Requirements for Automated Management of TLD IANA database

Version 1.11 DRAFT

Purpose:
To enable the provision of an efficient, non-discriminatory service, and to decentralise the IANA function for the benefit of the whole community. To enhance stability of technical Internet operations, reduce US Government political involvement whilst maintaining operational oversight of the Root Server system.

Status of this Document.
This system specification is a draft overview of how the IANA could be made to function. The technical mechanisms are based on existing models of registry operation.

This draft document is currently CONFIDENTIAL

1 Introduction

1.1 Document Revision History

Date	Version	Description
March 1994		http://www.isi.edu/in-notes/rfc1591.txt
		http://www.rfc-editor.org/rfc/rfc1591.txt
10 May 2001	2	http://www.centr.org/DoCs/legal/best-practice.html
March 2003		http://www.centr.org/docs/statements/future-IANA.html

1.2 Purpose of this Document

The purpose of this Document is to provide a high-level requirements specification for an *Automated Management System* related to the IANA Top Level Domain database. Its distribution is unlimited.

1.3 Naming Conventions and Definitions

ICANN	The Internet Corporation for Assigned Names and Numbers
IANA	Internet Assigned Numbers Authority
DoC	United States Government, Department of Commerce
NTIA	United States Government, National Telecommunications and Information Administration
gTLD	Generic Top Level Domain
ccTLD	Country Code Top Level Domain
TLD	Top Level Domain (this term includes gTLDs and ccTLDs)
LIC	Local Internet Community, relative to each ccTLD

1.4 Overview

Currently IANA maintains a database of the Internet's Top Level Domains (TLDs) including the identity of the TLD Manager organisation, their contact details and certain technical parameters. This is done under an agreement between the USDOC and the Internet Corporation for Assigned Names and Numbers (ICANN)

IANA is the initial review authority for proposed changes to information held in the IANA TLD Database. The TLD Manager, its Administrative Contact, or its Technical Contact may initiate such changes.

The current process for making a change to the TLD database is described below.

- A TLD Manager, TLD Administrative Contact, or TLD Technical Contact faxes, emails or otherwise delivers a Modification Template to IANA. As at June 2005, IANA is in the process of introducing a pre-filled web based template for email generation and transmission to assist registry managers complete the email Modification Template more accurately.

- IANA reviews Modification Template manually. This manual process is proving unacceptable with long delays ensuing
- IANA determines if the information contained on the Modification Template meets syntax requirements and is acceptably formatted.
- IANA communicates with the person submitting the request if the Modification Template is not acceptable for syntax or formatting reasons.
- IANA is responsible for verifying that the requestor is authorized to make such Modification requests. Current verification process is email or telephonic notification to the Administrative Contact of IANA's receipt of a Modification Template. IANA will only accept instructions from the individuals named as the contacts for Administrative Contact or Technical Contact (in the areas of their respective responsibilities) and will communicate by email solely to the email address listed in the IANA database.
- IANA performs limited technical tests to ensure that any new name servers are responding and operational.
- IANA approves the submitted Modification Template as suitable for consideration by the DoC or rejects the template. In the event of the template being rejected an explanation is provided to the requesting parties.
- If approved by IANA, IANA passes to the United States Government's Department of Commerce (DoC) the Modification Template in order to obtain their authorization for the change. In the event approval is not confirmed an explanation is provided to the requesting parties. These requests are made by email between ICANN and the US Government. To assist in checking the operator of the MasterRoot (Verisign) also receives a copy of DoC answer to IANA. VeriSign is also sent a copy of the initial IANA email to DoC, so is aware in advance of a pending change to entries in the Root Zone.
- The DoC's role is to verify that the ICANN request has followed the approved process path. The DoC makes no substantive determinations. The DoC only deals with one or two appointed ICANN representatives designated to make the requests to the NTIA department of the DoC.
- DoC manually looks at ICANN approved Modification requests and either approves or rejects. The NTIA is the office within DoC that deals with these matters. Once confirmed by the DoC then notifies IANA through email that it has been verified. In the event approval is not confirmed and explanation is provided to the requesting parties. The MasterRoot Server operator (currently 3 persons from VeriSign) is also cc'ed on this email.
- MasterRoot manually views the information received from DoC for accuracy/format
- MasterRoot makes the requested change in the Root Zone.
- Updated Zones published in Root

Some issues have been identified with the process described above and are given below.

