Network Working Group
Internet-Draft
Intended status: Standards Track
Expires: April 2, 2011

M. Hunt
New Zealand Registry Services

September 29, 2010

System for Managing a Shared Domain Registry
draft-nzrs-srs-03

Abstract

This document describes the typical usage and communication protocol of a client/server shared registry system for management of domain name registrations. The system described is a "thick registry" system, providing support for the storage and management of both the technical and the registrant contact information concerning domain registrations. The system relies on the existing HTTP and HTTPS infrastructure for transport and secure transfer to avoid having to implement a dedicated protocol and server environment. A bespoke XML format is used to communicate between clients and the SRS server.

Comments are solicited and should be addressed to the author: matt@nzrs.net.nz

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on April 2, 2011.

Copyright Notice

Table of Contents

1. Introduction

This document describes the Shared Registry System (SRS), a system for managing a shared domain name registry. This system broadly satisfies the requirements for a generic registry-registrar protocol as defined in RFC 3375 [RFC3375]. As this system only addresses the issue of managing a shared registry service and uses HTTP [RFC2616] as its transport layer, implementations are expected to be relatively easy.

This document also describes the communication protocol used by the SRS system. This protocol uses messages in an XML format for system requests and responses. The schema for the SRS protocol, in RELAX NG compact syntax, is provided in its entirety as an appendix (Appendix C) to this document, and individual parts of the protocol are covered in depth throughout the document.

The SRS works in a connection-oriented fashion with no session state. The registrar sends a request document to the registry containing commands to be executed by the SRS and the result of processing these commands is returned as the response. Each registrar request document receives a response document containing the result of processing all of the requests in a single request document.

Public Key Infrastructure (PKI) is used to manage issues of security, authentication of requests and non-repudiation of actions. Exchange of keys between the registry and registrars is outside the scope of this document.

A system built using this protocol is used by .nz Registry Services (NZRS) and a sample implementation [1] consisting of client and server software is available from the Sourceforge web site.

2. Conventions used in this Document

The definitions of Registry, Registrar, and Registrant from RFC 3375 [RFC3375] are used in this document and are included below.

SRS: a software implementation of the shared registry system described here.

Registry: An entity that provides back-end domain name registration services to registrars, managing a central repository of information associated with domain name delegations. A registry is typically responsible for publication and distribution of zone files used by the Domain Name System.

Registrar: An entity that provides front-end domain name registration services to registrants, providing a public interface to registry services.

Registrant: An entity that registers domain names in a registry through the services provided by a registrar. Registrants include individuals, organizations, and corporations.

UDAI: The Unique Domain Authentication Identifier (UDAI) is a domain code that is generated by the SRS and stored by the registrar and registrant to restrict updates to domain details. The value of the UDAI is not stored within the SRS, but a message digest of the value is kept to check the integrity of domain update and transfer requests. The UDAI SHOULD be an ASCII [US-ASCII] encoded character string.

2.1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

3. System Description

The SRS provides the functions required to support all of the usual business functions of a domain registration service, including:

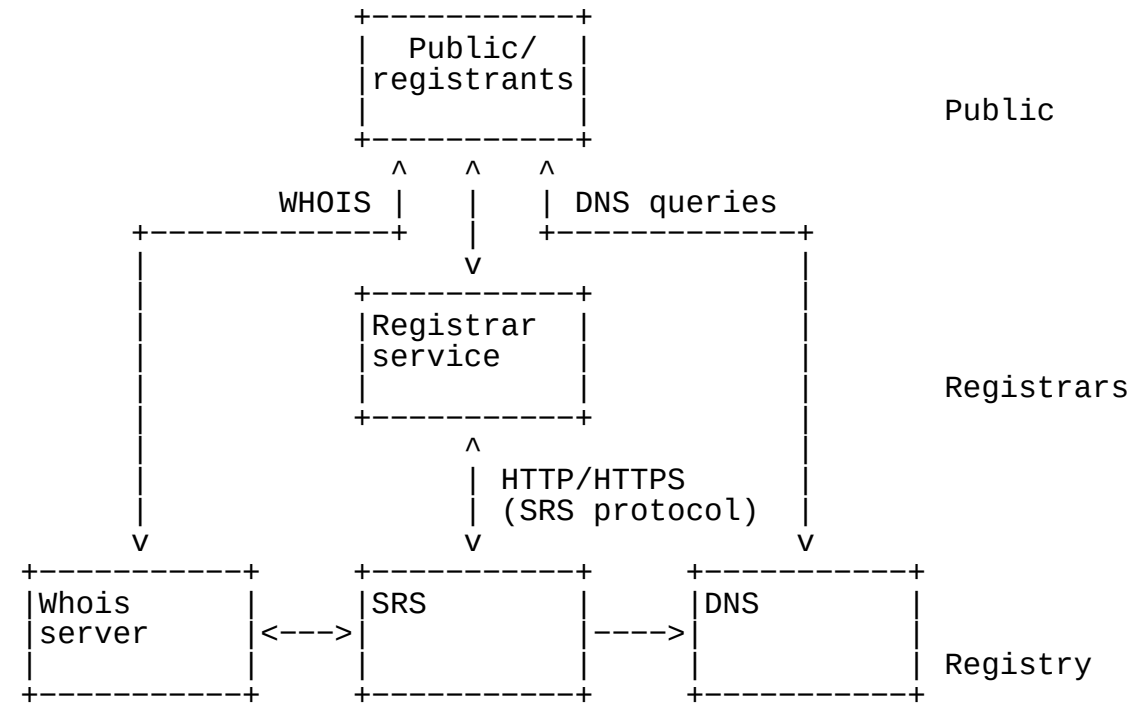
- creation, maintenance, querying and deletion of domain details
- querying of public details of a domain - to support a public WHOIS service
- transfer of domains between registrars
- creation, maintenance, querying and deletion of registrar details
- regular zone file creation for domains delegated to appear in the domain name system (DNS)
- registrar account query, maintenance, and message polling
- creation and cancellation of scheduled jobs in the SRS to support business functions (such as building zone files and releasing and renewing domains)
- management and configuration of the SRS by the registry

- o billing and accounting functions to work with the registry's accounting system

Direct and indirect interactions with the SRS may be split into three main groups:

- o the public (including registrants),
- o registrars,
- o and the registry.

Their interactions with the SRS are summarized below.



3.1. The Public

The public (and registrants − the domain registering public) have no direct access to the SRS server. They interact with the system through:

- o querying domain ownership details in the public WHOIS system,
- o performing hostname lookups to access services hosted on the internet,

- registering domains by establishing a business relationship with a registrar,
- transferring their registered domains between registrars,
- and maintaining their own domain details through systems provided by a registrar.

3.2. Registrars

Registrars generate most of the work that the SRS server handles. They are expected to maintain their own registrar details within the SRS as an aspect of their business relationship with the registry. They also offer services to the public, or a restricted section of the public, to manage domain registrations. These public services are likely to include:

- checking availability of domain names,
- registering domain names,
- transferring domain names from another registrar,
- cancelling domain registrations,
- billing for domain registrations,
- and providing a service to allow registrants to maintaining domain details.

In addition to their customer services, registrars are expected to regularly poll the SRS server using the GetMessages (Section 6.5.1) request, to retrieve details of actions relevant to their business with the registry that they have not initiated directly (for instance, registrant-initiated transfers of domains from them to another registrar, and actions performed by the registry on their behalf).

3.3. The Registry

Generally the registry will be responsible for maintaining all of the information associated with domain name registrations (including both the technical information required to produce zone files and the contact information for registrars and registrants), running the SRS service to support registrars' and its own maintenance of domains, running a public WHOIS service compliant with RFC 3912 [RFC3912], regular backups, data security, and running name servers for their domains.

By running a "thick registry" system, the registry provides security, stability and backup of the registry information, and ensures that registrants are protected against registrar failures.

The information for the public WHOIS service and the name server zone files is derived from the data held in the SRS server. Most registered domains will be delegated to other nameservers.

3.4. The Domain Registration Cycle

Registrants may register domains through registrars according to the limitations of the available subdomains allowed by the registry, and any policy decisions that the registry applies to domain naming.

Registries are encouraged to apply a system of grace periods to the registration cycle of domains once they have initially been registered. The .nz Registry Service applies the following grace periods:

- registration grace period
- renewal grace period
- auto-renew grace period
- redemption grace period

Each grace period exists for a specific period of time that is typically measured in days. The duration of each grace period is a matter of registry operational policy that is not addressed in this document.

3.4.1. Registration Grace Period

The registration grace period applies after the initial registration of a domain name. If the domain name is cancelled by the registrar during this period, all registrar account transactions (billing) for the domain will also be cancelled. The domain name is released back to the available pool of names. A registrant may not transfer the management of a domain to another registrar during this period.

The registry MAY restrict domain cancellations in this term to prevent a single registrar from cancelling a particular domain more than once during the registration grace period.

3.4.2. Renewal Grace Period

The renewal grace period applies after a domain name registration period is explicitly extended (renewed) by the registrar. If the domain name is cancelled by the registrar during this period, the registrar account transaction for the renewal will also be cancelled and the BilledUntil date of the domain rolled back to the previous value.

3.4.3. Auto-renew Grace Period

The auto-renew grace period applies after a domain name registration period expires and is extended (renewed) automatically by the registry. If the domain name is cancelled by the registrar during this period, the registrar account transaction for the renewal will also be cancelled and the BilledUntil date of the domain rolled back to the previous value.

3.4.4. Redemption Grace Period

The redemption grace period applies after a domain registration is cancelled by a registrant. It defines the length of time that a domain will stay in the cancelled state ("PendingRelease" status). After this time expires, the registry will release the domain name back to the available pool of names.

4. Authentication, Security and Authorization

4.1. Authentication

A two factor authentication system is used to establish the identity of the user that makes a request:

- A unique numeric identifier issued to each registrar by the registry
- An OpenPGP-compatible signature of the request body

Registrars are issued with a unique numeric identifier when their account is first created in the SRS. This registrar identifier MUST be included on client requests to allow the SRS server to identify the client. Failure to provide a correct identifier as part of the request SHALL result in the SRS server returning an error response.

The registrar must also maintain at least one public, private OpenPGP-compatible key pair for authentication. One or more public keys are provided to the registry when the registrar account is first

created and the registrar MUST sign requests using one of its registered private keys. This information is used for authentication and to ensure non-repudiation of requests. The registrar may provide multiple public keys to ease the process of expiring old or revoked keys without interrupting the work of the registrar.

If a request does not have a signature, or the signature does not confirm that the identity of the registrar that signed the request matches the registrar identifier attached to the request, then the SRS server SHALL return an error response.

Responses from the SRS server MUST also be signed. Responses are signed by the registry using the registry's private key. The registry public key MUST be made easily available to registrars to allow authentication of response messages. This ensures that registrars can be confident that the responses to their requests are authentic, and have not been altered in transit.

4.2. Security

The request and response signature mechanism provides a means of ensuring that messages have not been tampered with in transit. In addition to this, all requests for private data (data that cannot be retrieved using the public WHOIS system) MUST use an encrypted HTTP connection (HTTPS) for data security. If a request for private data is received via an unencrypted HTTP connection, the SRS server SHALL return an error response.

Only the Whois (Section 6.1.4) request may be issued over an unencrypted HTTP connection.

4.3. Authorization

SRS implementations SHOULD impose a permissions model to restrict the SRS requests that users are allowed to access. Action and role types are defined in the protocol definition for this purpose. If the originating user does not possess all of the permissions required to complete a request, the server SHOULD reject the transaction.

Transactions sent to the server MUST identify the registrar making the request. Registrars SHALL NOT be permitted to perform functions using an effective registrar other than their own. Any such requests received by the registry SHALL be rejected.

The registry SHOULD only access the SRS server through the same interface provided to registrars and SHOULD have one or more well-known registrar identifiers allocated to itself for the purpose of maintaining the registry. No changes should be made to public or

private data in the SRS using other means of access that the registry may have available (for example, direct access to a database store).

The registry MAY perform SRS functions using an arbitrary effective registrar value.

Registrants and the public have no direct access to the SRS.

5. Communication

All communication with the SRS is performed using XML [W3C.REC-xml] documents encoded in UTF-8 [RFC3629] and sent using HTTP [RFC2616] or HTTPS [RFC2818]. The request body MAY contain multiple independent requests to be performed on the SRS. The response MAY include a response to each request in the XML document, or a single error response. The SRS SHOULD process the requests in the order that they are received in the request body.

The user should ensure that:

- requests in an XML document are ordered logically to prevent errors due to sequencing (for example, attempting to update a domain record before creating it)

- the number of requests per XML document is limited to ensure acceptable processing time and response size

Both request and response messages MUST be accompanied by a digital signature of the complete XML request body (the value of the r parameter to the HTTP messages detailed below). The digital signature authentication method follows the specification in section 2.2 of OpenPGP Message Format [RFC4880] and MUST be encoded in ASCII Armor (see section 6.2 of [RFC4880]) for inclusion in the HTTP request. The SRS protocol is a signature-only application of OpenPGP.

SRS implementations MAY define a limit on the response size to support service level agreements on response time. SRS implementations MAY reject requests in an XML document if they would otherwise exceed a defined limit on the response size or response time.

The VerMajor and VerMinor attributes are required in the first element of each request and response to allow clients and servers to modify their behaviour dependent on the version of the protocol that they support. The meaning of the two fields is:

VerMajor: Major version number of the protocol. This number only changes when major changes are made to the system that are not backward compatible with previous versions; for example, client/server interface changes (changes to the protocol schema).

VerMinor: Minor version number of the protocol. This number changes for minor updates to the protocol that are backward compatible with previous versions with the same major version number.

An SRS server MUST reject any request made with a major version number that is greater than the SRS server's own supported version. SRS server implementations MAY support requests made with a major version number that is less than the SRS server's own supported version.

5.1. Request Format

Requests MUST include three parameters in the HTTP POST request:

Parameter	Description
n	The registry-assigned registrar identifier.
r	The XML request, encoded in UTF-8.
s	An OpenPGP-compatible signature of the XML request document, signed with the registrar's private key. Presented in ASCII armored format and encoded in UTF-8.

The XML request document MUST be formatted using the SRSRequest element or the NZSRSRequest element. These elements are identical (the SRSRequest element was introduced in version 5.4 of the protocol and is intended to replace the NZSRSRequest element). The elements MAY contain one or more requests. Valid request names are defined by the Action (Section 9.1.10) entity.

Syntax:

```
requestElements =
    (element.DomainCreate
     | element.DomainUpdate
     | element.HandleCreate
     | element.HandleUpdate
     | element.HandleDetailsQry
     | element.Whois
     | element.DomainDetailsQry
     | element.ActionDetailsQry
```

```
        | element.UDAIValidQry
        | element.RegistrarCreate
        | element.RegistrarUpdate
        | element.RegistrarDetailsQry
        | element.RegistrarAccountQry
        | element.GetMessages
        | element.AckMessage
        | element.SysParamsCreate
        | element.SysParamsUpdate
        | element.SysParamsQry
        | element.RunLogCreate
        | element.RunLogQry
        | element.ScheduleCreate
        | element.ScheduleCancel
        | element.ScheduleQry
        | element.ScheduleUpdate
        | element.BillingAmountUpdate
        | element.BillingAmountQry
        | element.DeferredIncomeSummaryQry
        | element.DeferredIncomeDetailQry
        | element.BilledUntilAdjustment
        | element.BuildDnsZoneFiles
        | element.GenerateDomainReport
        | element.AdjustRegistrarAccount
        | element.AccessControlListQry
        | element.AccessControlListAdd
        | element.AccessControlListRemove)+

   rootAttributes =
       attribute VerMajor { Number },
       attribute VerMinor { Number },
       attribute RegistrarId { RegistrarId }?

   element.NZSRSRequest =
      element NZSRSRequest {
       rootAttributes,
       requestElements
      }

   element.SRSRequest =
      element SRSRequest {
       rootAttributes,
       requestElements
      }
```

Example of a request body prior to encoding:

```
n=50041&r=
<SRSRequest VerMajor="5" VerMinor="4" RegistrarId="50041">
    <Whois DomainName="example.org" />
</SRSRequest>&s=-----BEGIN PGP SIGNATURE-----...
```

5.2. Response Format

The body of the SRS server response MUST include two parameters:

Parameter	Description
r	The XML response, encoded in UTF-8.
s	An OpenPGP-compatible signature of the XML response document, signed with the registry's private key. Presented in ASCII armored format and encoded in UTF-8.

The XML response document MUST be formatted using the SRSResponse element or the NZSRSResponse element (as with the request element, the element without the NZ prefix is expected to replace the element with the NZ prefix). The element MAY contain one or more Response (Section 5.2.1) elements or an Error (Section 7.8) element.

Syntax:

```
element.NZSRSResponse =
  element NZSRSResponse {
    rootAttributes,
    (element.Response+ | element.Error)
  }

element.SRSResponse =
  element SRSResponse {
    rootAttributes,
    (element.Response+ | element.Error)
  }
```

Example of a decoded response message:

```
r=<?xml version="1.0" encoding="utf-8"?>
<SRSResponse VerMajor="5" VerMinor="4" RegistrarId="50041">
    <Response Action="Whois" FeId="4" FeSeq="137"
      OrigRegistrarId="50041" RecipientRegistrarId="50041" Rows="1">
        <FeTimeStamp Year="2007" Month="10" Day="19" Hour="14"
           Minute="7" Second="51" TimeZoneOffset="+13:00" />
        <Domain DomainName="example.org">...</Domain>
    </Response>
</SRSResponse>&s=-----BEGIN PGP SIGNATURE-----...
```

5.2.1. Response

The response element acts as a container for all response types, including errors to individual requests in an XML document. If an error is encountered in parsing the request, or the client specified a major protocol version higher than that supported by the server, the SRS server MUST return the Error (Section 7.8) element with no Response container.

The response element may contain any of the following:

- multiple responses in response to a GetMessages (Section 6.5.1) request, or
- a single action response (Section 9.14.1) specific to the type of action request.

The Response element must specify:

Attribute	Description
Action	The name of the request action (Section 9.1.11) that this is a response to.
FeId	The unique identifier of the SRS server that handled the request.
FeSeq	The unique identifier for the request on the server that handled the request.
OrigRegistrarId	The unique identifier for the user that submitted the request to the SRS server.

The Response element may also specify:

Attribute	Description
TransId	The identifier (either an ActionId or a QryId) for the transaction submitted by the user that originated the request.
Rows	The number of results returned in the current response body.
Count	The total number of matches found in the SRS that satisfied the request query conditions.
MoreRowsAvailable	A boolean value indicating whether this response was truncated by an SRS limit on the number of results returned.
RecipientRegistrarId	The unique identifier for the user that the response is returned to.

The Response element MUST contain an FeTimeStamp (Section 8.43) element, which shows the time and date that the request was processed by the SRS server, and also MAY contain one of the SRS response types (Section 7).

Syntax:

```
element.Response =
  element Response {
    attribute Action { ActionEtc },
    attribute FeId { Number },
    attribute FeSeq { Number },
    attribute OrigRegistrarId { RegistrarId },
    attribute TransId { UID }?,
    attribute Rows { Number }?,
    attribute Count { Number }?,
    attribute MoreRowsAvailable { Boolean }?,
    attribute RecipientRegistrarId { RegistrarId }?,
    element.FeTimeStamp,
    (element.Response* | ActionResponse | element.AckResponse)?
  }
```

5.2.2. Error

An Error response may be returned for a whole request − for instance, when the request body failed validation or incorrect authentication was provided − or for one or more requests from the XML document body. In either case, the Error element will be used.

This document does not specify the error codes and situations. All

SRS server errors SHOULD be treated as a failed request by the client and the SRS server MUST NOT change any stored details if it returns an error to the client request.

6. SRS Requests

The SRS defines request elements that support the running of the shared domain registry from both a technical and a business perspective. Implementations SHOULD ensure that access to requests and data is restricted to comply with legal obligations and the registry's own business requirements.

To support the implementation of a flexible permissions model for SRS users, the requests are grouped into five major categories:

Domain query: requests that allow users to query domain related information stored in the SRS

Domain write: requests that allow users to create and update domain related information in the SRS

Registrar query: requests that allow users to query registrar related information stored in the SRS

Registrar write: requests that allow users to create and update registrar related information in the SRS

Registry: requests that support registry business functions, SRS system settings, running jobs on the SRS, and billing functions

Typically, registrars will have access to the domain query, domain write and registrar query requests, as well as the ability to maintain their own registrar information within the SRS. Administrative users will be able to create registrars and run registry requests – normally this will be restricted to the registry itself.

All requests that result in an update to data held by the SRS server MUST provide an ActionId to identify the request. The combination of RegistrarId and ActionId for a request MUST be unique. This allows requests to be fully identified by the user that made the request and the ActionId that the user assigned to it. SRS server implementations SHOULD maintain a full audit trail by logging all update requests and their outcomes.

If the SRS server receives a request with the same RegistrarId and ActionId as a previous request, but different request details, it

MUST return an Error (Section 7.8) response. If the SRS server receives a request with the same RegistrarId and ActionId as a previous request, and identical request details, it MUST respond by returning the response that was sent to the original request.

6.1. Domain Query Actions

The domain query requests are:

Action	Description
ActionDetailsQry	Retrieve the XML content and signature for a previous SRS request and the response that it received.
DomainDetailsQry	Retrieve the current stored details for a domain.
UDAIValidQry	Check the validity of a UDAI code for a domain.
Whois	Retrieve the public WHOIS data for a domain.

6.1.1. ActionDetailsQry

The ActionDetailsQry request allows the user to retrieve the original XML document and signature for a previous request to the SRS, and also the XML document and signature for the response that was returned. The user must supply the correct ActionId of the original request. Registrars SHOULD be restricted to only retrieving the details of requests that they were the originating registrar for.

6.1.1.1. Request

The ActionDetailsQry request is an empty element that must specify:

Attribute	Description
ActionId	An action identifier. This is the action identifier for a previous request to the SRS.

Additionally, the request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
OriginatingRegistrarId	A user identifier. The identifier of the registrar that originally requested the action that matches the provided ActionId.

Syntax:

```
element.ActionDetailsQry =
  element ActionDetailsQry {
    attribute QryId { UID }?,
    attribute ActionId { UID },
    attribute OriginatingRegistrarId { UID }?,
    empty
  }
```

6.1.1.2. Response

The response to an ActionDetailsQry request will be either an Error (Section 7.8) element or a RawRequest and a RawResponse (Section 7.11) element containing the XML and the registrar signature of the original request and response. If a QryId was provided in the request, it is returned in the TransId attribute of the Response element.

6.1.2. DomainDetailsQry

The DomainDetailsQry request allows the user to retrieve the stored details (including details that will not be shown for a public WHOIS query) for one or more domains. The request can be used to view historical details for a domain and may return a full update history for a domain.

