

Internet Engineering Task Force
Internet-Draft
Intended status: Informational
Expires: 17 October 2025

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15 April 2025

ICANN Registry Interfaces
draft-lozano-icann-registry-interfaces-24

Abstract

This document describes the technical details of the interfaces provided by the Internet Corporation for Assigned Names and Numbers (ICANN) to its contracted parties to fulfill reporting requirements. The interfaces provided by ICANN to Data Escrow Agents and Registry Operators to fulfill the requirements of Specifications 2 and 3 of the gTLD Base Registry Agreement are described in this document. Additionally, interfaces for retrieving the IP addresses of the probe nodes used in the SLA Monitoring System (SLAM) and interfaces for supporting maintenance window objects are described in this document.

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1. Introduction

This document describes the technical details of the interfaces provided by the Internet Corporation for Assigned Names and Numbers (ICANN) to other contracted parties to fulfill reporting requirements. The interface provided by ICANN to Registry Operators and Data Escrow Agents to fulfill the requirements of Specifications 2 and 3 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731] are described in this document. Additionally, interfaces for retrieving the IP addresses of the probe nodes used in the SLA Monitoring System (SLAM) and interfaces for supporting maintenance window objects are described in this document.

Extensible Markup Language (XML) 1.0 as described in [W3C.REC-xml-20081126] and XML Schema notation as described in [W3C.REC-xmlschema-1-20041028] and [W3C.REC-xmlschema-2-20041028] are used in this specification.

The provisioning of credentials and authentication methods used in the interfaces are outside of this document's scope.

1.1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

XML is case sensitive. Unless stated otherwise, XML specifications and examples provided in this document MUST be interpreted in the character case presented to develop a conforming implementation.

1.2. Date and Time

Numerous fields indicate "date and time", such as the creation and receipt dates for data escrow deposits. These fields SHALL contain timestamps indicating the date and time in UTC as specified in [RFC3339], with no offset from the zero meridian.

1.3. Common elements used in this specification

Common elements used in this specification are explained in this section.

- * `<base-url>`: The base URL used in the reporting interfaces examples must be replaced with the URL indicated by ICANN.

1.4. Object Description

This section describes the base objects supported by this specification.

1.4.1. `<iirdea:result>` object

The ICANN interfaces for registries and data escrow agents (IIRDEA) `<iirdea:result>` object is used to provide information on the result of a verification process when interacting with the interfaces. The XML Schema for the `<iirdea:result>` object can be found in Section 7.1.

The `<iirdea:result>` object contains the following attributes and child elements:

- * A "code" attribute whose value is a four-digit decimal number that identifies the result of a process. Available result code values MUST be defined for the corresponding process.

- * An OPTIONAL "domainCount" attribute indicates the number of domain names related to the reported result.
- * A <msg> element contains a human-readable description of the result code.
- * An OPTIONAL <description> element that includes additional details on the result conditions.

An example of a <iirdea:result> object is presented below:

```
<result code="2001">
  <msg>The structure of the report is invalid.</msg>
  <description>
    'XX' could not be parsed as a number (line: 2 column:3)
  </description>
</result>
```

1.4.2. <rdeReport:report> object

The contents of a data escrow deposit are described using a <rdeReport:report> object. The XML Schema for the <rdeReport:report> object can be found in Section 7.2.

The <rdeReport:report> object contains the following child elements:

- * An <id> element that contains the identifier assigned to this report. The report identifier MUST be the same as the "id" attribute from the <deposit>. If the data escrow deposit does not include a unique identifier, the Data Escrow Agent MUST generate a unique identifier to reference the data escrow deposit and use it in the <id> element.
- * A <version> element contains the version of the specification used. This value MUST be 1.
- * A <rydeSpecEscrow> element contains the version of the Data Escrow Specification (e.g., RFC8909) used to create the deposit. After the specification is published as an RFC, the value MUST be the RFC number assigned by IANA.
- * An OPTIONAL <rydeSpecMapping> element contains the version of the Domain Name Registration Data (DNRD) Objects Mapping (e.g., RFC9022) used to create the deposit. After the specification is published as an RFC, the value MUST be the RFC number assigned by IANA. The <rydeSpecMapping> element MUST be included if the deposit was created using any version of the DNRD objects mapping specification (see [RFC9022]).

- * A <resend> element contains the value of the "resend" attribute of the <deposit>.
- * A <crDate> element contains the date and time that the Registry Operator created the deposit.
- * A <kind> element is used to identify the kind of deposit: FULL, INCR (Incremental), or DIFF (Differential).
- * A <watermark> element contains the date and time corresponding to the Timeline Watermark (<watermark> element) of the <deposit>.
- * A <rdeHeader:header> element contains the header of the <deposit> as defined in [RFC9022].

An example of a <rdeReport:report> object is available in Section 2.1.

1.4.3. <rdeNotification:notification> object

The <rdeNotification:notification> object is used by Data Escrow Agents to document the result of the data escrow deposit verification process. The XML Schema for the <rdeNotification:notification> object can be found in Section 7.3.

The <rdeNotification:notification> object contains the following child elements:

- * A <deaName> element contains the name of the Data Escrow Agent.
- * A <version> element contains the version of the specification used. This value MUST be 1.
- * A <repDate> element contains the reported date. In the case of a DVPN or DVFN notification, this value MUST be the date of the <watermark> element of the <deposit>. In the case of a DRFN deposit notification, this value MUST be the date for which no deposit was received from the Registrar or Registry Operator.
- * A <status> element is used to specify the status of <repDate>. The possible values of status are DVPN, DVFN, and DRFN. The three types of notices determine the value for the <status> element:
 - Deposit Receipt Failure Notice (DRFN): generated by the Data Escrow Agent when no deposit is received according to the data escrow deposit schedule.

- Deposit Verification Failure Notice (DVFN): generated by the Data Escrow Agent when a deposit is received, but the final result of the verification process is a failure.
- Deposit Verification Pass Notice (DVPN): generated by the Data Escrow Agent when a deposit is received, and the final result of the verification process is a success.
- * An OPTIONAL <results> element contains the errors detected during the data escrow deposit verification process performed by the Data Escrow Agent. The <results> element includes one or more <iirdea:result> elements as defined in Section 1.4.1. In the case of a DRFN or DVPN deposit notification, the <results> element MUST NOT be present.
- * An OPTIONAL <reDate> element contains the date and time that the Data Escrow Agent successfully received the deposit. In the case of a DRFN deposit notification, this element MUST NOT be present.
- * An OPTIONAL <vaDate> element contains the date and time that the Data Escrow Agent processed the deposit for validation. In the case of a DRFN deposit notification, this element MUST NOT be present.
- * An OPTIONAL <lastFullDate> element contains the date of the Timeline Watermark (<watermark> element) of the most recent FULL deposit that the Data Escrow Agent successfully validated. This element MUST NOT be present if a successfully validated full deposit has never been deposited.
- * An OPTIONAL <rdeReport:report> element is used by the Data Escrow Agent to provide extended information about the deposit. In the case of a DRFN deposit notification, this element MUST NOT be present. In the case of a DVPN or DVFN deposit notification, this element MUST be present. When this element is present, the <rdeHeader:header> element MUST be generated by the Data Escrow Agent for the Timeline Watermark (<watermark> element) of the deposit being processed. If the deposit being processed is a differential or incremental deposit, the Data Escrow Agent MUST create a dataset by following Section 5.2 of [RFC8909] to generate the <rdeHeader:header> element.
- * Note: In the case of a DVPN or DVFN deposit notification, the <id> is used as a unique identifier.