- Should IANA once a year contact all ccTLD Managers for periodical update to contact information? Such a systematic roll call could help to keep contact information up to date.
- Should IANA make public all requests for changes in TLD database?

Do trivial changes such as address change, phone number change need to go through the manual process of verification and authorisation? If all requests for changes are being made public, and if IANA procedures allow for reverting to former state in case of challenge, then the above trivial changes became indeed trivial.

- Currently the TLD Manager, its Administrative Contact, and/or its Technical Contact are sometimes associated with a single live person which makes it very

difficult in situations where that person is no longer with the organization or is not available for contact due to any reason.

Because of some of the issues identified above and also to provide additional functionality MasterRoot is proposing a new Automated Management System for TLD IANA database to replace the existing process. This will enable the administration of the TLD database to be automated and reduce the need for manual intervention as much as possible. The public information on changes added to the possibility to revert to the immediately former state in case of challenge would help to build trust into automated system.

1.5 References

http://www.iana.org/cctld/redelegation-overview-19jun02.htm

1.6 Issues

N/A

2   Requirements

2.1 High Level Process

An interface will be provided which will allow authorized users with varying levels of privileges to request the actions needed. Notifications will be sent to the affected parties through appropriate channels as defined in the use cases below. The status of the requested operations and the TLD will be updated based on the action performed. IANA will institute and maintain a formal Change Control system in order to track all changes to the IANA database with a comprehensive and accurate audit trail that is available to all users of the system.

2.2 Users of the system

Based on the type of users, the system will allow only certain operations. The users of the system are given below and the summary of operations allowed for each type of user is included in Section 2.6.

2.2.1 IANA

IANA is responsible for the overall management of the Automated Management System of TLD IANA database. Therefore IANA has privileges to perform any of the tasks in the system.

2.2.2 DoC

The DoC is responsible for overseeing any changes that are made to the root zone file. Therefore, all such changes need to be approved by the DoC. The NTIA is the office within the DoC that deals with these matters.

2.2.3 MasterRoot

MasterRoot is responsible for publishing and administering the root zone file. Therefore any changes to the root zone file need to be sent to MasterRoot to be validated and published in the zone file. VeriSign Inc is the current operator of the MasterRoot under contract with the DoC.

2.2.4 TLD Manager

Each TLD in the system has a TLD Manager that is recognized by IANA. The TLD Manager is usually a corporation or incorporated organization that is responsible for the overall management of the TLD, including the appointment from time to time of Administrative Contact and Technical Contact. The attributes of the TLD Manager are given in further detail later in this Document.

2.2.5 Administrative Contact

Each TLD in the system has an Administrative Contact recognized by IANA or as designated from time to time by the TLD Manager for the TLD. The Administrative Contact is responsible for the administrative aspects of the TLD. The attributes of the Administrative Contact are given in further detail later in this Document.

2.2.6 Technical Contact

Each TLD in the system has a Technical Contact recognized by IANA or as designated from time to time by the TLD Manager. The Technical Contact is responsible for the technical aspects of the TLD such as maintaining the name servers for the TLD. The attributes of the Technical Contact are given in further detail in the following section.

2.2.7 Public

This is all Internet Users using the TLD including Government users and the local Interbet Community.

2.3 Entities and Attributes

The entities involved in the Automated TLD Management System and their attributes are given below.

2.3.1 TLD

Attribute Name	Data Type	Required?	Multiple	Public
TLD Name	Text	Y	N	Y
TLD Manager	Contact	Y	N	Y
Address	Text	Y	N	Y
Phone Number	Text	Y	N	Y
Fax Number	Text	Y	N	Y
Email Address	Text	Y	N	Y
Administrative Contact	Contact	Y	N	Y
Technical Contact	Contact	Y	N	Y
Primary Name Server	Name Server	Y	N	Y
Secondary Name Server	Name Server	Y	Y	Y
URL for Registration Services	Text	Y	N	Y
Whois Server	Text	N	Y	Y

Notes:
- The TLD Manager, Administrative Contact and Technical Contact can all be the same, all different, or any combination.