Registrars are expected to only request information on domains that they currently manage. SRS implementations SHOULD restrict access to non−public domain information to the managing registrar. If historical data is requested for a period when the registrar did not manage a particular domain − for example, in the case of domain transfers − then only the public details as returned by the Whois (Section 6.1.4) request shall be returned for this time.

6.1.2.1. Request

The DomainDetailsQry request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
Status	A text filter. Matched against the registration status of domains. Valid values are "Active" and "PendingRelease".
Delegate	A boolean value. Matched against the delegation status of domains.
Term	A numeric value. Matched against the billing term for domains.
RegistrantRef	A text filter. Matched against the registrar-provided customer reference of a domain's registrant.
MaxResults	A numeric value. Used to specify the maximum number of domain records to return. If not specified, the default defined by the server implementation will be used.
SkipResults	A numeric value that defaults to 0. Used to specify the number of records at the start of a results set to be skipped before returning domain results. Can be used with MaxResults to retrieve a large result set in pages.
CountResults	A boolean value that defaults to false. If true, the response should only return the number of matches for the query and no specific domain details. If MaxResults or SkipResults is defined and CountResults is true then the server SHALL return an error response.

For the optional Status, Delegate, Term, and RegistrantRef filters, if the attribute is not specified, then the results will not be filtered on these fields.

The request may also include elements to specify other filters to limit the results returned by the SRS server and to change the list of fields that are returned in the results. All of the filters are optional and, with the exception of the DomainNameFilter, may only occur once in the request. The DomainNameFilter may occur multiple times in the request and details of domains that match any of the provided filters will be returned in the results.

The elements that can be included in the DomainDetailsQry request are:

- DomainNameFilter (Section 8.19)
- DNSSECFilter (Section 8.18)
- NameServerFilter (Section 8.29)
- RegistrantContactFilter (Section 8.12)
- AdminContactFilter (Section 8.12)
- TechnicalContactFilter (Section 8.12)
- ResultDateRange (Section 8.14)
- SearchDateRange (Section 8.14)
- ChangedInDateRange (Section 8.14)
- RegisteredDateRange (Section 8.14)
- LockedDateRange (Section 8.14)
- CancelledDateRange (Section 8.14)
- BilledUntilDateRange (Section 8.14)
- AuditTextFilter (Section 8.8)
- ActionIdFilter (Section 8.3)
- FieldList (Section 8.26)

The FieldList element specifies the fields to be returned for each domain in the result set. If no FieldList is specified, the SRS server will only return the DomainName and Status for each domain.

Syntax:

```
element.DomainDetailsQry =
  element DomainDetailsQry {
    attribute QryId { UID }?,
    attribute Status { RegDomainStatus }?,
    attribute Delegate { Boolean }?,
    attribute Term { Term }?,
    attribute RegistrantRef { UID }?,
    attribute MaxResults { Number }?,
    attribute SkipResults { Number }?,
    [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
    element.DomainNameFilter*,
    element.NameServerFilter?,
    element.DNSSECFilter?,
    element.RegistrantContactFilter?,
    element.AdminContactFilter?,
    element.TechnicalContactFilter?,
    element.ResultDateRange?,
    element.SearchDateRange?,
    element.ChangedInDateRange?,
    element.RegisteredDateRange?,
    element.LockedDateRange?,
    element.CancelledDateRange?,
    element.BilledUntilDateRange?,
    element.AuditTextFilter?,
    element.ActionIdFilter?,
    element.FieldList?
  }
```

6.1.2.2. Response

The response to a DomainDetailsQry request will be either an Error (Section 7.8) element, or zero or more Domain (Section 7.6) elements that matched the filters specified in the request. If a QryId was provided in the request, it is returned in the TransId attribute of the Response element.

If a FieldList was specified in the request, the fields provided in any returned Domain elements will match the list provided unless restricted due to ownership by a registrar other than the registrar making the request − in such cases only the public Whois information shall be returned. DomainName will always be returned for all matched domains.

By default, only the DomainName and Status details shall be returned for each Domain.

The ResultDateRange element in a DomainDetailsQry request has a number of affects on the response:

- the results shall be extracted by first selecting all of the domains that were managed by the requesting registrar during the given date range and then applying the other filters to this new result set to produce the final response
- the EffectiveDateRange will also be returned for each result domain, regardless of whether it was specified by a FieldList attribute
- the MaxResults and SkipResults elements in the request (if specified) are treated as a maximum number of distinct domains and a number of distinct domains to skip - the actual number of results returned may exceed MaxResults due to having multiple entries for each domain returned with different effective date ranges

6.1.3. UDAIValidQry

The UDAIValidQry request allows users to check a UDAI strings against the details stored by the SRS for a domain. Changes to domains may only be made with a valid UDAI.

6.1.3.1. Request

The UDAIValidQry request is an empty element that must specify:

Attribute	Description
DomainName	A text string. The name of the domain to check.
UDAI	A text string. The UDAI to be checked.

Additionally, the request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.

Syntax:

```
element.UDAIValidQry =
  element UDAIValidQry {
    attribute QryId { UID }?,
    attribute DomainName { DomainName },
    attribute UDAI { UID },
    empty
  }
```

6.1.3.2. Response

The response to a UDAIValidQry request will be a UDAIValid (Section 7.16) element. If a QryId was provided in the request, it is returned in the TransId attribute of the Response element.

6.1.4. Whois

The Whois request allows users to retrieve the public information stored on domains. The details requested may be the full public details, or a simple check of the status of the domain.

6.1.4.1. Request

The Whois request is an empty element that must specify:

Attribute	Description
DomainName	A text string. The domain name for which the details are requested.

Additionally, the request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
FullResult	A boolean value. Indicates whether the full domain details should be returned. If false, only the status of the domain shall be returned. Defaults to true.

SourceIP	An IP address. The source IP address of the request. This may be used to monitor and limit Whois requests.

Syntax:

```
element.Whois =
  element Whois {
    attribute QryId { UID }?,
    [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
    attribute SourceIP { text }?,
    attribute DomainName { DomainName },
    empty
  }
```

6.1.4.2. Response

The response to a Whois request will be either an Error (Section 7.8) element, or a Domain (Section 7.6) element. If a QryId was provided in the request, it is returned in the TransId attribute of the Response element.

The amount of detail returned for matched domains will depend on the request details and the domain status:

- if the domain is not currently registered, only the domain's name and status ("Available") will be returned,
- if the request is not for a full result, only the domain status will be returned,
- otherwise, the Domain element will be returned with any of the public details for which the SRS server has a value stored

The public details for a domain should be set by the registry's policy. For the .nz registry, the public details are:

- DomainName
- Status
- RegisteredDate
- CancelledDate
- LockedDate

- BilledUntil
- EffectiveFrom
- Delegate
- RegistrarPublicContact
- RegistrantContact
- AdminContact
- TechnicalContact
- NameServers
- AuditDetails

6.2. Domain Write Actions

The domain write requests are:

Request	Description
DomainCreate	Register a new domain in the SRS.
DomainUpdate	Update the stored details of an existing domain in the SRS.

6.2.1. DomainCreate

The DomainCreate request allows users to request the creation of a new domain in the SRS. The domain created will be managed by the registrar that makes the request - or by the effective registrar for the request, if the request is made by the registry. This request will only be successful if the domain name is available.

SRS implementations SHOULD support internationalized domain names (IDNs). Domain names containing non-ASCII characters MUST use the Punycode encoding RFC3492 [RFC3492] for the DomainName attribute, and provide the domain name in the original scripts in the DomainNameUnicode attribute. The DomainNameLanguage attribute may be used to provide a description of the original script and language for the domain name.

Version 5.4 of the SRS protocol introduced support for the storage of DNSSEC [RFC4033] information. DNSSEC details may be provided to

support checking of the authenticity of results retrieved from the DNS system for delegated domains. SRS implementations SHOULD at a minimum enforce the use of DNSSEC details compliant with RFC4034 [RFC4034] and MAY support subsequent amendments to that RFC.

6.2.1.1. Request

The DomainCreate request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
DomainName	A text string. The domain name to be created. Must conform to the format and syntax in RFC 1035 [RFC1035], RFC 1123 [RFC1123], and RFC 2181 [RFC2181]. For domain names containing non-ASCII characters this MUST be formatted according to RFC 3492 [RFC3492].
Term	A numeric value. The number of months to bill when the domain is registered or renewed.

Additionally, the request may specify:

Attribute	Description
DomainNameUnicode	A UTF-8 text string. The domain name in the script intended by the registrant. Used for internationalized domain names (IDNs).
DomainNameLanguage	A text string. For domain names using non-ASCII characters, this should provide the language and script for the unicode domain name. For example, ".NZ LATIN"
RegistrantRef	A customer identifier. Assigned to the registrant by the registrar.
Delegate	A boolean value that defaults to true. Indicates whether the domain should be delegated to appear in the DNS. Requires details of name servers to be provided with the domain creation request.

The request must also include a RegistrantContact (Section 8.11) details element for the domain, and may include elements defining the AdminContact (Section 8.11), TechnicalContact (Section 8.11),

NameServers (Section 8.28), DNSSEC (Section 8.17) records, and also AuditText (Section 8.7) for the transaction.

Syntax:

```
element.DomainCreate =
  element DomainCreate {
    attribute ActionId { UID },
    attribute DomainName { DomainName },
    attribute DomainNameUnicode { DomainNameUnicode }?,
    attribute DomainNameLanguage { DomainNameLanguage }?,
    attribute RegistrantRef { UID }?,
    attribute Term { Term },
    [ a:defaultValue = "1" ] attribute Delegate { Boolean }?,
    element.RegistrantContact,
    element.AdminContact?,
    element.TechnicalContact?,
    element.NameServers?,
    element.DNSSEC?,
    element.AuditText?
  }
```

6.2.1.2. Response

The response to a DomainCreate request will be either an Error (Section 7.8) element, or a full Domain (Section 7.6) element. The Domain element will only be returned if the domain creation is successful.

6.2.2. DomainUpdate

The DomainUpdate request allows users to update the details of existing domains and to perform various update functions, including:

- transferring a domain
- cancelling a domain
- un-cancelling a domain
- renewing a domain
- changing the delegation status of a domain
- requesting a new domain UDAI

Domain details may be updated individually or combined in a single request that updates multiple parts of the domain information.

In the absence of a valid UDAI, domain updates are restricted to the registrar that currently manages a domain, or to suitably authorized registry users. If a registrant provides the UDAI for their domain to a registrar other than the one that currently manages the domain, the other registrar will be able to perform an update to the domain. If the UDAI is valid, then the new registrar may make any required updates to the domain details and the SRS server will automatically initiate a domain transfer as part of processing the request.

A domain can be transferred regardless of the status of the domain (that is, the status of the domain can be "Active" or "PendingRelease" at the time of the transfer), however, the domain MUST NOT be locked. A locked domain cannot be transferred until it is unlocked. Registrants SHOULD have access to the UDAI for their domains to allow them to transfer their domains freely between registrars.

6.2.2.1. Request

The DomainUpdate request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

Additionally, the request may specify:

Attribute	Description
UDAI	A text string. The UDAI for the domain.
NewUDAI	A boolean value. Allows the user to request generation of a new UDAI for the domain. The server MAY provide a new UDAI value regardless of the value of this parameter.
RegistrantRef	A customer identifier. Assigned to the registrant by the registrar.
Term	A numeric value. The number of months to bill when the domain is registered or renewed.

Delegate	A boolean value. Indicates whether the domain should be delegated to appear in the DNS. Requires details of name servers to be available to the SRS server.
Renew	A boolean value. Indicates that the domain should be billed for a further billing period immediately, rather than waiting for it to expire.
NoAutoRenew	A boolean value. Indicates that the domain should not automatically renew at the expiry date. Only the registry can change the automatic renewal status for a domain.
Lock	A boolean value. Specifies the lock status of the domain. Locked domains cannot be updated until they are unlocked by the registry. If the attribute is not specified, the current lock setting will remain unchanged. SRS implementations MAY allow registrars to change the lock status of domains.
Cancel	A boolean value. Specifies a request to change the status of a domain. If true, a domain in "Active" status will change to "PendingRelease"; domains in any other status will remain unchanged. If false, a domain in "PendingRelease" status will change to "Active"; domains in any other status will remain unchanged. If the attribute is not specified, the current status will remain unchanged.
Release	A boolean value. Specifies that the domain should become "Available" after the cancellation grace period expires.
ConvertContactsToHandles	A boolean value. Specifies that the domain contact details should be returned to the client as handles (Section 7.9). Where no handle exists, a handle SHOULD be automatically generated for the corresponding contact details. This feature exists to support interoperability with EPP servers, and SRS implementations SHOULD only allow this for domain transfer requests.

FullResult	A boolean value. Specifies that a full domain result is required (if true), or only the changed fields (if false). Defaults to true.

For the boolean attributes, if the attribute is not specified in the update request, then no change will be made to the related domain details.

The DomainUpdate request must also include a DomainNameFilter (Section 8.19) element to identify the domain(s) to be updated and may include elements defining the new details for RegistrantContact (Section 8.11), AdminContact (Section 8.11), TechnicalContact (Section 8.11), NameServers (Section 8.28), DNSSEC (Section 8.17) records, and also AuditText (Section 8.7) for the transaction.

Syntax:

```
element.DomainUpdate =
  element DomainUpdate {
    attribute ActionId { UID },
    attribute UDAI { UID }?,
    attribute NewUDAI { Boolean }?,
    attribute RegistrantRef { UID }?,
    attribute Term { Term }?,
    attribute Delegate { Boolean }?,
    attribute Renew { Boolean }?,
    attribute NoAutoRenew { Boolean }?,
    attribute Lock { Boolean }?,
    attribute Cancel { Boolean }?,
    attribute Release { Boolean }?,
    attribute ConvertContactsToHandles { Boolean }?,
    [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
    element.DomainNameFilter+,
    element.RegistrantContact?,
    element.AdminContact?,
    element.TechnicalContact?,
    element.NameServers?,
    element.DNSSEC?,
    element.AuditText?
  }
```

6.2.2.2. Response

The response to a DomainUpdate request will be either an Error (Section 7.8) element, or a Domain (Section 7.6) element. By default the Domain element returned will include the following fields:

- DomainName
- AuditDetails
- Status
- Delegate
- Term
- NameServers
- RegistrantRef
- RegistrarId
- RegistrantContact
- AdminContact
- TechnicalContact
- BilledUntil
- RegisteredDate
- CancelledDate
- LockedDate

If the FullResult parameter in the request is false, the DomainName and AuditDetails fields will be returned along with any of the other fields above that have been updated by the transaction.

6.3. Handle Query Action

The system provides a single request for accessing details of handles:

Action	Description
HandleDetailsQry	Retrieve the details of object handles.

6.3.1. HandleDetailsQry

The HandleDetailsQry request allows the user to retrieve the details of handles that match their search parameters. Handles are used to provide a simple shorthand for referring to registrant details in the registry.

Registrars SHALL be limited to accessing details of handles associated directly with their RegistrarID. The registry user may search details of all handles.

6.3.1.1. Request

The HandleDetailsQry request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
MaxResults	A numeric value. Used to specify the maximum number of handle records to return. If not specified, the default defined by the server implementation will be used.
SkipResults	A numeric value that defaults to 0. Used to specify the number of records at the start of a results set to be skipped before returning handle results. Can be used with MaxResults to retrieve a large result set in pages.
CountResults	A boolean value that defaults to false. If true, the response should only return the number of matches for the query and no specific handle details. If MaxResults or SkipResults is defined and CountResults is true then the server SHALL return an error response.

The elements that can be included in the HandleDetailsQry request are:

- HandleIdFilter (Section 8.27)
- SearchDateRange (Section 8.14)
- ChangedInDateRange (Section 8.14)

o ContactFilter (Section 8.12)

Syntax:

```
element.HandleDetailsQry =
  element HandleDetailsQry {
    attribute QryId { UID }?,
    attribute MaxResults { Number }?,
    attribute SkipResults { Number }?,
    [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
    element.HandleIdFilter*,
    element.SearchDateRange?,
    element.ChangedInDateRange?,
    element.ContactFilter?
}
```

6.3.1.2. Response

The response to a HandleDetailsQry request will be either an Error (Section 7.8) element or zero or more Handle (Section 7.9) elements − dependent on the number of handles matched the query specification.

If CountResults was specified in the request and the request was valid, then the number of rows that matched the query specification shall be returned, but no Handle elements will be included.

6.4. Handle Write Actions

The handle write requests are:

Request	Description
HandleCreate	Request creation of a new handle belonging to the current registrar (or effective registrar) with the provided details.
HandleUpdate	Request update of handle details for a handle belonging to the current registrar (or effective registar).

6.4.1. HandleCreate

The HandleCreate request allows users to request the creation of a new handle in the SRS. The handle created will belong to the registrar that makes the request − or to the effective registrar for the request, if the request is made by the registry. This request will only be successful if a handle with the same identifier

belonging to the current effective registrar does not already exist.

6.4.1.1. Request

The HandleCreate request must specify:

Attribute	Description
ActionId A handle identifier. This is a unique identifier for the handle to be created.	An action identifier. This is a unique identifier for the request to the SRS server.

The request may also include ContactAttr (Section 9.4.2) entity and a Contact (Section 9.4.1) entity to provide contact details for the handle, and AuditText (Section 8.7) for the transaction.

Syntax:

```
element.HandleCreate =
  element HandleCreate {
    attribute ActionId { UID },
    attribute HandleId { UID },
    ContactAttr,
    Contact,
    element.AuditText?
  }
```

6.4.1.2. Response

The response to a HandleCreate request will be either an Error (Section 7.8) element, or a full Handle (Section 7.9) element. The Handle element will only be returned if the handle creation is successful.

6.4.2. HandleUpdate

The HandleUpdate request allows the user to update detais for a contact handle that they previously created. The registry may maintain information for handles belonging to any registrar.

6.4.2.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
HandleId	A handle identifier. This is a unique identifier for the handle to be created.

Additionally, the request may specify:

Attribute	Description
Delete	A boolean value that defaults to false. If true, the update should cause the matching handle belonging to the effective registrar to be deleted.

The HandleUpdate request may also include new contact details for the handle and audit details for the update:

- ContactAttr (Section 9.4.2)
- Contact (Section 9.4.1)
- AuditText (Section 8.7)

If an attribute or element is not provided in the request, then the related details SHALL NOT be updated by the SRS server.

Syntax:

```
element.HandleUpdate =
  element HandleUpdate {
    attribute ActionId { UID },
    attribute HandleId { UID },
    attribute Delete { Boolean }?,
    ContactAttr,
    Contact,
    element.AuditText?
  }
```

6.4.2.2. Response

The response to a HandleUpdate request will be either an Error (Section 7.8) element or a Handle (Section 7.12) element showing the updated state of the handle details.

6.5. Message Query Action

Registrars are provided with a single request for obtaining messages from the system:

Request	Description
GetMessages	Retrieve responses generated by the SRS server for a registrar.

6.5.1. GetMessages

The GetMessages request allows the user to retrieve messages that they may have been unaware of, or to confirm the status of a specific transaction that had been sent previously. Messages that registrars may miss are likely to include requests that are made by the registry on the registrar's behalf, and domain transfer requests issued by other registrars transferring domains at the request of a registrant.

The GetMessages request MUST NOT be accompanied by any other requests within a request document.

6.5.1.1. Request

The GetMessages request that may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
OriginatingRegistrarId	A user identifier. The identifier of the registrar that originally requested the action. Also accepts the special "other registrar" (Section 9.13.2) value.
ActionId	An action identifier. This is the action identifier for a previous request to the SRS.

RecipientRegistrarId	A user identifier. The registrar identifier of the registrar that the messages retrieved were intended for. Only registry users can retrieve messages intended for a user other than themselves.
MaxResults	A numeric value. Used to specify the maximum number of messages to return. If not specified, the default defined by the server implementation will be used.
SkipResults	A numeric value. Used to specify the number of records at the start of a results set to be skipped before returning domain results. Can be used with MaxResults to retrieve a large result set in pages.
CountResults	A boolean value that defaults to false. If true, the response should only return the number of matches for the query and no messages. If MaxResults or SkipResults is defined and CountResults is true then the server SHALL return an error response.
QueueMode	A boolean value that defaults to false. If true, the response should only return messages that have not previously been acknowledged (using AckMessage).

The GetMessages request may also include a TransDateRange (Section 8.14) element, an AuditTextFilter (Section 8.8) element and may include one or more TypeFilter (Section 8.33) elements to limit the type of messages returned.

Either an ActionId or a TransDateRange MUST be specified in order for the request to succeed.

Syntax:

```
element.GetMessages =
  element GetMessages {
    attribute QryId { UID }?,
    attribute OriginatingRegistrarId { RegistrarIdOrOTHERS }?,
    attribute ActionId { UID }?,
    attribute RecipientRegistrarId { RegistrarId }?,
    attribute MaxResults { Number }?,
    attribute SkipResults { Number }?,
    [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
    [ a:defaultValue = "0" ] attribute QueueMode { Boolean }?,
    element.TransDateRange?,
    element.AuditTextFilter?,
    element.TypeFilter*
  }
```

6.5.1.2. Response

The response to a GetMessages request will be either an Error (Section 7.8) element or one or more Response (Section 5.2.1) elements containing the details of messages that match the request specification.

6.6. Message Write Action

Registrars are provided with a single request for acknowledging receipt of messages from the system:

Request	Description
AckMessage	Acknowledge receipt of a message retrieved using GetMessages.

6.6.1. AckMessage

The AckMessage request allows the user to acknowledge receipt of a message retrieved using GetMessages to prevent the system from returning the message in response to subsequent GetMessages requests.

6.6.1.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
OrigRegistrarId	The unique identifier for the user that submitted the request to the SRS server.
TransId	The identifier (either an ActionId or a QryId) for the transaction submitted by the user that originated the request.

Syntax:

```
element.AckMessage =
  element AckMessage {
    attribute ActionId { UID },
    attribute OriginatingRegistrarId { RegistrarId },
    attribute TransId { UID }
  }
```

6.6.1.2. Response

The response to an AckMessage request will be either an Error (Section 7.8) element or a Response (Section 5.2.1) element.

6.7. Registrar Query Actions

The registrar query requests are:

Request	Description
RegistrarAccountQry	Request details of transactions in the account of a registrar.
RegistrarDetailsQry	Request the registrar details stored by the SRS server.

6.7.1. RegistrarAccountQry

The RegistrarAccountQry request allows the user to retrieve the details of billing transactions made in the account of a registrar.

