

ANNEX 1: TECHNICAL COMMUNICATION RULES FOR TOP LEVEL DOMAIN .sk

Service Level Agreement for Services of .sk Top Level Domain Registry (SLA)

SK-NIC will provide continuity in the provision of services and will provide the system, which supports monitoring of registrar services and functions that will provide monthly report on level of the services provided by the registry in relation to the required level of the services.

1. Basic Definitions

- 1.1. **DNS** refers to the Domain Name System as specified in RFC 1034, 1035 and other related RFCs.
- 1.2. **DNSSEC proper resolution.** If for the top-level domain in the root trust, the records for the Delegation Signer are disclosed in the DNS root trust for the top level domain, then there is a valid DNSSEC chain of trust from the root trust anchor to a particular domain, e.g., a top level domain, a domain registered under a top level domain, etc.
- 1.3. **EPP** refers to the Extensible Provisioning Protocol as specified in RFC 5730 and related RFCs.
- 1.4. **IP address** refers to IPv4 or IPv6 addresses. When there is need to make a distinction, IPv4 or IPv6 is used.
- 1.5. **Probe** refers to network host used to perform tests (DNS, EPP, etc., see below) that is located at various global locations.
- 1.6. **Registrar** as defined in the Terms and Conditions of Domain Name Service in Top Level Domain .sk.
- 1.7. **RDDS** (Registration Data Directory Services) refers to the collective of WHOIS and Web-based WHOIS services.
- 1.8. **RTT is** Round-Trip Time or RTT that refers to the time measured from the sending of the first bit of the first packet of the sequence of packets needed to make a request until the reception of the last bit of the last packet of the sequence needed to receive the response. If the client does not receive the whole sequence of packets needed to consider the response as received, the request will be considered unanswered.
- 1.9. **SLR** is Service Level Requirement, i.e. service level expected for a certain parameter being measured according to the Service Level Agreement (SLA).
- 1.10. **Critical level of SLR** refers to the threshold level of the service, trespassing of which means that service is provided at unacceptable level.

2. Definition of the Services Critical Levels

Critical service	Parameter	Critical Level of SLR (monthly basis)
DNS	DNS service availability	SLR $\leq 4,32$ min of downtime ($\approx 99,99$ % availability)
	DNS name server availability	SLR ≤ 432 min of downtime ($\approx 99\%$)
	TCP DNS resolution RTT	SLR ≤ 1500 ms, for at least 95% of the queries
	TCP UDP resolution RTT	SLR ≤ 500 ms, for at least 95% of the queries
	DNS update time	SLR ≤ 560 min, for at least 95% of the probes
RDDS	RDDS availability	SLR ≤ 864 min of downtime ($\approx 98\%$)
	RDDS query RTT	SLR ≤ 2000 ms, for at least 95% of the queries
	RDDS update time	SLR ≤ 60 min, for at least 95% of the probes
EPP	EPP service availability	SLR ≤ 864 min of downtime ($\approx 98\%$)
	EPP session-command RTT	SLR ≤ 4000 ms, for at least 90% of the commands
	EPP query-command RTT	SLR ≤ 2000 ms, for at least 90% of the commands
	EPP transform-command RTT	SLR ≤ 4000 ms, for at least 90% of the commands

SK-NIC shall perform maintenance of the different services at the dates and times of statistically lower traffic for each service. There is no provision for planned outages or similar, i.e. any unavailability of the system, be it for maintenance or due to system failures, will be noted simply as downtime for SLA purposes.

3. Methodology for DNS service

- 3.1. **DNS service availability** refers to the ability of the group of listed-as-authoritative name servers of a particular domain name (e.g., a TLD), to answer DNS queries from DNS probes. For the service to be considered available at a particular moment, at least, two of the delegated name servers registered in the DNS must have successful results from DNS tests to each of their public-DNS registered IP addresses to which the name server resolves. If 51% or more of the DNS testing probes see the service as unavailable during a given time, the DNS service will be considered unavailable.
- 3.2. **DNS name server availability** refers to the ability of a public-DNS registered "IP address" of a particular name server listed as authoritative for a domain name, to answer DNS queries from an Internet user. All the public DNS-registered "IP address" of all name servers of the domain name being monitored shall be tested individually. If 51% or more of the DNS testing probes get undefined/unanswered results from "DNS tests" to a name server "IP address" during a given time, the name server "IP address" will be considered unavailable.
- 3.3. **UDP DNS resolution RTT** refers to the RTT of the sequence of two packets, the UDP DNS query and the corresponding UDP DNS response. If the RTT is 5 times greater than the time specified in the relevant SLR, the RTT will be considered undefined.
- 3.4. **TCP DNS resolution RTT** refers to the RTT of the sequence of packets from the start of the TCP connection to its end, including the reception of the DNS response for only one DNS query. If the

RTT is 5 times greater than the time specified in the relevant SLR, the RTT will be considered undefined.