2.3.2 IANA

Attribute Name	Data Type	Required?	Multiple	Public
IANA Contact	Contact	Y	N	N

2.3.3 DoC

Attribute Name	Data Type	Required?	Multiple	Public
DoC Contact	Contact	Y	N	N

2.3.4 MasterRoot

Attribute Name	Data Type	Required?	Multiple	Public
MasterRoot Contact	Contact	Y	N	N

2.3.5 Contact

Attribute Name	Data Type	Required?	Multiple	Public
Contact name	Text	Y	N	Y
Address	Text	Y	N	Y
Phone Number	Text	Y	N	Y
Fax Number	Text	Y	N	Y
Email Address	Text	Y	N	Y
SystemUser	User	Y	Y	N

2.3.6 Name Server Host Name

Attribute Name	Data Type	Required?	Multiple	Public
Host Name (FQDN)	Text	Y	N	Y
IP v4 Address	Text	Y	Y	Y
IP v6 Address	Text	N	Y	Y

2.3.7 SystemUser

SystemUsers gain access to the system using their logon name and logon password.

Attribute Name	Data Type	Required?	Multiple	Public
SystemUser Type	Text	Y	N	N
SystemUser Name	Text	Y	N	N
Logon Name	Text	Y	N	N
Password	Text	Y	N	N
Email Address	Text	Y	N	N
Public Key/Certificate	Binary	N	Y	N

Notes:
- The valid values for SystemUser Type are Individual or Role.

2.4 Statuses

Both TLDs and operations performed on the TLD entries within the IANA database and root zone, have statuses as defined below.

2.4.1 Existing TLDs

2.4.1.1 NO_ACTIVITY

NO_ACTIVITY status is the rest state of the TLD. It means that there are no operations currently in process for this TLD.

2.4.1.2 OPERATIONS_PENDING

OPERATIONS_PENDING status is used to signal that there are operations currently being processed that may lead to a change in the state of the TLD.

2.4.2 Create TLD Operation

This operation is a special case as it has its own set of statuses. Once it is in the root zone and the IANA database it is treated as an existing TLD and a different set of statuses apply.   In the case of new TLDs it is assumed a secure channel exists to request the creation of new TLDs and so no authenticity verification status is needed.

2.4.2.1 CREATE_PENDING_IANA_APPROVAL

The operation to create a new TLD goes into this state when it requires the approval of IANA. Approval cannot be withheld if the technical checks are satisfied.

2.4.2.2 CREATE_PENDING_USDoC_APPROVAL

The operation to create a new TLD goes into this state when it requires the approval of the DoC,

2.4.2.3 CREATE_PENDING_DATABASE_INSERTION

The operation to create a new TLD goes into this state when it has been approved and is waiting to go into the IANA database.

2.4.2.4 CREATE_PENDING_ZONE_INSERTION

The operation to create a new TLD goes into this state when it has been approved, but requires MasterRoot to add it to the root zone file.

2.4.2.5 CREATE_COMPLETED

The operation to create a new TLD goes into this state when it has been approved and completed.

2.4.2.6 CREATE_WITHDRAWN

The operation to create a new TLD goes into this state when it has been withdrawn. No further action is taken on this operation.

2.4.2.7 CREATE_REJECTED

The operation to create a new TLD goes into this state when it has been rejected at one of the approval stages. No further action is taken on this operation.

2.4.3 Operation Statuses

All other operations go through different statuses as they are processed. There can be multiple operations being processed at any one time, for the same TLD. As there exist potentially insecure channels for requests to be made, each request may require an initial verification stage.

2.4.3.1 PENDING_IANA_CONFIRMATION

An operation goes into this state when it requires IANA to obtain confirmation from one of the parties involved that it is an authentic request.

2.4.3.2 PENDING_IANA_APPROVAL

An operation goes into this state when it requires the approval of IANA. Approval cannot be withheld if the technical checks are satisfied.

2.4.3.3 PENDING_USDoC_APPROVAL

An operation goes into this state when it requires the approval of the DoC,

2.4.3.4 PENDING_DATABASE_UPDATE

An operation goes into this state when it has been approved but requires the IANA database to be updated.

2.4.3.5 PENDING_ZONE_UPDATE

An operation goes into this state when it has been approved, but is a DNS change that requires MasterRoot to update the root zone file.

2.4.3.6 COMPLETED

An operation goes into this state when it has been approved and completed.

2.4.3.7 WITHDRAWN

An operation goes into this state when it has been withdrawn. No further action is taken on this operation.

2.4.3.8 REJECTED

An operation goes into this state when it has been rejected at one of the approval stages. No further action is taken on this operation.