An example of a <rdeNotification:notification> object is available in Section 2.2.

1.4.4. <rriReporting:summary> Object

Interfaces that support monitoring the reporting status for a specific repository provide a <rriReporting:summary> object as defined by the schema in Section 7.4 in the HTTP Entity-body when a HTTP/200 code is sent by the interface.

The <rriReporting:summary> element includes the following child elements:

- * A choice of one of the elements as defined in the "rdeHeader:repositoryTypeGroup" (see [RFC9022]) that indicates the unique identifier for the repository being escrowed.
- * A <creationDate> element with the date and time in which the queried repository was created in the system.
- * A <depositSchedule> OPTIONAL element indicating the current Data Escrow Deposit schedule for the queried repository. Possible values are "None", "Weekly", and "Daily".
- * An OPTIONAL <lastFullDate> element indicating the date of the Timeline Watermark (<watermark> element) of the most recent FULL deposit that was successfully validated for the queried repository as notified by the Data Escrow Agent.
- * A <statusReports> element with a <statusReport> element for each report type for the queried repository. Each <statusReport> element includes the following child elements:
 - <type>: a string value indicating the report type to which the information provided pertains.
 - <enabled>: a boolean value indicating if the report type is enabled for the repository.
 - <status>: a string value indicating the reporting status. A value of "ok" indicates no reporting issues in the corresponding report type, otherwise the value of "unsatisfactory" is shown.
 - An OPTIONAL <issues> element included only when the <status> element has a value of "unsatisfactory", and includes an empty <issue> element for each date with a reporting problem found in the corresponding report type. Each <issue> element includes a REQUIRED "date" attribute in "YYYY-MM-DD" format and a REQUIRED "description" attribute to describe the issue. The possible values to describe each reporting issue are:

- o "Missing_Deposit_Full": If the latest notification received from the Data Escrow Agent for the date indicates that a scheduled "Full" deposit was not submitted by the repository owner.
- o "Missing_Deposit_Diff": If the latest notification received from the Data Escrow Agent for the date indicates that a scheduled "Differential" deposit was not submitted by the repository owner.
- o "Invalid_Deposit_Full": If the latest notification received from the Data Escrow Agent for the date indicates that a "Full" deposit was received by the Data Escrow Agent, but failed the verification process.
- o "Invalid_Deposit_Diff": If the latest notification received from the Data Escrow Agent for the date indicates that a "Differential" deposit was received by the Data Escrow Agent, but failed the verification process.
- o "No_Report_Received" If no report has been received for the date.

- * A <timestamp> element to indicate the date and time the reporting status response was created.

1.4.5. <rdeReports:reports> Object

Interfaces that support monitoring and retrieving Data Escrow Reports received, provide a <rdeReports:reports> object as defined by the schema in Section 7.6 in the HTTP Entity-body when an HTTP/200 code is sent by the interface.

The <rdeReports:reports> element includes a list of <rdeReports:receivedReport> objects, one for each <rdeReport:report> successfully received by ICANN.

Each <rdeReports:receivedReport> object includes the following child elements:

- * A <received> element to indicate the date and time in which ICANN received the report.
- * A <rdeReport:report> element as defined in Section 1.4.2 as received by ICANN.

1.4.6. <rdeNotifications:notifications> Object

Interfaces that support monitoring and retrieving Data Escrow Notifications received from Data Escrow Agents, provide a <rdeNotifications:notifications> object as defined by the schema in Section 7.5 in the HTTP Entity-body when an HTTP/200 code is sent by the interface.

The <rdeNotifications:notifications> element includes a list of <rdeNotifications:receivedNotification> objects, one for each <rdeNotification:notification> successfully received by ICANN.

Each <rdeNotifications:receivedNotification> object includes the following child elements:

- * A <received> element to indicate the date and time in which ICANN received the notification.
- * A <rdeNotification:notification> element as defined in Section 1.4.3 as received by ICANN.

1.4.7. <schedule:schedule> object

The <schedule:schedule> object is used to provide details of an instance of a maintenance window. The maintenance window is identified by a Universally Unique Identifier version 4 (see [RFC4122]) captured in the attribute "scheduleId". An additional attribute "enabled" defined as a boolean can be used to enable (value of true) or disable (value of false) the maintenance window. The XML Schema for the <schedule:schedule> object can be found in Section 7.7.

The <schedule:schedule> object contains the following child elements:

- * A <name> element contains a descriptive name of the maintenance window.
- * A <description> element contains a description of the maintenance window.
- * A <version> element contains the version of the specification used. This value MUST be 1.
- * A <startTime> element contains the date and time when the maintenance window starts being active.
- * A <endTime> element contains the date and time when the maintenance window ends being active.

An example of a `<schedule:schedule>` object is available in Section 4.

1.4.8. `<schedule:schedules>` object

The `<schedule:schedules>` object is used to provide the list of maintenance window objects. The XML Schema for the `<schedule:schedules>` object can be found in Section 7.7.

The `<schedule:schedules>` object contains the following child elements:

- * Zero or more `<schedule:schedule>` elements. See, Section 1.4.7 for the definition of `<schedule:schedule>`.

An example of a `<schedule:schedules>` object is available in Section 4.

1.4.9. `<probeNode:probeNodes>` object

The `<probeNode:probeNodes>` object is used to provide the list of probe nodes used by the SLA Monitoring System. The XML Schema for the `<probeNode:probeNodes>` object can be found in Section 7.8.

The `<probeNode:probeNodes>` object contains the following child elements:

- * One or more `<probeNode>` elements. Each `<probeNode>` element contains the following child elements:
 - A `<city>` element contains the name of the city where the node is located.
 - One or more `<addr>` element contains the IP addresses used in the node to originate test connections. An "ip" attribute contains the string "v4" if the IP address is an IPv4 address or "v6" if the IP address is an IPv6 address.
- * A `<updateTime>` element contains the date and time of the last update of the list.
- * A `<version>` element contains the version of the specification used. This value MUST be 1.

An example of a `<probeNode:probeNodes>` object is available in Section 5.

2. Interfaces for Specification 2 - Data Escrow Reporting

This section describes the interfaces provided by ICANN to Registry Operators and Data Escrow Agents to fulfill the reporting requirements detailed in Specification 2 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731].

2.1. Registry Operator Reporting

The gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731], Specification 2, Part A, Section 7 requires Registry Operators to provide ICANN with a written statement that includes a copy of the report generated upon creation of a deposit and a statement that the deposit has been inspected by the Registry Operator and is complete and accurate.

In order to satisfy this requirement, the Registry Operator sends to ICANN a `<rdeReport:report>` object as defined in Section 1.4.2 for each deposit successfully sent to the Data Escrow Agent, using the PUT HTTP verb in the interface provided by ICANN at:

```
<base-url>/report/registry-escrow-report/<tld>/<id>
```

Where:

- `<tld>` MUST be substituted by the TLD for which the report is being provided. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- `<id>` MUST be substituted by the identifier assigned to this report, which MUST be the same as the "id" attribute from the `<deposit>`.

Note: the interface supports overwriting the information of a particular report `<id>` to support asynchronous interfaces between Registry Operators and Data Escrow Agents.