- 3.5. **DNS resolution RTT** refers to either UDP DNS resolution RTT or TCP DNS resolution RTT.
- 3.6. **DNS update time** refers to the time measured from the reception of an EPP confirmation to a transform command on a domain name, until the name servers of the parent domain name answer “DNS queries” with data consistent with the change made. This only applies for changes to DNS information.
- 3.7. **DNS test** means one non-recursive DNS query sent to a particular “IP address” (via UDP or TCP). If DNSSEC is offered in the queried DNS zone, for a query to be considered answered, the signatures must be positively verified against a corresponding DS record published in the parent zone or, if the parent is not signed, against a statically configured Trust Anchor. The answer to the query must contain the corresponding information from the Registry System, otherwise the query will be considered unanswered. A query with a “DNS resolution RTT” 5 times higher than the corresponding SLR, will be considered unanswered. The possible results to a DNS test are: a number in milliseconds corresponding to the “DNS resolution RTT” or, undefined/unanswered.
- 3.8. **Measuring DNS parameters.** Every minute, every DNS probe will make an UDP or TCP “DNS test” to each of the public-DNS registered “IP addresses” of the name servers of the domain name being monitored. If a “DNS test” result is undefined/unanswered, the tested IP will be considered unavailable from that probe until it is time to make a new test.
- 3.9. **Collating the results from DNS probes.** The minimum number of active testing probes to consider a measurement valid is 210 at any given measurement period, otherwise the measurements will be discarded and will be considered inconclusive. During this situation no fault will be flagged against the SLRs.
- 3.10. **Distribution of UDP and TCP queries.** DNS probes will send UDP or TCP “DNS test” approximating the distribution of these queries.
- 3.11. **Placement of DNS probes.** Probes for measuring DNS parameters shall be placed as near as possible to the DNS resolvers on the networks with the most users across the different geographic regions; care shall be taken not to deploy probes behind high propagation-delay links, such as satellite links.

4. Methodology for RDDS Service

- 4.1. **RDDS availability** refers to the ability of all the RDDS services for the TLD, to respond to queries from an Internet user with appropriate data from the relevant Registry System. If 51% or more of the RDDS testing probes see any of the RDDS services as unavailable during a given time, the RDDS will be considered unavailable.
- 4.2. **WHOIS query RTT** refers to the RTT of the sequence of packets from the start of the TCP connection to its end, including the reception of the WHOIS response. If the RTT is 5-times or more the corresponding SLR, the RTT will be considered undefined.
- 4.3. **Web-based-WHOIS query RTT** refers to the RTT of the sequence of packets from the start of the TCP connection to its end, including the reception of the HTTP response for only one HTTP request. If Registry Operator implements a multiple-step process to get to the information, only the last step shall be measured. If the RTT is 5-times or more the corresponding SLR, the RTT will be considered undefined..

- 4.4. **RDDS query RTT** refers to the collective of WHOIS query RTT and Web-based- WHOIS query RTT”.
- 4.5. **RDDS update time** refers to the time measured from the reception of an EPP confirmation to a transform command on a domain name, host or contact, up until the servers of the RDDS services reflect the changes made.
- 4.6. **RDDS test** means one query sent to a particular "IP address" of one of the servers of one of the RDDS services. Queries shall be about existing objects in the Registry System and the responses must contain the corresponding information otherwise the query will be considered unanswered. Queries with an RTT 5 times higher than the corresponding SLR will be considered as unanswered. The possible results to an RDDS test are: a number in milliseconds corresponding to the RTT or undefined/unanswered.
- 4.7. **Measuring RDDS parameters.** Every 5 minutes, RDDS probes will select one IP address from all the public-DNS registered “IP addresses” of the servers for each RDDS service of the .sk TLD and make an “RDDS test” to each one. If an “RDDS test” result is undefined/unanswered, the corresponding RDDS service will be considered as unavailable from that probe.
- 4.8. **Collating the results from RDDS probes.** The minimum number of active testing probes to consider a measurement valid is 10 at any given measurement period, otherwise the measurements will be discarded and will be considered inconclusive; during this situation no fault will be flagged against the SLRs.
- 4.9. **Placement of RDDS probes.** Probes for measuring RDDS parameters shall be placed inside the networks with the most users across the different geographic regions; increased care shall be taken not to deploy probes behind high propagation-delay links, such as satellite links.

