**SERVICE LEVEL EXPECTATIONS FOR IANA ROOT ZONE MANAGEMENT**

**POST TRANSITION**

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**Background**

The Service Level Expectation (SLE) Design Team group is comprised of 3 gTLD Registry representatives and 3 ccTLD Representatives. We have been in contact with ICANN staff and they have been helpful where permitted.

The Design Team was asked review the current IANA root management operations, to record where ICANN is performing well and identify any gaps and issues that it considered in need of further clarification, these carry a “?” notation.

The SLE Group conducted historical analysis based on two factors. The first was an analysis of the current Service Level Agreement that NTIA has with IANA and the second was to undertake analysis of real world transaction activity. The source of this second data set was based on two categories: published IANA performance reports, and transaction logs provided by ccTLD registries interacting with the IANA root management function.

The historical analysis used to determine actual transaction times resulted in the SLE Group analysing data from September 2013 to January 2015 which provided approximately 565 total data points – only 27 transactions took longer than 9 days and 13 took longer than 12 days. It should also be highlighted that some/much of the delay is as a result of the Registry not responding to IANA to authorise the change request – so the delay is not necessarily within IANA's control. 4 transactions took longer than 1 year and that is not necessarily a bad thing if the stability of the DNS is assured.

For efficient service delivery of the SLE this document is separated into the current requirement (pre-transition) and also where the SLE could be improved post transition so to identify where more work and information is needed and assist Registry operators be assured of efficient and predictable IANA service this is shown in GREEN

Regarding Escalations: The Design Team endorses the concept of an IANA Customer Group specifically to monitor and also to fulfill escalation path for breach of service expectations. The role and remit of the CSC is outside of DT-A’s remit, so the escalation path described in this document is rudimentary and designed to support Registry operations. We hand over to our CWG colleagues to better describe the recommended escalation path.

## Principles

These are guiding principles that help define the expectation for the monitoring and reporting environment, and guide the definition of the individual criteria used for reporting and assessment of the naming-related portions of the IANA Functions:

1. **Attributable measures.** Where practical, individual metrics should be reported attributing time taken to the party responsible. For example, time spent by IANA staff processing a change request should be accounted for distinctly from time spent waiting for customer action during a change request.
2. **Overall times.** Notwithstanding the previous principle, there is value in overall metrics being reported to identify general trends associated with end-to-end processing times.
3. **Relevance.** There should be a distinction between metrics that should be collected to support general analysis, versus which are the critical metrics that are considered important to set specific thresholds for judging breaches in ICANN’s ability to provide an appropriate level of service.
4. **Clear definition.** Each metric should be sufficiently defined such that there is a commonly held understanding on what is being measured, and how an automated approach would be implemented to measure against the standard.
5. **Definition of thresholds.** The definition of specific thresholds for a performance criteria should be set based on analysis of actual data. This may require first the definition of a metric, a period of data collection, and later analysis by the community before defining the threshold.
6. **Review process.** The service level expectations should be reviewed periodically, and adapted based on the revised expectations of the community and updates to the environment. They should be mutually agreed between the community and the IANA Functions Operator.
7. **Regular reporting.** To the extent practical, metrics should be regularly reported in a near real-time fashion.

**Capturing the current status quo for IANA Root Zone Management**

**Introduction**

Service Level Expectations (SLEs) for a registry are normally based on specific transactions sent by a client to the registry. The metric for that transaction is generally of the form of “Transaction A must complete within X period Y percent of the time measured over Z”, for example, “a root zone update must complete within 72 hours 95% of the time measured on a monthly basis”. These SLE metrics are based on the following current assumptions:

