv4-address>194.171.17.5</ipv4-address>
67        <ipv4-address>194.171.17.6</ipv4-address>
68      </nameserver>
69      <signature>
70        <maintainer lang="en-UK" format="plain">
71          NL Domain Registry
72        </maintainer>
73        <copyright lang="en-UK" format="html">
74 &lt;p&gt;&lt;span class="copy"&gt;Copyright notice&lt;/span&gt;&lt;br&gt;
75 No part of this publication may be reproduced, published, stored in a
76 retrieval system, or transmitted, in any form or by any means,
77 electronic, mechanical, recording, or otherwise, without prior
78 perm [etc...]
79        </copyright>
80      </signature>
81    </whois-response>
```

A   Complete schema

```
1    <schema
2      xmlns="http://www.w3.org/2001/XMLSchema"
3      xmlns:whois="http://rxsd.domain-registry.nl/sidn-whois-drs50"
4      targetNamespace="http://rxsd.domain-registry.nl/sidn-whois-drs50"
5      elementFormDefault="qualified"
6      version="2010-08-25"
7    >
8
9    <!-- please read the document which explains this schema, available from
10       http://rxsd.domain-registry.nl/
11      -->
12
13     <complexType name="addressType">
14       <sequence>
15         <element name="organization" type="string" minOccurs="0" />
16         <element name="department"   type="string" minOccurs="0" />
17         <element name="street"       type="string" maxOccurs="3" />
18         <element name="postal-code"  type="string" minOccurs="0" />
19         <element name="city"         type="string" minOccurs="0" />
20         <element name="country-code" type="whois:countryCodeType"/>
21         <element name="country"      type="whois:userTextType"   />
22       </sequence>
23       <attribute name="format"        type="whois:textFormatType"
24          fixed="plain" />
25     </complexType>
26
27     <complexType name="anyQueryType">
28       <sequence>
29         <element name="lang" type="language" default="en-UK" />
30         <element name="output-format"   type="whois:outputFormatType"
31            default="xml" />
32         <element name="usertext-format" type="whois:textFormatType"
33            default="plain" />
34       </sequence>
35     </complexType>
36
37     <simpleType name="businessClassType">
38       <restriction base="token">
39         <enumeration value="ANDERS"      />
40         <enumeration value="BGG"         />
41         <enumeration value="BRO"         />
42         <enumeration value="BV"          />
43         <enumeration value="BVI/O"       />
44         <enumeration value="COOP"        />
45         <enumeration value="CV"          />
46         <enumeration value="EENMANSZAAK" />
47         <enumeration value="EESV"        />
48         <enumeration value="KERK"        />
49         <enumeration value="MAATSCHAP"   />
50         <enumeration value="NV"          />
51         <enumeration value="OWM"         />
```

23

```
52        <enumeration value="PERSOON"      />
53        <enumeration value="REDR"         />
54        <enumeration value="STICHTING"    />
55        <enumeration value="VERENIGING"   />
56        <enumeration value="VOF"          />
57      </restriction>
58    </simpleType>
59
60    <complexType name="businessTypeType">
61      <simpleContent>
62        <extension base="string">
63          <attribute name="class"  type="whois:businessClassType" />
64          <attribute name="lang"   type="language" />
65          <attribute name="format" type="whois:textFormatType"
66            fixed="plain" />
67        </extension>
68      </simpleContent>
69    </complexType>
70
71    <complexType name="companyType">
72      <sequence>
73        <element name="type-of-business"
74          type="whois:businessTypeType" />
75        <element name="trade-register-number" type="string" />
76      </sequence>
77    </complexType>
78
79    <element name="contact" type="whois:contactType" />
80
81    <complexType name="contactType">
82      <complexContent>
83        <extension base="whois:whoisObjectType">
84          <sequence>
85            <element name="name"    type="string" />
86            <element name="email"   type="string"
87              minOccurs="0" />
88            <element name="voice"   type="whois:phoneNumberType"
89              minOccurs="0" />
90            <element name="address" type="whois:addressType"
91              minOccurs="0" />
92            <element name="company" type="whois:companyType"
93              minOccurs="0" />
94            <element name="domicile-sidn" type="whois:userTextType"
95              minOccurs="0" />
96          </sequence>
97          <attribute name="id"      type="whois:contactLabelType"
98            use="required"  />
99          <attribute name="view"    type="whois:contactViewType"
100            default="no"    />
101        </extension>
102      </complexContent>
103    </complexType>
104
```