5. Methodology for EPP service

- 5.1. **EPP service availability** refers to the ability of the .sk TLD EPP servers as a group, to respond to commands from the Registrars, who already have credentials to the servers. The response shall include appropriate data from the Registry System. An EPP command with “EPP command RTT” 5 times higher than the corresponding SLR will be considered as unanswered. If 51% or more of the EPP testing probes see the EPP service as unavailable during a given time, the EPP service will be considered unavailable.
- 5.2. **EPP session-command RTT** refers to the RTT of the sequence of packets that includes the sending of a session command plus the reception of the EPP response for only one EPP session command. For the login command it will include packets needed for starting the TCP session. For the logout command it will include packets needed for closing the TCP session. EPP session commands are those described in section 2.9.1 of EPP RFC 5730. If the RTT is 5 times or more the corresponding SLR, the RTT will be considered undefined.
- 5.3. **EPP query-command RTT** refers to the RTT of the sequence of packets that includes the sending of a query command plus the reception of the EPP response for only one EPP query command and it does not include packets needed for the start or close of either the EPP or the TCP session. EPP query commands are those described in section 2.9.2 of EPP RFC 5730. If the RTT is 5-times or more the corresponding SLR, the RTT will be considered undefined.
- 5.4. **EPP transform-command RTT** refers to the RTT of the sequence of packets that includes the sending of a transform command plus the reception of the EPP response for only one EPP transform

command and it does not include packets needed for the start or close of either the EPP or the TCP session. EPP transform commands are those described in section 2.9.3 of EPP RFC 5730. If the RTT is 5 times or more the corresponding SLR, the RTT will be considered undefined.

- 5.5. **EPP command RTT** refers to EPP session-command RTT, EPP query-command RTT or EPP transform-command RTT.
- 5.6. **EPP test** means one EPP command sent to a particular “IP address” for one of the EPP servers. Query and transform commands, with the exception of “create”, shall be about existing objects in the Registry System. The response shall include appropriate data from the Registry System. The possible results to an EPP test are: a number in milliseconds corresponding to the EPP command RTT or undefined/unanswered.
- 5.7. **Measuring EPP parameters.** Every 5 minutes, EPP probes will select one IP address of the EPP servers of the TLD being monitored and make an EPP test; every time they should alternate between the 3 different types of commands and between the commands inside each category. If an EPP test result is undefined/unanswered, the EPP service will be considered as unavailable from that probe until it is time to make a new test.
- 5.8. **Collating the results from EPP probes.** The minimum number of active testing probes to consider a measurement valid is 5 at any given measurement period, otherwise the measurements will be discarded and will be considered inconclusive; during this situation no fault will be flagged against the SLRs.
- 5.9. **Placement of EPP probes.** Probes for measuring EPP parameters shall be placed inside or close to Registrars points of access to the Internet across the different geographic regions; increased care shall be taken not to deploy probes behind high propagation-delay links, such as satellite links.

6. Obligations Regarding Measurement of Performance and Administration of .sk Top Level Domain

- 6.1. **No attempt to interfere.** SK-NIC shall not interfere with measuring probes, not even in the form of any preferential processing of queries for monitored services. SK-NIC system shall react to the measuring tests described in the SLA agreement in such a way, as it would normally react to any other queries from Internet users (for DNS and RDDS) or from Registrars (for EPP).
- 6.2. **Reporting.** SK-NIC shall continuously monitor, i.e. measure specified services with monthly assessment of observed SLR and shall file reports about results of the measurement within the operating reports for the corresponding preceding period.
- 6.3. **Stability, security and resilience.** Functional operation in line with SLA at the same time fulfils basic conditions for ensuring high level of stability, security and resilience of the administration of the top level domain .sk.