

SPECIFICATION 2

DATA ESCROW REQUIREMENTS

NOTE: THIS INTERIM DRAFT SPECIFICATION IS UNDER DEVELOPMENT BY ICANN AND REGISTRY TECHNICAL TEAMS.

Registry Operator will engage an independent entity to act as data escrow agent ("*Escrow Agent*") for the provision of data escrow services related to the Registry Agreement. The following Technical Specifications set forth in Part A, and Legal Requirements set forth in Part B, will be included in any data escrow agreement between Registry Operator and the Escrow Agent, under which ICANN must be named a third-party beneficiary. In addition to the following requirements, the data escrow agreement may contain other provisions that are not contradictory or intended to subvert the required terms provided below.

PART A – TECHNICAL SPECIFICATIONS

1. Deposits.

1.1 Deposits must be of two kinds: Full Deposits and Incremental Deposits.

1.1.1 "**Full Deposit(s)**" means the Registry Data that reflects the current and complete Registry Database and will consist of data that reflects the state of the registry as of 0000 UTC on each Sunday. Pending transactions at that time (i.e. transactions that have not been committed to the Registry Database) will not be reflected in the Full Deposit.

1.1.2 "**Incremental Deposit(s)**" means data that reflects all transactions involving the database that are not reflected in the last previous Full Deposit or Incremental Deposit, as the case may be, and are cumulative since the last Full Deposit. Each incremental file will contain all database transactions since the previous Full Deposit was completed.

2. Procedure for Deposits. Each formatted Full Deposit and Incremental Deposit must be processed and electronically delivered in encrypted form to Escrow Agent. The formatted, encrypted and signed Deposit file(s) must be sent, by anonymous file transfer, to Escrow Agent's server within the specified time window.

3. Schedule for Deposits. Registry operators are obligated to submit a set of escrow files on a daily basis as follows:

3.1 Once a week, a Full Deposit of the entire set of objects in the registry must be submitted. Each of these files will be marked with the [full] type.

3.2 The other six days of the week, an Incremental Deposit must be submitted indicating objects that have been created or updated. Each of these files will be marked with the [inc] type.

3.3 Each incremental submission must *at least* cover the time period since the generation of the previous submission.

3.4 It is permissible for there to be some overlap with the previous escrow submission.

4. Escrow Format Specification.

4.1 **File Naming Conventions.** Files shall be named according to the following convention:

[gTLD]_[FILE]_[YYYY-MM-DD]_[type]_[#].[suffix] where:

- 4.1.1 [gTLD] is replaced with the gTLD name;
- 4.1.2 [FILE] is replaced with the file type (as indicated in the [| #Detailed File Formats] below);
- 4.1.3 [YYYY-MM-DD] is replaced by the file creation date;
- 4.1.4 [type] is replaced by:
 - (1) full, if the data represents a full deposit;
 - (2) inc, if the data represents an incremental deposit;
 - (3) hash, if the data represents a hash string for a deposit file;
 - (4) [#] is replaced by the position of the file in a series of files.
 - (5) [suffix] indicates a file extension or suffix as appropriate to the compression and encryption regimen used
 - (6) Additional naming to accommodate possible network error conditions, renaming the files once it is known they have been successfully transferred:
 - i) [YYYY-MM-DD] may be augmented to [YYYY-MM-DD-HH] to indicate the hour of transmission, to permit distinguishing between multiple attempts during a day
 - ii) [type] may permit the additional type 'resend' indicating an attempt to resend a deposit

4.2 **Object Handles.** For each of the object types (domains, contacts, nameservers, dnssec delegation signer records, and registrars), an ID or "handle" will be used to permit compactly referencing objects from other files.

- 4.2.1 These handles may be represented as alphanumeric values, offering maximum flexibility.
- 4.2.2 Registry operator may use the domain name as the domain handle.