Example of a `<rdeReport:report>` object for a data escrow deposit corresponding to a TLD Registry repository:

```
<?xml version="1.0" encoding="UTF-8"?>
<rdeReport:report
  xmlns:rdeReport="urn:ietf:params:xml:ns:rdeReport-1.0"
  xmlns:rdeHeader="urn:ietf:params:xml:ns:rdeHeader-1.0">
  <rdeReport:id>20101017001</rdeReport:id>
  <rdeReport:version>1</rdeReport:version>
  <rdeReport:rydeSpecEscrow>
    RFC8909
  </rdeReport:rydeSpecEscrow>
  <rdeReport:rydeSpecMapping>
    RFC9022
  </rdeReport:rydeSpecMapping>
  <rdeReport:resend>0</rdeReport:resend>
  <rdeReport:crDate>2010-10-17T00:15:00.0Z</rdeReport:crDate>
  <rdeReport:kind>FULL</rdeReport:kind>
  <rdeReport:watermark>2010-10-17T00:00:00Z</rdeReport:watermark>
  <rdeHeader:header>
    <rdeHeader:tld>test</rdeHeader:tld>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeDomain-1.0">2</rdeHeader:count>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeHost-1.0">1</rdeHeader:count>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeContact-1.0">1</rdeHeader:count>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeRegistrar-1.0">1
    </rdeHeader:count>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeIDN-1.0">1</rdeHeader:count>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeNNDN-1.0">1</rdeHeader:count>
    <rdeHeader:count
      uri="urn:ietf:params:xml:ns:rdeEppParams-1.0">1
    </rdeHeader:count>
  </rdeHeader:header>
</rdeReport:report>
```

2.2. Data Escrow Agent Reporting

The gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731], Specification 2, Part B, Section 7 requires Data Escrow Agents to deliver ICANN with a notification object every time a successfully processed deposit is received from the Registry Operator regardless of the final status of the verification process.

To satisfy this requirement, the Data Escrow Agent sends to ICANN a <rdeNotification:notification> object as defined in Section 1.4.3, using the POST HTTP verb in the interface provided by ICANN at:

<base-url>/report/escrow-agent-notification/<tld>

Where:

- <tld> MUST be substituted by the TLD for which the notification is being provided. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.

If by 23:59:59 UTC, a deposit has not been successfully processed regardless of the final status of the verification process, a <rdeNotification:notification> object with DRFN status MUST be sent to ICANN.

Example of a <rdeNotification:notification> object of a Data Escrow Agent notification corresponding to a Registry repository Data Escrow Deposit:

```
<?xml version="1.0" encoding="UTF-8"?>
<rdeNotification:notification
  xmlns:rdeNotification="urn:ietf:params:xml:ns:rdeNotification-1.0"
  xmlns:rdeReport="urn:ietf:params:xml:ns:rdeReport-1.0"
  xmlns:rdeHeader="urn:ietf:params:xml:ns:rdeHeader-1.0">
  <rdeNotification:deaName>Escrow Agent Inc.</rdeNotification:deaName>
  <rdeNotification:version>1</rdeNotification:version>
  <rdeNotification:repDate>2010-10-17</rdeNotification:repDate>
  <rdeNotification:status>DVPN</rdeNotification:status>
  <rdeNotification:reDate>
    2010-10-17T03:15:00.0Z
  </rdeNotification:reDate>
  <rdeNotification:vaDate>
    2010-10-17T05:15:00.0Z
  </rdeNotification:vaDate>
  <rdeNotification:lastFullDate>
    2010-10-14
  </rdeNotification:lastFullDate>
  <rdeReport:report>
    <rdeReport:id>20101017001</rdeReport:id>
    <rdeReport:version>1</rdeReport:version>
    <rdeReport:rydeSpecEscrow>
      RFC8909
    </rdeReport:rydeSpecEscrow>
    <rdeReport:rydeSpecMapping>
      RFC9022
    </rdeReport:rydeSpecMapping>
    <rdeReport:resend>0</rdeReport:resend>
    <rdeReport:crDate>2010-10-17T00:15:00.0Z</rdeReport:crDate>
    <rdeReport:kind>FULL</rdeReport:kind>
    <rdeReport:watermark>2010-10-17T00:00:00Z</rdeReport:watermark>
```

```
<rdeHeader:header>
  <rdeHeader:tld>test</rdeHeader:tld>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeDomain-1.0">1</rdeHeader:count>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeHost-1.0">3</rdeHeader:count>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeContact-1.0">1</rdeHeader:count>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeRegistrar-1.0">3</rdeHeader:count>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeIDN-1.0">1</rdeHeader:count>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeNNDN-1.0">10</rdeHeader:count>
  <rdeHeader:count
uri="urn:ietf:params:xml:ns:rdeEppParams-1.0">0</rdeHeader:count>
</rdeHeader:header>
</rdeReport:report>
</rdeNotification:notification>
```

2.3. Monitoring the reporting status

Registries MAY monitor the status of the reports described in Specification 2 [ICANN-GTLD-RA-20170731] using the following interfaces that support the HEAD HTTP verb:

2.3.1. Monitoring the status of Data Escrow Reports

Registries MAY monitor the status of Data Escrow Reports using the following interface:

<base-url>/info/report/registry-escrow-report/<tld>/<date>

Where:

- <tld> MUST be substituted by the TLD being queried. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- <date> MUST be substituted by the day being queried. For example, 2013-03-02.

Possible results are:

- The interface provides an HTTP/200 status code if a syntactically valid data escrow report was received for the queried date.

- The interface provides an HTTP/404 status code if a syntactically valid data escrow report has not been received for the queried date.

2.3.2. Monitoring the status of Data Escrow Notifications

Registries and Data Escrow Agents MAY monitor the status of Data Escrow Notifications using the following interface:

<base-url>/info/report/escrow-agent-notification/<tld>/<date>

Where:

- <tld> MUST be substituted by the TLD being queried. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- <date> MUST be substituted by the day being queried. For example, 2013-03-02.

Possible results are:

- The interface provides an HTTP/200 status code if a syntactically valid data escrow notification was received for the queried date.
- The interface provides an HTTP/404 status code if a syntactically valid data escrow notification has not been received for the queried date.

3. Interfaces of Specification 3 - Registry Operator Monthly Reporting

Specification 3 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731] requires Registry Operators to provide a set of monthly reports per gTLD. Two types of reports are required to be sent by Registries: Per-Registrar Transactions Report and Registry Functions Activity Report. This section specifies the interfaces provided by ICANN to automate the upload of these reports by Registry Operators.

The cut-off date for the reception of the reports specified in specification 3 is defined in the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731]. Before the cut-off date, the Registry Operator MAY replace a successfully validated report as many times as needed.

3.1. Per-Registrar Transactions Report

The Per-Registrar Transactions Report is a CSV report encoded in UTF-8 described in Section 1 of Specification 3 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731].

To satisfy this requirement, the Registry Operator sends a CSV report monthly as described in the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731], using the PUT HTTP verb in the interface provided by ICANN at:

```
<base-url>/report/registrar-transactions/<tld>/<date>
```

Where:

- <tld> MUST be substituted by the TLD for which the report is being provided. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- <date> MUST be substituted by the month for which the report is being provided in the form of YYYY-MM. Where 'YYYY' is the year, and 'MM' is the two-digit month number. For example, 2013-03.