1. The current process is simplified to five key stages for all change requests (notification is implicit in each stage):
2. Confirm the details of the change;
3. Verify the change complies with documented technical standards and policies and all applicable checks pass;
4. Obtain authorization to proceed with the change;
5. Implement the change
6. Notify the change requester of completion of the change.
7. Root Zone Management processes for routine change requests are largely automated. This automation includes:
8. A web based interface for submitting change requests to the IANA Function Operator (IFO). The web based interface authenticates the credentials presented by the change requester and facilitates the creation of root zone file and root zone database change requests.
9. Near-real time confirmation email to the initiator of the change request of its safe receipt by the IANA system. Note, in certain circumstances, the request is initiated by other means; fax, written letter. In these situations, email may not necessarily be used in communications.
10. Automated/Manual technical checks conducted by the IANA system on the change request. Once compliance with documented technical requirements is verified, an email is sent to both the admin and technical contacts at the Registry for both parties to validate the update. (Note: Some contacts are slow to respond which creates inefficiency in the validation process as well in certain circumstances, third party verification is required, i.e. Governmental )
11. The verified change request is transmitted to NTIA for authorization. For changes that impact the root zone file, the change request is also transmitted to the Root Zone Maintainer (RZM). This is performed via online APIs – shown in blue shading below (14 to 15 on the flow chart - now removed for post transition).
12. Once confirmed, notification is sent by NTIA to IANA, and for changes that impact the root zone file, to the RZM authorizing the change request for implementation– shown in blue below (14 to 15 on the flow chart - now removed for post transition).
13. Prior to implementation, the RZM repeats automated technical compliance checks on the request and once verified, implements the change within the root zone file. This file is typically published twice daily.
14. On publication of updates to the root zone file, RZM notifies IANA, who verifies the changes match the requested changes, and notifies the Registry.
15. The processing role previously undertaken by the NTIA no longer exists and those steps are no longer undertaken.  This means that IANA will have responsibility.

D. IANA’s online systems operate 24x7 365 days a year, except for maintenance periods, as befits a service that has customers in every time zone.

E. A change request that fails checks must be resubmitted rather than any changes made to the request by IANA to correct the detected failures.  If the requestor is allowed to correct a request then that counts as a new request for SLE compliance purposes.

The fields in the following tables are as follows:

* **Service Definition and Availability**
* **Credential Verification**
* **Process.**  The business process that IANA is requested to perform.
* **Metric.**  The individual metric that will be measured as part of the completion of the business process.
* **Target.** The specified target for each individual change request.
* **Type.**  Whether the target specified is a minimum target (compliance must be less than the target) or a maximum target (compliance must not be more than the target).
* **Escalation Path**
* **Breach.**  The percentage limit of change requests within the specified period that fail to meet the metric, which if reached is deemed a breach in the SLE.
* **Continuous Improvement**
* **Period.**  The period over which SLE compliance is measured.

Initially we wish to ensure the process has been correctly identified – please see the table below.



**Process Reporting**

IANA is required to provide the following reporting mechanisms. The SLE’s for the Process Reporting are in Appendix A.

|  |  |  |  |
| --- | --- | --- | --- |
| **Access** | **Type of Reporting** | **Metrics or Data Points** | **New/Existing** |
| Public | Real-time dashboard | Process Volumes | Existing |
|  |  | Current SLE Metrics | Existing |
|  |  | Performance Indicators (Green, Yellow Red) | New |
|  |  | Alerts | Existing |
|  | SLE Report | Performance against metrics | Existing |
|  |  | Notification of breaches | Existing |
|  |  | Explanations of any breaches | Existing |
|  | Request database (data is of sufficient detail to verify the metric calculations use for the SLE report) | Every request made (that is accepted as a genuine request) | New |
|  |  | What stage in the process | New |
|  |  | Timestamps of key points in the request lifecycle | Existing |
|  |  | What policies apply in the processing of the request | New |
|  |  | The results of the request | New |
| Private (Requesting TLDs Only) | Status tracker (Current and Historical) | Every request made for the TLD | Existing |
|  |  | The current status | Existing |
|  |  | Timestamps of key events | Existing |
|  |  | What action, if any, the TLD is required to do to move it to the next step | Existing |