4.3 **Dates.** Numerous fields indicate "dates", such as the creation and expiry dates for domains. These fields should contain timestamps indicating the date and time in a format and time zone that is consistent across all such fields in the escrow deposit. ICANN may require following one of the following standards:

- 4.3.1 RFC 3339 - Date and Time on the Internet;
- 4.3.2 ISO 8601 unifies several older ISO standards on date and time notation; and
- 4.3.3 Timestamps should be presented relative to UTC consistent with the date/time handling in EPP, RFC 4930.

4.4 **CSV Format.** Escrow data shall be compiled into CSV text files, as described in RFC 4180. In accordance with RFC 4180, the character encoding for these files should be US-ASCII, though UTF-8 is also permissible.

4.5 **Object Statuses.** RFC 4930 (EPP) and related RFCs (4931, 4932, 4933) indicate permissible status codes for various registry objects. As represented in these RFCs, escrow deposits should use the following RFC-specified codes, such as:

Status
clientHold
clientDeleteProhibited

clientTransferProhibited
clientUpdateProhibited
clientRenewProhibited
serverHold
serverDeleteProhibited
serverRenewProhibited
serverTransferProhibited
serverUpdateProhibited
Ok
pendingCreate
pendingDelete
pendingTransfer
pendingRenew
pendingUpdate
Linked

There may be a need for additional values, such as "Reserved" (to indicate reserved names).

4.6 Detailed File Formats.

4.6.1 Domains. Indicates a file type "DOMAIN"

The following fields shall be stored in the DOMAIN file:

- i) Domain Handle;
- ii) Domain Name;
- iii) Registrar handle for the present sponsoring registrar;
- iv) Creation Date;
- v) Registrar Handle for the initial sponsoring registrar;
- vi) Expiry Date;
- vii) Authinfo for the domain; and
- viii) Contact handles.

4.6.2 Internationalized Domain Names (IDNs). In the case of internationalized domain names, the ASCII-compatible form (A-Label) of the IDN string shall be referenced in the domain name field (e.g. - "xn-11b5bs1di.tld"), not the Unicode label (U-Label). If it is necessary to capture both A-Labels and U-Labels, that shall be handled by creating an extension file.

The following fields shall be stored in the DOMIDN file:

- i) Domain Handle;
- ii) Unicode Label/U-Label;
- iii) Language Tag (based on ISO 639-1); and
- iv) Script Tag (based on ISO 15924).

4.6.3 Variant Handling. If Registry Operator offers IDNs, the variant table and registration policy must be deposited with the IANA IDN Practices Repository

(<http://www.iana.org/domains/idn-tables/>). In some cases, for a particular name, there may be multiple "variants," where reservation of a domain name indicates reservation of one or more other names that are equivalent, in the language representation. Depending on implementation, there are several possible implications for escrow:

- (1) Multiple name variants may be expressed in the registry, and presented in the DNS zone; each such name shall be stored in the DOMAIN file, as described above.
- (2) It may suffice, in some cases, to store variants in the form shown above as the "DOMIDN" file, where variant names, in Unicode form, are associated with the "parent/canonical" domain name.
- (3) There will be cases where there is an algorithm used to generate variant names, and where the number of variants would be impractical to store or to submit directly for escrow. In such cases, out of band documentation must provide details about variant generation algorithms. It may also be necessary to add an extension file to indicate, for domains having variant names, the algorithm and any other parameters used to compute variants.

4.6.4 Reserved Name Handling. Registries typically have a set of names reserved on behalf of themselves or IANA. The following are reasonable approaches to choose between:

- (1) Reserved names may be included in the DOMAIN file, and have a special "Reserved" status associated with it in the DOMSTATUS file to indicate that it is reserved; and
- (2) An additional file, RESERVED, may be established, with the following fields:
 - i) Reserved Name; and
 - ii) Registrar Handle for the organization for which it is reserved.