6.7.1.1. Request

The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
RegistrantRef	A text filter. Matched against the registrar-provided customer reference of a registrant.
DomainName	A text filter. Matched against the domain name that billing amounts relate to.
InvoiceId	An invoice identifier. Used to match billing records that have been associated with an invoice.
MaxResults	A numeric value. Used to specify the maximum number of messages to return. If not specified, the default defined by the server implementation will be used.
SkipResults	A numeric value. Used to specify the number of records at the start of a results set to be skipped before returning domain results. Can be used with MaxResults to retrieve a large result set in pages.
TransStatus	A BillStatus (Section 9.2.2) value. Used to filter on the bill status of billing amounts.
CountResults	A boolean value that defaults to false. If true, the response should only return the number of matches for the query and no messages. If MaxResults or SkipResults is defined and CountResults is true then the server SHALL return an error response.

The RegistrarAccountQry request may also include a TransDateRange (Section 8.14) element and an InvoiceDateRange (Section 8.14) element.

Syntax:

```
element.RegistrarAccountQry =
  element RegistrarAccountQry {
    attribute QryId { UID }?,
    attribute RegistrantRef { UID }?,
    attribute DomainName { DomainName }?,
    attribute InvoiceId { UID }?,
    attribute MaxResults { Number }?,
    attribute SkipResults { Number }?,
    attribute TransStatus { BillStatus }?,
    [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
    element.TransDateRange?,
    element.InvoiceDateRange?
  }
```

6.7.1.2. Response

The response to a RegistrarAccountQry request will be either an Error (Section 7.8) element or a set of BillingTrans (Section 7.4) elements.

6.7.2. RegistrarDetailsQry

The RegistrarDetailsQry request allows the user to retrieve the stored details for a registrar account. Registrars SHOULD be restricted to only retrieving details of their own account. The registry may retrieve information about any registrar.

6.7.2.1. Request

The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
RegistrarId	A user identifier. The registrar identifier of the registrar to retrieve stored details for.
NameFilter	A text filter. Matched against the registrar names stored in the SRS server.

The RegistrarDetailsQry request may also include a ResultDateRange (Section 8.14) element.

If the ResultDateRange element is supplied, it will cause the server to return multiple records for each registrar, describing all the changes that the registrar went through during the given period. Otherwise, if it is not specified, only the latest data for each registrar that matches the filters will be returned. When a ResultDateRange is requested, the Allowed2LDs and the Roles are not returned (there is no historical data available for these fields).

Syntax:

```
element.RegistrarDetailsQry =
  element RegistrarDetailsQry {
    attribute QryId { UID }?,
    attribute RegistrarId { RegistrarId }?,
    attribute NameFilter { text }?,
    element.ResultDateRange?
  }
```

6.7.2.2. Response

The response to a RegistrarDetailsQry request will be either an Error (Section 7.8) element or one or more Registrar (Section 7.12) elements matching the provided filter details.

6.8. Registrar Write Actions

Registrars typically only have access to a single request for the maintenance of their details stored at the SRS:

Request	Description
RegistrarUpdate	Updates the details stored about a registrar.

6.8.1. RegistrarUpdate

The RegistrarUpdate request allows the user to update their own account details and allows the registry to maintain registrar information for any registrar.

6.8.1.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

Additionally, the request may specify:

Attribute	Description
Name	A text string. The registrar's identifier in the registry's accounting system.
AccRef	A text string. The registrar's identifier in the registry's accounting system.
URL	A text string. The registrar's public web site address.

The RegistrarUpdate request may also include new details for any of the related registrar information elements:

- RegistrarPublicContact (Section 8.11)
- RegistrarSRSContact (Section 8.11)
- DefaultTechnicalContact (Section 8.11)
- EncryptKeys (Section 8.23)
- EPPAuth (Section 8.24)
- Allowed2LDs (Section 8.5)
- Roles (Section 8.37)
- AuditText (Section 8.7)

If an attribute or element is not provided in the request, then the related details SHALL NOT be updated by the SRS server.

Syntax:

```
element.RegistrarUpdate =
  element RegistrarUpdate {
    attribute ActionId { UID },
    attribute Name { text }?,
    attribute AccRef { text }?,
    attribute URL { text }?,
    element.RegistrarPublicContact?,
    element.RegistrarSRSContact?,
    element.DefaultTechnicalContact?,
    element.EncryptKeys?,
    element.EPPAuth?,
    element.Allowed2LDs?,
    element.Roles?,
    element.AuditText?
  }
```

6.8.1.2. Response

The response to a RegistrarUpdate request will be either an Error (Section 7.8) element or a Registrar (Section 7.12) element showing the updated state of the user details.

6.9. Registry Actions

The registry requests are used by the registry to manage the business functions of the SRS. Registrars MUST NOT have access to these functions.

The registry requests are:

Request	Description
AccessControlListAdd	Adds one or more entries to the registry's access control list.
AccessControlListQry	Queries the registry's access control list.
AccessControlListRemove	Removes one or more entries from the registry's access control list.
AdjustRegistrarAccount	Creates billing transactions in order to adjust the details of a registrar's account with the registry.
BilledUntilAdjustment	Adjusts the end date of billing for a domain name.
BuildDnsZoneFiles	Builds the registry's DNS zone files including details of all of the currently delegated domain.
DeferredIncomeDetailQry	Reports on the billing transactions that contribute to an amount of deferred income for an income month.
DeferredIncomeSummaryQry	Reports on all deferred income for an income month.
GenerateDomainReport	Generates a report on all of the domains registered in the SRS.
BillingAmountQry	Queries the per-term charge for domain registration over time.
RegistrarCreate	Creates a new registrar in the SRS and assigns initial details to the record.
RunLogCreate	Creates an entry in the SRS server log.
RunLogQry	Queries details of entries in the SRS server log.
ScheduleCancel	Cancels a scheduled process in the SRS server.
ScheduleCreate	Creates a scheduled process in the SRS server.
ScheduleQry	Queries details of a scheduled process in the SRS server.
ScheduleUpdate	Updates the details of a scheduled process in the SRS server.
BillingAmountUpdate	Inserts a new per-term charge for domain registrations.
SysParamsCreate	Creates new configurable system parameter entries in the SRS server.
SysParamsQry	Queries the details of configurable system parameters in the SRS server.

SysParamsUpdate	Updates the details of configurable system parameters in the SRS server.

6.9.1. AccessControlListAdd

The AccessControlListAdd request allows the registry to add entries to its access control lists.

6.9.1.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
Resource	A text string. An identifier for the system or resource to which the access control list entries should be added. For example, this might specify a service name such as "whoisd".
List	A text string. A description of the function of the access control list to which the access control lists should be added. For example, "allow" or "deny".

Additionally, the request may specify:

Attribute	Description
FullResult	A boolean value. Indicates whether the result returned should contain full details of entries in the modified access control lists.

The AccessControlListAdd request must also include one or more AccessControlListEntry (Section 8.2) elements to specify the entries to be added to the access control lists, and may include an AuditText (Section 8.7) element giving a description for the addition.

Syntax:

```
element.AccessControlListAdd =
  element AccessControlListAdd {
    attribute Resource { text },
    attribute List { text },
    attribute ActionId { UID },
    [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
    element.AccessControlListEntry+,
    element.AuditText?
  }
```

6.9.1.2. Response

The response to an AccessControlListAdd request will be either an Error (Section 7.8) or one AccessControlList (Section 7.1) element. The attribute SizeChange will indicate the number of entries added.

6.9.2. AccessControlListQry

The AccessControlListQry request allows the registry to retrieve details of the current state of access control lists.

6.9.2.1. Request

The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
Resource	A text string. Used to match the system or resource name of the access control list.
List	A text string. Used to match the name of the access control list.
Type	A text string. Specifies what datatype the list is.
FullResult	A boolean value. Indicates whether the result returned should contain full details of entries in the matched access control lists.

Syntax:

```
element.AccessControlListQry =
  element AccessControlListQry {
    attribute QryId { UID }?,
    attribute Resource { text }?,
    attribute List { text }?,
    attribute Type { text }?,
    [ a:defaultValue = "0" ] attribute FullResult { Boolean }?,
    AccessControlListContentFilter*
  }
```

6.9.2.2. Response

The response to an AccessControlListQry request will be either an Error (Section 7.8) element or zero or more AccessControlList (Section 7.1) elements − dependent on the number of access control lists that matched the query specification.

Type must be provided to return AccessControlListEntry elements inside the AccessControlList (Section 7.1) element. Currently supported values for Type are: "ip", "domain", "registrar", "registrar_ip" and "registrar_domain".

If Type is provided the AccessControlListQry element may contain some AccessControlListContentFilter (Section 8.1) elements to search on the list’s contents.

If Type is provided and FullResult is 1, the response will contain AccessControlList elements and AccessControlListEntry elements with their EffectiveDate elements for matched lists.

6.9.3. AccessControlListRemove

The AccessControlListRemove request allows the registry to remove entries from access control lists.

6.9.3.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

Resource	A text string. An identifier for the system or resource of the access control list from which the entries should be removed.
List	A text string. A description of the function of the access control list from which the entries should be removed.

Additionally, the request may specify:

Attribute	Description
FullResult	A boolean value. Indicates whether the result returned should contain full details of entries in the modified access control lists.

The AccessControlListRemove request must also include one or more AccessControlListEntry (Section 8.2) elements to specify the entries to be removed from the access control lists, and may include an AuditText (Section 8.7) element.

Syntax:

```
element.AccessControlListRemove =
  element AccessControlListRemove {
    attribute Resource { text },
    attribute List { text },
    attribute ActionId { UID },
    [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
    element.AccessControlListEntry*,
    element.AuditText?
  }
```

6.9.3.2. Response

The response to an AccessControlListRemove request will be either an Error (Section 7.8) or one AccessControlList (Section 7.1) element. The attribute SizeChange will indicate the number of entries removed; this will be a negative integer or zero.

6.9.4. AdjustRegistrarAccount

The AdjustRegistrarAccount request allows the registry to adjust the account of a registrar by creating a billing transaction in the registrar's name. This allows the registry to make adjustments by crediting or debiting the registrar account, for instance, in the

case of a refunded payment.

6.9.4.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
RegistrarId	A user identifier. The identifier of the registrar whose account is to be adjusted.
DomainName	A text string. The name of the domain for which the registrar's account is being adjusted.
Months	An integer. The number of months of payment to credit to, or debit from the registrar's account for the specified domain.
ActionType	A text string. A valid accounting action; either 'Credit' or 'Debit'.

The AdjustRegistrarAccount request must also include the date details for the billing transaction as a TransactionDate (Section 8.43) element, a BillPeriodStart (Section 8.43) element, and a BillPeriodEnd (Section 8.43) element, and also an AuditText (Section 8.7) element providing audit details for the adjustment.

Syntax:

```
element.AdjustRegistrarAccount =
  element AdjustRegistrarAccount {
    attribute RegistrarId { RegistrarId },
    attribute DomainName { DomainName },
    attribute ActionId { UID },
    attribute Months { Number },
    attribute ActionType { AccountingAction },
    element.TransactionDate,
    element.BillPeriodStart,
    element.BillPeriodEnd,
    element.AuditText
  }
```

6.9.4.2. Response

The response to a AdjustRegistrarAccount request will be either an Error (Section 7.8) element or a BillingTrans (Section 7.4) element for the new transaction details provided.

6.9.5. BilledUntilAdjustment

The BilledUntilAdjustment request allows the registry to change the date that a domain has been billed until, for example, when a domain is renewed by the registrar before the automatic renewal date arrives.

6.9.5.1. Request

The request must specify:

Attribute	Description
DomainName	A text string. The name of the domain to adjust the billed until date for.
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The BilledUntilAdjustment request must also include a NewBilledUntilDate (Section 8.43) element providing the new date for the domain billed until record, and an AuditText (Section 8.7) element describing the reason for the change.

Syntax:

```
element.BilledUntilAdjustment =
  element BilledUntilAdjustment {
    attribute DomainName { DomainName },
    attribute ActionId { UID },
    element.NewBilledUntilDate,
    element.AuditText
  }
```

6.9.5.2. Response

The response to a BilledUntilAdjustment request will be either an Error (Section 7.8) element or a full Domain (Section 7.6) element showing all details for the updated domain, including the new BilledUntil date.

6.9.6. BuildDnsZoneFiles

The BuildDnsZoneFiles request allows the registry to initiate the creation of DNS zone and configuration files for all registered domains that have been set to delegate. The SRS server SHALL generate a run-log entry for this request recording the final status

and MAY include statistics on the domains exported to the DNS.

The SRS server MUST NOT allow multiple instances of this request to run simultaneously.

6.9.6.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The BuildDnsZoneFiles request may also include a RunDate (Section 8.43) element to specify the date and time to run the zone build process.

Syntax:

```
element.BuildDnsZoneFiles =
  element BuildDnsZoneFiles {
    attribute ActionId { UID },
    element.RunDate
  }
```

6.9.6.2. Response

The response to a BuildDnsZoneFiles request will be either an Error (Section 7.8) element or a RunLog (Section 7.13) element containing details produced by the zone file build process.

6.9.7. DeferredIncomeDetailQry

The DeferredIncomeDetailQry request allows the registry to obtain a report of billing transactions that contribute to an amount of deferred income (for example, to provide a breakdown of the billing transactions that make up an amount of deferred income reported by the DeferredIncomeSummaryQry (Section 6.9.8) request).

6.9.7.1. Request

The request must specify:

Attribute	Description
BaseMonth	An integer. The latest month (January = 1, December = 12) of the base year to consider billing transactions for when calculating deferred income. Billing transactions up to, and including, this month will be included.
BaseYear	An integer. The latest year to consider billing transactions for when calculating deferred income.
IncomeMonth	An integer. The month (January = 1, December = 12) of the income year to calculate deferred income for.
IncomeYear	An integer. The year to calculate deferred income for.

Additionally, the request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.

Syntax:

```
element.DeferredIncomeDetailQry =
  element DeferredIncomeDetailQry {
    attribute BaseMonth { text },
    attribute BaseYear { text },
    attribute IncomeMonth { text },
    attribute IncomeYear { text },
    attribute QryId { UID }?,
    empty
  }
```

6.9.7.2. Response

The response to a DeferredIncomeDetailQry request will be either an Error (Section 7.8) element or a set of BillingTrans (Section 7.4) elements consisting of all of the billing transactions that contributed to deferred income for the specified period.

6.9.8. DeferredIncomeSummaryQry

The DeferredIncomeSummaryQry request allows the registry to generate a report on the amount of deferred income that can be realised in any given month for the period provided in the request.

6.9.8.1. Request

The request must specify:

Attribute	Description
BaseMonth	An integer. The latest month (January = 1, December = 12) of the base year to consider billing transactions for when calculating deferred income. Billing transactions up to, and including, this month will be included.
BaseYear	An integer. The latest year to consider billing transactions for when calculating deferred income.
IncomeMonth	An integer. The month (January = 1, December = 12) of the income year to calculate deferred income for.
IncomeYear	An integer. The year to calculate deferred income for.

Additionally, the request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.

Syntax:

```
element.DeferredIncomeSummaryQry =
  element DeferredIncomeSummaryQry {
    attribute BaseMonth { text },
    attribute BaseYear { text },
    attribute IncomeMonth { text },
    attribute IncomeYear { text },
    attribute QryId { UID }?,
    empty
  }
```

6.9.8.2. Response

The response to a DeferredIncomeSummaryQry request will be either an Error (Section 7.8) element or a set of DeferredRegistrarIncome (Section 7.5) elements containing the deferred income contribution for each registrar for the specified period.

6.9.9. GenerateDomainReport

The GenerateDomainReport request allows the registry to initiate the creation of a domain report containing details of the domains registered in the SRS system. SRS implementations may vary in the information that they include in this report.

6.9.9.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The GenerateDomainReport request must also include a RunDate (Section 8.43) element providing the date and time at which the domain report creation process should run.

Syntax:

```
element.GenerateDomainReport =
  element GenerateDomainReport {
    attribute ActionId { UID },
    element.RunDate
  }
```

6.9.9.2. Response

The response to a GenerateDomainReport request will be either an Error (Section 7.8) element or a RunLog (Section 7.13) element containing details produced by the domain report creation process.

6.9.10. BillingAmountQry

The BillingAmountQry request allows the registry to query all of the billing amounts in the system (including all historical billing amounts, the current effective billing amount and any future billing amounts). It does not set a new billing amount.

6.9.10.1. Request

The BillingAmountQry request has no required parameters. The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.

Syntax:

```
element.BillingAmountQry =
  element BillingAmountQry {
    attribute QryId { UID }?,
    empty
  }
```

6.9.10.2. Response

The BillingAmountQry response will either be an Error (Section 7.8) element or a set of BillingAmount (Section 7.3) elements. If a QryId was provided with the request, this will be returned in the TransId attribute of the Response (Section 5.2.1) element.

6.9.11. RegistrarCreate

The RegistrarCreate request allows the user to create a new registrar user account in the SRS server and to provide details for it.

6.9.11.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
Name	A text string. The name of the registrar.
AccRef	A text string. The registrar's identifier in the registry's accounting system.
RegistrarId	A user identifier. The unique number to be assigned to the new registrar.

Additionally, the request may specify:

Attribute	Description
URL	A text string. The registrar's public web site address.

The RegistrarCreate request must also include a RegistrarPublicContact (Section 8.11) element specifying the public contact details for the registrar, a RegistrarSRSContact (Section 8.11) element specifying the contact details for the registry's use, a DefaultTechnicalContact (Section 8.11) element which will be applied to domains registered through the registrar if no other technical contact is specified, and an EncryptKeys (Section 8.23) element providing one or more public keys that the registrar will use.

The RegistrarCreate request may also include the Allowed2LDs (Section 8.5) element specifying the domains in which the registrar may manage domain registrations, a Roles (Section 8.37) element defining system access roles for the registrar, and the AuditText (Section 8.7) element to provide details on the addition of the new registrar account.

Syntax:

```
element.RegistrarCreate =
  element RegistrarCreate {
    attribute ActionId { UID },
    attribute Name { text },
    attribute AccRef { text },
    attribute RegistrarId { RegistrarId },
    attribute URL { text }?,
    element.RegistrarPublicContact,
    element.RegistrarSRSContact,
    element.DefaultTechnicalContact,
    element.EncryptKeys,
    element.EPPAuth?,
    element.Allowed2LDs?,
    element.Roles?,
    element.AuditText?
  }
```

6.9.11.2. Response

The response to a RegistrarCreate request will be either an Error (Section 7.8) element or a Registrar (Section 7.12) element showing the details for the new registrar account.

6.9.12. RunLogCreate

The RunLogCreate request allows the registry to request creation of a log entry in the SRS server's run log. This is useful for allowing batch processes that interface with the SRS server to log messages to a standard location.

6.9.12.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The RunLogCreate request must also include a FirstRunDate (Section 8.43) element specifying the date at which the process was initiated, and a RunLog (Section 7.13) element containing the details of the log entry to be created.

Syntax:

```
element.RunLogCreate =
  element RunLogCreate {
    attribute ActionId { UID },
    element.FirstRunDate,
    element.RunLog
  }
```

6.9.12.2. Response

The response to a RunLogCreate request will be either an Error (Section 7.8) element or a RunLog (Section 7.13) element containing the details of the log entry that was created.

6.9.13. RunLogQry

The RunLogQry request allows the registry to query the SRS server for details of log entries created by processes that interact with the SRS server.

6.9.13.1. Request

The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
ProcessName	A text string. The name of a scheduled job process that created the run log. This will be matched against existing run log entries to limit the results returned.
Parameters	A text string. The parameters with which a process was called. This will be matched against existing run log entries to limit the results returned.

The RunLogQry request may also include a LogDateRange (Section 8.14) element defining the period for which to return run log entry details.

If no limiting terms are specified, the SRS server will return all run log entries. The server MAY impose a limit on the number of entries that are returned in a single response.

Syntax:

```
element.RunLogQry =
  element RunLogQry {
    attribute QryId { UID }?,
    attribute ProcessName { text }?,
    attribute Parameters { text }?,
    element.LogDateRange?
  }
```

6.9.13.2. Response

The response to a RunLogQry request will be either an Error (Section 7.8) element or a set of RunLog (Section 7.13) elements matching the provided terms.

6.9.14. ScheduleCancel

The ScheduleCancel request allows the registry to cancel a scheduled process that has been registered in the SRS server using the ScheduleCreate (Section 6.9.15) request.

6.9.14.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
ProcessName	A text string. The name of a scheduled job process to be cancelled.

Additionally, the request may specify:

Attribute	Description
Parameters	A text string. The parameters with which a process to be cancelled was called.

The ScheduleCancel request must also include a FirstRunDate (Section 8.43) element identifying the first run date of the scheduled job process to be cancelled, and may include a AuditText (Section 8.7) element providing the reasons for the job cancellation.

Syntax:

```
element.ScheduleCancel =
  element ScheduleCancel {
    attribute ActionId { UID },
    attribute ProcessName { ScheduledJob },
    attribute Parameters { text }?,
    element.FirstRunDate,
    element.AuditText?
  }
```

6.9.14.2. Response

The response to a ScheduleCancel request will be either an Error (Section 7.8) element or a Schedule (Section 7.14) element giving the details of the cancelled job, including the new cancellation date.

6.9.15. ScheduleCreate

The ScheduleCreate request allows the registry to insert a scheduled job entry into the SRS server to be run at a specified time, and possibly at regular intervals after that time. This may be used to set times for running processes that support the day-to-day work of the registry. These processes are defined by the ScheduledJob (Section 9.16.1) entity.

6.9.15.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
ProcessName	A text string. The name of the process to be executed at the designated time.
Frequency	An text string. The delay between repeat executions of the process, after the initial run date. The format for this is implementation dependent but it is recommended that a simple text description be used; as examples: "15 minutes", "1 hour", "1 day". Registries should ensure that the frequency is not shorter than the run-time for the process.

Additionally, the request may specify:

Attribute	Description
Parameters	A text string. The parameters to be passed to the process when it is executed.

The ScheduleCreate request must also include a FirstRunDate (Section 8.43) element providing the date and time at which the process should first be executed. The request may also include a FinalRunDate (Section 8.43) element providing the last date and time at which a repeating process should be executed, and an AuditText (Section 8.7) element providing details about the process creation request.

Syntax:

```
element.ScheduleCreate =
  element ScheduleCreate {
    attribute ProcessName { ScheduledJob },
    attribute Frequency { text },
    attribute Parameters { text }?,
    attribute ActionId { UID },
    element.FirstRunDate,
    element.FinalRunDate?,
    element.AuditText?
  }
```

6.9.15.2. Response

The response to a ScheduleCreate request will be either an Error (Section 7.8) element or a Schedule (Section 7.14) element with the newly created scheduled job details.

6.9.16. ScheduleQry

The ScheduleQry request allows the registry to query details of scheduled jobs in the SRS system. The results may be filtered to return only scheduled events with particular characteristics.

6.9.16.1. Request

The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.
ProcessName	A text string. Used to match against the name of a scheduled process.
Parameters	A text string. Used to match against the parameters specified for a scheduled process.