2.5 Operations

In addition to the operations defined below a public read-only interface will be provided to enable the users to view the current state of the TLD database or track all changes.

2.5.1 Common Functionality

2.5.1.1 Confirmation

An operation goes into the state PENDING_IANA_CONFIRMATION when it requires IANA to obtain confirmation from one of the parties involved that it is an authentic request. All operations requested by the TLD Manager, Administrative Contact or Technical Contact require confirmation. This allows insecure mechanisms for requesting operations (such as the current email based system) to continue to be used.

Process:

1. The operation is put into state PENDING_IANA_CONFIRMATION and IANA notifies those who can confirm the operation that they need to do so.

If confirmation is given then

2. The appropriate User confirms the operation.
3. The status of the operation is updated to the next appropriate status

If confirmation is not given (or times out) then

2. The appropriate user rejects the operation, or the operation times out after a certain time with no response.
3. The status of the operation is set to WITHDRAWN. Notification is sent to MasterRoot, TLD Manager, Administrative Contact and Technical Contact that the operation has been withdrawn.

2.5.1.2 Withdrawal

At any point the originator of the operation may withdraw it.

Process:

1. The originator withdraws the operation.
2. The state of the operation is changed to WITHDRAWN. Notification is sent to MasterRoot, TLD Manager, Administrative Contact and Technical Contact that the operation has been withdrawn.

2.5.2 Create New TLD

This operation is used to create a new TLD in the database.

Authorized Users:

- IANA upon completion of international process to agree creation of new TLD.

Process:

1. IANA requests the creation of the TLD by creating a new operation with all of the required data for a new TLD. No entry is yet made in the IANA TLD database
2. The status of the operation is updated to CREATE_PENDING_IANA_APPROVAL.
3. Notification is sent to IANA indicating that it needs to verify the new name servers for the new TLD.
4. IANA verifies the new name servers. The potential process here is described in section 3.3
5. The status of the operation is changed to CREATE_PENDING_USDoC_APPROVAL.
6. Notification is sent out to DoC indicating that it needs to confirm the process for the creation of the new TLD has been followed and the request is valid. Notification is sent to MasterRoot, TLD Manager, Administrative Contact and Technical Contact indicating that a request for creation of a new TLD has been made and that it is pending DoC approval.

If the DoC approves the operation then the following happens

7. DoC approves the operation.
8. The status of operation is changed to CREATE_PENDING_DATABASE_INSERTION. IANA are notified that the TLD now needs to be inserted into the IANA TLD database.
9. IANA add the details of the new TLD to the IANA TLD database.
10. The status of the operation is changed to CREATE_PENDING_ZONE_INSERTION.
11. Notification is sent out to MasterRoot indicating that it needs to add the new TLD to the root zone. Notification is sent to IANA, TLD Manager, Administrative Contact and Technical Contact indicating that the DoC has approved the request for creation of a new TLD and that it is pending zone insertion.
12. MasterRoot puts the new TLD in the root zone and confirms it has been done.
13. The status of the operation is set to CREATE_COMPLETED.

14. Notification is sent to IANA, DoC, TLD Manager, Administrative Contact and Technical Contact that the new TLD has been added to the root zone file.

If the DoC rejects the operation then the following happens

7. DoC rejects the request for the creation of the new TLD.
8. The status of the operation is changed to CREATE_REJECTED.
9. Notification is sent to IANA, TLD Manager, Administrative Contact and Technical Contact indicating that the DoC has rejected the request for creation of a new TLD.

2.5.3 Replace TLD Manager

This operation will enable the user to replace the current TLD Manager with a new TLD Manager. This is also known as re-delegation or re-assignment or Change of Manager of the TLD.

Authorized Users:

- TLD Manager with confirmation from TLD Manager;
- IANA upon completion of an international process that governs a contractual relationship with old and new TLD Manager of a gTLD.
- IANA upon receipt of appropriate judicial determination covering management of a TLD.

Process:

1. The request is in state PENDING_IANA_CONFIRMATION whilst confirmation is sought as documented in section 2.5.1.1

If confirmation is received then the following happens

2. Once confirmed notification is sent to DoC indicating that it needs to confirm the process for replacing an existing TLD Manager been followed and the request is valid.
3. The status of the operation is updated to PENDING_USDoC_APPROVAL.