**Credential Verification**

These elements reflect activity areas which are provided by the IANA Functions Operator, and disclosed in reporting (either in real-time or in other reports) to inform the community on important parameters relating to the naming-related functions.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **Metric** | **Design Team A Target** | **Type** | **Breach** | **Period** |
| Issuance of new username or password | Time to dispatch confirmation email of forgotten username | *5m* | *max* | *95%* | *month* |
| Time to dispatch confirmation email with link to change the password | *5m* | *max* | *95%* | *month* |
| Time to implement new password within the system | *5m* | *max* | *95%* | *month* |

**Key Areas for Measurement and Reporting**

These elements reflect activity areas which should be instrumented by the IANA Functions Operator, and disclosed in reporting (either in real-time or in other reports) to inform the community on important parameters relating to the naming-related functions.

|  |  |  |
| --- | --- | --- |
| **Metric** | **New/Existing** | **Mechanism** |
| **Overall Request Processing Timelines** | | |
| **Total Time** — average end-to-end processing time from submission to completion of change requests | Existing (as monthly report) | Publish in dashboard |
| **Volume** — number of requests performed, divided across high-level portioning of request types (such as contact data changes, nameserver changes, delegations/redelegations and root srver changes) | Existing (as monthly report) | Publish in dashboard |
| **Final outcome** — number/percentage of requests that are implemented, versus that are closed due to deficiencies, withdrawn by customer, etc. | New | Publish in dashboard |
| **Time per actor —** average time taken for IANA processing, Root Zone Maintainer processing, waiting on customer response, waiting on ICANN Board (for delegations/redelegations), and other such parties. | New | Publish in dashboard |
| **Time taken for key stages of processing** | | |
| **Time from submission to customer action required** — average time between submission of a change request via RZMS to when customer is asked to act on change request (i.e. contact confirmation, fix technical issues, etc.) | Existing | Publish in dashboard |
| **IANA enquiry response time —** average time taken for IANA to respond to enquiries made by customers | Existing | Publish in dashboard |
| **IANA processing time —** average time taken for routine requests between when customer qualifying criteria is met (i.e. meets technical and consent requirements), until request is dispatched for implementation. | Existing | Publish in dashboard |
| **Root Zone implementation time** — average time taken between a request being dispatched for implementation, to the changes being published in the DNS root zone. | Existing | Publish in dashboard |
| **Accuracy (APPENDIX D)** | | |
| **Incorrectly implemented requests —** Incidents where data published (i.e. in the root zone) differs from that requested and processed through the process should result in an incident report, including a root cause analysis and any future remediation steps if necessary. | Existing (as monthly report) | Produce incident reports |
| **Online Services - Availability (Appendix B)** | | |
| **RZMS availability for API interaction —** percentage availability of the RZMS to allow customers to perform self-service operations via the web interface. | New | Publish in dashboard |
| **Website availability** — percentage availability of IANA website for consulting documentations and other posted materials. | New | Publish in dashboard |
| **Directory service availability** — percentage availability of WHOIS server and other registration data publication services | New | Publish in dashboard |

**Key Areas for Setting Service Level Expectations**

These elements reflect measures against which specific thresholds should be set, with an expectation that the IANA Functions Operator will normally perform within the threshold, and the inability to meet the threshold will be identified, result in follow-up with the Customer Standing Committee to identify the cause. Regular unexplained inability to meet the thresholds may result in remedial action. The thresholds will be modified over time as part of periodic reviews of the service level expectation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Requirement** | **New/Existing** | **Threshold** | **Pct** | **Type** | **Mechanism** |
| **Process Performance (Appendix C)** | | | | | |
| **IANA Processing Time for Routine Changes —**  *Routine is defined as processing that does not require additional documentary evidence or additional clarifications from the customer or third parties (i.e. excludes delegations/redelegations, requests with special handling instructions, requests with special legal considerations)* | Existing | TBD | 95% | Max | Report if not met |
| **IANA Processing Time for non-Routine Changes** | Existing | TBD | 80% | Max | Report if not met |
| *(there are a number of existing measures in this category, should they be kept?)* |  |  |  |  |  |
| **Accuracy (APPENDIX D)** | | | | | |
| **Implement with accuracy —**  Data published (i.e. in the root zone) must match from that requested, except where modified as part of regular processing. | Existing | Accurate | 100% | Min | Report if not met |
| **Availability** | | | | | |
| **RZMS availability for API interface** — The self-service web interface shall be available except for scheduled maintenance that have been notified in advance. | New | 2h/mo | — | Max | Report if not met |