The ScheduleQry request may also include an ActiveOn (Section 8.43) element providing a date and time at which a process must have been active (between the first run date and the last run date of a repeating process), and a FirstRunDate (Section 8.43) element to match against the first run dates of scheduled jobs.

Syntax:

```
element.ScheduleQry =
  element ScheduleQry {
    attribute QryId { UID }?,
    attribute ProcessName { text }?,
    attribute Parameters { text }?,
    element.ActiveOn?,
    element.FirstRunDate?
  }
```

6.9.16.2. Response

The response to a ScheduleQry request will be either an Error (Section 7.8) element or a set of Schedule (Section 7.14) elements, one for each schedule that matched the request parameters.

6.9.17. ScheduleUpdate

The ScheduleUpdate request allows the registry to amend the details for an existing Schedule (Section 7.14) entry in the SRS server.

6.9.17.1. Request

The request may specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.
ProcessName	A text string. The name of the process to be executed at the designated time.

Additionally, the request may specify:

Attribute	Description
Parameters	A text string. The parameters to be passed to the process when it is executed.

The ScheduleUpdate request must also include a FirstRunDate (Section 8.43) element to specify the new first run date for the process. The request may include a LastRunDate (Section 8.43) element to specify a new date at which the process last ran and an AuditText (Section 8.7) element providing details about the schedule update request.

Syntax:

```
element.ScheduleUpdate =
  element ScheduleUpdate {
    attribute ActionId { UID },
    attribute Parameters { text }?,
    attribute Frequency { text }?,
    attribute ProcessName { ScheduledJob },
    element.FirstRunDate,
    element.LastRunDate?,
    element.AuditText?
  }
```

6.9.17.2. Response

The response to a ScheduleUpdate request will be either an Error (Section 7.8) element or a Schedule (Section 7.14) element with the new scheduled job details.

6.9.18. BillingAmountUpdate

The BillingAmountUpdate request allows the registry to set a new per-domain monthly charge for registered domains within the SRS.

Each change to the monthly charge MUST also include a date that the new charge will become effective. SRS implementations SHOULD ensure that the effective date is not in the past (that is, charges should not be altered retroactively). Future billing amount changes may be amended by issuing a new BillingAmountUpdate request with the same effective date.

If the request succeeds, the response will provide a list of all stored billing amounts and their effective dates. On failure an error response is returned.

6.9.18.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The BillingAmountUpdate request must also include a BillingAmount (Section 7.3) element specifying the new per-domain monthly charge and the effective date for the new charge.

Syntax:

```
element.BillingAmountUpdate =
  element BillingAmountUpdate {
    attribute ActionId { UID },
    element.BillingAmount
  }
```

Example:

```
<BillingAmountUpdate ActionId="000000123">
   <BillingAmount Amount="7.50">
       <EffectiveDate Year="2007" Month="11" Day="19" Hour="12"
          Minute="00" Second="00" TimeZoneOffset="+13:00" />
   </BillingAmount>
</BillingAmountUpdate>
```

6.9.18.2. Response

The response to a BillingAmountUpdate request will be either an Error (Section 7.8) element or a set of BillingAmount (Section 7.3) elements, one for each billing amount in the history of the SRS

server and the new value.

Example:

```
<Response Action="BillingAmountUpdate" FeId="4" FeSeq="214"
  OrigRegistrarId="50041">
   <BillingAmount Amount="6.00">
       <EffectiveDate Year="2004" Month="01" Day="01" Hour="04"
          Minute="00" Second="00" TimeZoneOffset="+13:00" />
   </BillingAmount>
   <BillingAmount Amount="4.00">
       <EffectiveDate Year="2005" Month="01" Day="01" Hour="04"
          Minute="00" Second="00" TimeZoneOffset="+13:00" />
   </BillingAmount>
   <BillingAmount Amount="4.50">
       <EffectiveDate Year="2006" Month="01" Day="01" Hour="04"
          Minute="00" Second="00" TimeZoneOffset="+13:00" />
   </BillingAmount>
   <BillingAmount Amount="7.50">
       <EffectiveDate Year="2007" Month="11" Day="19" Hour="12"
          Minute="00" Second="00" TimeZoneOffset="+13:00" />
   </BillingAmount>
</Response>
```

6.9.19. SysParamsCreate

The SysParamsCreate request allows the registry to add configurable parameters to the SRS server.

6.9.19.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The SysParamsCreate request must include one or more SysParam (Section 7.15) elements containing the new parameters and their details.

The SysParamsCreate request may also include an AuditText (Section 8.7) element giving further details of the action.

Syntax:

```
element.SysParamsCreate =
  element SysParamsCreate {
    attribute ActionId { UID },
    element.SysParam+,
    element.AuditText?
  }
```

6.9.19.2. Response

The response to a SysParamsCreate request will be either an Error (Section 7.8) element or a set of SysParam (Section 7.15) elements, one for each new system parameter.

6.9.20. SysParamsQry

The SysParamsQry request allows the registry to obtain a list of the current state of the SRS server's configurable parameters.

6.9.20.1. Request

The request may specify:

Attribute	Description
QryId	A query identifier. This has no meaning within the SRS; if provided, it will be returned in the response to this request.

Syntax:

```
element.SysParamsQry =
  element SysParamsQry {
    attribute QryId { UID }?,
    empty
  }
```

6.9.20.2. Response

The response to a SysParamsQry request will be either an Error (Section 7.8) element or a set of SysParam (Section 7.15) elements, one for each user-configurable system parameter in the SRS server implementation.

6.9.21. SysParamsUpdate

The SysParamsUpdate request allows the registry to update the value of any user configurable parameters in the SRS server implementation.

6.9.21.1. Request

The request must specify:

Attribute	Description
ActionId	An action identifier. This is a unique identifier for the request to the SRS server.

The SysParamsUpdate request must include one or more SysParam (Section 7.15) elements containing the new parameter details.

The SysParamsUpdate request may also include an AuditText (Section 8.7) element giving further details of the configuration changes.

Syntax:

```
element.SysParamsUpdate =
  element SysParamsUpdate {
    attribute ActionId { UID },
    element.SysParam+,
    element.AuditText?
  }
```

6.9.21.2. Response

The response to a SysParamsUpdate request will be either an Error (Section 7.8) element or a set of SysParam (Section 7.15) elements, one for each changed system parameter, showing the new value.

7. SRS Response Types

7.1. AccessControlList

The AccessControlList element is used by the SRS to return details of the registry's access control lists.

The AccessControlList element must specify:

Attribute	Description
Resource	A text string. The system that the access control list is intended to be applied to.
List	A text string. A descriptive name for the access control list; for example, "whitelist".
Type	A text string. The type of access control list that is being returned. Registries may maintain different lists for different purposes, for example, blacklists and whitelists for controlling access.

Additionally, the AccessControlList element may specify:

Attribute	Description
Size or SizeChange	An integer. For a list query, the Size attribute should be included, providing the number of entries in the list. For a list change, the SizeChange element should be included, providing the number of list entries changed (positive for additions, negative for deletions).

The AccessControlList element may include one or more AccessControlListEntry (Section 8.2) elements.

Syntax:

```
element.AccessControlList =
  element AccessControlList {
    attribute Resource { text },
    attribute List { text },
    ( attribute Size { Number }
      | attribute SizeChange { Number } )?,
    attribute Type { text }?,
    element.AccessControlListEntry*
  }
```

Example:

```
<AccessControlList List="WHOIS blacklist" Size="3"
    Resource="whoisd" Type="blacklist">
    <AccessControlListEntry Address="192.0.2.5"
       Comment="Blacklisted for abuse." />
    <AccessControlListEntry Address="192.0.2.9"
        Comment="Blacklisted for abuse." />
    <AccessControlListEntry Address="192.0.2.237"
        Comment="Blacklisted at owner's request" />
</AccessControlList>
```

7.2. AckResponse

The AckResponse element is used by the SRS to return the result of an AckMessage request.

The AckResponse element must specify:

Attribute	Description
OriginatingRegistrarId	The unique identifier for the user that submitted the AckMessage request to the SRS server.
TransId	The identifier for the transaction submitted by the user that originated the request.
Remaining	An integer. The number of messages for the originating user that have not yet been acknowledged.

Definition:

```
element.AckResponse =
  element AckResponse {
    attribute OriginatingRegistrarId { RegistrarId },
    attribute TransId { UID },
    attribute Remaining { Number }
}
```

7.3. BillingAmount

The BillingAmount element is used by the SRS to return details of the amount charged for registered domains and the date that the amount became effective in the SRS.

The element content consists of an Amount attribute containing the charge in the registry's chosen currency, and may also include an EffectiveDate (Section 8.43) element containing the date and time that the charge became (or will become, for future changes) effective. The Amount value should be validated as an acceptable currency value.

The BillingAmount element must specify:

Attribute	Description
Amount	A numeric currency value. The amount charged per-term for domain registration and renewal.

The BillingAmount element may also include an EffectiveDate (Section 8.43) element.

Syntax:

```
element.BillingAmount =
  element BillingAmount {
    attribute Amount { Dollars },
    element.EffectiveDate?
  }
```

Example:

```
<BillingAmount Amount="9.95">
    <EffectiveDate Year="2004" Month="01" Day="01" Hour="04"
        Minute="00" Second="00" TimeZoneOffset="+13:00" />
</BillingAmount>
```

7.4. BillingTrans

The BillingTrans element is used by the SRS to return details of charges that have been incurred by registrars over a given billing period.

The BillingTrans element must specify:

Attribute	Description
RegistrarId	A user identifier. The identifier of the registrar that manages the domain that the billing amount relates to.
Type	A text string. The type of transaction that the billing amount relates to, for instance, "Create" or "Renew" a domain.
TransStatus	A text string. The status of the billing transaction; valid values are defined by the BillStatus (Section 9.2.2) entity.
DomainName	A text string. The domain name that the billing transaction relates to.
BillingTerm	An integer. The number of months of payment for which the billing transaction was issued.
Amount	A numeric currency value. The amount of money attached to the billing transaction.

The BillingTrans element may also specify:

Attribute	Description
RegistrantRef	A customer identifier. A reference assigned to the registrant by the registrar.
InvoiceId	An invoice identifier. The identifier from the registry's accounting system that relates to the billing transaction.

The BillingTrans element must also include a TransDate (Section 8.43) element containing the date on which the billing transaction (domain creation, renewal, etc.) occurred, a BillPeriodStart (Section 8.43) and a BillPeriodEnd (Section 8.43) element containing the start and end of the billing period to which the transaction belongs. The element may include an InvoiceDate (Section 8.43) element containing the date of the invoice to which the billing transaction has been assigned.

Syntax:

```
element.BillingTrans =
  element BillingTrans {
    attribute RegistrarId { RegistrarId },
    attribute Type { text },
    attribute TransStatus { BillStatus },
    attribute DomainName { DomainName },
    attribute RegistrantRef { UID }?,
    attribute BillingTerm { Term },
    attribute InvoiceId { UID }?,
    attribute Amount { Dollars },
    element.InvoiceDate?,
    element.TransDate,
    element.BillPeriodStart,
    element.BillPeriodEnd
  }
```

Example:

```
<BillingTrans Amount="1.50" BillingTerm="1" DomainName="example.org"
    RegistrantRef="Example registrant" RegistrarId="50041"
    TransStatus="PendingConfirmation" Type="Create">
    <TransDate Day="21" Hour="17" Minute="08" Month="2"
        Second="31" TimeZoneOffset="+13:00" Year="2008" />
    <BillPeriodStart Day="21" Hour="17" Minute="08" Month="2"
        Second="31" TimeZoneOffset="+13:00" Year="2008" />
    <BillPeriodEnd Day="21" Hour="17" Minute="08" Month="3"
        Second="31" TimeZoneOffset="+13:00" Year="2008" />
</BillingTrans>
```

7.5. DeferredRegistrarIncome

The DeferredRegistrarIncome element allows the SRS server to return details of deferred income that may be realised in a particular month by considering the domain registration payments that have been made by a registrar up to and including a base month.

The DeferredRegistrarIncome element must specify:

Attribute	Description
RegistrarId	A user identifier. The identifier of the registrar that the deferred income amount relates to.
BilledAmount	A numeric currency value. The amount of a billed amount that can be realised in the income month, considering all billing transactions up to and including the base month.
BilledCount	An integer.
BaseMonth	An integer. The latest month (January = 1, December = 12) of the base year to consider billing transactions for.
BaseYear	An integer. The latest year to consider billing transactions for.
IncomeMonth	An integer. The month (January = 1, December = 12) of the income year.
IncomeYear	An integer. The year to calculate deferred income for.

Syntax:

```
element.DeferredRegistrarIncome =
  element DeferredRegistrarIncome {
    attribute BaseMonth { text },
    attribute BaseYear { text },
    attribute IncomeMonth { text },
    attribute IncomeYear { text },
    attribute RegistrarId { RegistrarId },
    attribute BilledAmount { Dollars },
    attribute BilledCount { Number },
    empty
  }
```

7.6. Domain

The Domain element can contain full details of a domain and its status within the SRS server and is used for creating and updating domains, as well as for reporting the current domain details.

The Domain element must specify:

Attribute	Description
DomainName	A text string. The domain name. Must conform to the format and syntax in RFC 1035 [RFC1035], RFC 1123 [RFC1123], and RFC 2181 [RFC2181].

The Domain element may also specify:

Attribute	Description
Delegate	A boolean value. Indicates whether the domain should be delegated to appear in the DNS.
DomainNameUnicode	A UTF-8 text string. The domain name in the script intended by the registrant. Used for internationalized domain names (IDNs).
DomainNameUnicode	A text string. For domain names using non-ASCII characters, this is the domain name in the script intended by the registrant. Used for internationalized domain names (IDNs).
DomainNameUnicodeHex	A text string. For domain names using non-ASCII characters, this is the domain name encoded in a unicode hex format (for example, m<U+0101>ori.example.org). Used for internationalized domain names (IDNs).
DomainNameLanguage	A text string. For domain names using non-ASCII characters, this contains the language and script for the unicode domain name. For example, ".NZ LATIN"
RegistrantRef	A customer identifier. Assigned to the registrant by the registrar.
RegistrarId	A user identifier. The unique identifier for the registrar that manages the domain.
RegistrarName	A text string. The name of the registrar that manages the domain.
Status	A text string. The registration status of the domain. Valid values are defined by the RegDomainStatus (Section 9.9.1) entity.
Term	A numeric value. The number of months to bill when the domain is renewed.
UDAI	A text string. The UDAI to be checked.

The Domain element may also include elements to define the contact details, name servers and various dates relating to the registration. These optional elements are:

- NameServers (Section 8.28)
- DNSSEC (Section 8.17)
- RegistrantContact (Section 8.11)
- RegistrarPublicContact (Section 8.11)
- AdminContact (Section 8.11)
- TechnicalContact (Section 8.11)
- BilledUntil (Section 8.43)
- RegisteredDate (Section 8.43)
- CancelledDate (Section 8.43)
- LockedDate (Section 8.43)
- AuditDetails (Section 8.6)

Syntax:

```
element.Domain =
  element Domain {
    attribute DomainName { DomainName },
    attribute DomainNameUnicode { DomainNameUnicode }?,
    attribute DomainNameUnicodeHex { DomainNameUnicodeHex }?,
    attribute DomainNameLanguage { DomainNameLanguage }?,
    attribute RegistrantRef { UID }?,
    attribute RegistrarName { text }?,
    attribute Status { DomainStatus }?,
    attribute Delegate { Boolean }?,
    attribute Term { Term }?,
    attribute RegistrarId { RegistrarId }?,
    attribute UDAI { UID }?,
    element.NameServers?,
    element.DNSSEC?,
    element.RegistrantContact?,
    element.RegistrarPublicContact?,
    element.AdminContact?,
    element.TechnicalContact?,
    element.BilledUntil?,
    element.RegisteredDate?,
    element.CancelledDate?,
    element.LockedDate?,
    element.AuditDetails?
  }
```

Example:

```
<Domain Delegate="1" DomainName="mydomain.example.org"
      RegistrantRef="RS1001" RegistrarId="50041" Status="Active"
      Term="1" UDAI="ke783oe9">
    <NameServers>
        <Server FQDN="ns1.mydomain.example.org" />
        <Server FQDN="ns2.mydomain.example.org" />
    </NameServers>
    <RegistrantContact Name="John Smith"
        Email="j.smith@mydomain.example.org">
        <PostalAddress Address1="14 Rural Street" Address2="Suburbia"
            City="Wellington" CountryCode="NZ" PostalCode="6135" />
        <Phone AreaCode="4" CountryCode="64" LocalNumber="111234" />
        <Fax AreaCode="4" CountryCode="64" LocalNumber="111235" />
    </RegistrantContact>
    <AdminContact Name="ISP Administrator"
        Email="admin@myisp.example.org">
        <PostalAddress Address1="1 Main Road" Address2="Central"
            City="Wellington" CountryCode="NZ" PostalCode="6001" />
        <Phone AreaCode="4" CountryCode="64" LocalNumber="111123" />
        <Fax AreaCode="4" CountryCode="64" LocalNumber="111124" />
    </AdminContact>
    <TechnicalContact Name="ISP Technician"
        Email="tech@myisp.example.org">
        <PostalAddress Address1="1 Main Road" Address2="Central"
            City="Wellington" CountryCode="NZ" PostalCode="6001" />
        <Phone AreaCode="4" CountryCode="64" LocalNumber="111125" />
        <Fax AreaCode="4" CountryCode="64" LocalNumber="111126" />
    </TechnicalContact>
    <BilledUntil Hour="10" Minute="00" Second="00"
        Day="1" Month="2" Year="2009" TimeZoneOffset="+13:00" />
    <RegisteredDate Hour="10" Minute="00" Second="00"
        Day="1" Month="2" Year="2008" TimeZoneOffset="+13:00" />
    <AuditDetails ActionId="Domain create for mydomain.example.org"
        RegistrarId="50041">
        <AuditTime>
            <From Hour="10" Minute="00" Second="00" Day="1"
                Month="2" Year="2008" TimeZoneOffset="+13:00" />
        </AuditTime>
        <AuditText>Domain created for John Smith, RS8974</AuditText>
    </AuditDetails>
</Domain>
```

7.7. DomainTransfer

The DomainTransfer element is used by the SRS to inform a registrar of the transfer of one of the domains that they were the managing

registrar for. This element will be returned in response to a GetMessages (Section 6.5.1) request.

The DomainTransfer element must specify:

Attribute	Description
RegistrarName	A text string. The name of the registrar that the domain has been transferred to.
Minute	An integer value. The minute in which the domain transfer occurred.
Hour	An integer value. The hour in which the domain transfer occurred.
Day	An integer value. The day in which the domain transfer occurred.
Month	An integer value. The month in which the domain transfer occurred.
Year	An integer value. The year in which the domain transfer occurred.

The DomainTransfer element may also specify:

Attribute	Description
Second	An integer value. The second in which the domain transfer occurred.
TimeZoneOffset	An integer value. The TimeZoneOffset from UTC of the SRS server that processed the domain transfer.

The DomainTransfer element must also include one or more TransferredDomain (Section 8.44) elements to define the domain names that have been transferred to another registrar.

Syntax:

```
element.DomainTransfer =
  element DomainTransfer {
    attribute RegistrarName { text },
    TimeStamp,
    element.TransferredDomain+
  }
```

Example:

```
<DomainTransfer RegistrarName="My ISP" Hour="10" Minute="00"
    Second="00" Day="1" Month="4" Year="2008" TimeZoneOffset="+13" />
    <TransferredDomain>domain.co.example</TransferredDomain>
</DomainTransfer>
```

7.8. Error

The Error element may be used to present details of errors that occur when processing individual requests or a whole transaction.

The Error element must specify:

Attribute	Description
ErrorId	SRS system identifier for the error that occurred.
Severity	Indicative severity level for the error.
Hint	SRS server hint for addressing the error.

The Error element also contains a Description (Section 8.15) element and may also provide ErrorDetails (Section 8.25) elements with extra description of the error.

Syntax:

```
element.Error =
  element Error {
    attribute ErrorId { UID },
    attribute Severity { Number },
    attribute Hint { UID },
    element.Description,
    element.ErrorDetails*
  }
```

Example:

```
<Error Hint="MALFORMED_REQUEST_ERROR" ErrorId="INVALID_FIELD"
     Severity="er">
<Description>Invalid value in field</Description>
<ErrorDetails>DomainName</ErrorDetails>
</Error>
```

7.9. Handle

The Handle element allows the SRS server to return details associated with a contact handle. It must include a RegistrarID attribute referencing the registrar that created the handle, and a CreatedDate (Section 8.43) element. It may also include the ContactAttr (Section 9.4.2) attribute definitions, Contact (Section 9.4.1) element content, the AuditDetails (Section 8.6) element referencing the most recent update to the handle, and the ChangedDomains (Section 8.10) element.

Syntax:

```
element.Handle =
  element Handle {
    attribute RegistrarId { RegistrarId }
    ContactAttr,
    Contact,
    element.CreatedDate,
    element.AuditDetails?,
    element.ChangedDomains?
  }
```

Example:

```
<Handle
    RegistrarID="100"
    HandleId="EXAMPLE-1"
    Name="Example Registration Services, Inc."
    ActionId="1021021">
    <PostalAddress
        Address1="14 Example Road"
        Address2="Example Plaza"
        City="Example"
        CountryCode="US" />
    <EffectiveDate Year="2010" Month="09" Day="20"
        Hour="12" Minute="00" Second="00" TimeZoneOffset="+13:00" />
    <AuditDetails RegistrarId="100" ActionId="1021021">
        <AuditText>Add handle for ERS Inc.</AuditText>
    </AuditDetails>
</Handle>
```

7.10. Message

The Message element allows the SRS server to return message details to the user along with an indication of the number of messages outstanding. The Message response element is used when the GetMessages (Section 6.5.1) request is used with QueueMode enabled.

It contains a Response (Section 5.2.1) element and has an optional attribute, Remaining, indicating the number of messages for the effective registrar of the request that have not yet been acknowledged, and which are not included in the current action response.

Syntax:

```
element.Message =
  element Message {
       element.Response,
       attribute Remaining { Number }?
  }
```

7.11. RawRequest and RawResponse

The RawRequest and RawResponse elements allow the SRS server to return the details of a previous request and response. The details are returned as XML (Section 8.45) and Signature (Section 8.42) elements with content encoded as parsed character data.

Syntax:

```
element.RawRequest =
  element RawRequest {
    element.XML,
    element.Signature
  }

element.RawResponse =
  element RawResponse {
    element.XML,
    element.Signature
  }
```

Example:

```
<Response Action="ActionDetailsQry" FeId="4" FeSeq="137"
  OrigRegistrarId="50041">
    <RawRequest>
        <XML>&lt;SRSRequest VerMajor="2" ...</XML>
        <Signature>-----BEGIN PGP SIGNATURE-----...</Signature>
    </RawRequest>
    <RawResponse>
        <XML>&lt;SRSResponse VerMajor="2" ...</XML>
        <Signature>-----BEGIN PGP SIGNATURE-----...</Signature>
    </RawResponse>
</Response>
```

7.12. Registrar

The Registrar element is used to contain the details for a registrar.