If the DoC approves the operation then the following happens

4. DoC approves the operation.
5. The status of the operation is changed to PENDING_DATABASE_UPDATE
6. Notification is sent to IANA indicating that the DoC has approved the operation and the IANA database needs to be updated.
7. IANA replaces the TLD Manager in the IANA database.
8. The status of the operation is updated to COMPLETED.
9. Notification is sent to new TLD Manager, Administrative Contact and Technical Contact, old TLD Manager, Administrative Contact and Technical Contact indicating that IANA has replaced the TLD Manager.

If the DoC rejects the operation then the following happens

4. DoC rejects the request for the creation of the new TLD.
5. The status of the operation is changed to REJECTED.
6. Notification is sent to IANA, TLD Manager, Administrative Contact and Technical Contact indicating that the DoC has rejected the request.

2.5.4 Replace Administrative Contact

This operation will enable the user to replace the Administrative contact of a TLD with a new Administrative Contact.

Authorized Users:

- TLD Manager with confirmation from TLD Manager, Administrative Contact or Technical Contact;
- Administrative Contact with confirmation from TLD Manager or Technical Contact;
- IANA upon receipt of appropriate judicial determination covering management of a TLD.

Process:

1. The request is in state PENDING_IANA_CONFIRMATION whilst confirmation is sought as documented in section 2.5.1.1

If confirmation is received then the following happens

2. The status of the operation is changed to PENDING_DATABASE_UPDATE.
3. Notification is sent to IANA that the IANA TLD database requires updating.
4. IANA replace the Administrative Contact in the IANA database.
5. The status of the operation is changed to COMPLETED.
6. Notification is sent to IANA, TLD Manager, new Administrative Contact, old Administrative Contact, and Technical Contact indicating that the Administrative Contact for the TLD has been replaced.

2.5.5 Replace Technical Contact

This operation will enable the user to replace the Technical contact of a TLD with a new Technical Contact.

Authorized Users:

1. TLD Manager with confirmation from TLD Manager, Administrative Contact or Technical Contact
2. Administrative Contact with confirmation from TLD Manager or Technical Contact;
3. Technical Contact with confirmation from TLD Manager or Administrative Contact or technical Contact;
4. IANA upon receipt of appropriate judicial determination covering management of a TLD.

Process:

1. The request is in state PENDING_IANA_CONFIRMATION whilst confirmation is sought as documented in section 2.5.1.1

If confirmation is received then the following happens

2. The status of the operation is changed to PENDING_DATABASE_UPDATE.
3. Notification is sent to IANA that the IANA TLD database requires updating.
4. IANA replace the Technical Contact in the IANA database.
5. The status of the operation is changed to COMPLETED.
6. Notification is sent to IANA, TLD Manager, Administrative Contact, old Technical Contact and new Technical Contact indicating that the Technical Contact for the TLD has been replaced.

2.5.6 Modify Primary Name Server

This operation will enable the user to modify the primary name server of a TLD.

Authorized Users:

- TLD Manager, Administrative Contact or Technical Contact, confirmed by any of the three.
- IANA when clearly required to protect stability of DNS.

Process:

1. The request is in state PENDING_IANA_CONFIRMATION whilst confirmation is sought as documented in section 2.5.1.1

If confirmation is received then the following happens:

2. The status of the operation is updated to PENDING_IANA_APPROVAL.
3. Notification is sent to IANA indicating that it needs to verify the change in primary name server. Notification is sent to DoC, MasterRoot, TLD Manager, Administrative Contact and Technical Contact indicating that TLD Manager/Administrative Contact/Technical Contact has requested a change in primary name server.
4. IANA verifies the primary name server change. The potential process here is described in section 3.3
5. The status of the operation is changed to PENDING_USDoC_APPROVAL.
6. Notification is sent out to DoC indicating that it needs to confirm the process for changing the primary name server has been followed. Notification is sent to MasterRoot, TLD Manager, Administrative Contact and Technical Contact indicating that IANA has approved the change in primary name server.

If he DoC approves the request then the following happens:

7. DoC approves the operation.
8. The status of the operation is changed to PENDING_DATABASE_UPDATE.
9. Notification is sent to IANA indicating that it needs to update the TLD database.
10. IANA updates the TLD database with the details of the new nameserver.
11. The status of the operation changes to PENDING_ZONE_UPDATE.
12. Notification is sent out to MasterRoot indicating that it needs to update the root zone with the name server change. Notification is sent to IANA, TLD Manager, Administrative Contact and Technical Contact indicating that IANA has approved the change in primary name server.
13. MasterRoot updates the root zone.
14. The status of the operation is changed to COMPLETED.
15. Notification is sent to IANA, DoC, TLD Manager, Administrative Contact and Technical Contact indicating that the root zone has been updated with the change in primary name server.