**APPENDIX A**

**PROCESS REPORTING AVAILABILITY**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **Metric** | **Design Team A Target** | **Type** | **Breach** | **Period** |
| Dashboard | Update frequency | *30 mins* | *max* | *>2 hours* | *Month* |
|  | Correctness | *100%* | *min* | *<100%* | *Month* |
|  | Availability | *99%1* | *min* | *<99%* | *Month* |
| SLE reports | Production frequency | *Monthly* |  |  | *-* |
|  | Published on web site | *<10 days after month end* | *max* | *>10 days* | *Month* |
|  | Notification of publication (delivery to contracted parties) | *<2 hours after publish* | *max* | *>2 hours* | *Month* |
|  | Availability | *99%1* | *min* | *<99%* | *Month* |
| Request database | Update frequency | *Daily* |  |  | *-* |
|  | Correctness | *100%* | *min* | *<100%* | *Month* |
|  | Availability | *99%1* | *min* | *<99%* | *Month* |
| Status tracker | Update frequency | *30 mins* | *max* | *>30 mins* | *Month* |
|  | Correctness | *100%* | *min* | *<100%* | *Month* |
|  | Availability | *99%1* | *min* | *<99%* | *Month* |
| Ad-hoc requests | Acknowledgement of receipt | *1 hour* | *max* | *<100%* | *Month* |
|  | Initial response to Urgent priority requests | *2 hours* | *max* | *<90%* | *Month* |
|  | Full response to Urgent priority requests | *12 hours* | *max* | *<90%* | *Month* |
|  | Initial response to High priority requests | *8 hours* | *max* | *<95%* | *Month* |
|  | Full response to High priority requests | *48 hours* | *max* | *<95%* | *Month* |
|  | Initial response to Normal priority requests | *5 days* | *max* | *<95%* | *Month* |
|  | Full response to Normal priority requests | *15 days* | *max* | *<95%* | *Month* |

**APPENDIX B**

**ONLINE SERVICES DEFINITION AND AVAILABILITY**

|  |  |  |  |
| --- | --- | --- | --- |
| **Service Area** | **#** | **Service** | **Availability** |
| Root Database (Register of TLDs) | 1a | Online web publication of the authoritative database of TLDs | 99.9% |
|  | 1b | An online interactive web service for credentialed customers to submit change requests to their root zone database entries | 99.0% |
|  | 1c |  | 95.0% |
|  | 1d |  | 95.0% |
|  | 1e | Online publication of the complete root zone file for download | 99.9% |
| IDN Table Repository | 3a | Online web publication of the repository of IDN tables | 99.9% |
| RDAP Bootstrap Service | 4d4c | A service to remove the RDAP endpoint of a departing customerA service for customers to populate a new RDAP endpoint | 100% |
|  | 4d | A service to remove the RDAP endpoint of a departing customer | 99.9% |
|  |  |  | 95.0% |
|  |  |  | 95.0% |

API Development for Root Zone Automation – Introduced here as a place holder although not a part of the SLEs, but post transition.

**Online Services — Definition and Availability**

Availability is calculated and reported over a month.

**APPENDIX C**

**PROCESS MATRIX**

| Step Number | **Step** | Routine changes to Root Zone File Data (NS, DS and glue records) | Routine changes to Root Zone Database (Contact details and metadata) | Delegation or Transfer of a Generic Top-Level Domain | Delegation or Transfer of a Country-Code Top-Level Domain | Other non-routine change requests to Root Zone File or Root Zone Database |
| --- | --- | --- | --- | --- | --- | --- |
| **1** | Time for automated email to be sent to authorization contacts following receipt of change request via automated submission interface | **X** | **X** | **X** | **X** |  |
| **2** | Time to return results for technical checks following obtaining required consent from contacts via automated submission interface | **X** | **X** | **X** | **X** |  |
| **3** | Time to complete all other validations and reviews by IANA Functions Operator and release request for implementation | **X** | **X** | **X** | **X** |  |
| **3a** | Time for third-party review of request (i.e. by ICANN Board of Directors) |  |  |  | **X** |  |
| **4** | Time for root zone changes to be published following completion of validations and reviews by IANA Functions Operator | **X** |  | **X** | **X** |  |
| **5** | Time to notify requester of change completion following publication of requested changes | **X** | **X** | **X** | **X** |  |