3.2. Registry Functions Activity Report

The Registry Functions Activity Report is a CSV report encoded in UTF-8 described in Section 2 of Specification 3 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731].

To satisfy this requirement, the Registry Operator sends a CSV report monthly as described in the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731], using the PUT HTTP verb in the interface provided by ICANN at:

```
<base-url>/report/registry-functions-activity/<tld>/<date>
```

Where:

- <tld> MUST be substituted by the TLD for which the report is being provided. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- <date> MUST be substituted by the month for which the report is being provided in the form of YYYY-MM. Where 'YYYY' is the year, and 'MM' is the two-digit month number. For example, 2013-03.

3.3. Monitoring the reporting status

Registries MAY monitor the status of the reports described in Specification 3 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731] using the following interfaces that support the HEAD HTTP verb:

3.3.1. Monitoring the status of Registry Functions Activity Report

Registries MAY monitor the status of Registry Functions Activity Report using the following interface:

`<base-url>/info/report/registry-functions-activity/<tld>/<date>`

Where:

- `<tld>` MUST be substituted by the TLD being queried. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- `<date>` MUST be substituted by the month being queried. For example, 2013-03.

Possible results are:

- The interface provides an HTTP/200 status code if a syntactically valid registry functions activity report was received for the queried month.
- The interface provides an HTTP/404 status code if a syntactically valid registry functions activity report has not been received for the queried month.

3.3.2. Monitoring the status of the Per-Registrar Transactions Report

Registries MAY monitor the status of Per-Registrar Transactions Report using the following interface:

`<base-url>/info/report/registrar-transactions/<tld>/<date>`

Where:

- `<tld>` MUST be substituted by the TLD being queried. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- `<date>` MUST be substituted by the month being queried. For example, 2013-03.

Possible results are:

- The interface provides an HTTP/200 status code if a syntactically valid per-registrar transactions report was received for the queried month.
- The interface provides an HTTP/404 status code if a syntactically valid per-registrar transactions report has not been received for the queried month.

4. Maintenance Windows

Specification 10 of the gTLD Base Registry Agreement [ICANN-GTLD-RA-20170731] allows Registry Operators to provide notice to ICANN about plans of maintenance. This section specifies the interfaces provided by ICANN to programmatically manage maintenance windows by Registry Operators.

4.1. Creating and updating a maintenance window

To create or update a previously created maintenance window, the Registry Operator sends a `<schedule:schedule>` object (see Section 1.4.7) using the PUT HTTP verb in the interface provided by ICANN at:

`<base-url>/maintenance-window/<tld>/<service>/<scheduleId>`

Where:

- `<tld>` MUST be substituted by the TLD for which the report is being provided. In the case of an IDN TLD, the A-label (see [RFC5890]) MUST be used.
- `<service>` MUST be substituted by a service for which a maintenance window could be created. The following values may be used in the `<service>` element:
 - o EPP. Refers to the Extensible Provisioning Protocol service.
 - o RDAP. Refers to the Registration Data Access Protocol Directory service.
 - o RDDS. Refers to the collective of WHOIS and web-based WHOIS services.
- `<scheduleId>` MUST be substituted by a Universally Unique Identifier version 4 (see [RFC4122]).

4.2. Deleting a maintenance window

To delete a previously created maintenance window, the Registry Operator uses the DELETE HTTP verb in the interface provided by ICANN at:

```
<base-url>/maintenance-window/<tld>/<service>/<scheduleId>
```

4.3. Getting the persisted data for a maintenance window

To get the persisted data for a maintenance window, the Registry Operator uses the GET HTTP verb in the interface provided by ICANN at:

```
<base-url>/maintenance-window/<tld>/<service>/<scheduleId>
```

The interface provides an HTTP/200 status code and sets the HTTP header Content-type: text/xml after a successful request, and includes a <schedule:schedule> object as defined in Section 1.4.7.

Example of a <schedule:schedule> object of a Maintenance Window:

```
<?xml version="1.0" encoding="UTF-8"?>
<schedule:schedule xmlns:schedule="urn:ietf:params:xml:ns:schedule-1.0"
enabled="true" scheduleId="6257b2b9-1ff7-4159-bc0d-397fec035d38">
  <schedule:name>Maintenance window for RDDS semester II-2017
</schedule:name>
  <schedule:description>Pre-planned maintenance window for RDDS
</schedule:description>
  <schedule:startTime>2010-10-17T00:15:00.0Z</schedule:startTime>
  <schedule:endTime>2010-10-17T02:15:00.0Z</schedule:endTime>
  <schedule:version>1</schedule:version>
</schedule:schedule>
```

4.4. Getting a list of maintenance windows

To get the list of all the maintenance windows that have not ended yet (see Section 4), the Registry Operator uses the GET HTTP verb in the interface provided by ICANN at:

```
<base-url>maintenance-window/<tld>/<service>
```

The interface provides an HTTP/200 status code and sets the HTTP header Content-type: text/xml after a successful request, and includes a <schedule:schedules> object as defined in Section 1.4.8.

Example of a <schedule:schedules>:

```
<?xml version="1.0" encoding="UTF-8"?>
<schedule:schedules
  xmlns:schedule="urn:ietf:params:xml:ns:schedule-1.0">
  <schedule:schedule enabled="true"
    scheduleId="6257b2b9-1ff7-4159-bc0d-397fec035d38">
    <schedule:name>Maintenance window for example</schedule:name>
    <schedule:description>Pre-planned maintenance window 1
    </schedule:description>
    <schedule:startTime>2010-10-17T00:15:00.0Z</schedule:startTime>
    <schedule:endTime>2010-10-17T02:15:00.0Z</schedule:endTime>
    <schedule:version>1</schedule:version>
  </schedule:schedule>
  <schedule:schedule enabled="true"
    scheduleId="3da01e98-1945-4cc9-9334-bd3ad5b36371">
    <schedule:name>Maintenance window for example</schedule:name>
    <schedule:description>Pre-planned maintenance window 2
    </schedule:description>
    <schedule:startTime>2010-10-19T00:15:00.0Z</schedule:startTime>
    <schedule:endTime>2010-10-19T02:15:00.0Z</schedule:endTime>
    <schedule:version>1</schedule:version>
  </schedule:schedule>
</schedule:schedules>
```

4.5. Suppression of alerts

ICANN will suspend Emergency Escalation services only for the 10% Emergency Threshold alert for RDDS, RDAP and EPP when an enabled (i.e., the "enabled" attribute is true) schedule object exists and the threshold is reached on a point in time covered by the <schedule:startTime> and <schedule:endTime>.

5. Interfaces for the SLAM Probe Node List

The current list of probe nodes used by the SLA Monitoring System may be retrieved by using the GET HTTP verb in the interface provided by ICANN at:

```
<base-url>/slam-probe-nodes/list
```

The interface provides an HTTP/200 status code and sets the HTTP header Content-type: text/xml after a successful request, and includes a <probeNode:probeNodes> object as defined in Section 1.4.9.