4.6.5 Contacts. Indicates a file type "CONTACT".

The following fields shall be stored in the CONTACT file:

- i) Contact Handle;
- ii) Registrar Handle for the sponsoring registrar;
- iii) Creation Date;
- iv) Authinfo for the contact;
- v) Contact Name;
- vi) Contact Organization;
- vii) Voice Telephone Number;
- viii) Voice Telephone Extension (if separate);
- ix) Fax Telephone Number;
- x) Fax Extension (if separate);
- xi) Postal Address 1;
- xii) Postal Address 2;
- xiii) Postal Address 3;
- xiv) Postal Address 4;
- xv) City;

- xvi) State/Province/Region;
- xvii) Postal Code;
- xviii) Country; and
- xix) Email Address.

Notes:

The following fields are ones where standards documents may be able to indicate requirements appropriate to validation. In particular, the EPP Contact Mapping ([RFC 3733](#)) requires reference to other standards documents as follows:

Country

Country identifiers are represented using two character identifiers as specified in ISO 3166.

Telephone numbers

Telephone numbers (both voice and fax) are formatted based on structures defined in ITU standard E164a.

Email Address

Email address syntax is defined in [RFC 2822](#).

- 4.6.6 **Nameservers.** Indicates a file type "NAMESERVER".
The following fields shall be stored in the NAMESERVER file:
 - i) Nameserver Handle;
 - ii) Nameserver Name;
 - iii) Creation Date; and
 - iv) Registrar Handle of sponsoring registrar.
- 4.6.7 **Nameserver IP Addresses.** Indicates a file type "NSIP"
The following fields shall be stored in the NSIP file:
 - i) Nameserver Handle; and
 - ii) IP Address.
- Notes.** IP addresses must conform either to, [RFC 791](#), for IPv4 addresses, or [RFC 4291](#), for IPv6 addresses.
- 4.6.8 **Registrars.** Indicates a file type "REGISTRAR"
The following fields shall be stored in the REGISTRAR file:
 - i) Registrar Handle;
 - ii) IANA ID for Registrar as per IANA Registrar IDs; and
 - iii) Registrar Name;
- 4.6.9 **Domain/Status Associations.** Indicates a file type "DOMSTATUS"
The following fields shall be stored in the DOMSTATUS file:
 - i) Domain Handle;
 - ii) Status Value, as per the earlier section on Object Statuses; and
 - iii) Reason Code.
- 4.6.10 **Contact/Status Associations.** Indicates a file type "CONSTATUS"
The following fields shall be stored in the CONSTATUS file:
 - i) Contact Handle;
 - ii) Status Value, as per the earlier section on Object Statuses; and
 - iii) Reason Code.
- 4.6.11 **Nameserver/Status Associations.** Indicates a file type "NSSTATUS"

The following fields shall be stored in the NSSTATUS file:

- i) Nameserver Handle;
- ii) Status Value, as per the earlier section on Object Statuses; and
- iii) Reason Code.

4.6.12 Domain/Contact Associations. Indicates a file type "DOMCONTACT"

The following fields shall be stored in the DOMCONTACT file:

- i) Domain Handle;
- ii) Contact Handle; and
- iii) Contact Type.

Type	Possible Abbreviations
Registrant Contact	R, REG
Administrative Contact	A, ADMIN
Billing Contact	B, BILL
Technical Contact	T, TECH

4.6.13 Domain/Nameserver Associations. Indicates a file type "DOMNS"

The following fields shall be stored in the DOMNS file:

- i) Domain Handle; and
- ii) Nameserver Handle.

4.6.14 Domain Deletions. Indicates a file type "DOMDEL." This file is only required for incremental escrow deposits (e.g. - file type "inc"); it indicates the list of domains that were in the previous deposit that have since been removed.

- (1) Domain Name; and
- (2) Deletion Date.

4.6.15 Contact Deletions. Indicates a file type "CONTDEL." This file is only required for incremental escrow deposits (e.g. - file type "inc"); it indicates the list of contacts that were in the previous deposit that have since been removed.

- (1) Contact Handle; and
- (2) Deletion Date.

4.6.16 Nameserver Deletions. Indicates a file type "NSDEL." This file is only required for incremental escrow deposits (e.g. - file type "inc"); it indicates the list of nameservers that were in the previous deposit that have since been removed.