**APPENDIX D**

**CURRENT PROCESS PERFORMANCE**

| **Process** | **Step**  **Number** | **Metric** | **Design Team A Proposal**  **(6)** | **Type**  **(7)** | **Breach**  **(8)** |
| --- | --- | --- | --- | --- | --- |
| Changes to NS, DS, and glue records for existing TLD | 1 | Time for automated email to be sent to authorization contacts following receipt of change request via automated submission interface |  |  |  |
| 2 | Time to return results for technical checks following obtaining required consent from contacts via automated submission interface |  |  |  |
| 3a | Time to complete all other validations and reviews by IANA Functions Operator and release request for implementation |  |  |  |
| 3b | Time for third-party review of request (i.e. by ICANN Board of Directors) |  |  |  |
| 4 | Time for root zone changes to be published following completion of validations and reviews by IANA Functions Operator |  |  |  |
| 5 | Time to notify requester of change completion following publication of requested changes |  |  |  |
| Routine changes to Root Zone Database (Contact details and metadata) | 1 | Time for automated email to be sent to authorization contacts following receipt of change request via automated submission interface |  |  |  |
| 2 | Time to return results for technical checks following obtaining required consent from contacts via automated submission interface |  |  |  |
| 3 | Time to complete all other validations and reviews by IANA Functions Operator and release request for implementation |  |  |  |
| 4 | Time to notify requester of change completion following publication of requested changes |  |  |  |
| Non-hostile re-assignment/re-delegation of a ccTLD | 1 | Time for automated email to be sent to authorization contacts following receipt of change request via automated submission interface |  |  |  |
| 2 | Time to return results for technical checks following obtaining required consent from contacts via automated submission interface |  |  |  |
| 3 | Time to complete all other validations and reviews by IANA Functions Operator and release request for implementation |  |  |  |
| 3a | Time for third-party review of request (i.e. by ICANN Board of Directors) |  |  |  |
| 4 | Time for root zone changes to be published following completion of validations and reviews by IANA Functions Operator |  |  |  |
| 5 | Time to notify requester of change completion following publication of requested changes |  |  |  |
| Hostile re-delegation of a ccTLD | 1 |  |  |  |  |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| Delegation or Transfer of a Generic Top-Level Domain | 1 | Time for automated email to be sent to authorization contacts following receipt of change request via automated submission interface |  |  |  |
| 2 | Time to return results for technical checks following obtaining required consent from contacts via automated submission interface |  |  |  |
| 4 | Time for root zone changes to be published following completion of validations and reviews by IANA Functions Operator |  |  |  |
| 5 | Time to notify requester of change completion following publication of requested changes |  |  |  |