Example of the response upon successful retrieval of the SLAM Probe Node List:

```
<?xml version="1.0" encoding="UTF-8"?>
<probeNode:probeNodes
  xmlns:probeNode="urn:ietf:params:xml:ns:probeNode-1.0">
  <probeNode:probeNode>
    <probeNode:city>Mumbai</probeNode:city>
    <probeNode:addr ip="v4">192.0.2.1</probeNode:addr>
    <probeNode:addr ip="v6">2001:db8:1::1</probeNode:addr>
  </probeNode:probeNode>
  <probeNode:probeNode>
    <probeNode:city>Seoul</probeNode:city>
    <probeNode:addr ip="v4">198.51.100.1</probeNode:addr>
  </probeNode:probeNode>
  <probeNode:updateTime>2020-11-18T02:23:56-08:00
  </probeNode:updateTime>
  <probeNode:version>1</probeNode:version>
</probeNode:probeNodes>
```

6. Technical details of the interfaces

This section describes the technical details of the interfaces described in this document.

6.1. General technical details

This section describes the technical details that apply to all the interfaces described in this document.

The following HTTP status codes are returned:

- * The interface provides an HTTP/401 status code and sets the HTTP header Content-type: text/plain, if the credentials provided do not authorize the user to perform the action requested for that <tld>.
- * The interface provides an HTTP/403 status code and sets the HTTP header Content-type: text/plain, if the user attempts to access a resource that permission is not granted for, or the connecting IP address is not authorized for the <tld>.
- * The interface provides an HTTP/404 status code if the object referenced in the URL is not found.
- * The interface provides an HTTP/405 status code if the interface does not support the request method.

- * The interface provides an HTTP/500 status code and sets the HTTP header Content-type: text/plain, if the system is experiencing a general failure. The sending party is responsible for sending the input again.
- * The interface provides an HTTP/501 status code and sets the HTTP header Content-type: text/plain, if the functionality has not yet been implemented.

After sending the response, the interfaces close the TCP connection.

The interfaces support HTTP streams only (HTTP multi-part forms are not supported).

6.2. Specific technical details

This section describes the technical details that apply to the following interfaces:

- * Registry Operator Reporting (see Section 2.1)
- * Data Escrow Agent Reporting (see Section 2.2)
- * Per-Registrar Transactions Report (see Section 3.1)
- * Registry Functions Activity Report (see Section 3.2)
- * Creating and updating a maintenance window (see Section 4.1)
- * Deleting a maintenance window (see Section 4.2)

The following additional HTTP status codes are returned:

- * The interface provides an HTTP/200 status code and sets the HTTP header Content-type: text/xml, if the interface was able to receive the input successfully, the client MUST review the response object (see Section 6.2.1) to verify the result code after processing the input.
- * The interface provides an HTTP/400 status code and sets the HTTP header Content-type: text/xml, if the input is incorrect or the syntax of the input is invalid. A response object (see Section 6.2.1) is included with the input validation failure details.

Content-type value in the HTTP header:

- * The client MUST set "text/xml" in the HTTP header Content-type when using the interfaces described in Section 2.1, Section 2.2, Section 4.1, and Section 4.2.
- * The client MUST set "text/csv" in the HTTP header Content-type when using the interfaces described in Section 3.1 and Section 3.2.

6.2.1. Response Object

After processing the input provided to the interfaces described in this section, a response object defined in Section 1.4.1 is sent in the HTTP Entity-body when an HTTP/200 or HTTP/400 status code is sent by the interface.

An example of a response object upon successful input receipt is presented below:

```
HTTP/1.1 200 OK
Content-Type: text/xml
Content-Length: 248
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<response
  xmlns="urn:ietf:params:xml:ns:iirdea-1.0">
  <result code="1000">
    <msg>No ERRORS were found and the report has been
      accepted by ICANN.</msg>
    <description></description>
  </result>
</response>
```

An example of a response object in the event of input error is presented below:

HTTP/1.1 400 Bad Request
Content-Type: text/xml
Content-Length: 279

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<response
  xmlns="urn:ietf:params:xml:ns:iirdea-1.0">
  <result code="2001">
    <msg>The structure of the report is invalid.</msg>
    <description>
      'XX' could not be parsed as a number (line: 2 column:3)
    </description>
  </result>
</response>
```

The following sections provide the IIRDEA Result Codes per interface:

6.2.1.1. Registry Operator Reporting

The following table lists the result codes of the Registry Operator Reporting interface (see Section 2.1):

Result Code	Message
1000	No ERRORS were found, and the report has been accepted by ICANN.
2001	The request did not validate against the schema.
2004	Report for a date in the future. The <crDate> and <watermark> date should not be in the future.
2005	Version is not supported.
2006	The <id> in the <report> element and the <id> in the URL path do not match.
2007	Interface is disabled for this TLD.
2008	The <crDate> and <watermark> date should not be before the creation date of the TLD in the system.
2202	The <tld> in the <header> and the TLD in the URL path do not match.
2205	Report regarding a differential deposit received when a full deposit was expected (<watermark>).
2206	csvDomain and rdeDomain count provided in the <header>.
2209	Missing required <tld> element in the <header>.
2210	The value of the "rcdn" attribute in the <count> element does not match the same or lower level names in the <tld> in the URL path.
2211	Multiple count elements with the same "uri", "rcdn", and "registrarId" attribute values provided in the <header>.
2212	An invalid NR-LDH label or A-label was found or the domain name syntax is invalid in the "rcdn" attribute.

Table 1: Data Escrow Reporting Result Codes

6.2.1.2. Data Escrow Agent Reporting

The following table lists the result codes of the Data Escrow Agent Reporting interface (see Section 2.2):

Result Code	Message
1000	No ERRORS were found, and the notification has been accepted by ICANN.
2001	The request did not validate against the schema.
2002	A DVPN notification exists for that date (<repDate>).
2004	Notification for a date in the future. The <crDate> and <watermark> and <repDate> date should not be in the future.
2005	Version is not supported.
2007	Interface is disabled for this TLD.
2008	The <crDate> and <watermark> and <repDate> date should not be before the creation date of the TLD in the system.
2201	The <repDate> and <watermark> in the notification do not match.
2202	The <tld> in the <header> and the TLD in the URL path do not match.
2203	A Deposit Verification Pass Notice (DVPN) notification was received, but the Domain Name count is missing in the <header>.
2204	The notification for the report "id" already exists.
2205	Notification regarding a differential deposit received when a full deposit was expected (<repDate>).
2206	csvDomain and rdeDomain count provided in the

	<header>.
2207	A DVPN or DVFN was received, but the <report> element is missing in the notification.
2208	A DRFN was received, but an <report> element exists in the notification.
2209	Missing required <tld> element in the <header>.
2210	The value of the "rcdn" attribute in the <count> element does not match the same or lower level names in the <tld> in the URL path.
2211	Multiple count elements with the same "uri", "rcdn", and "registrarId" attribute values provided in the <header>.
2212	An invalid NR-LDH label or A-label was found or the domain name syntax is invalid in the "rcdn" attribute.

Table 2: Data Escrow Reporting Result Codes

6.2.1.3. Per-Registrar Transactions Report

The following table lists the result codes of the Per-Registrar Transactions Report interface (see Section 3.1):

Result Code	Message
1000	No ERRORS were found, and the report has been accepted by ICANN.
2001	The structure of the report is invalid.
2002	A report for that month already exists, the cut-off date already passed.
2003	Negative numeric value present in the report.
2004	Report for a month in the future.
2007	Interface is disabled for this TLD.
2008	Reported month before the creation date of the TLD in the system.
2101	Incorrect totals present in the report.
2102	A non-ICANN-accredited registrar is present in the report.
2103	Values found in the second field of the totals line.
2105	The report is not encoded in UTF-8. Note: reports encoded in US-ASCII are accepted.

Table 3: Per-Registrar Transactions Report Result Codes

6.2.1.4. Registry Functions Activity Report

The following table lists the result codes of the Registry Functions Activity Report interface (see Section 3.2):

Result Code	Message
1000	No ERRORS were found, and the report has been accepted by ICANN.
2001	The structure of the report is invalid.
2002	A report for that month already exists, the cut-off date already passed.
2003	Negative numeric value present in the report.
2004	Report for a month in the future.
2007	Interface is disabled for this TLD.
2008	Reported month before the creation date of the TLD in the system.
2105	The report is not encoded in UTF-8. Note: reports encoded in US-ASCII are accepted.

Table 4: Registry Functions Activity Report Result Codes

6.2.1.5. Maintenance Window Management

The following table lists the result codes of the Maintenance Window Management interface (see Section 4):

Result Code	PUT	DELETE	GET	Message
1000	*	*		No ERRORS were found, and the report has been accepted by ICANN.
2001	*			The request did not validate against the schema.
2005	*			Version is not supported.
2006	*			The scheduleId in the schedule object and the scheduleId in the URL PATH do not match.

2007	*	*	*	Interface is disabled for this TLD.
2401	*	*	*	The syntax of the UUID in the PATH is incorrect.
2402	*			The maintenance window start date and time is not 24 hours ahead of the current date and time.
2403	*			The period specified by start and end date and time is greater than the monthly SLR for the service.
2404	*			The period specified in the maintenance window collides with a previously scheduled maintenance window for the service.
2405		*		The maintenance window that you are trying to delete already started.
2406	*			The endTime is in the past, before or equal to the startTime.
2407	*			The maintenance window that you are trying to update already ended, updates are not allowed.
2408	*			The maintenance window that you are trying to update already started, only enabled and endTime fields can be modified.

Table 5: Maintenance Window Management Result Codes

7. Formal Syntax

The schema of the IIRDEA Result, Report, Notification, RRI Reporting, Notifications, and Reports objects described in Section 1.4 are presented here.

The <CODE BEGINS> and <CODE ENDS> tags are not part of the schema; they are used to note the beginning and ending of the schema for URI registration purposes.

7.1. RRI IIRDEA Result Schema

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:iirdea-1.0"
  xmlns:iirdea="urn:ietf:params:xml:ns:iirdea-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <annotation>
    <documentation>
      ICANN interfaces for registries and data escrow agents
    </documentation>
  </annotation>
  <element name="response" type="iirdea:responseType"/>
  <element name="result" type="iirdea:resultType"/>
  <complexType name="responseType">
    <sequence>
      <element ref="iirdea:result" />
    </sequence>
  </complexType>
  <complexType name="resultType">
    <sequence>
      <element name="msg" type="token"/>
      <element name="description" type="string"
        minOccurs="0"/>
    </sequence>
    <attribute name="code" type="iirdea:codeType"
      use="required"/>
    <attribute name="domainCount" type="unsignedInt"/>
  </complexType>
  <simpleType name="codeType">
    <restriction base="unsignedShort">
      <minInclusive value="1000"/>
      <maxInclusive value="9999"/>
    </restriction>
  </simpleType>
</schema>
<CODE ENDS>
```