The Registrar element must specify:

Attribute	Description
RegistrarId	A user identifier. The unique number to be assigned to the new registrar.
Name	A text string. The name of the registrar.
AccRef	A text string. The registrar's identifier in the registry's accounting system.

The Registrar element may also specify:

Attribute	Description
URL	A text string. The public web site address for the registrar.

The Registrar element must also include a RegistrarPublicContact (Section 8.11) element specifying the public contact details for the registrar, a RegistrarSRSContact (Section 8.11) element specifying the contact details for the registry's use, a DefaultTechnicalContact (Section 8.11) element which will be applied to domains registered through the registrar if no other technical contact is specified, and an EncryptKeys (Section 8.23) element providing one or more public keys that the registrar will use.

The Registrar element may also include the Allowed2LDs (Section 8.5) element specifying the subdomains managed by the registry in which the registrar may manage domain registrations, a Roles (Section 8.37) element defining system access roles for the registrar, and the AuditText (Section 8.7) element to provide details on the addition of the new registrar account.

Syntax:

```
element.Registrar =
  element Registrar {
    attribute RegistrarId { RegistrarId },
    attribute Name { text },
    attribute AccRef { text },
    attribute URL { text }?,
    element.RegistrarPublicContact,
    element.RegistrarSRSContact,
    element.DefaultTechnicalContact,
    element.EncryptKeys,
    element.EPPAuth?,
    element.Allowed2LDs?,
    element.Roles?,
    element.AuditDetails?
  }
```

Example:

```
<Registrar AccRef="Reg8974" Name="My ISP" RegistrarId="50041">
    <RegistrarPublicContact Name="Customer Service"
        Email="custserv@myisp.example.org">
        <PostalAddress Address1="1 Main Road" Address2="Central"
            City="Wellington" CountryCode="NZ" PostalCode="6001" />
        <Phone AreaCode="4" CountryCode="64" LocalNumber="111123" />
        <Fax AreaCode="4" CountryCode="64" LocalNumber="111124" />
    </RegistrarPublicContact>
    <RegistrarSRSContact Name="Admin"
        Email="admin@myisp.example.org">
        <PostalAddress Address1="1 Main Road" Address2="Central"
            City="Wellington" CountryCode="NZ" PostalCode="6001" />
        <Phone AreaCode="4" CountryCode="64" LocalNumber="111125" />
        <Fax AreaCode="4" CountryCode="64" LocalNumber="111126" />
    </RegistrarSRSContact>
    <DefaultTechnicalContact Name="ISP Technician"
        Email="tech@myisp.example.org">
        <PostalAddress Address1="1 Main Road" Address2="Central"
            City="Wellington" CountryCode="NZ" PostalCode="6001" />
        <Phone AreaCode="4" CountryCode="64" LocalNumber="111123" />
        <Fax AreaCode="4" CountryCode="64" LocalNumber="111124" />
    </DefaultTechnicalContact>
    <EncryptKeys>
        <EncryptKey>-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v1.4.6 (GNU/Linux)

mQGiBEfpmesRBADBkcApvlyH67pTIDObNgUm40u5WuLMkBvP8a9RWJNACdbUjMj+
...
```

```
   =nDaR
   -----END PGP PUBLIC KEY BLOCK-----</EncryptKey>
       </EncryptKeys>
       <Allowed2LDs>
           <SecondLD DomainName="co.example" />
           <SecondLD DomainName="org.example" />
       </Allowed2LDs>
       <Roles>
           <Role RoleName="CancelDomain" />
           <Role RoleName="Connect" />
           <Role RoleName="CreateDomain" />
           <Role RoleName="Query" />
           <Role RoleName="Registrar" />
           <Role RoleName="TransferDomain" />
           <Role RoleName="UncancelDomain" />
           <Role RoleName="UpdateDomain" />
           <Role RoleName="UpdateRegistrar" />
           <Role RoleName="Whois" />
       </Roles>
       <AuditDetails ActionId="Registrar update My ISP"
           RegistrarId="50041">
           <AuditTime>
               <From Hour="17" Minute="09" Second="10" Day="21"
                   Month="2" Year="2008" TimeZoneOffset="+13:00" />
           </AuditTime>
           <AuditText>Update contact details</AuditText>
       </AuditDetails>
   </Registrar>
```

7.13. RunLog

The RunLog element is used to provide details of log messages from processes, such as batch processes, that interact with the SRS server. This includes the scheduled job processes that support the running of the registry, as well as any other systems that wish to log messages in the SRS server log.

The RunLog element must specify:

Attribute	Description
ActionStatus	A text string. The status of the process that created the log.
ProcessName	A text string. The name of the process that created the run log entry.

The RunLog element may also specify:

Attribute	Description
Parameters	A text string. The parameters with which the process was called.
Control	A text string. A free-text field for storing extra information about the process run. For example, SRS server implementations may store the name of the server that executed the process and the completion time of the process here.

Syntax:

```
element.RunLog =
  element RunLog {
    attribute ProcessName { text },
    attribute Parameters { text }?,
    attribute ActionStatus { text },
    attribute Control { text }?,
    element.RunLogTimeStamp,
    element.RunLogDetails?
  }
```

7.14. Schedule

The Schedule element is used to return details of scheduled events within the SRS system.

The Schedule element must specify:

Attribute	Description
ProcessName	A text string. The name of the scheduled job process.
Frequency	An text string. The delay between repeat executions of the process, after the initial run date.
CreateByRegistrarId	A user identifier. The registry's registrar identifier that was used to create the scheduled job.
CreateActionId	An action identifier. This is the unique identifier for the request to the SRS server that created the scheduled job.

The Schedule element may also specify:

Attribute	Description
Parameters	A text string. The parameters to be passed to the process when it is executed.
CancelByRegistrarId	A user identifier. The registry's registrar identifier that was used to cancel the scheduled job.
CancelActionId	An action identifier. This is the unique identifier for the request to the SRS server that cancelled the scheduled job.

The Schedule element must also include a FirstRunDate (Section 8.43) element specifying the first date and time at which the process should be executed, and may also include a FinalRunDate (Section 8.43) element specifying the last time at which the process should run (for a repeating process), a CreateAuditText (Section 8.13) element providing details on the creation of the scheduled job entry, and a CancelAuditText (Section 8.9) element providing details on the cancellation of the scheduled job entry.

Syntax:

```
element.Schedule =
  element Schedule {
    attribute ProcessName { ScheduledJob },
    attribute Frequency { text },
    attribute Parameters { text }?,
    attribute CreateByRegistrarId { UID },
    attribute CreateActionId { UID },
    attribute CancelByRegistrarId { UID }?,
    attribute CancelActionId { UID }?,
    element.FirstRunDate,
    element.FinalRunDate?,
    element.CreateAuditText?,
    element.CancelAuditText?
  }
```

Example:

```
<Schedule CreateActionId="BUILDZONES-20060601"
          CreateByRegistrarId="50001" Frequency="01:00:00"
          Parameters="" ProcessName="BuildDnsZoneFiles">
    <FirstRunDate Day="21" Hour="17" Minute="10" Month="2"
                  Second="30" TimeZoneOffset="+13:00" Year="2008" />
    <CreateAuditText>Registry regular zone build</CreateAuditText>
</Schedule>
```

7.15. SysParam

The SysParam element is used to return details of system settings and any audit details relating to them.

The SysParam element must specify:

Attribute	Description
Name	A text string. The name of the system parameter.

The SysParam element must include a ParamValue (Section 8.30) element containing the value of the system parameter, and may include an AuditDetails (Section 8.6) element containing details about the most recent change to the parameter.

Syntax:

```
element.SysParam =
  element SysParam {
    attribute Name { text },
    element.ParamValue,
    element.AuditDetails?
  }
```

7.16. UDAIValid

The UDAIValid response element is used to return the result of checking the validity of a UDAI string for a given DomainName. The element has a single boolean attribute containing the result of the UDAI validation.

The UDAIValid element must specify:

Attribute	Description
Valid	A boolean value. The validity status of the tested UDAI value.

Syntax:

```
element.UDAIValid =
  element UDAIValid {
    attribute Valid { Boolean },
    empty
  }
```

Example:

```
<UDAIValid Valid="1" />
```

8. Information Elements

This section documents elements from the schema that are not used as request or response elements. These information elements contain data passed between the client and server during normal registry usage. The elements are used by requests and responses throughout the system.

8.1. AccessControlListContentFilter

The AccessControlListContentFilter is a simple container for elements that provide search patterns for access control list data.

Zero or more such filters may be supplied; filters of the same type logically OR and groups of the distinct types of filters are logically AND.

Currently supported are AddressFilter (Section 8.4), RegistrarIdFilter (Section 8.35) and DomainNameFilter (Section 8.19), which correspond to the three possible data attributes of an AccessControlListEntry (Section 8.2)

An AccessControlListContentFilter element is used by the AccessControlList (Section 7.1) element to return details of access control lists, and by the AccessControlListAdd (Section 6.9.1) and AccessControlListRemove (Section 6.9.3) queries to specify entries to add to and remove from access control lists.

Syntax:

```
AccessControlListContentFilter =
  element.DomainNameFilter
  | element.RegistrarIdFilter
  | element.AddressFilter
```

8.2. AccessControlListEntry

The AccessControlListEntry contains details for a single entry in the registry's access control list and may also include an EffectiveDate (Section 8.43) element containing the date and time that the access control list entry became effective. It has several attributes allowed in certain combinations:

Address: An identifier to be used to match and control client access to network services (for example, an IP address or a range of IP addresses).

DomainName: A domain name.

RegistrarId: A RegistrarId.

Comment: A brief comment giving the reason for entry in the access control list.

Currently allowed is DomainName, Address, RegistrarId, and RegistrarId with either DomainName and Address. One of these combinations must be satisfied.

The Address may include a network mask length, for example: 192.0.2.32/28 may match addresses on that network, for for example 192.0.2.41, if the list is queried in a properly semantic way, for example with a AddressFilter (Section 8.4) field in an AccessControlListQry (Section 6.9.2).

The Comment is an optional element which can be used to maintain a record of the reason that Addresses were added to the access control list.

The AccessControlListEntry element is used by the AccessControlList (Section 7.1) element to return details of access control lists, and by the AccessControlListAdd (Section 6.9.1) and AccessControlListRemove (Section 6.9.3) queries to specify entries to add to and remove from access control lists.

Syntax:

```
element.AccessControlListEntry =
  element AccessControlListEntry {
    attribute Address { text }?,
    attribute DomainName { text }?,
    attribute RegistrarId { RegistrarId }?,
    attribute Comment { text }?,
    element.EffectiveDate?
  }
```

8.3. ActionIdFilter

The ActionIdFilter element contains a pattern match string to match against the stored action identifiers of previous requests made to the SRS. The content should be a valid text filter (Section 10).

Syntax:

```
element.ActionIdFilter =
  element ActionIdFilter {
    text
  }
```

8.4. AddressFilter

The AddressFilter element is a simple element that contains parsed character data. The content of this element is used as a PostgreSQL inet address, in a contains-or-equals operation, so for example 192.0.2.41 would match a 192.0.2.32/28 datum.

Syntax:

```
element.AddressFilter =
  element AddressFilter {
    text
  }
```

8.5. Allowed2LDs

The Allowed2LDs element contains zero or more SecondLD (Section 8.39) elements and is used to hold a list of the subdomains managed by the registry for which a registrar may manage domain registrations.

Syntax:

```
element.Allowed2LDs =
  element Allowed2LDs {
    element.SecondLD*
  }
```

8.6. AuditDetails

The AuditDetails element contains the registrar and action identifiers of actions for system auditing purposes. The element may also contain details of the time of the action in an AuditTime (Section 8.43) element and a text description in an AuditText (Section 8.7) element.

Syntax:

```
element.AuditDetails =
  element AuditDetails {
    attribute RegistrarId { text }?,
    attribute ActionId { UID }?,
    element.AuditTime?,
    element.AuditText?
  }
```

8.7. AuditText

The AuditText element is a simple element that contains parsed character data that describes an action in the SRS. For instance, it may contain a text description of the purpose of a request.

Syntax:

```
element.AuditText =
  element AuditText {
    text
  }
```

8.8. AuditTextFilter

The AuditTextFilter element is a simple element that contains parsed character data. The content of this element is used as a pattern match string to match against audit text for previous transactions made to the SRS. The content should be a valid text filter (Section 10).

Syntax:

```
element.AuditTextFilter =
  element AuditTextFilter {
    text
  }
```

8.9. CancelAuditText

The CancelAuditText element is a simple element that contains parsed character data. The content of this element is used to hold the text of an audit message provided during cancellation of a scheduled process in the SRS. It is used by the Schedule (Section 7.14) response element.

Syntax:

```
element.CancelAuditText =
  element CancelAuditText {
    text
  }
```

8.10. ChangedDomains

The ChangedDomains element is a container for Domain (Section 7.6) elements. It is returned in a Handle (Section 7.9) element when multiple domains are updated by a HandleUpdate (Section 6.4.2) request.

Syntax:

```
element.CancelAuditText =
  element CancelAuditText {
    text
  }
```

8.11. Contact Details Elements

The SRS protocol employs many contact details elements that all share a common definition. The contact details elements are:

- AdminContact
- DefaultTechnicalContact
- RegistrantContact

- RegistrarPublicContact
- RegistrarSRSContact
- TechnicalContact

The contact details elements are defined using the Contact (Section 9.4.1) entity definition for the element content, and the ContactAttr (Section 9.4.2) entity for the element attribute definitions.

The contact details elements have Name and Email attributes to store the contact name and email address; either attribute may be omitted where appropriate. The contact details elements may also include elements for PostalAddress (Section 8.31), Phone (Section 8.34), and Fax (Section 8.34) details.

Syntax:

```
element.AdminContact =
  element AdminContact {
    ContactAttr,
    Contact
  }

element.DefaultTechnicalContact =
  element DefaultTechnicalContact {
    ContactAttr,
    Contact
  }

element.RegistrantContact =
  element RegistrantContact {
    ContactAttr,
    Contact
  }

element.RegistrarPublicContact =
  element RegistrarPublicContact {
    ContactAttr,
    Contact
  }

element.RegistrarSRSContact =
  element RegistrarSRSContact {
    ContactAttr,
    Contact
  }

element.TechnicalContact =
  element TechnicalContact {
    ContactAttr,
    Contact
  }
```

Example:

```
<AdminContact Name="John Doe" Email="john_doe@example.org">
    <PostalAddress Address1="1 Example Street" Address2=""
        City="Example" CountryCode="NZ" PostalCode="99001"
        Province="" />
    <Phone CountryCode="99" AreaCode="8" LocalNumber="555-5678"/>
    <Fax CountryCode="99" AreaCode="8" LocalNumber="555-5679"/>
</AdminContact>
```

8.12. Contact Details Search Filters

The contact details search filter elements all share a common definition referenced from the ContactFilter (Section 9.5.1) entity definition for the element content, and the ContactFilterAttr (Section 9.5.2) entity for the element attribute definitions. The contact details filters are used to provide fields for matching against stored contact details when using the DomainDetailsQry (Section 6.1.2) request. Only the details provided in the filter are used to match against stored values in the SRS, this enables general matches, for instance, to select all domains with a particular administrative contact name.

The contact details filter elements have the same structure as the contact details elements. Name and Email attributes specify the match values for contact name and email address; either attribute may be omitted where appropriate. The contact details filter elements may also include filter details elements for PostalAddress (Section 8.32), Phone (Section 8.34), and Fax (Section 8.34) details.

Syntax:

```
element.AdminContactFilter =
  element AdminContactFilter {
    ContactAttrFilter,
    ContactFilter
  }

element.RegistrantContactFilter =
  element RegistrantContactFilter {
    ContactAttrFilter,
    ContactFilter
  }

element.TechnicalContactFilter =
  element TechnicalContactFilter {
    ContactAttrFilter,
    ContactFilter
  }
```

8.13. CreateAuditText

The CreateAuditText element is a simple element that contains parsed character data. The content of this element is used to hold the text of an audit message provided during creation of a scheduled process in the SRS. It is used by the Schedule (Section 7.14) response element.

Syntax:

```
element.CreateAuditText =
  element CreateAuditText {
    text
  }
```

8.14. Date Range Elements

The SRS protocol employs many date range elements that all share a common definition. The date range elements are:

- AuditTime
- BilledUntilDateRange
- CancelledDateRange
- ChangedInDateRange
- InvoiceDateRange
- LockedDateRange
- LogDateRange
- RegisteredDateRange
- ResultDateRange
- SearchDateRange
- TransDateRange

The content of the date range elements is defined using the DateRange (Section 9.7.4) entity. The date range elements can contain two optional elements, a From (Section 8.43) date and a To (Section 8.43) date, that define the start and end of a range of dates.

If the From date is omitted, SRS implementations SHOULD use the earliest action in the system as the From date value. If the To date is omitted, SRS implementation SHOULD use the current date as the To date value.

Syntax:

```
element.AuditTime =
  element AuditTime {
```

```
      DateRange
    }

  element.BilledUntilDateRange =
    element BilledUntilDateRange {
      DateRange
    }

  element.CancelledDateRange =
    element CancelledDateRange {
      DateRange
    }

  element.ChangedInDateRange =
    element ChangedInDateRange {
      DateRange
    }

  element.InvoiceDateRange =
    element InvoiceDateRange {
      DateRange
    }

  element.LockedDateRange =
    element LockedDateRange {
      DateRange
    }

  element.LogDateRange =
    element LogDateRange {
      DateRange,
      empty
    }

  element.RegisteredDateRange =
    element RegisteredDateRange {
      DateRange
    }

  element.ResultDateRange =
    element ResultDateRange {
      DateRange
    }

  element.SearchDateRange =
    element SearchDateRange {
      DateRange
    }
```

```
element.TransDateRange =
  element TransDateRange {
    DateRange
  }
```

Example of a ResultDateRange element:

```
<ResultDateRange>
    <From Year="2008" Month="01" Day="01" Hour="00"
        Minute="00" Second="00" TimeZoneOffset="+13:00" />
    <To Year="2008" Month="01" Day="31" Hour="23"
        Minute="59" Second="59" TimeZoneOffset="+13:00" />
</ResultDateRange>
```

8.15. Description

The Description element is a simple element that contains parsed character data. The content of this element is a text description of an error condition. It is used by the Error (Section 7.8) element.

Syntax:

```
element.Description =
  element Description {
    text
  }
```

8.16. Digest

The Digest element is a simple element that contains parsed character data. The content of this element is used to store the domain delegation signature for use in DNSSEC applications.

Syntax:

```
element.Digest =
  element Digest {
    text
  }
```

8.17. DNSSEC

The DNSSEC element is a simple container for Delegation Signer, DS (Section 8.20), elements. It is used to add domain signature details for delegated domains to support the verification of domain information obtained from the DNS system. SRS implementations MAY set a limit on the number of DS elements that can be provided.

Syntax:

```
element.DNSSEC =
  element DNSSEC {
    element.DS*
  }
```

8.18. DNSSECFilter

The DNSSECFilter element is a simple container for DSFilter (Section 8.21) elements for use in selecting domains by delegation signer details.

Syntax:

```
element.DNSSECFilter =
  element DNSSECFilter {
    element.DSFilter*
  }
```

8.19. DomainNameFilter

The DomainNameFilter element is a simple element that contains parsed character data. The content of this element is used as a pattern match string to match against the names of domains registered in the SRS. The content should be a valid text filter (Section 10) for matching against domain names.

Syntax:

```
element.DomainNameFilter =
  element DomainNameFilter {
    text
  }
```

8.20. DS

The DS element contains details for domain delegation signatures used to verify domain information for delegated domains when using DNSSEC. All attributes and a Digest element MUST be provided in a valid DS element.

The element attributes define the key tag, algorithm, and digest type for the signature digest. The digest is supplied as a Digest (Section 8.16) element. All values should conform to the descriptions in RFC4034. [RFC4034]

A domain may have multiple DS records with different security

algorithms and digest types.

Syntax:

```
element.DS =
  element DS {
    attribute KeyTag { Number },
    attribute Algorithm { Number },
    attribute DigestType { Number },
    element.Digest
  }
```

8.21. DSFilter

The DSFilter element contains delegation signer details used for matching domains in domain queries. The provided attribute and element details are used to match against the stored delegation signer details of domains registered in the SRS. All attributes and the Digest element are optional.

Syntax:

```
element.DSFilter =
  element DSFilter {
    attribute KeyTag { Number }?,
    attribute Algorithm { Number }?,
    attribute DigestType { Number }?,
    element.Digest?
  }
```

8.22. EncryptKey

The EncryptKey element is a simple element that contains parsed character data. The content of this element will be an ASCII armored copy of a registrar's OpenPGP-compatible public key. It is used by the EncryptKeys (Section 8.23) element.

Syntax:

```
element.EncryptKey =
  element EncryptKey {
    text
  }
```

8.23. EncryptKeys

The EncryptKeys element is a simple simple container for EncryptKey (Section 8.22) elements. It is used when creating and updating

registrars and when the SRS returns details of registrars.

Syntax:

```
element.EncryptKeys =
  element EncryptKeys {
    element.EncryptKey*
  }
```

8.24. EPPAuth

The EPPAuth element is an empty element with a single attribute: Password. It is used to view and update the password a registrar uses to connect via the EPP protocol.

The Password can be supplied as a Unix-style hashed password of the form "5saltstring$hash", if so SHA-256 [FIPS.180-2.2002] and a salt must be used. Plain text may be provided instead (defined as not looking like a Unix-style hashed password at the start), which will be hashed.

Once set, the hash will be returned in the Password attribute.

Syntax:

```
element.EPPAuth =
  element EPPAuth {
    attribute Password { text }
  }
```

8.25. ErrorDetails

The ErrorDetails element is a simple element that contains parsed character data. The content of this element is a text description providing further details about an error condition. It is used by the Error (Section 7.8) element.

Syntax:

```
element.ErrorDetails =
  element ErrorDetails {
    text
  }
```

8.26. FieldList

The FieldList element is an empty element with a set of Boolean (Section 9.3.3) attributes. It is used in the DomainDetailsQry

(Section 6.1.2) request to specify the domain details to return for matching domains in the SRS.

The domain details that may be requested and their FieldList attributes are:

Status: The registration status of the domain ("Active" or "PendingRelease").

NameServers: The list of name servers that the domain is delegated to.

DNSSEC: The list of delegation signer records for delegated domains.

RegisteredDate: The date and time that the domain was registered.