- (1) Nameserver Name; and
- (2) Deletion Date.

4.6.17 DNSSEC Delegation Signer Record. Indicates a file type "DS"

The following fields shall be stored in the DS file:

- i) DNSSEC Delegation Signer Record;
- ii) Creation Date; and
- iii) Registrar Handle of sponsoring registrar.

- 4.6.18 **DNSSEC Delegation Signer Record/Status Associations.** Indicates a file type "DSSTATUS"
The following fields shall be stored in the DSSTATUS file:
i) DNSSEC Delegation Signer Record;
ii) Status Value, as per the earlier section on Object Statuses; and
iii) Reason Code.
- 4.6.19 **Domain/DNSSEC Delegation Signer Record Associations.** Indicates a file type "DOMDS"
(1) The following fields shall be stored in the DOMDS file:
i) Domain Handle; and
ii) DNSSEC Delegation Signer Record.
- 4.6.20 **DNSSEC Delegation Signer Record Deletions.** Indicates a file type "DSDEL." This file is only required for incremental escrow deposits (e.g. - file type "inc"); it indicates the list of DNSSEC delegation signer records that were in the previous deposit that have since been removed.
(1) DNSSEC Delegation Signer Record; and
(2) Deletion Date.
- 4.6.21 **Extensions.** If a particular registry operator's contract requires submission of additional data, not included above, additional "extension" files may be defined to represent that data which may use Domain, Contact, Nameserver, and Registrar handles in order to associate that data with these objects, and which may introduce new objects, with their own handles that may, in turn, be used to allow extension files to indicate references to these new objects.
- 4.7 **Compression and Encryption.** Data encryption shall be used to ensure the privacy of registry escrow data.
- 4.7.1 **"Best practices"** also include the use of data compression, as it reduces transfer time, and strengthens cryptographic security. PGP normally compresses plain text before encrypting it; the OpenPGP message format (RFC 2440) indicates that implementers should support ZIP (RFC 1951) compression, and may implement ZLIB (RFC 1950). Implementations are also free to support additional algorithms; some support BZIP2.
- 4.7.2 Registry Operator should use compression and encryption thus:
(1) The file should be compressed. This specification does not require that this be done either together with or separate from the encryption process.
(2) The compressed data shall be encrypted using the escrow agent's public key, a digital signature being generated and signed using the registry's private key.
(3) The encrypted files and digital signatures shall then be transferred to the escrow agent. This specification does not require any particular transmission mechanism; acceptable options would include (but are not restricted to) electronic delivery via protocols such as FTP, SFTP, etc., or via delivery of a physical medium such as CD-ROMs, DVD-ROMs, or USB storage devices.

- (4) The escrow agent may then validate that the encrypted data was correctly transferred by decrypting the files and validating the digital signatures.
- 4.8 **Distribution Of Public Keys.** Each of Registry Operator and Escrow Agent will distribute its public key to the other party (Registry Operator or Escrow Agent, as the case may be) via email to an email address to be specified. Each party will confirm receipt of the other party's public key with a reply email, and the distributing party will subsequently reconfirm the authenticity of the key transmitted. In this way, public key transmission is authenticated to a user able to send and receive mail via a mail server operated by the distributing party. Escrow Agent, Registry and ICANN shall exchange keys by the same procedure.
5. **Notification of Deposits.** Along with the delivery of each Deposit, Registry Operator will deliver to Escrow Agent and to ICANN a written statement (which may be by authenticated e-mail) that includes a copy of the report generated upon creation of the Deposit and states that the Deposit has been inspected by Registry Operator and is complete and accurate. Escrow Agent will notify ICANN of all Deposits received, within two business days of receipt.
6. **Verification Procedures.**
- 6.1 Within two business days after receiving each Deposit, Escrow Agent must verify the format and completeness of each Deposit and deliver to ICANN a copy of the verification report generated for each Deposit (which may be by authenticated e-mail).
- 6.2 If Escrow Agent discovers that any Deposit fails the verification procedures, Escrow Agent must notify, including by email, fax and phone, Registry Operator and ICANN of such nonconformity within forty-eight hours of discovery. Upon notification of such verification failure, Registry Operator must begin developing modifications, updates, corrections, and other fixes of the Deposit necessary for the Deposit to pass the verification procedures and deliver such fixes to Escrow Agent as promptly as possible. Escrow Agent must verify the accuracy or completeness of any such corrected Deposit and give ICANN notice of successful verification within twenty-four hours.