7.2. RRI Report Object


```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:rdeReport-1.0"
  xmlns:rdeReport="urn:ietf:params:xml:ns:rdeReport-1.0"
  xmlns:rdeHeader="urn:ietf:params:xml:ns:rdeHeader-1.0"
  xmlns:rde="urn:ietf:params:xml:ns:rde-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <import namespace="urn:ietf:params:xml:ns:rde-1.0" />
  <import namespace="urn:ietf:params:xml:ns:rdeHeader-1.0" />
  <annotation>
    <documentation>
      Data Escrow Report schema
    </documentation>
  </annotation>
  <element name="report" type="rdeReport:reportType"/>
  <complexType name="reportType">
    <sequence>
      <element name="id" type="rde:depositIdType"/>
      <element name="version" type="unsignedShort"/>
      <element name="rydeSpecEscrow" type="token"/>
      <element name="rydeSpecMapping" type="token" minOccurs="0"/>
      <element name="resend" type="unsignedShort"/>
      <element name="crDate" type="dateTime"/>
      <element name="kind" type="rde:depositTypeType"/>
      <element name="watermark" type="dateTime"/>
      <element ref="rdeHeader:header"/>
    </sequence>
  </complexType>
</schema>
<CODE ENDS>
```

7.3. RRI Notification Object

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:rdeNotification-1.0"
  xmlns:rdeNotification="urn:ietf:params:xml:ns:rdeNotification-1.0"
  xmlns:rdeReport="urn:ietf:params:xml:ns:rdeReport-1.0"
  xmlns:iirdea="urn:ietf:params:xml:ns:iirdea-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <import namespace="urn:ietf:params:xml:ns:rdeReport-1.0" />
  <import namespace="urn:ietf:params:xml:ns:iirdea-1.0" />
  <annotation>
    <documentation>
```

```

    Data Escrow Notification schema
  </documentation>
</annotation>
<element name="notification"
type="rdeNotification:notificationType"/>
<complexType name="notificationType">
  <sequence>
    <element name="deaName" type="rdeNotification:nameType"/>
    <element name="version" type="unsignedShort"/>
    <element name="repDate" type="date"/>
    <element name="status" type="rdeNotification:statusType"/>
    <element name="results" type="rdeNotification:resultsType"
      minOccurs="0" />
    <element name="reDate" type="dateTime" minOccurs="0"/>
    <element name="vaDate" type="dateTime" minOccurs="0"/>
    <element name="lastFullDate" type="date" minOccurs="0"/>
    <element ref="rdeReport:report" minOccurs="0"/>
  </sequence>
</complexType>
<simpleType name="nameType">
  <restriction base="normalizedString">
    <minLength value="1" />
    <maxLength value="255" />
  </restriction>
</simpleType>
<complexType name="resultsType">
  <sequence>
    <element ref="iirdea:result" maxOccurs="unbounded" />
  </sequence>
</complexType>
<simpleType name="statusType">
  <restriction base="token">
    <enumeration value="DVPN"/>
    <enumeration value="DVFN"/>
    <enumeration value="DRFN"/>
  </restriction>
</simpleType>
</schema>
<CODE ENDS>

```

7.4. RRI Reporting Summary Object

```

<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:rriReporting-1.0"
  xmlns:rriReporting="urn:ietf:params:xml:ns:rriReporting-1.0"
  xmlns:rdeHeader="urn:ietf:params:xml:ns:rdeHeader-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"

```