If the DoC rejects the operation then the following happens

7. DoC rejects the request for the creation of the new TLD.
8. The status of the operation is changed to REJECTED.
9. Notification is sent to IANA, TLD Manager, Administrative Contact and Technical Contact indicating that the DoC has rejected the request.

2.5.7 Modify Secondary Name Servers

This operation will enable the user to modify the secondary name servers of a TLD.

Authorized Users:

- TLD Manager, or Administrative Contact and Technical Contact with confirmation from any of the three.
- IANA when clearly required to protect stability of DNS.

Process:

1. The request is in state PENDING_IANA_CONFIRMATION whilst confirmation is sought as documented in section 2.5.1.1

If confirmation is received then the following happens:

2. The status of the operation is updated to PENDING_IANA_APPROVAL.
3. Notification is sent to IANA indicating that it needs to verify the change in primary name server. Notification is sent to DoC, MasterRoot, TLD Manager, Administrative Contact and Technical Contact indicating that TLD Manager/Administrative Contact/Technical Contact has requested a change in primary name server.
4. IANA verifies the secondary name server change. The potential process here is described in section 3.3.
5. The status of the operation is changed to PENDING_DATABASE_UPDATE.
6. Notification is sent to IANA indicating that it needs to update the TLD database.
7. IANA updates the TLD database with the details of the new nameserver.
8. The status of the operation changes to PENDING_ZONE_UPDATE.
9. Notification is sent out to MasterRoot indicating that it needs to update the root zone with the name server change. Notification is sent to IANA, TLD Manager, Administrative Contact and Technical Contact indicating that IANA has approved the change in secondary name server.
10. MasterRoot updates the root zone.
11. The status of the operation is changed to COMPLETED.
12. Notification is sent to IANA, DoC, TLD Manager, Administrative Contact and Technical Contact indicating that the root zone has been updated with the change in secondary name server.

2.5.8 Check the status of a TLD

This operation will enable the user to check the status of a TLD.

Authorized to request:

- IANA, DoC, MasterRoot, TLD Manager, Administrative Contact, Technical Contact, with no confirmation.

Process:

1. The system will display the current status of the TLD and all current and recent operations to the user.

2.5.9 Modify URL for registration services

This operation will enable the user to update the URL for registration services field of a TLD.

Authorized Users:

- TLD Manager, Administrative Contact or Technical Contact., no confirmation is required.

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.10 Modify Whois Server

This operation will enable the user to update the Whois Server field of a TLD. The database will be updated immediately.

Authorized Users:

- TLD Manager, Administrative Contact or Technical Contact, no confirmation is required.

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.11 Modify TLD Manager attributes

This operation will enable the user to update the attributes of the TLD Manager but must not be used to replace the TLD Manager, which is covered in section 2.5.3. The attributes that can be changed include address, phone, fax and email.

Authorized Users:

- TLD Manager, no confirmation required.

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.12 Modify Administrative Contact attributes

This operation will enable the user to update the attributes of the Administrative Contact but must not be used to replace the Administrative contact, which is covered in section 2.5.4. The attributes that can be changed include address, phone, fax and email.

Authorized Users:

- Administrative Contact, no confirmation required.

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.13 Modify Technical Contact attributes

This operation will enable the user to update the attributes of the Technical Contact but must not be used to replace the Technical Contact, which is covered in section 2.5.5. The attributes that can be changed include address, phone, fax and email.

Authorized Users:

• Technical Contact, no confirmation required.

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.14 Add/Remove/Modify SystemUser for TLD Manager

This operation will enable the user to add, remove or modify their SystemUsers, i.e. the actual logins to the system given to their staff.

Authorized Users:

• TLD Manager, no confirmation required.

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.15 Add/Remove/Modify SystemUser for Administrative Contact

This operation will enable the user to add, remove or modify their SystemUsers, i.e. the actual logins to the system given to their staff.

Authorized Users:

• Administrative Contact, no confirmation required

Process:

1. The operation enters state PENDING_DATABASE_UPDATE.
2. Notification is sent to IANA that the change is required.
3. IANA make the change.
4. The state of the operation is changed to COMPLETED.