***All measurement periods are monthly***

1Except during maintenance periods

**APPENDIX E**

**ACCURACY (PROCESS CORRECTNESS)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Process** | **Metric** | **Proposed Method of Measurement** | | **Design Team A Proposal** | | **Type** | | **Breach** |
| Changes to NS records for existing TLD | Accuracy of data as sent to RZM compared to that specified in change request |  | | *100%* | | *min* | | *<100%* |
| Changes to DS records for existing TLD | Accuracy of data as sent to RZM compared to that specified in change request | *Number of DS records that have been returned to IANA that have failed the RZM’s technical checks.* | | *100%* | | *min* | | *<100%* |
| Change to authorising contact | Accuracy of data as sent to RZM compared to that specified in change request | *Further Discussion* | | *100%* | | *min* | | *<100%* |
| Change to root DB that is not a re-delegation | Accuracy of data as entered into root DB compared to that specified in change request | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Specified organizations exist | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Specified contact details are genuine | *Further Discussion* | | *100%* | | *min* | | *<90%* |
| Non-hostile re-assignment/re-delegation of a ccTLD | Affected parties identified | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Views of the affected parties accurately recorded and represented | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Independent confirmation received that existing domain registration data has been ported to new ccTLD registry operator | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Accuracy of data ported to new ccTLD registry operator | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Accuracy of data as entered into root DB compared to that specified in change request | *Further Discussion* | | *100%* | | *min* | | *<100%* |
| Hostile re-assignment/re-delegation of a ccTLD | ??? | *Further Discussion* | |  | |  | |  |
| Re-delegation of a gTLD | Affected parties identified | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Views of the affected parties accurately recorded and represented | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Independent confirmation received that existing domain registration data has been ported to new ccTLD registry operator | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Accuracy of data ported to new ccTLD registry operator | *Further Discussion* | | *100%* | | *min* | | *<100%* |
|  | Accuracy of data as entered into root DB compared to that specified in change request | *Further Discussion* | | *100%* | | *min* | | *<100%* |
| Delegation of a new TLD | ??? | *Further Discussion* | |  | |  | |  |

**APPENDIX F**

**EXAMPLE ESCALATION PATH**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Level** | **Contact** | **Method** | **Response Time** | **Expectation** |
| 1 | IANA Help Desk | Email/Telephone | 4 Hours (working hours) | Response/Resolution |
| 2 | IANA General Manager | Email/Telephone | Within 24 Hours | Resolution |
| 3 | Registry Representative on Customer Service Committee (CSC) | Email/Telephone |  | Log of incident and Resolution |

Note: Escalation Path being developed by CSC/Escalation DTM

**APPENDIX G**

**DELEGATION AND RE-DELEGATIONS TIMES FOR COUNTRY-CODE TLDS**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TLD** | Request Received | Request Validated | Request Dispatched | Request Completed | Days to Validate | Days  to Dispatch | Days to  Complete | End-to-End |
| **Ø§ÛŒØ±Ø§Ù†\*\*** | 7/8/2013 | 9/18/2013 | 10/5/2013 | 10/9/2013 | 72 | 17 | 4 | 93 |
| **zm** | 7/9/2013 | 7/30/2013 | 4/4/2014 | 4/4/2014 | 21 | 248 | 0 | 269 |
| **vg** | 10/11/2013 | 4/8/2014 | 4/9/2014 | 4/10/2014 | 179 | 1 | 1 | 181 |
| **gw** | 1/23/2014 | 2/25/2014 | 7/9/2014 | 7/10/2014 | 33 | 134 | 1 | 168 |
| **mk** | 4/10/2014 | 4/23/2014 | 10/22/2014 | 10/22/2014 | 13 | 182 | 0 | 195 |
| **Ð¼ÐºÐ´\*\*** | 4/10/2014 | 4/23/2014 | 10/22/2014 | 10/22/2014 | 13 | 182 | 0 | 195 |
| **áƒ’áƒ”\*\*** | 7/22/2014 | 8/5/2014 | 10/22/2014 | 10/24/2014 | 14 | 78 | 2 | 94 |

\*Data acquired from IANA published matrices.

\*\* During automated data acquisition from IANA website, native language did not convert.

*Request Validated – Fastest time – 13 days*

*Request Dispatched – Fastest time – 1 days*

*Request Completed – Fastest time – 0 days*

*Theoretical End-to-End (fastest) – 14 days*

*Actual Fastest End-to-End – 94 days*

**APPENDIX H**

**DELEGATION/RE-DELEGATION TIMES FOR GENERIC TLDS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Average Number of Days | Minimum Number of Days | Maximum Number of Days |  |
| **Days to Validate** | 2.932 | 0 | 32 | Includes time for gTLD to respond to validation email. |
| **Days to Dispatch** | 3.255 | 0 | 13 | Time for IANA to dispatch to NTIA |
| **Days To complete** | 4.9519 | 0 | 15 | Time is from Validation email to confirmation. |