```
elementFormDefault="qualified">

<import namespace="urn:ietf:params:xml:ns:rdeHeader-1.0" />
<element name="summary" type="rriReporting:summaryType"/>
<complexType name="summaryType">
  <sequence>
    <group ref="rdeHeader:repositoryTypeGroup"/>
    <element name="creationDate" type="dateTime" />
    <element name="depositSchedule"
      type="rriReporting:depositScheduleType" />
    <element name="lastFullDate" type="date" minOccurs="0"/>
    <element name="statusReports"
      type="rriReporting:statusReportsType" />
    <element name="timestamp" type="dateTime" />
  </sequence>
</complexType>
<simpleType name="depositScheduleType">
  <restriction base="token">
    <enumeration value="None" />
    <enumeration value="Weekly" />
    <enumeration value="Daily" />
  </restriction>
</simpleType>
<complexType name="statusReportsType">
  <sequence>
    <element name="statusReport"
      type="rriReporting:statusReportType" maxOccurs="unbounded" />
  </sequence>
</complexType>
<complexType name="statusReportType">
  <sequence>
    <element name="type" type="rriReporting:statusReportTypeType" />
    <element name="enabled" type="boolean" />
    <element name="status" type="rriReporting:statusType" />
    <element name="issues" type="rriReporting:issuesType"
      minOccurs="0" />
  </sequence>
</complexType>
<simpleType name="statusReportTypeType">
  <restriction base="token">
    <enumeration value="DEA_Notification" />
    <enumeration value="Registrar_Escrow_Report" />
    <enumeration value="Registry_Escrow_Report" />
    <enumeration value="PPSP_Escrow_Report" />
    <enumeration value="Registry_Functions_Activity_Report" />
    <enumeration value="Registry_Per_Registrar_Transactions_Report" />
    <enumeration value="PPSP_Per_Registrar_Activity_Report" />
  </restriction>
</simpleType>
```

```
</simpleType>
<simpleType name="statusType">
  <restriction base="token">
    <enumeration value="ok" />
    <enumeration value="unsatisfactory" />
  </restriction>
</simpleType>
<complexType name="issuesType">
  <sequence>
    <element name="issue" type="rriReporting:issueType"
      maxOccurs="unbounded" />
  </sequence>
</complexType>
<complexType name="issueType">
  <attribute name="date" type="rriReporting:issueDateType"
    use="required" />
  <attribute name="description" type="rriReporting:descriptionType"
    use="required" />
</complexType>
<simpleType name="issueDateType">
  <restriction base="token">
    <pattern
      value="\d{4}-(0[1-9]|1[012])-(0[1-9]|12)[0-9]|3[01])?" />
  </restriction>
</simpleType>
<simpleType name="descriptionType">
  <restriction base="token">
    <enumeration value="Missing_Deposit_Full" />
    <enumeration value="Missing_Deposit_Diff" />
    <enumeration value="Invalid_Deposit_Full" />
    <enumeration value="Invalid_Deposit_Diff" />
    <enumeration value="No_Report_Received" />
  </restriction>
</simpleType>
</schema>
<CODE ENDS>
```

7.5. RRI Notifications Object

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:rdeNotifications-1.0"
  xmlns:rdeNotifications="urn:ietf:params:xml:ns:rdeNotifications-1.0"
  xmlns:rdeNotification="urn:ietf:params:xml:ns:rdeNotification-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <import namespace="urn:ietf:params:xml:ns:rdeNotification-1.0" />
  <element name="notifications"
    type="rdeNotifications:notificationsType" />
  <complexType name="notificationsType">
    <sequence>
      <element name="receivedNotification" maxOccurs="unbounded"
        minOccurs="0">
        <complexType>
          <sequence>
            <element name="received" type="dateTime" />
            <element ref="rdeNotification:notification" />
          </sequence>
        </complexType>
      </element>
    </sequence>
  </complexType>
</schema>
<CODE ENDS>
```

7.6. RRI Reports Object

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:rdeReports-1.0"
  xmlns:rdeReport="urn:ietf:params:xml:ns:rdeReport-1.0"
  xmlns:rdeReports="urn:ietf:params:xml:ns:rdeReports-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <import namespace="urn:ietf:params:xml:ns:rdeReport-1.0" />
  <element name="reports" type="rdeReports:reportsType" />
  <complexType name="reportsType">
    <sequence>
      <element name="receivedReport" maxOccurs="unbounded"
        minOccurs="0">
        <complexType>
          <sequence>
            <element name="received" type="dateTime" />
            <element ref="rdeReport:report" />
          </sequence>
        </complexType>
      </element>
    </sequence>
  </complexType>
</schema>
<CODE ENDS>
```

7.7. Maintenance Window

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:schedule-1.0"
  xmlns:schedule="urn:ietf:params:xml:ns:schedule-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <element name="schedule" type="schedule:scheduleType"/>
  <element name="schedules" type="schedule:schedulesType"/>
  <complexType name="scheduleType">
    <sequence>
      <element name="name" type="schedule:nameType"/>
      <element name="description" type="schedule:descriptionType"/>
      <element name="startTime" type="dateTime"/>
      <element name="endTime" type="dateTime"/>
      <element name="version" type="unsignedShort"/>
    </sequence>
    <attribute name="enabled" type="boolean"
      use="required"/>
    <attribute name="scheduleId" type="schedule:uuidType"/>
  </complexType>
  <complexType name="schedulesType">
    <sequence>
      <element name="schedule" type="schedule:scheduleType"
        maxOccurs="unbounded" minOccurs="0"/>
    </sequence>
  </complexType>
  <simpleType name="uuidType">
    <restriction base="token">
      <pattern
value="[a-f0-9]{8}-[a-f0-9]{4}-[a-f0-9]{4}-[a-f0-9]{4}-[a-f0-9]{12}">
      </pattern>
    </restriction>
  </simpleType>
  <simpleType name="nameType">
    <restriction base="token">
      <minLength value="1"/>
    </restriction>
  </simpleType>
  <simpleType name="descriptionType">
    <restriction base="token">
      <minLength value="1"/>
    </restriction>
  </simpleType>
</schema>
<CODE ENDS>
```