AdminContact: The domain's administrative contact details.

RegistrantContact: The domain's registrant contact details.

TechnicalContact: The domain's technical contact details.

LockedDate: The date that a locked domain was locked.

Delegate: Whether the domain is delegated in the DNS system.

RegistrarId: The registry-assigned registrar number.

RegistrarName: The name of the registrar that manages the domain.

RegistrantRef: The personal reference for the registrant of the domain.

LastActionId: The unique identifier for the last transaction that amended the domain details in the SRS.

ChangedByRegistrarId: The identifier of the registrar that last updated the domain.

Term: The billing term for the domain registration.

BilledUntil: The date and time that the domain has been billed until.

CancelledDate: The date that a cancelled domain registration was cancelled.

AuditText: The audit text for changes to the domain. This is an optional reference for the user.

EffectiveFrom: The date that this domain record was replaced.

Syntax:

```
element.FieldList =
  element FieldList {
    attribute Status { Boolean }?,
    attribute NameServers { Boolean }?,
    attribute DNSSEC { Boolean }?,
    attribute RegistrantContact { Boolean }?,
    attribute RegisteredDate { Boolean }?,
    attribute AdminContact { Boolean }?,
    attribute TechnicalContact { Boolean }?,
    attribute LockedDate { Boolean }?,
    attribute Delegate { Boolean }?,
    attribute RegistrarId { Boolean }?,
    attribute RegistrarName { Boolean }?,
    attribute RegistrantRef { Boolean }?,
    attribute LastActionId { Boolean }?,
    attribute ChangedByRegistrarId { Boolean }?,
    attribute Term { Boolean }?,
    attribute BilledUntil { Boolean }?,
    attribute CancelledDate { Boolean }?,
    attribute AuditText { Boolean }?,
    attribute EffectiveFrom { Boolean }?,
    empty
  }
```

8.27. HandleIdFilter

The HandleIdFilter element contains a pattern match string to match against the stored handles. The content should be a valid text filter (Section 10).

Syntax:

```
element.HandleIdFilter =
  element HandleIdFilter {
    text
  }
```

8.28. NameServers

The NameServers element is a simple container for Server (Section 8.40) elements. It is used when creating and updating

domains and when the SRS returns details of the name servers for domains. SRS implementations MAY set a limit on the number of server elements that can be provided.

Syntax:

```
element.NameServers =
  element NameServers {
    element.Server*
  }
```

8.29. NameServerFilter

The NameServerFilter element is a simple container for ServerFilter (Section 8.41) elements. It is used in the DomainDetailsQry (Section 6.1.2) request to specify name server details to match against the details of domains in the SRS.

If multiple ServerFilter elements are provided, the SRS should return domain results that match any of the provided filters (assuming that other filter restrictions are also met).

Syntax:

```
element.NameServerFilter =
  element NameServerFilter {
    element.ServerFilter+
  }
```

8.30. ParamValue

The ParamValue element is a simple element that contains parsed character data. The content of this element is the value of an SRS system parameter. It is used by the SysParam (Section 7.15) element.

Syntax:

```
element.ParamValue =
  element ParamValue {
    text
  }
```

8.31. PostalAddress

The PostalAddress element is an empty element with attributes for describing postal address details. SRS implementations SHOULD validate the CountryCode as a valid ISO 3166 [ISO.3166.1988] two-letter country code.

Syntax:

```
element.PostalAddress =
  element PostalAddress {
    attribute Address1 { text }?,
    attribute Address2 { text }?,
    attribute City { text }?,
    attribute Province { text }?,
    attribute CountryCode { text }?,
    attribute PostalCode { text }?,
    empty
  }
```

8.32. PostalAddressFilter

The PostalAddressFilter element is an empty element with attributes for describing postal address details to match against details held by the SRS.

Syntax:

```
element.PostalAddressFilter =
  element PostalAddressFilter {
    attribute Address1 { text }?,
    attribute Address2 { text }?,
    attribute City { text }?,
    attribute Province { text }?,
    attribute CountryCode { text }?,
    attribute PostalCode { text }?,
    empty
  }
```

8.33. TypeFilter

The TypeFilter element is an empty element with a single attribute, Type. It is used to specify message types when retrieving messages from the SRS.

The Type attribute must be a valid GetMessagesTypes (Section 9.11.1) value.

Syntax:

```
element.TypeFilter =
  element TypeFilter {
    attribute Type { GetMessagesTypes }
  }
```

8.34. Telephone Number Details

There are two telephone number details elements that share a common definition:

- Fax
- Phone

The telephone number details elements are empty elements that use the PhoneAttr (Section 9.17.1) entity for attribute declarations.

Syntax:

```
element.Fax =
  element Fax {
    PhoneAttr,
    empty
  }

element.Phone =
  element Phone {
    PhoneAttr,
    empty
  }
```

8.35. RegistrarIdFilter

The RegistrarIdFilter element is a simple element that contains parsed character data. The content of this element is used as a RegistrarId. The purpose in making this an element is so that multiple values can be provided.

Syntax:

```
element.RegistrarIdFilter =
  element RegistrarIdFilter {
    text
  }
```

8.36. Role

The Role element is an empty element. It has a single attribute, RoleName, that must contain a value as defined by the Role (Section 9.15.1) entity.

Syntax:

```
Role =
  "Registrar"
  | "Registry"
  | "Whois"
  | "Query"
  | "CreateDomain"
  | "UpdateDomain"
  | "TransferDomain"
  | "CancelDomain"
  | "UncancelDomain"
  | "UpdateRegistrar"
  | "Administer"
  | "Supervisor"
  | "Connect"
  | "ReleaseDomain"
  | "QueryACL"
  | "UpdateACL"
  | "QueryRegACL"
```

8.37. Roles

The Roles element is a simple container for Role (Section 8.36) elements. It is used when creating and updating registrars and when the SRS returns details of registrars.

Syntax:

```
element.Roles =
  element Roles {
    element.Role*
  }
```

8.38. RunLogDetails

The RunLogDetails element is a simple element that contains parsed character data. The content of this element is the value of an SRS system parameter. It is used by the SysParam (Section 7.15) element and contains process data to be stored in the SRS log.

Syntax:

```
element.RunLogDetails =
  element RunLogDetails {
    text
  }
```

8.39. SecondLD

The SecondLD element is an empty element. It has a single attribute, DomainName, that will contain a subdomain for which a given registrar has domain registration privileges. It is used by the Allowed2LDs (Section 8.5) element.

The SecondLD element MAY contain subdomains at any level in the domain name system hierarchy that the registry supports registrations for. It is not technically restricted to second level domains.

Syntax:

```
element.SecondLD =
  element SecondLD {
    attribute DomainName { DomainName },
    empty
  }
```

8.40. Server

The Server element is an empty element. It has three attributes:

FQDN: The fully qualified domain name of the server.

IP4Addr: The IPv4 address of the server.

IP6Addr: The IPv6 address of the server.

The fully qualified domain name is a required attribute. The IP address fields should only be included if the fully qualified domain name is within the domain that the server is a name server for.

The IP4Addr value should be given in standard dotted-decimal notation, for example, 192.0.2.14

The IP6Addr value should be given in any of the formats described in RFC 4291 [RFC4291], for example:

Fully specified (preferred form): 2001:DB8:0:0:0:0:C000:20E

Compressed form: 2001:DB8::C000:20E

Alternative form: 2001:DB8:0:0:0:0:192.0.2.14 (or 2001:DB8::
192.0.2.14)

The Server element is used by the NameServers (Section 8.28) element to specify name server details.

Syntax:

```
element.Server =
  element Server {
    attribute FQDN { text },
    attribute IP4Addr { text }?,
    attribute IP6Addr { text }?,
    empty
  }
```

8.41. ServerFilter

The ServerFilter element is an empty element. It has the same attributes as the Server (Section 8.40) element, however all of the attributes are optional in the ServerFilter element. The content of the ServerFilter attributes is used to match against name server details held by the SRS.

The ServerFilter element is used by the NameServerFilter (Section 8.29) element to specify the server details to match.

Syntax:

```
element.ServerFilter =
  element ServerFilter {
    attribute FQDN { text }?,
    attribute IP4Addr { text }?,
    attribute IP6Addr { text }?,
    empty
  }
```

8.42. Signature

The Signature element is a simple element that contains parsed character data. The content of this element is the OpenPGP-compatible signature of a request message in ASCII armored format and encoded in UTF-8. It is used by the RawRequest and RawResponse (Section 7.11) elements when returning details of previous SRS transactions.

Syntax:

```
element.Signature =
  element Signature {
    text
  }
```

8.43. Timestamp Elements

The SRS protocol employs many timestamp elements that all share a common definition. The timestamp elements are:

- ActiveOn
- BilledUntil
- BillPeriodEnd
- BillPeriodStart
- CancelledDate
- CreatedDate
- EffectiveDate
- FeTimeStamp
- FinalRunDate
- FirstRunDate
- From
- InvoiceDate
- LastRunDate
- LockedDate
- NewBilledUntilDate
- RegisteredDate
- RunDate
- RunLogTimeStamp
- To
- TransactionDate
- TransDate

The timestamp elements are empty elements that use the TimeStamp

(Section 9.7.3) entity for attribute declarations.

Syntax:

```
element.ActiveOn =
  element ActiveOn {
    TimeStamp
  }

element.BilledUntil =
  element BilledUntil {
    TimeStamp,
    empty
  }

element.BillPeriodEnd =
  element BillPeriodEnd {
    TimeStamp,
    empty
  }

element.BillPeriodStart =
  element BillPeriodStart {
    TimeStamp,
    empty
  }

element.CancelledDate =
  element CancelledDate {
    TimeStamp,
    empty
  }

element.CreatedDate =
  element CreatedDate {
    TimeStamp,
    empty
  }

element.EffectiveDate =
  element EffectiveDate {
    TimeStamp,
    empty
  }

element.FeTimeStamp =
  element FeTimeStamp {
    TimeStamp,
```

```
      empty
    }

  element.FinalRunDate =
    element FinalRunDate {
      TimeStamp,
      empty
    }

  element.FirstRunDate =
    element FirstRunDate {
      TimeStamp,
      empty
    }

  element.From =
    element From {
      TimeStamp,
      empty
    }

  element.InvoiceDate =
    element InvoiceDate {
      TimeStamp,
      empty
    }

  element.LastRunDate =
    element LastRunDate {
      TimeStamp,
      empty
    }

  element.LockedDate =
    element LockedDate {
      TimeStamp,
      empty
    }

  element.NewBilledUntilDate =
    element NewBilledUntilDate {
      TimeStamp,
      empty
    }

  element.RegisteredDate =
    element RegisteredDate {
      TimeStamp,
```

```
      empty
    }

  element.RunDate =
    element RunDate {
      TimeStamp,
      empty
    }

  element.RunLogTimeStamp =
    element RunLogTimeStamp {
      TimeStamp,
      empty
    }

  element.To =
    element To {
      TimeStamp,
      empty
    }

  element.TransactionDate =
    element TransactionDate {
      TimeStamp,
      empty
    }

  element.TransDate =
    element TransDate {
      TimeStamp,
      empty
    }
```

Example of an EffectiveDate element:

```
<EffectiveDate Year="2007" Month="11" Day="19" Hour="12"
    Minute="00" Second="00" TimeZoneOffset="+13:00" />
```

8.44. TransferredDomain

The TransferredDomain element is a simple element that contains parsed character data. The content of the element is the domain name of a domain that has been transferred from one registrar to another. It is used by the DomainTransfer (Section 7.7) element.

Syntax:

```
element.TransferredDomain =
  element TransferredDomain {
    text
  }
```

8.45. XML

The XML element is a simple element that contains parsed character data. The content of this element is the XML content of a request or response message encoded in UTF-8. It is used by the RawRequest and RawResponse (Section 7.11) elements when returning details of previous SRS transactions.

Syntax:

```
element.XML =
  element XML {
    text
  }
```

9. Internal Entities

The schema for the SRS communications protocol uses internal entities to provide common definitions in the schema. These entities also enhance the readability of the schema.

9.1. Actions

9.1.1. DomainQueryAction

The DomainQueryAction entity defines the valid values for attributes that hold the name of a domain query request.

Definition:

```
DomainQueryAction =
  "Whois"
  | "DomainDetailsQry"
  | "ActionDetailsQry"
  | "UDAIValidQry"
```

9.1.2. DomainWriteAction

The DomainWriteAction entity defines the valid values for attributes that hold the name of a domain write request.

Definition:

```
DomainWriteAction =
  "DomainCreate"
  | "DomainUpdate"
```

9.1.3. HandleQueryAction

The HandleQueryAction entity defines the valid values for attributes that hold the name of a handle query request.

Definition:

```
HandleQueryAction =
  "HandleDetailsQry"
```

9.1.4. HandleWriteAction

The HandleWriteAction entity defines the valid values for attributes that hold the name of a handle write request.

Definition:

```
HandleWriteAction =
  "HandleCreate"
  | "HandleUpdate"
```

9.1.5. MessageQueryAction

The MessageQueryAction entity defines the valid values for attributes that hold the name of a message query request.

Definition:

```
MessageQueryAction =
  "GetMessages"
```

9.1.6. MessageWriteAction

The MessageWriteAction entity defines the valid values for attributes that hold the name of a message write request.

Definition:

```
MessageWriteAction =
  "AckMessage"
```

9.1.7. RegistrarQueryAction

The RegistrarQueryAction entity defines the valid values for attributes that hold the name of a registrar query request.

Definition:

```
RegistrarQueryAction =
  "RegistrarDetailsQry"
  | "RegistrarAccountQry"
```

9.1.8. RegistrarWriteAction

The RegistrarWriteAction entity defines the valid values for attributes that hold the name of a registrar write request.

Definition:

```
RegistrarWriteAction =
  "RegistrarCreate"
  | "RegistrarUpdate"
```

9.1.9. RegistryAction

The RegistryAction entity defines the valid values for attributes that hold the name of a registry request.

Definition:

```
RegistryAction =
  "SysParamsUpdate"
  | "SysParamsQry"
  | "SysParamsCreate"
  | "RunLogCreate"
  | "RunLogQry"
  | "ScheduleCreate"
  | "ScheduleCancel"
  | "ScheduleQry"
  | "ScheduleUpdate"
  | "BillingExtract"
  | "SetBillingAmount"
  | "BillingAmountQry"
  | "DeferredIncomeSummaryQry"
  | "DeferredIncomeDetailQry"
  | "BilledUntilAdjustment"
  | "BuildDnsZoneFiles"
  | "GenerateDomainReport"
  | "AdjustRegistrarAccount"
  | "AccessControlListQry"
  | "AccessControlListAdd"
  | "AccessControlListRemove"
  | "BillingAmountUpdate"
```

9.1.10. Action

The Action entity defines the valid values for attributes that hold the name of an SRS request action. It is defined in terms of the various action entity definitions.

Definition:

```
Action =
  DomainWriteAction
  | DomainQueryAction
  | HandleWriteAction
  | HandleQueryAction
  | RegistrarWriteAction
  | RegistrarQueryAction
  | MessageWriteAction
  | MessageQueryAction
  | RegistryAction
```

9.1.11. ActionEtc

The ActionEtc entity defines the valid values for the response action string. It includes all the valid values of the Action (Section 9.1.10) entity and, additionally, the strings "UnknownTransaction" and "DomainTransfer".

Definition:

```
ActionEtc =
  Action
  | "UnknownTransaction"
  | "DomainTransfer"
```

9.2. Accounts

9.2.1. AccountingAction

The AccountingAction entity defines the valid values for attributes that hold the name of an accounting action type.

Definition:

```
AccountingAction = "Credit" | "Debit"
```

9.2.2. BillStatus

The BillStatus entity defines the valid values for attributes that hold the name of a billing status.

Definition:

```
BillStatus = "PendingConfirmation" | "Confirmed"
```

9.3. Booleans

9.3.1. True

The True entity defines a fixed integer value for true boolean values in the SRS protocol.

Definition:

```
True = "1"
```

9.3.2. False

The False entity defines a fixed integer value for false boolean values in the SRS protocol.

Definition:

```
False = "0"
```

9.3.3. Boolean

The Boolean entity defines the valid values for attributes that hold a boolean value.

Definition:

```
Boolean = False | True
```

9.4. Contact Details

9.4.1. Contact

The Contact entity defines a content model for elements that contain contact details.

Definition:

```
Contact =
  element.PostalAddress?,
  element.Phone?,
  element.Fax?
```

9.4.2. ContactAttr

The ContactAttr entity defines the attribute specification for elements that contain contact details.

Definition:

```
ContactAttr =
  attribute HandleId { text }?,
  attribute Name { text }?,
  attribute Email { text }?,
  attribute ActionId { text }?
```

9.5. Contact Details Filters

9.5.1. ContactFilter

The ContactFilter entity defines a content model for elements that contain contact filter details.

Definition:

```
ContactFilter =
  element.PostalAddressFilter?,
  element.Phone?,
  element.Fax?
```

9.5.2. ContactFilterAttr

The ContactFilterAttr entity defines the attribute specification for elements that contain contact filter details.

Definition:

```
ContactAttrFilter =
  attribute HandleId { text }?,
  attribute Name { text }?,
  attribute Email { text }?
```

9.6. Currency

9.6.1. Dollars

The Dollars entity defines a value definition for attributes that contain currency values. SRS implementations SHOULD ensure that values given and received in attributes of this type conform to valid values in their registry's working currency.

Definition:

```
Dollars = xsd:decimal { fractionDigits = "2" }
```

9.7. Dates And Times

9.7.1. Date

The Date entity defines the attribute specification for elements that contain date details.

Definition:

```
Date =
  attribute Year { Number },
  attribute Month { Number },
  attribute Day { Number }
```

9.7.2. Time

The Time entity defines the attribute specification for elements that contain time details. SRS implementations MAY use their local timezone offset from UTC as a default value for TimeZoneOffset if this field is not populated.

Definition:

```
Time =
  attribute Hour { Number },
  attribute Minute { Number },
  attribute Second { Number }?,
  attribute TimeZoneOffset { text }?
```

9.7.3. TimeStamp

The TimeStamp entity defines a composite attribute specification for elements that contain a combined date and time value. It is defined in terms of the Date (Section 9.7.1) and Time (Section 9.7.2) entities.

Definition:

```
TimeStamp = Date, Time
```

9.7.4. DateRange

The DateRange entity defines a content model for elements that contain a start date and time and an end date and time. Such elements consist of an optional From (Section 8.43) element and an optional To (Section 8.43) element. Both the From and To element are empty elements with attributes as defined in the TimeStamp (Section 9.7.3) entity.

Definition:

```
DateRange =
  element.From?,
  element.To?
```

9.8. Domain Names

9.8.1. DomainName

The DomainName entity defines the valid value definition for attributes that hold a domain name.

Definition:

DomainName = string

9.9. Domain Status

9.9.1. RegDomainStatus

The RegDomainStatus entity defines the valid values for attributes that hold the status of registered domains.

Definition:

RegDomainStatus = "Active" | "PendingRelease"

9.9.2. DomainStatus

The DomainStatus entity defines the valid values for attributes that hold the status of both registered and unregistered domains.

Definition:

DomainStatus = RegDomainStatus | "Available"

9.10. Duration

9.10.1. Term

The Term entity defines the valid value definition for attributes that hold a timespan. Generally this will be an integer number of months representing the registry's billing cycle for registered domains.

Definition:

Term = xsd:positiveInteger

9.11. Message Types

9.11.1. GetMessagesTypes

The GetMessagesTypes entity defines the valid values for attributes that hold a message type name.

Definition:

GetMessagesTypes = "third-party" | "server-generated-data"

9.12. Numeric

9.12.1. Number

The Number entity defines the valid value definition for attributes that hold a number. SRS implementations SHOULD ensure that data provided in such attributes is numeric.

Definition:

Number = xsd:nonNegativeInteger

9.13. Registrar Identifiers

9.13.1. RegistrarId

The RegistrarId entity defines the valid value definition for attributes that hold a registrar identifier. Registrar identifiers in the SRS are numeric and this entity is defined in terms of the Number (Section 9.12.1) entity.

Registrar identifiers are assigned to registrars for performing registrar functions and to the registry for performing registry functions.

The registry may have more than one identity, with each identity having separate roles and permissions in the system. The registry's registrar identifiers should be known to registrars so that registrars can identify actions performed by the registry.

Definition:

RegistrarId = xsd:positiveInteger

9.13.2. RegistrarIdOrOTHERS

The RegistrarIdOrOTHERS entity defines the valid value definition for attributes that hold a registrar identifier or the special value "OTHERS". SRS Implementations SHOULD ensure that data provided in

such attributes is either a valid registrar identifier or the string "OTHERS". The value "OTHERS" may be used instead of a registrar identifier in some cases, for example when using the GetMessages (Section 6.5.1) request, to specify a registrar identifier other than the registrar making the request.

Definition:

```
RegistrarIdOrOTHERS = RegistrarId | "OTHERS"
```

9.14. Responses

9.14.1. ActionResponse

The ActionResponse entity defines the valid values for attributes that hold the name of an action response type.

Definition:

```
ActionResponse =
  element.Error
  | element.Domain*
  | element.UDAIValid
  | element.DomainTransfer
  | element.BillingTrans*
  | element.DeferredRegistrarIncome*
  | element.Registrar*
  | element.SysParam*
  | element.RunLog*
  | element.Schedule*
  | element.AccessControlList*
  | (element.RawRequest, element.RawResponse)
  | element.BillingAmount*
  | element.Handle*
  | element.Message*
```

9.15. System Roles

9.15.1. Role

The Role entity defines the valid values for attributes that hold the name of a system role type. Roles may be used by implementations to restrict the requests that users (typically registrars) have access to.

Definition:

```
Role =
  "Registrar"
  | "Registry"
  | "Whois"
  | "Query"
  | "CreateDomain"
  | "UpdateDomain"
  | "TransferDomain"
  | "CancelDomain"
  | "UncancelDomain"
  | "UpdateRegistrar"
  | "Administer"
  | "Supervisor"
  | "Connect"
  | "ReleaseDomain"
  | "QueryACL"
  | "UpdateACL"
```

9.16. Scheduled Processes

9.16.1. ScheduledJob

The ScheduledJob entity defines the valid values for attributes that hold the name of a scheduled job type.

Definition:

```
ScheduledJob =
  "BuildDnsZoneFiles"
  | "ReleaseDomains"
  | "RenewDomains"
  | "GenerateDomainReport"
  | "GenerateStatsReport"
  | "ExtractWebsiteData"
  | "DeleteUnusedHandles"
```

9.17. Telephone Numbers

9.17.1. PhoneAttr

The PhoneAttr entity defines the attribute specification for elements that telephone or fax number details.