```
105    <complexType name="contactDetailsType">
106      <complexContent>
107        <extension base="whois:userTextType">
108          <attribute name="restriction"
109             type="whois:contactViewType" />
110        </extension>
111      </complexContent>
112    </complexType>
113
114    <simpleType name="contactLabelType">
115      <restriction base="token">
116        <pattern value="[A-Z]{3}[0-9]{6}-[A-Z0-9]{5}" />
117      </restriction>
118    </simpleType>
119
120    <complexType name="contactRefType">
121      <simpleContent>
122        <extension base="whois:contactLabelType">
123          <attribute name="role" type="whois:contactRoleType"
124             use="required" />
125        </extension>
126      </simpleContent>
127    </complexType>
128
129    <simpleType name="contactRoleType">
130      <restriction base="token">
131        <enumeration value="registrant" />
132        <enumeration value="admin" />
133        <enumeration value="tech"  />
134      </restriction>
135    </simpleType>
136
137    <simpleType name="contactViewType">
138      <restriction base="token">
139        <enumeration value="no"     />
140        <enumeration value="all"    />
141        <enumeration value="csi"    />
142        <enumeration value="public" />
143        <enumeration value="optout" />
144      </restriction>
145    </simpleType>
146
147    <simpleType name="countryCodeType">
148      <restriction base="token">
149        <pattern value="[A-Z]{2}" />
150      </restriction>
151    </simpleType>
152
153    <element name="domain" type="whois:domainType" />
154
155    <complexType name="domainType">
156      <complexContent>
157        <extension base="whois:whoisObjectType">
```