7.8. SLAM Probe Node List

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:probeNode-1.0"
  xmlns:probeNode="urn:ietf:params:xml:ns:probeNode-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <element name="probeNode" type="probeNode:probeNodeType" />
  <element name="probeNodes" type="probeNode:probeNodesType" />
  <complexType name="probeNodeType">
    <sequence>
      <element name="city" type="token" />
      <element name="addr" type="probeNode:addrType"
        maxOccurs="unbounded" />
    </sequence>
  </complexType>
  <complexType name="probeNodesType">
    <sequence>
      <element name="probeNode" type="probeNode:probeNodeType"
        maxOccurs="unbounded" />
      <element name="updateTime" type="dateTime" />
      <element name="version" type="unsignedShort" />
    </sequence>
  </complexType>
  <complexType name="addrType">
    <simpleContent>
      <extension base="probeNode:addrStringType">
        <attribute name="ip" type="probeNode:ipType"
          use="required" />
      </extension>
    </simpleContent>
  </complexType>
  <simpleType name="addrStringType">
    <restriction base="token">
      <minLength value="3" />
      <maxLength value="45" />
    </restriction>
  </simpleType>
  <simpleType name="ipType">
    <restriction base="token">
      <enumeration value="v4" />
      <enumeration value="v6" />
    </restriction>
  </simpleType>
</schema>
<CODE ENDS>
```


8. Acknowledgements

Special suggestions that have been incorporated into this document were provided by David Kipling, James Gould, Gregory Zaltsman, Brett Carr, and Harel Efraim.

9. Change History

[[RFC Editor: Please remove this section.]]

9.1. Version 00

Initial version.

9.2. Version 01

- * <rdeReport:report> and <rdeNotification:notification> moved from escrow drafts to this draft
- * Added <crDate> to <rdeReport:report>
- * <reDate> element of <rdeReport:report> is now OPTIONAL
- * Added <deaName> element to <rdeNotification:notification>
- * <rydeSpecEscrow> and <rydeSpecMapping> added to the draft
- * Several report elements are OPTIONAL to support async interfaces between Registry Operators and Data Escrow Agents
- * Added <TLD> and <id> to registry-escrow-report interface in order to make the interface idempotent and support async RyO-DEA interfaces
- * Added <TLD> to escrow-agent-notification interface
- * The escrow-agent-notification uses POST and not PUT, this has been fixed
- * Several clarifications

9.3. Version 02

- * Added and updated several result codes.
- * Added <version> element.
- * Added Content-type definition.

9.4. Version 03

- * Added several result codes.
- * unsignedShort is now used for result code in iirdea schema.
- * Enumeration was removed from the iirdea schema.

9.5. Version 04

- * Added result codes: 2207 and 2208.
- * Removed result codes: 2203.
- * Added clarification regarding the support of HTTP streams.

9.6. Version 05

- * Added result codes: 2007 and 2008.

9.7. Version 06

- * Added clarification of error code HTTP/403 in Section 6.

9.8. Version 07

- * Added Section 5: "Monitoring compliance with the New gTLD Base Agreement".

9.9. Version 08

- * Reorganized specification structure to allow easier references from new specifications expanding functionality in the ICANN Registry Interfaces.
- * Added Section 1.4 to document object definitions, previously defined in other sections.
- * Added <rriReporting>, <notifications>, and <reports> object descriptions to Section 1.4, and schema definitions to Section 7.
- * Renamed Section 5 title as "Monitoring the reporting status".
- * Updated element <rydeSpecMapping> as OPTIONAL in the <rdeReport> schema.
- * Added OPTIONAL attribute "domainCount" to the <iirdea:result> element.

- * Added OPTIONAL element <results> to the <rdeNotification> schema.
- * Added result codes: 2105, 2209, 2210 and 2211.
- * Added "gTLD Base Registry Agreement" references.
- * Added clarifications to Section 6.

9.10. Version 09

- * Standardized XSD schema validation error message for notifications and reports.
- * Element <lastFullDate> made optional in the <rriReporting> schema.
- * Separated example RRI interface responses for successful and unsuccessful input.

9.11. Version 10

1. Ping update.

9.12. Version 11

1. Ping update.

9.13. Version 12

1. Ping update.

9.14. Version 13

1. IANA Considerations section added.
2. Implementation section added.
3. Internationalization Considerations status section added.
4. Security section added.
5. Editorial updates.

9.15. Version 14

1. Ping update.

9.16. Version 15

1. Added description and technical details for the interfaces for management of maintenance windows and list of probe nodes.
2. I-D was restructured to make it easier to read.
3. Editorial updates.

9.17. Version 16

1. Added interface description for supporting maintenance window objects and retrieving the IP addresses of the probe nodes used in the SLA Monitoring System (SLAM).
2. I-D was restructured to make it easier to read.
3. Editorial updates.

9.18. Version 17

1. Ping update.

9.19. Version 18

1. Ping update.

9.20. Version 19

1. Ping update.

9.21. Version 20

1. Ping update.

9.22. Version 21

1. Ping update.

9.23. Version 22

1. A note was added about suppressing alerts that reach the 10% emergency threshold when a maintenance window is active.

9.24. Version 23

1. Ping update.

9.25. Version 24

1. The allowed values for the service element of the maintenance window object were added.

10. Internationalization Considerations

The interfaces described in this document use XML, which provides native support for encoding information using the Unicode character set and its more compact representations including UTF-8. Conformant XML processors recognize both UTF-8 and UTF-16. Though XML includes provisions to identify and use other character encodings through use of an "encoding" attribute in an `<?xml?>` declaration, use of UTF-8 is RECOMMENDED.

11. IANA Considerations

This document uses URNs to describe XML namespaces and XML schemas conforming to a registry mechanism described in [RFC3688]. Six URI assignments have been registered by the IANA.

Registration request for the RRI IIRDEA Result namespace:

URI: urn:ietf:params:xml:ns:iirdea-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the RRI IIRDEA Result XML schema:

URI: urn:ietf:params:xml:ns:iirdea-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.1 of this document.

Registration request for the RRI Report namespace:

URI: urn:ietf:params:xml:ns:rdeReport-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the RRI Report schema:

URI: urn:ietf:params:xml:ns:rdeReport-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.2 of this document.

Registration request for the RRI Notification namespace:

URI: urn:ietf:params:xml:ns:rdeNotification-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the RRI Notification XML schema:

URI: urn:ietf:params:xml:ns:rdeNotification-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.3 of this document.

Registration request for the RRI Reporting Summary namespace:

URI: urn:ietf:params:xml:ns:rriReporting-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the RRI Reporting Summary XML schema:

URI: urn:ietf:params:xml:ns:rriReporting-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.4 of this document.

Registration request for the RRI Notifications namespace:

URI: urn:ietf:params:xml:ns:rdeNotifications-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the RRI Notifications XML schema:

URI: urn:ietf:params:xml:ns:rdeNotifications-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.5 of this document.

Registration request for the RRI Reports namespace:

URI: urn:ietf:params:xml:ns:rdeReports-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the RRI Reports XML schema:

URI: urn:ietf:params:xml:ns:rdeReports-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.6 of this document.

Registration request for the Maintenance Window namespace:

URI: urn:ietf:params:xml:ns:schedule-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the Maintenance Window XML schema:

URI: urn:ietf:params:xml:ns:schedule-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.7 of this document.

Registration request for the SLAM Probe Node List namespace:

URI: urn:ietf:params:xml:ns:probeNode-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the SLAM Probe Node List XML schema:

URI: urn:ietf:params:xml:ns:probeNode-1.0

Registrant Contact: ICANN <tech-services@icann.org>

Note to RFC Editor: Please remove the email address from the RFC after IANA records it.

See section Section 7.8 of this document.

12. Implementation Status

Note to RFC Editor: Please remove this section and the reference to RFC 7942 [RFC7942] before publication.

This section records the status of known implementations of the protocol defined by this specification at the time of posting of this Internet-Draft, and is based on a proposal described in RFC 7942 [RFC7942]. The description of implementations in this section is intended to assist the IETF in its decision processes in progressing drafts to RFCs. Please note that the listing of any individual implementation here does not imply endorsement by the IETF. Furthermore, no effort has been spent to verify the information presented here that was supplied by IETF contributors. This is not intended as, and must not be construed to be, a catalog of available implementations or their features. Readers are advised to note that other implementations may exist.

According to RFC 7942 [RFC7942], "this will allow reviewers and working groups to assign due consideration to documents that have the benefit of running code, which may serve as evidence of valuable experimentation and feedback that have made the implemented protocols more mature. It is up to the individual working groups to use this information as they see fit".

12.1. Implementation in the gTLD space

Organization: ICANN

Name: ICANN Registry Agreement

Description: the ICANN Base Registry Agreement requires Registries, Data Escrow Agents, and ICANN to implement this specification. ICANN receives daily notifications from Data Escrow Agents and Registries using this specification.

Level of maturity: production.

Coverage: all aspects of this specification are implemented.

Version compatibility: versions 00 - 09 are known to be implemented.

Contact: gustavo.lozano@icann.org

URL: <https://www.icann.org/resources/pages/registries/registries-agreements-en>

13. Security Considerations

The interfaces described in this document MUST be provided using HTTPS. The recommendations in [RFC7525] MUST be implemented.

14. References

14.1. Normative References

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