Definition:

```
PhoneAttr =
  attribute CountryCode { text }?,
  attribute AreaCode { text }?,
  attribute LocalNumber { text }?
```

9.18. Unique Identifiers

9.18.1. UID

The UID entity defines a value definition for attributes that contain unique identifier values.

Definition:

```
UID = string
```

10. Text Filter

The text filter provides support for case-insensitive matching of a character string against information held in the SRS. Two wildcard characters are supported:

Wildcard	Description
?	matches any single character
*	matches zero or more characters

Note: when a text filter pattern is used for matching against domain names, the wildcard characters will not match the dot-separator character. The only exception to this is when the * wildcard is used at the start of the text filter pattern, in this case the wildcard may match any characters, as shown in the examples below.

Text filter pattern matching examples for domain names:

Text filter pattern	Domain	Result
alpha.*.org	alpha.example.org	Match
alpha.*.org	alpha.beta.example.org	No match
*.example.org	alpha.example.org	Match
*.example.org	alpha.beta.example.org	Match
*.example.org	example.org	No match
alpha.*	alpha.example	Match
alpha.*	alpha.co.example	No match
*	any.example.org	Match (* on its own will match all domains in the SRS)

11. Security Considerations

Care should be taken to ensure that no private data is sent over any unsecured transport. HTTPS MUST be used for all transactions involving private data - that is, data that cannot be retrieved using the public WHOIS system.

The exchange of public keys between registry and registrar when a new registrar is created in the SRS SHOULD be handled in a secure way with careful identity verification by both parties.

Storage of private keys by the registry and the registrar must be handled carefully to avoid compromise. Keys should be changed on an occasional basis, according to current best practice, to ensure that the SRS remains secure. The registrar may provide the registry with more than one valid public key to support migration from one key to another and the expiration of old keys.

Registrars MUST be restricted to only viewing data that is publicly available (that is, data that can be retrieved using the public WHOIS system), and data that they manage. Registrars MUST NOT be able to access through the SRS registry information that is managed by other registrars and is not available through the public WHOIS system.

The registry SHOULD access all requests and data through the SRS system. This allows the implementation to ensure that there is only a single way to access the system functions and data.

12. IANA Considerations

This document has no actions for IANA.

13. References

13.1. Normative References

[RFC1035] Mockapetris, P., "Domain names - implementation and specification", STD 13, RFC 1035, November 1987.

[RFC1123] Braden, R., "Requirements for Internet Hosts - Application and Support", STD 3, RFC 1123, October 1989.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2181] Elz, R. and R. Bush, "Clarifications to the DNS Specification", RFC 2181, July 1997.

[RFC4880] Callas, J., Donnerhacke, L., Finney, H., Shaw, D., and R. Thayer, "OpenPGP Message Format", RFC 4880, November 2007.

[RFC2616] Fielding, R., Gettys, J., Mogul, J., Frystyk, H., Masinter, L., Leach, P., and T. Berners-Lee, "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999.

[RFC2818] Rescorla, E., "HTTP Over TLS", RFC 2818, May 2000.

[RFC3492] Costello, A., "Punycode: A Bootstring encoding of Unicode for Internationalized Domain Names in Applications (IDNA)", RFC 3492, March 2003.

[RFC3629] Yergeau, F., "UTF-8, a transformation format of ISO 10646", STD 63, RFC 3629, November 2003.

[RFC4034] Arends, R., Austein, R., Larson, M., Massey, D., and S. Rose, "Resource Records for the DNS Security Extensions", RFC 4034, March 2005.

[W3C.REC-xml] Bray, T., Paoli, J., Sperberg-McQueen, C., and E. Maler, "Extensible Markup Language (XML) 1.0 (2nd ed)", W3C REC-xml, October 2000, <http://www.w3.org/TR/REC-xml>.

[ISO.3166.1988] International Organization for Standardization, "Codes for

the representation of names of countries, 3rd edition", ISO Standard 3166, August 1988.

[FIPS.180-2.2002]
National Institute of Standards and Technology, "Secure Hash Standard", FIPS PUB 180-2, August 2002, <http://csrc.nist.gov/publications/fips/fips180-2/fips180-2.pdf>.

13.2. Informative References

[RFC3912] Daigle, L., "WHOIS Protocol Specification", RFC 3912, September 2004.

[RFC4033] Arends, R., Austein, R., Larson, M., Massey, D., and S. Rose, "DNS Security Introduction and Requirements", RFC 4033, March 2005.

[RFC4291] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", RFC 4291, February 2006.

[RFC3375] Hollenbeck, S., "Generic Registry-Registrar Protocol Requirements", RFC 3375, September 2002.

[US-ASCII]
American National Standards Institute, "Coded Character Set - 7-bit American Standard Code for Information Interchange", ANSI X3.4, 1986, 1968.

URIs

[1] <http://sourceforge.net/projects/dnrs/>

Appendix A. Example

This example shows a typical request and response document. The example does not show the full format of the multipart request body that must be sent to the server for a request.

A.1. Whois request

Example of a Whois request (formatted for readability):

```
C: n=50041&r=<!DOCTYPE SRSRequest SYSTEM "protocol.dtd">
C: <SRSRequest VerMajor="5" VerMinor="4" RegistrarId="500411">
C:    <Whois FullResult="0" DomainName="example.org"/>
C: </SRSRequest>
C: &s=-----BEGIN PGP SIGNATURE-----
C: Version: Crypt::OpenPGP 1.03
C:
C: iQBGBAARAgAGBQJHtLqmAAoJECvUc6XZCUibvs4An2qp5xHugp7tOjO4pmxTqb3k
C: N63OAJ44F+/O3bsRhIGoqrCjvg1hlFAK0A==
C: =5C/k
C: -----END PGP SIGNATURE-----

S: r=<?xml version="1.0"?>
S: <!DOCTYPE SRSResponse SYSTEM "protocol.dtd">
S: <SRSResponse VerMajor="5" VerMinor="4" RegistrarId="1">
S:    <Response Action="Whois" FeId="7" FeSeq="1996051"
S:        OrigRegistrarId="1" RecipientRegistrarId="1">
S:       <FeTimeStamp Day="15" Hour="11" Minute="03" Month="2"
S:             Second="18" TimeZoneOffset=" 13:00" Year="2008"/>
S:       <Domain DomainName="example.org" Status="Active"/>
S:    </Response>
S: </SRSResponse>
S: &s=-----BEGIN PGP SIGNATURE-----
S: Version: Crypt::OpenPGP 1.03
S:
S: iQBGBAARAgAGBQJHtLqmAAoJENi/K6P6QHemSbgAn2W3SQFFZzI1GKbGbiJZtq4w
S: k7SxAJ491nPIkU/8kJvJ+No+Ysiph19Whw==
S: =r5Vn
S: -----END PGP SIGNATURE-----
```

Appendix B. Acknowledgements

The author would like to thank the following groups and individuals for reviewing this document in draft format and providing very helpful comments and advice.

- The SRS Implementation Team at Catalyst IT Limited
- Dave Baker of .nz Registry Services