PART B – LEGAL REQUIREMENTS

1. **Identity of Escrow Agent.** Prior to entering into an escrow agreement, the Registry Operator must contact and inform ICANN as to the identity of the Escrow Agent, and provide ICANN with contact information and a copy of the relevant escrow agreement.
2. **Fees.** Registry Operator must pay, or have paid on its behalf, fees to the Escrow Agent directly. If Registry Operator fails to pay any fee by the due date(s), the Escrow Agent will give ICANN written notice of such non-payment and ICANN may pay the past-due fee(s) within ten business days after receipt of the written notice from Escrow Agent. Upon payment of the past-due fees by ICANN, ICANN shall have a claim for such amount against Registry Operator, which Registry Operator shall be required to submit to ICANN together with the next fee payment due under the Registry Agreement.
3. **Ownership.** Ownership of the Deposits during the term of the escrow agreement will remain with the Registry Operator at all times. In the event that Deposits are released from escrow, such rights, if any, held by Registry Operator in the Deposits will

automatically be licensed on a non-exclusive, irrevocable, royalty-free paid-up basis to ICANN or to a party designated in writing by ICANN.

4. **Integrity and Confidentiality.** Escrow Agent will be required to (i) hold and maintain the Deposits in a secure, locked, and environmentally safe facility which is accessible only to authorized representatives of Escrow Agent and (ii) protect the integrity and confidentiality of the Deposits using all commercially reasonable measures. ICANN and Registry Operator will be provided the right to inspect Escrow Agent's applicable records upon reasonable prior notice and during normal business hours.
5. **Copies.** Escrow Agent may be permitted to duplicate any Deposit, at its expense, in order to comply with the terms and provisions of the escrow agreement.
6. **Release of Deposits.** Escrow Agent will deliver to ICANN or its designee, at the Registry Operator's expense, all Deposits in Escrow Agent's possession in the event that the Escrow Agent receives a request from Registry Operator to effect such delivery to ICANN, or receives one of the following written notices by ICANN stating that:
 - 6.1 the Registry Agreement has expired without renewal, or been terminated; or
 - 6.2 ICANN failed, with respect to (a) any Full Deposit or (b) five Incremental Deposits within any calendar month, to receive, within five calendar days after the Deposit's scheduled delivery date, notification of receipt from Escrow Agent; and (x) ICANN gave notice to Escrow Agent and Registry Operator of that failure; and (y) ICANN has not, within seven calendar days after such notice, received notice from Escrow Agent that the Deposit has been received; or
 - 6.3 ICANN has received notification from Escrow Agent of failed verification of a Full Deposit or of failed verification of five Incremental Deposits within any calendar month and (a) ICANN gave notice to Registry Operator of that receipt; and (b) ICANN has not, within seven calendar days after such notice, received notice from Escrow Agent of verification of a remediated version of the Deposit; or
 - 6.4 Registry Operator has: (i) ceased to conduct its business in the ordinary course; or (ii) filed for bankruptcy, become insolvent or anything analogous to any of the foregoing under the laws of any jurisdiction anywhere in the world; or
 - 6.5 a competent court, arbitral, legislative, or government agency mandates the release of the Deposits to ICANN.
 - 6.6 Unless Escrow Agent has previously released the Registry Operator's Deposits to ICANN or its designee, Escrow Agent will deliver all Deposits to Registry Operator upon termination of the Registry Agreement.