```
158              <sequence>
159                <element ref="whois:status" />
160
161                <element name="registrar"
162                   type="whois:registrarRefType"
163                   minOccurs="0" />
164
165                <element name="contact"
166                   type="whois:contactRefType"
167                   minOccurs="0" maxOccurs="unbounded" />
168
169                <element name="nameserver"
170                   type="whois:nameserverRefType"
171                   minOccurs="0" maxOccurs="unbounded" />
172
173                <element name="contact-details"
174                   type="whois:contactDetailsType"
175                   minOccurs="0" />
176                <element name="registered"  type="date"
177                   minOccurs="0" />
178                <element name="last-change" type="date"
179                   minOccurs="0" />
180           </sequence>
181
182           <attribute name="name" type="whois:domainRefType"
183              use="required" />
184
185           <attribute name="view" type="whois:domainViewType"
186              use="required" />
187
188         </extension>
189       </complexContent>
190     </complexType>
191
192     <simpleType name="domainRefType">
193       <restriction base="token">
194         <pattern value="[a-zA-Z0-9-]{2,63}\.nl" />
195       </restriction>
196     </simpleType>
197
198     <simpleType name="domainViewType">
199       <restriction base="token">
200         <enumeration value="ca"     />
201         <enumeration value="csi"    />
202         <enumeration value="public" />
203         <enumeration value="isp"    />
204       </restriction>
205     </simpleType>
206
207     <element name="fault" type="whois:faultType" />
208
209     <complexType name="faultType">
210       <complexContent>
```

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```
211          <extension base="whois:whoisObjectType">
212            <sequence>
213              <element name="code" type="unsignedShort" />
214              <element name="explain"
215                  type="whois:userTextType" />
216            </sequence>
217          </extension>
218        </complexContent>
219      </complexType>
220
221      <simpleType name="hostRefType">
222        <restriction base="token">
223          <pattern value="[a-z0-9.-]+\.[a-z]{2,}" />
224        </restriction>
225      </simpleType>
226
227      <simpleType name="ipv4AddressType">
228        <restriction base="token">
229          <pattern value="[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}" />
230        </restriction>
231      </simpleType>
232
233      <simpleType name="ipv6AddressType">
234        <restriction base="token">
235          <pattern value="[0-9a-f:]{3,39}" />
236        </restriction>
237      </simpleType>
238
239      <element name="is-query" type="whois:isQueryType" />
240
241      <complexType name="isQueryType">
242        <complexContent>
243          <extension base="whois:anyQueryType">
244            <sequence>
245              <element name="domain" type="whois:domainRefType" />
246            </sequence>
247          </extension>
248        </complexContent>
249      </complexType>
250
251      <element name="is-response" type="whois:isResponseType" />
252
253      <complexType name="isResponseType">
254        <choice>
255          <element ref="whois:fault"     />
256          <element ref="whois:is-status" />
257        </choice>
258      </complexType>
259
260      <element name="is-status" type="whois:isStatusType" />
261
262      <complexType name="isStatusType">
263        <complexContent>
```

```
264        <extension base="whois:whoisObjectType">
265          <sequence>
266            <element name="available" type="boolean" />
267            <element name="code"     type="whois:statusCodeType"/>
268            <element name="explain" type="whois:userTextType"  />
269          </sequence>
270          <attribute name="domain"  type="whois:domainRefType" />
271        </extension>
272      </complexContent>
273    </complexType>
274
275    <element name="nameserver" type="whois:nameserverType" />
276
277    <complexType name="nameserverType">
278      <complexContent>
279        <extension base="whois:whoisObjectType">
280          <choice minOccurs="1" maxOccurs="13">
281            <element name="ipv4-address"
282               type="whois:ipv4AddressType" />
283            <element name="ipv6-address"
284               type="whois:ipv6AddressType" />
285          </choice>
286          <attribute name="host" type="whois:hostRefType"
287             use="required" />
288        </extension>
289      </complexContent>
290    </complexType>
291
292    <complexType name="nameserverRefType">
293      <simpleContent>
294        <extension base="whois:hostRefType">
295          <attribute name="in-zone" type="boolean" use="required" />
296        </extension>
297      </simpleContent>
298    </complexType>
299
300    <simpleType name="outputFormatType">
301      <restriction base="token">
302        <enumeration value="plain" />
303        <enumeration value="html"  />
304        <enumeration value="xml"   />
305      </restriction>
306    </simpleType>
307
308    <simpleType name="phoneNumberType">
309      <restriction base="token">
310        <pattern value="\+[0-9]{1,3}\.[0-9]{1,14}" />
311      </restriction>
312    </simpleType>
313
314    <element name="registrar" type="whois:registrarType" />
315
316    <complexType name="registrarType">
```

```
317        <complexContent>
318          <extension base="whois:whoisObjectType">
319            <sequence>
320              <element name="name"    type="string" />
321              <element name="address" type="whois:addressType" />
322            </sequence>
323          </extension>
324        </complexContent>
325      </complexType>
326
327      <simpleType name="registrarRefType">
328        <restriction base="token" />
329      </simpleType>
330
331      <element name="signature" type="whois:signatureType" />
332
333      <complexType name="signatureType">
334        <sequence>
335          <element name="maintainer" type="whois:userTextType" />
336          <element name="copyright"  type="whois:userTextType" />
337        </sequence>
338      </complexType>
339
340      <element name="status" type="whois:statusType" />
341
342      <complexType name="statusType">
343        <sequence>
344          <element name="code"    type="whois:statusCodeType" />
345          <element name="explain" type="whois:userTextType"   />
346          <choice minOccurs="0">
347            <element name="domain-release-date" type="date"   />
348          </choice>
349        </sequence>
350      </complexType>
351
352      <simpleType name="statusCodeType">
353        <restriction base="token">
354          <enumeration value="active"    />
355          <enumeration value="requested" />
356          <enumeration value="inactive"  />
357          <enumeration value="withdrawn" />
358          <enumeration value="quarantine"/>
359          <enumeration value="excluded"  />
360          <enumeration value="free"      />
361        </restriction>
362      </simpleType>
363
364      <simpleType name="textFormatType">
365        <restriction base="token">
366          <enumeration value="plain" />
367          <enumeration value="html"  />
368        </restriction>
369      </simpleType>
```

```
370
371    <complexType name="userTextType">
372      <simpleContent>
373        <extension base="string">
374
375          <attribute name="lang" type="language"
376             use="required" />
377
378          <attribute name="format" type="whois:textFormatType"
379             default="plain" />
380
381        </extension>
382      </simpleContent>
383    </complexType>
384
385    <element name="whois-query" type="whois:whoisQueryType" />
386
387    <complexType name="whoisQueryType">
388      <complexContent>
389        <extension base="whois:anyQueryType">
390          <sequence>
391            <element name="domain" type="whois:domainRefType" />
392          </sequence>
393        </extension>
394      </complexContent>
395    </complexType>
396
397    <element name="whois-response" type="whois:whoisResponseType" />
398
399    <complexType name="whoisResponseType">
400      <choice>
401        <element ref="whois:fault" />
402        <sequence>
403          <element ref="whois:domain" />
404          <element ref="whois:registrar"
405             minOccurs="0" />
406          <element ref="whois:contact"
407             minOccurs="0" maxOccurs="unbounded" />
408          <element ref="whois:nameserver"
409             minOccurs="0" maxOccurs="unbounded" />
410          <element ref="whois:signature" />
411        </sequence>
412      </choice>
413    </complexType>
414
415    <complexType name="whoisObjectType" abstract="true">
416      <sequence>
417        <element name="date" type="dateTime" />
418      </sequence>
419    </complexType>
420
421  </schema>
```

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