2.5.16 Add/Remove/Modify SystemUser for Technical Contact

This operation will enable the user to add, remove or modify their SystemUsers, i.e. the actual logins to the system given to their staff.

Authorized Users:

• Technical Contact, no confirmation required

Process:

5. The operation enters state PENDING_DATABASE_UPDATE.
6. Notification is sent to IANA that the change is required.
7. IANA make the change.
8. The state of the operation is changed to COMPLETED.

2.6 Summary of Users and Operations allowed

2.6.1 Technical Contact

• Replace Technical Contact
• Modify primary name server
• Modify secondary name servers
• Check the status of a TLD
• Modify Technical Contact attributes
• Modify URL for registration services
• Modify Whois Server
• Add/Remove/Modify SystemUser for Technical Contact

2.6.2 Administrative Contact

• Replace Administrative Contact
• Modify primary name server
• Modify secondary name servers
• Check the status of a TLD
• Modify Administrative Contact attributes
• Modify URL for registration services
• Modify Whois Server
• Add/Remove/Modify SystemUser for Administrative Contact

2.6.3 TLD Manager

• Replace TLD Manager
• Replace Administrative Contact
• Replace Technical Contact
• Modify primary name server
• Modify secondary name servers
• Check the status of a TLD
• Modify URL for registration services
• Modify Whois Server
• Modify TLD Manager attributes
• Add/Remove/Modify SystemUser for TLD Manager

2.6.4 IANA – under specific, documented circumstances

- Create New TLD
- Replace TLD Manager
- Replace Administrative Contact
- Replace Technical Contact
- Modify primary name server
- Modify secondary name servers
- Check the status of a TLD

2.6.5 IANA – under instructions from a TLD Manager, Administrative Contact or Technical Contact that cannot use any automated system.

- Replace TLD Manager
- Replace Administrative Contact
- Replace Technical Contact
- Modify primary name server
- Modify secondary name servers
- Check the status of a TLD
- Modify URL for registration services
- Modify Whois Server
- Modify TLD Manager attributes
- Add/Remove/Modify SystemUser for TLD Manager
- Add/Remove/Modify SystemUser for Administrative Contact
- Add/Remove/Modify SystemUser for Technical Contact

2.6.6 DoC

- Check the status of a TLD
- Verify/reject any changes that need DoC's approval

2.6.7 MasterRoot

- Check the status of a TLD
- Make the required root zone changes and update the system

2.7 Audit Requirements

All transactions that involve any change to the data will need to be audited. The audit data should be available to the users of the system.

- The amount of audit data is not expected to be too large. So, the complete history of the audit data will be retained.
- The audit data will be accessed through the same interface as the rest of the system.
- Date history of operations and approvals/rejections will be audited.

3 Implementation

This document does not mandate any specific implementation of this specification. The following section sets common standards available to any implementation and proposes a number of alternative implementations.

3.1 Possible Implementations

The most obvious possible implementation is a web site using HTTP over SSL with 2 – way authentication. This could include server certification of the web-page by a recognised signature authority, and client certification by a certificate signed by the TLD manager's certificate (which is itself certified by a recognised signature authority).

As an alternative yet complementary service to the web-based interface, an email interface where email communications shall be authenticated by digital signature will also be provided to the IANA database operator. The email template format shall enable the same functionality as the web-based interface. Such an interface may include the use of PGP for secured email, or even specific IP addresses.

3.2 Initial Authentication

To start the process, the TLD Manager should advise the IANA in writing of the mode of authentication the IANA should accept as being authorised. This makes provision for TLD Managers who operated in countries that require a formal chain of authentication to be specified. This also may empower the IANA to enter requests on behalf of a TLD Manager, when so authorised, in countries where on-line communication is not consider secure, legally binding, or the preferred method of communication. The IANA procedures must be published on the web and may include some or all of the following methods of communication. Each TLD Manager should notify the IANA of its preferred method of authentication which may include:

- Signed letter received through the post or by fax
- PGP signed email
- Key Exchange
- DNSsec
- Password Exchange
- Client certificates
- Any combination of above
- Any of above but including telephone confirmation

3.3 IANA Name Server Checks

- The name server compliance/configuration checks are performed in section 2.5.6 and section 2.5.7, which cover the operations to change nameservers. These checks are described at:

    http://www.iana.org/procedures/delegation-data.html