Appendix C. RELAX NG schema

Complete RELAX NG schema for the SRS protocol (compact syntax):

```
# protocol.rnc: RELAX NG schema for Shared Registry System Protocol
#
# Author:     Srdjan Jankovic
# Version:    Release version __SRSVERMAJOR__.__SRSVERMINOR__
# Revised:    SRS Development Team
#
# Based on a prototype written by Ewen McNeill, 2002/03/05

# The NZ SRS registrar/registry protocol consists of an (externally)
# signed XML request document containing a series of actions to be
# performed on the register (updating it, or extracting information
# from it), which is answered by an (externally) signed XML response
# document containing answers to each of those actions, or an
# overall error message.
#
# Each action has its own element to specify that action, and there
# is also a response element which is used to enclose each response
# to an action.
#
# Each update-type action has an id number which is the registrar's
# identification for the action, which must be unique in all
# requests made to the register by that registrar.  The status of
# each action with an id number can be queried with the "getmsg"
# action.
#
# The registrar internally is the effective registrar of the
# transaction.  This must normally match the registrar UID specified
# externally.  However the registry may set this to a specific
# registrar other than its own "psuedo registrar" to perform actions
# "as if" it was that registrar, eg filter by that registrar.
#
# It is also included to assist debugging (by allowing network
# streams to be more directly linked to the registrar).
#
# ====================================
#
# Copyright 2002-2009 NZ Registry Services
#
# This file is part of the Shared Registry System
#
# The Shared Registry System is free software; you can redistribute
# it and/or modify it under the terms of the GNU General Public
# License as published by the Free Software Foundation; either
# version 2 of the License, or (at your option) any later version.
#
# The Shared Registry System is distributed in the hope that it will
# be useful, but WITHOUT ANY WARRANTY; without even the implied
```

```
   # warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
   # See the GNU General Public License for more details.
   #
   # You should have received a copy of the GNU General Public License
   # along with the Shared Registry System; if not, write to the Free
   # Software Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA
   # 02111-1307  USA
   #

   namespace a = "http://relaxng.org/ns/compatibility/annotations/1.0"

   # == Common entities ====================

   # Simple data types

   Number = xsd:nonNegativeInteger
   Dollars = xsd:decimal { fractionDigits = "2" }
   True = "1"
   False = "0"
   Boolean = False | True

   # Valid date
   Date =
     attribute Year { Number },
     attribute Month { Number },
     attribute Day { Number }
   # Valid time.
   # If TimeZoneOffset omitted, NZ local time assumed. The mandatory
   # format is (+/-)HH:MM (the sign is mandatory!), although (+/-)HHMM
   # will be accepted with the ':' silently added.
   # If Second is omitted, it defaults to 0
   Time =
     attribute Hour { Number },
     attribute Minute { Number },
     attribute Second { Number }?,
     attribute TimeZoneOffset { text }?

   TimeStamp = Date, Time

   # Valid domain name
   DomainName = string

   # Valid DomainName details - for registering IDN
   DomainNameUnicode = string
   DomainNameUnicodeHex = string
   DomainNameLanguage = string

   # Valid unique identifier ?
```

```
   UID = string

   # Valid term
   Term = xsd:positiveInteger

   RegistrarId = xsd:positiveInteger

   RegistrarIdOrOTHERS = RegistrarId | "OTHERS"

   # Complex data types/definitions
   ActionResponse =
     element.Error
     | element.Domain*
     | element.UDAIValid
     | element.DomainTransfer
     | element.BillingTrans*
     | element.DeferredRegistrarIncome*
     | element.Registrar*
     | element.SysParam*
     | element.RunLog*
     | element.Schedule*
     | element.AccessControlList*
     | (element.RawRequest, element.RawResponse)
     | element.BillingAmount*
     | element.Handle*
     | element.Message*

   RegDomainStatus = "Active" | "PendingRelease"
   DomainStatus = RegDomainStatus | "Available"
   BillStatus = "PendingConfirmation" | "Confirmed"

   Contact =
     element.PostalAddress?,
     element.Phone?,
     element.Fax?

   ContactAttr =
     attribute HandleId { text }?,
     attribute Name { text }?,
     attribute Email { text }?,
     attribute ActionId { text }?

   ContactFilter =
     element.PostalAddressFilter?,
     element.Phone?,
     element.Fax?

   ContactAttrFilter =
```

```
    attribute HandleId { text }?,
    attribute Name { text }?,
    attribute Email { text }?

  PhoneAttr =
    attribute CountryCode { text }?,
    attribute AreaCode { text }?,
    attribute LocalNumber { text }?

  Role =
    "Registrar"
    | "Registry"
    | "Whois"
    | "Query"
    | "CreateDomain"
    | "UpdateDomain"
    | "TransferDomain"
    | "CancelDomain"
    | "UncancelDomain"
    | "UpdateRegistrar"
    | "Administer"
    | "Supervisor"
    | "Connect"
    | "ReleaseDomain"
    | "QueryACL"
    | "UpdateACL"
    | "QueryRegACL"

  ScheduledJob =
    "BuildDnsZoneFiles"
    | "ReleaseDomains"
    | "RenewDomains"
    | "GenerateDomainReport"
    | "GenerateStatsReport"
    | "ExtractWebsiteData"
    | "DeleteUnusedHandles"

  DateRange =
    element.From?,
    element.To?

  AccountingAction = "Credit" | "Debit"

  # == Root element ======================

  requestElements =
      (element.DomainCreate
       | element.DomainUpdate
```

```
        | element.HandleCreate
        | element.HandleUpdate
        | element.HandleDetailsQry
        | element.Whois
        | element.DomainDetailsQry
        | element.ActionDetailsQry
        | element.UDAIValidQry
        | element.RegistrarCreate
        | element.RegistrarUpdate
        | element.RegistrarDetailsQry
        | element.RegistrarAccountQry
        | element.GetMessages
        | element.AckMessage
        | element.SysParamsCreate
        | element.SysParamsUpdate
        | element.SysParamsQry
        | element.RunLogCreate
        | element.RunLogQry
        | element.ScheduleCreate
        | element.ScheduleCancel
        | element.ScheduleQry
        | element.ScheduleUpdate
        | element.BillingAmountUpdate
        | element.BillingAmountQry
        | element.DeferredIncomeSummaryQry
        | element.DeferredIncomeDetailQry
        | element.BilledUntilAdjustment
        | element.BuildDnsZoneFiles
        | element.GenerateDomainReport
        | element.AdjustRegistrarAccount
        | element.AccessControlListQry
        | element.AccessControlListAdd
        | element.AccessControlListRemove)+

   rootAttributes =
       attribute VerMajor { Number },
       attribute VerMinor { Number },
       attribute RegistrarId { RegistrarId }?

   element.NZSRSRequest =
      element NZSRSRequest {
       rootAttributes,
       requestElements
      }

   element.SRSRequest =
      element SRSRequest {
       rootAttributes,
```

```
      requestElements
     }

  element.NZSRSResponse =
    element NZSRSResponse {
      rootAttributes,
      (element.Response+ | element.Error)
    }

  element.SRSResponse =
    element SRSResponse {
     rootAttributes,
     (element.Response+ | element.Error)
    }

  # == Request actions ==================

  # ++ Domain details update actions +++++

  # Create new domain name (record)
  # ActionResponse: (Domain|Error)
  element.DomainCreate =
    element DomainCreate {
      attribute ActionId { UID },
      attribute DomainName { DomainName },
      attribute DomainNameUnicode { DomainNameUnicode }?,
      attribute DomainNameLanguage { DomainNameLanguage }?,
      attribute RegistrantRef { UID }?,
      attribute Term { Term },
      [ a:defaultValue = "1" ] attribute Delegate { Boolean }?,
      element.RegistrantContact,
      element.AdminContact?,
      element.TechnicalContact?,
      element.NameServers?,
      element.DNSSEC?,
      element.AuditText?
    }

  # Update domain record
  # Usage:
  #   − update all domain records that match DomainNameFilter pattern
  #     (? replaces a single character, * replaces a group of
  #     characters); not all updates are possible (sensible)
  #
  #   Following actions are invoked by setting corresponding attribute
  #   to %True; or opposite actions when set to %False; − omission of
  #   the attribute means no action:
  #   − newUDAI − force a new authentication UID to be generated
```

```
   #   - renew
   #   - cancel
   #   - lock
   #   Transfer to another registrar is an implied operation - if
   #   non-owner registrar is doing an update, the domain is
   #   transferred to the new registrar. For this operation UDAI is
   #   required, and the DomainNameFilter must be a simple domain name
   #   (no wildcards!)
   # ActionResponse: (Domain+|Error)
   element.DomainUpdate =
     element DomainUpdate {
       attribute ActionId { UID },
       attribute UDAI { UID }?,
       attribute NewUDAI { Boolean }?,
       attribute RegistrantRef { UID }?,
       attribute Term { Term }?,
       attribute Delegate { Boolean }?,
       attribute Renew { Boolean }?,
       attribute NoAutoRenew { Boolean }?,
       attribute Lock { Boolean }?,
       attribute Cancel { Boolean }?,
       attribute Release { Boolean }?,
       attribute ConvertContactsToHandles { Boolean }?,
       [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
       element.DomainNameFilter+,
       element.RegistrantContact?,
       element.AdminContact?,
       element.TechnicalContact?,
       element.NameServers?,
       element.DNSSEC?,
       element.AuditText?
     }

   element.HandleCreate =
     element HandleCreate {
       attribute ActionId { UID },
       attribute HandleId { UID },
       ContactAttr,
       Contact,
       element.AuditText?
     }

   element.HandleUpdate =
     element HandleUpdate {
       attribute ActionId { UID },
       attribute HandleId { UID },
       attribute Delete { Boolean }?,
       ContactAttr,
```

```
      Contact,
      element.AuditText?
    }

  element.HandleDetailsQry =
    element HandleDetailsQry {
      attribute QryId { UID }?,
      attribute MaxResults { Number }?,
      attribute SkipResults { Number }?,
      [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
      element.HandleIdFilter*,
      element.SearchDateRange?,
      element.ChangedInDateRange?,
      element.ContactFilter?
    }

  element.DomainNameFilter =
    element DomainNameFilter {
      text
    }

  # ++ Domain details query actions  +++++

  # Whois  (retrieve details of DomainName)
  # ActionResponse: (Domain|Error)
  element.Whois =
    element Whois {
      attribute QryId { UID }?,
      [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
      attribute SourceIP { text }?,
      attribute DomainName { DomainName },
      empty
    }

  # UDAIValidQry - enquire if the UDAI for a domain is correct
  # ActionResponse: (UDAIValid)
  element.UDAIValidQry =
    element UDAIValidQry {
      attribute QryId { UID }?,
      attribute DomainName { DomainName },
      attribute UDAI { UID },
      empty
    }

  # General register query
  # ActionResponse: (Domain*|Error)
  element.DomainDetailsQry =
    element DomainDetailsQry {
```

```
      attribute QryId { UID }?,
      attribute Status { RegDomainStatus }?,
      attribute Delegate { Boolean }?,
      attribute Term { Term }?,
      attribute RegistrantRef { UID }?,
      attribute MaxResults { Number }?,
      attribute SkipResults { Number }?,
      [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
      element.DomainNameFilter*,
      element.NameServerFilter?,
      element.DNSSECFilter?,
      element.RegistrantContactFilter?,
      element.AdminContactFilter?,
      element.TechnicalContactFilter?,
      element.ResultDateRange?,
      element.SearchDateRange?,
      element.ChangedInDateRange?,
      element.RegisteredDateRange?,
      element.LockedDateRange?,
      element.CancelledDateRange?,
      element.BilledUntilDateRange?,
      element.AuditTextFilter?,
      element.ActionIdFilter?,
      element.FieldList?
    }

  element.AuditTextFilter =
    element AuditTextFilter {
      text
    }

  element.ActionIdFilter =
    element ActionIdFilter {
      text
    }

  # Query request - returns request-response pair
  # ActionResponse: ((RawRequest,RawResponse)|Error)
  element.ActionDetailsQry =
    element ActionDetailsQry {
      attribute QryId { UID }?,
      attribute ActionId { UID },
      attribute OriginatingRegistrarId { UID }?,
      empty
    }

  # ++ Registrar details update actions ++
  # ActionResponse: (Registrar|Error)
```

```
   element.RegistrarCreate =
     element RegistrarCreate {
       attribute ActionId { UID },
       attribute Name { text },
       attribute AccRef { text },
       attribute RegistrarId { RegistrarId },
       attribute URL { text }?,
       element.RegistrarPublicContact,
       element.RegistrarSRSContact,
       element.DefaultTechnicalContact,
       element.EncryptKeys,
       element.EPPAuth?,
       element.Allowed2LDs?,
       element.Roles?,
       element.AuditText?
     }

   element.RegistrarUpdate =
     element RegistrarUpdate {
       attribute ActionId { UID },
       attribute Name { text }?,
       attribute AccRef { text }?,
       attribute URL { text }?,
       element.RegistrarPublicContact?,
       element.RegistrarSRSContact?,
       element.DefaultTechnicalContact?,
       element.EncryptKeys?,
       element.EPPAuth?,
       element.Allowed2LDs?,
       element.Roles?,
       element.AuditText?
     }

   # ++ Registrar details query actions +++

   # ActionResponse: (Registrar*|Error)
   element.RegistrarDetailsQry =
     element RegistrarDetailsQry {
       attribute QryId { UID }?,
       attribute RegistrarId { RegistrarId }?,
       attribute NameFilter { text }?,
       element.ResultDateRange?
     }

   # RegistrarAccountQry (obtain billing records)
   # ActionResponse: (BillingTrans*|Error)
   element.RegistrarAccountQry =
     element RegistrarAccountQry {
```

```
      attribute QryId { UID }?,
      attribute RegistrantRef { UID }?,
      attribute DomainName { DomainName }?,
      attribute InvoiceId { UID }?,
      attribute MaxResults { Number }?,
      attribute SkipResults { Number }?,
      attribute TransStatus { BillStatus }?,
      [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
      element.TransDateRange?,
      element.InvoiceDateRange?
    }

  # BillingAmount Transactions
  # (To set the monthly charge for Billing)
  # ActionResponse: (BillingAmount*|Error)
  element.BillingAmountUpdate =
    element BillingAmountUpdate {
      attribute ActionId { UID },
      element.BillingAmount
    }

  element.BillingAmountQry =
    element BillingAmountQry {
      attribute QryId { UID }?,
      empty
    }

  element.BillingAmount =
    element BillingAmount {
      attribute Amount { Dollars },
      element.EffectiveDate?
    }

  element.EffectiveDate =
    element EffectiveDate {
      TimeStamp,
      empty
    }

  # ++ Query date ranges +++++++++++++++++

  element.ResultDateRange =
    element ResultDateRange {
      DateRange
    }

  element.SearchDateRange =
    element SearchDateRange {
```

```
      DateRange
    }

  element.ChangedInDateRange =
    element ChangedInDateRange {
      DateRange
    }

  element.RegisteredDateRange =
    element RegisteredDateRange {
      DateRange
    }

  element.CancelledDateRange =
    element CancelledDateRange {
      DateRange
    }

  element.LockedDateRange =
    element LockedDateRange {
      DateRange
    }

  element.BilledUntilDateRange =
    element BilledUntilDateRange {
      DateRange
    }

  element.InvoiceDateRange =
    element InvoiceDateRange {
      DateRange
    }

  element.TransDateRange =
    element TransDateRange {
      DateRange
    }

  # ++ Query field list ++++++++++++++++++

  element.FieldList =
    element FieldList {
      attribute Status { Boolean }?,
      attribute NameServers { Boolean }?,
      attribute DNSSEC { Boolean }?,
      attribute RegistrantContact { Boolean }?,
      attribute RegisteredDate { Boolean }?,
      attribute AdminContact { Boolean }?,
```

```
      attribute TechnicalContact { Boolean }?,
      attribute LockedDate { Boolean }?,
      attribute Delegate { Boolean }?,
      attribute RegistrarId { Boolean }?,
      attribute RegistrarName { Boolean }?,
      attribute RegistrantRef { Boolean }?,
      attribute LastActionId { Boolean }?,
      attribute ChangedByRegistrarId { Boolean }?,
      attribute Term { Boolean }?,
      attribute BilledUntil { Boolean }?,
      attribute CancelledDate { Boolean }?,
      attribute AuditText { Boolean }?,
      attribute EffectiveFrom { Boolean }?,
      attribute DefaultContacts { Boolean }?,
      empty
    }

  # ++ Registry actions ++++++++++++++++++

  # ActionResponse: (SysParam*|Error)
  element.SysParamsCreate =
    element SysParamsCreate {
      attribute ActionId { UID },
      element.SysParam+,
      element.AuditText?
    }

  element.SysParamsUpdate =
    element SysParamsUpdate {
      attribute ActionId { UID },
      element.SysParam+,
      element.AuditText?
    }

  element.SysParamsQry =
    element SysParamsQry {
      attribute QryId { UID }?,
      empty
    }

  # ActionResponse: (RunLog|Error)
  element.RunLogCreate =
    element RunLogCreate {
      attribute ActionId { UID },
      element.FirstRunDate,
      element.RunLog
    }
```

```
   # ActionResponse: (RunLog*|Error)
   element.RunLogQry =
     element RunLogQry {
       attribute QryId { UID }?,
       attribute ProcessName { text }?,
       attribute Parameters { text }?,
       element.LogDateRange?
     }

   element.LogDateRange =
     element LogDateRange {
       DateRange,
       empty
     }

   # ActionResponse: (Schedule|Error)
   element.ScheduleCreate =
     element ScheduleCreate {
       attribute ProcessName { ScheduledJob },
       attribute Frequency { text },
       attribute Parameters { text }?,
       attribute ActionId { UID },
       element.FirstRunDate,
       element.FinalRunDate?,
       element.AuditText?
     }

   element.ScheduleCancel =
     element ScheduleCancel {
       attribute ActionId { UID },
       attribute ProcessName { ScheduledJob },
       attribute Parameters { text }?,
       element.FirstRunDate,
       element.AuditText?
     }

   element.ScheduleUpdate =
     element ScheduleUpdate {
       attribute ActionId { UID },
       attribute Parameters { text }?,
       attribute Frequency { text }?,
       attribute ProcessName { ScheduledJob },
       element.FirstRunDate,
       element.LastRunDate?,
       element.AuditText?
     }

   element.FinalRunDate =
```

```
    element FinalRunDate {
      TimeStamp,
      empty
    }

  element.ScheduleQry =
    element ScheduleQry {
      attribute QryId { UID }?,
      attribute ProcessName { text }?,
      attribute Parameters { text }?,
      element.ActiveOn?,
      element.FirstRunDate?
    }

  element.ActiveOn =
    element ActiveOn {
      TimeStamp
    }

  element.DeferredIncomeSummaryQry =
    element DeferredIncomeSummaryQry {
      attribute BaseMonth { text },
      attribute BaseYear { text },
      attribute IncomeMonth { text },
      attribute IncomeYear { text },
      attribute QryId { UID }?,
      empty
    }

  element.DeferredRegistrarIncome =
    element DeferredRegistrarIncome {
      attribute BaseMonth { text },
      attribute BaseYear { text },
      attribute IncomeMonth { text },
      attribute IncomeYear { text },
      attribute RegistrarId { RegistrarId },
      attribute BilledAmount { Dollars },
      attribute BilledCount { Number },
      empty
    }

  element.DeferredIncomeDetailQry =
    element DeferredIncomeDetailQry {
      attribute BaseMonth { text },
      attribute BaseYear { text },
      attribute IncomeMonth { text },
      attribute IncomeYear { text },
      attribute QryId { UID }?,
```

```
      empty
    }

  element.BilledUntilAdjustment =
    element BilledUntilAdjustment {
      attribute DomainName { DomainName },
      attribute ActionId { UID },
      element.NewBilledUntilDate,
      element.AuditText
    }

  element.NewBilledUntilDate =
    element NewBilledUntilDate {
      TimeStamp,
      empty
    }

  element.BuildDnsZoneFiles =
    element BuildDnsZoneFiles {
      attribute ActionId { UID },
      element.RunDate
    }

  element.GenerateDomainReport =
    element GenerateDomainReport {
      attribute ActionId { UID },
      element.RunDate
    }

  element.RunDate =
    element RunDate {
      TimeStamp,
      empty
    }

  element.AdjustRegistrarAccount =
    element AdjustRegistrarAccount {
      attribute RegistrarId { RegistrarId },
      attribute DomainName { DomainName },
      attribute ActionId { UID },
      attribute Months { Number },
      attribute ActionType { AccountingAction },
      element.TransactionDate,
      element.BillPeriodStart,
      element.BillPeriodEnd,
      element.AuditText
    }
```

```
   element.TransactionDate =
     element TransactionDate {
       TimeStamp,
       empty
     }

   element.AccessControlListQry =
     element AccessControlListQry {
       attribute QryId { UID }?,
       attribute Resource { text }?,
       attribute List { text }?,
       attribute Type { text }?,
       [ a:defaultValue = "0" ] attribute FullResult { Boolean }?,
       AccessControlListContentFilter*
     }

   AccessControlListContentFilter =
     element.DomainNameFilter
     | element.RegistrarIdFilter
     | element.AddressFilter

   element.RegistrarIdFilter =
     element RegistrarIdFilter {
       text
     }

   element.AddressFilter =
     element AddressFilter {
       text
     }

   element.AccessControlListRemove =
     element AccessControlListRemove {
       attribute Resource { text },
       attribute List { text },
       attribute ActionId { UID },
       [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
       element.AccessControlListEntry*,
       element.AuditText?
     }

   element.AccessControlListAdd =
     element AccessControlListAdd {
       attribute Resource { text },
       attribute List { text },
       attribute ActionId { UID },
       [ a:defaultValue = "1" ] attribute FullResult { Boolean }?,
       element.AccessControlListEntry+,
```

```
      element.AuditText?
    }

  element.AccessControlList =
    element AccessControlList {
      attribute Resource { text },
      attribute List { text },
      ( attribute Size { Number }
        | attribute SizeChange { Number } )?,
      attribute Type { text }?,
      element.AccessControlListEntry*
    }

  element.AccessControlListEntry =
    element AccessControlListEntry {
      attribute Address { text }?,
      attribute DomainName { text }?,
      attribute RegistrarId { RegistrarId }?,
      attribute Comment { text }?,
      element.EffectiveDate?
    }

  # == GetMessages ======================

  # Get message by UID, or messages since date/time for the Effective
  # registrar
  #
  # Non-DTD enforced compliance:
  #   - either UID or date range must be supplied
  # ActionResponses: (Response|Error)
  element.GetMessages =
    element GetMessages {
      attribute QryId { UID }?,
      attribute OriginatingRegistrarId { RegistrarIdOrOTHERS }?,
      attribute ActionId { UID }?,
      attribute RecipientRegistrarId { RegistrarId }?,
      attribute MaxResults { Number }?,
      attribute SkipResults { Number }?,
      [ a:defaultValue = "0" ] attribute CountResults { Boolean }?,
      [ a:defaultValue = "0" ] attribute QueueMode { Boolean }?,
      element.TransDateRange?,
      element.AuditTextFilter?,
      element.TypeFilter*
    }

  GetMessagesTypes = "third-party" | "server-generated-data"

  element.TypeFilter =
```

```
    element TypeFilter {
      attribute Type { GetMessagesTypes }
    }

  # == AckMessage ========================

  # ACK message by originating RegistrarId/UID
  # ActionResponse: (Response|Error)
  element.AckMessage =
    element AckMessage {
      attribute ActionId { UID },
      attribute OriginatingRegistrarId { RegistrarId },
      attribute TransId { UID }
    }

  # == ActionResponse ====================

  # ++ Response +++++++++++++++++++++++++
  # This is a "one size fits all" response, which can contain any type
  # of response.  Errors to individual actions can be specified within
  # the response (errors in parsing the total request are handled by
  # the error ELEMENT).  The response may contain multiple domain
  # records (eg, for queries), and may contain a complete history of
  # the domain.
  # The registrar and id will match those passed in for most requests,
  # but will be present to uniquely identify a getmsg response.  Most
  # requests will result in a single response; but getmsg requests for
  # messages since a date/time will result in one response per
  # response found.
  # The DomainTransfer differs from the rest in that it is not a
  # direct response to an action, but a message for the registrar
  # generated by an action of another registrar. It may be returned in
  # response to a GetMessages action.
  DomainWriteAction =
    "DomainCreate"
    | "DomainUpdate"

  DomainQueryAction =
    "Whois"
    | "DomainDetailsQry"
    | "ActionDetailsQry"
    | "UDAIValidQry"

  HandleWriteAction =
    "HandleCreate"
    | "HandleUpdate"

  HandleQueryAction =
```

```
    "HandleDetailsQry"

  MessageWriteAction =
    "AckMessage"

  MessageQueryAction =
    "GetMessages"

  RegistrarWriteAction =
    "RegistrarCreate"
    | "RegistrarUpdate"

  RegistrarQueryAction =
    "RegistrarDetailsQry"
    | "RegistrarAccountQry"

  RegistryAction =
    "SysParamsUpdate"
    | "SysParamsCreate"
    | "SysParamsQry"
    | "RunLogCreate"
    | "RunLogQry"
    | "ScheduleCreate"
    | "ScheduleCancel"
    | "ScheduleQry"
    | "ScheduleUpdate"
    | "BillingExtract"
    | "SetBillingAmount"
    | "BillingAmountQry"
    | "DeferredIncomeSummaryQry"
    | "DeferredIncomeDetailQry"
    | "BilledUntilAdjustment"
    | "BuildDnsZoneFiles"
    | "GenerateDomainReport"
    | "AdjustRegistrarAccount"
    | "AccessControlListQry"
    | "AccessControlListAdd"
    | "AccessControlListRemove"
    | "BillingAmountUpdate"

  Action =
    DomainWriteAction
    | DomainQueryAction
    | HandleWriteAction
    | HandleQueryAction
    | RegistrarWriteAction
    | RegistrarQueryAction
    | MessageWriteAction
```

```
     | MessageQueryAction
     | RegistryAction

   ActionEtc =
     Action
     | "UnknownTransaction"
     | "DomainTransfer"

   element.Response =
     element Response {
       attribute Action { ActionEtc },
       attribute FeId { Number },
       attribute FeSeq { Number },
       attribute OrigRegistrarId { RegistrarId },
       attribute TransId { UID }?,
       attribute Rows { Number }?,
       attribute Count { Number }?,
       attribute MoreRowsAvailable { Boolean }?,
       attribute RecipientRegistrarId { RegistrarId }?,
       element.FeTimeStamp,
       (element.Response* | ActionResponse | element.AckResponse)?
     }

   element.AckResponse =
     element AckResponse {
       attribute OriginatingRegistrarId { RegistrarId },
       attribute TransId { UID },
       attribute Remaining { Number }
     }


   # ++ Error ++++++++++++++++++++++++++++++
   # Errors can be either specific to a requested action, or generic to
   # the whole request.  A globally unique errorid identifies the error
   # that occured, and a human-readable string describing the error is
   # enclosed.
   # The errorids are assigned like HTTP, where there are three digits
   # to identify the error.  The first digit indicates approximately
   # the status (success, failure, etc); the second is a subcategory of
   # that, and the third is used for fine detail indications.  The
   # exact list of errors is in SRS::Error module.
   element.Error =
     element Error {
       attribute ErrorId { UID },
       attribute Severity { Number },
       attribute Hint { UID },
       element.Description,
       element.ErrorDetails*
```

```
    }

  element.Description =
    element Description {
      text
    }

  element.ErrorDetails =
    element ErrorDetails {
      text
    }

  element.FeTimeStamp =
    element FeTimeStamp {
      TimeStamp,
      empty
    }

  # == Lower level elements ==============

  # Zone information: fields held in the register, that can be
  # obtained through the registrar/registry protocol and/or are
  # maintainable through the registry protocol.

  # ++ Domain details +++++++++++++++++++
  # NOTE: the domain authid (UDAI) is sent ONLY if it has been newly
  # generated; otherwise it is assumed that the registrar has the
  # previous value cached.
  element.Domain =
    element Domain {
      attribute DomainName { DomainName },
      attribute DomainNameUnicode { DomainNameUnicode }?,
      attribute DomainNameUnicodeHex { DomainNameUnicodeHex }?,
      attribute DomainNameLanguage { DomainNameLanguage }?,
      attribute RegistrantRef { UID }?,
      attribute RegistrarName { text }?,
      attribute Status { DomainStatus }?,
      attribute Delegate { Boolean }?,
      attribute Term { Term }?,
      attribute RegistrarId { RegistrarId }?,
      attribute UDAI { UID }?,
      element.NameServers?,
      element.DNSSEC?,
      element.RegistrantContact?,
      element.RegistrarPublicContact?,
      element.AdminContact?,
      element.TechnicalContact?,
      element.BilledUntil?,
```

```
      element.RegisteredDate?,
      element.CancelledDate?,
      element.LockedDate?,
      element.DefaultContacts?,
      element.AuditDetails?
    }

  element.BilledUntil =
    element BilledUntil {
      TimeStamp,
      empty
    }

  element.LockedDate =
    element LockedDate {
      TimeStamp,
      empty
    }

  element.RegisteredDate =
    element RegisteredDate {
      TimeStamp,
      empty
    }

  element.CancelledDate =
    element CancelledDate {
      TimeStamp,
      empty
    }

  element.DomainTransfer =
    element DomainTransfer {
      attribute RegistrarName { text },
      TimeStamp,
      element.TransferredDomain+
    }

  element.TransferredDomain =
    element TransferredDomain {
      text
    }

  element.UDAIValid =
    element UDAIValid {
      attribute Valid { Boolean },
      empty
    }
```

```
   # Name servers
   # The IP address should be included if and only if the FQDN is
   # within the zone that it is associated with.
   # The IP6Addr may be in any of the formats specified by RFC 2373:
   #     1.  X:X:X:X:X:X:X         (Fully Specified)
   #     2.  X:X:X::X              ('::' denotes compressed zeroes )
   #     3.  X:X:X:X:X:X:d.d.d.d   ('d.d.d.d' denotes an IP4 Address)
   element.NameServers =
     element NameServers {
       element.Server*
     }

   element.Server =
     element Server {
       attribute FQDN { text },
       attribute IP4Addr { text }?,
       attribute IP6Addr { text }?,
       empty
     }

   # Name server Filter
   # As above, but a filter for a search
   element.NameServerFilter =
     element NameServerFilter {
       element.ServerFilter+
     }

   element.ServerFilter =
     element ServerFilter {
       attribute FQDN { text }?,
       attribute IP4Addr { text }?,
       attribute IP6Addr { text }?,
       empty
     }

   # DS for DNSSEC support
   element.DNSSEC =
     element DNSSEC {
       element.DS*
     }

   element.DS =
     element DS {
       attribute KeyTag { Number },
       attribute Algorithm { Number },
       attribute DigestType { Number },
       element.Digest
     }
```

```
   element.Digest =
     element Digest {
       text
     }

   # DNSSEC Filter
   # As above, but a filter for a search
   element.DNSSECFilter =
     element DNSSECFilter {
       element.DSFilter+
     }

   element.DSFilter =
     element DSFilter {
       attribute KeyTag { Number }?,
       attribute Algorithm { Number }?,
       attribute DigestType { Number }?,
       element.Digest?
     }

   element.DefaultContacts =
     element DefaultContacts {
           attribute AdminContact { Boolean }?,
           attribute TechnicalContact { Boolean }?,
           empty
     }

   # ++ Registrar details +++++++++++++++++

   element.Registrar =
     element Registrar {
       attribute RegistrarId { RegistrarId },
       attribute Name { text },
       attribute AccRef { text },
       attribute URL { text }?,
       element.RegistrarPublicContact,
       element.RegistrarSRSContact,
       element.DefaultTechnicalContact,
       element.EncryptKeys,
       element.EPPAuth?,
       element.Allowed2LDs?,
       element.Roles?,
       element.AuditDetails?
     }

   element.Allowed2LDs =
     element Allowed2LDs {
       element.SecondLD*
```

```
    }

  element.SecondLD =
    element SecondLD {
      attribute DomainName { DomainName },
      empty
    }

  element.Roles =
    element Roles {
      element.Role*
    }

  element.Role =
    element Role {
      attribute RoleName { Role },
      empty
    }

  element.EncryptKeys =
    element EncryptKeys {
      element.EncryptKey*
    }

  element.EncryptKey =
    element EncryptKey {
      text
    }

  element.EPPAuth =
    element EPPAuth {
      attribute Password { text }
    }

  # ++ Billing transaction +++++++++++++++

  element.BillingTrans =
    element BillingTrans {
      attribute RegistrarId { RegistrarId },
      attribute Type { text },
      attribute TransStatus { BillStatus },
      attribute DomainName { DomainName },
      attribute RegistrantRef { UID }?,
      attribute BillingTerm { Term },
      attribute InvoiceId { UID }?,
      attribute Amount { Dollars },
      element.InvoiceDate?,
      element.TransDate,
```

```
      element.BillPeriodStart,
      element.BillPeriodEnd
    }

  element.InvoiceDate =
    element InvoiceDate {
      TimeStamp,
      empty
    }

  element.TransDate =
    element TransDate {
      TimeStamp,
      empty
    }

  element.BillPeriodStart =
    element BillPeriodStart {
      TimeStamp,
      empty
    }

  element.BillPeriodEnd =
    element BillPeriodEnd {
      TimeStamp,
      empty
    }

  # ++ Contact information: for registrant, admin, technical ++

  element.RegistrantContact =
    element RegistrantContact {
      ContactAttr,
      Contact
    }

  element.RegistrantContactFilter =
    element RegistrantContactFilter {
      ContactAttrFilter,
      ContactFilter
    }

  element.AdminContact =
    element AdminContact {
      ContactAttr,
      Contact
    }
```

```
   element.AdminContactFilter =
     element AdminContactFilter {
       ContactAttrFilter,
       ContactFilter
     }

   element.TechnicalContact =
     element TechnicalContact {
       ContactAttr,
       Contact
     }

   element.TechnicalContactFilter =
     element TechnicalContactFilter {
       ContactAttrFilter,
       ContactFilter
     }

   element.ChangedDomains =
     element ChangedDomains {
        element.Domain*
     }

   element.CreatedDate =
     element CreatedDate {
       TimeStamp,
       empty
     }

   element.Handle =
     element Handle {
       attribute RegistrarId { RegistrarId },
       ContactAttr,
       Contact,
       element.CreatedDate,
       element.AuditDetails?,
       element.ChangedDomains?
     }


   element.Message =
     element Message {
       element.Response,
       attribute Remaining { Number }?
     }

   element.HandleIdFilter =
     element HandleIdFilter {
```

```
      text
    }

  element.ContactFilter =
    element ContactFilter {
      ContactAttrFilter,
      ContactFilter
    }

  element.RegistrarPublicContact =
    element RegistrarPublicContact {
      ContactAttr,
      Contact
    }

  element.DefaultTechnicalContact =
    element DefaultTechnicalContact {
      ContactAttr,
      Contact
    }

  element.RegistrarSRSContact =
    element RegistrarSRSContact {
      ContactAttr,
      Contact
    }

  # Country is an ISO 3166-1 country code
  element.PostalAddress =
    element PostalAddress {
      attribute Address1 { text }?,
      attribute Address2 { text }?,
      attribute City { text }?,
      attribute Province { text }?,
      attribute CountryCode { text }?,
      attribute PostalCode { text }?,
      empty
    }

  element.PostalAddressFilter =
    element PostalAddressFilter {
      attribute Address1 { text }?,
      attribute Address2 { text }?,
      attribute City { text }?,
      attribute Province { text }?,
      attribute CountryCode { text }?,
      attribute PostalCode { text }?,
      empty
```

```
    }

  element.Phone =
    element Phone {
      PhoneAttr,
      empty
    }

  element.Fax =
    element Fax {
      PhoneAttr,
      empty
    }

  # ++ Raw responses +++++++++++++++++++++

  element.RawRequest =
    element RawRequest {
      element.XML,
      element.Signature
    }

  element.RawResponse =
    element RawResponse {
      element.XML,
      element.Signature
    }

  element.XML =
    element XML {
      text
    }

  element.Signature =
    element Signature {
      text
    }

  # ++ System Parameters +++++++++++++++++

  element.SysParam =
    element SysParam {
      attribute Name { text },
      element.ParamValue,
      element.AuditDetails?
    }

  element.ParamValue =
```

```
    element ParamValue {
      text
    }

  # ++ Run Log ++++++++++++++++++++++++++

  element.RunLog =
    element RunLog {
      attribute ProcessName { text },
      attribute Parameters { text }?,
      attribute ActionStatus { text },
      attribute Control { text }?,
      element.RunLogTimeStamp,
      element.RunLogDetails?
    }

  element.RunLogDetails =
    element RunLogDetails {
      text
    }

  element.RunLogTimeStamp =
    element RunLogTimeStamp {
      TimeStamp,
      empty
    }

  # ++ Schedule ++++++++++++++++++++++++++

  # Frequency in ?
  element.Schedule =
    element Schedule {
      attribute ProcessName { ScheduledJob },
      attribute Frequency { text },
      attribute Parameters { text }?,
      attribute CreateByRegistrarId { UID },
      attribute CreateActionId { UID },
      attribute CancelByRegistrarId { UID }?,
      attribute CancelActionId { UID }?,
      element.FirstRunDate,
      element.FinalRunDate?,
      element.CreateAuditText?,
      element.CancelAuditText?
    }

  element.FirstRunDate =
    element FirstRunDate {
      TimeStamp,
```

```
      empty
    }

  element.LastRunDate =
    element LastRunDate {
      TimeStamp,
      empty
    }

  element.CreateAuditText =
    element CreateAuditText {
      text
    }

  element.CancelAuditText =
    element CancelAuditText {
      text
    }

  # ++ Audit details ++++++++++++++++++++

  element.AuditDetails =
    element AuditDetails {
      attribute RegistrarId { text }?,
      attribute ActionId { UID }?,
      element.AuditTime?,
      element.AuditText?
    }

  element.AuditTime =
    element AuditTime {
      DateRange
    }

  element.AuditText =
    element AuditText {
      text
    }

  # == Various ============================

  element.From =
    element From {
      TimeStamp,
      empty
    }

  element.To =
```

```
     element To {
       TimeStamp,
       empty
     }

   start = element.NZSRSRequest | element.NZSRSResponse
            | element.SRSRequest | element.SRSResponse
```

Author's Address

Matthew Hunt
New Zealand Registry Services
Level 9
Exchange Place
5-7 Willeston Street
Wellington
New Zealand

Email: matt@nzrs.net.nz
URI: http://www.nzrs.net.nz/