

SRS Resource Manager

Background

The SRS is currently configured to allow registrars to compete on an open and even basis. As transaction rates sent to the SRS increase, the SRS performance will degrade. The application servers are unable to keep up with the transaction rate and the SRS will take itself off-line to try and bring itself up to date. The normal day to day transaction rates that we currently see in the SRS have little if any effect on the performance of the SRS servers.

There are times when the normal transaction rate thresholds are exceeded, such as when a registrar's automated process runs out of control and sends through a constant stream of transactions to the SRS, or around the time of the daily "release domains" process, when several registrars competing for a name send through large numbers of queries in a short space of time. These times have caused times of instability of the SRS.

Planned Solution

In order to resolve this issue we are planning to implement a Resource Manager component into the SRS to protect the SRS and to share the SRS resources equally between registrars.

The Resource Manager will monitor registrar transactions and if a registrar crosses certain thresholds (in terms of the number of requests they send each second, for example) then the SRS will begin to reject their requests until such time as they reduce the workload they are sending to the SRS.

Initially, a simple rate-limit will be imposed on each registrar that they may not send more than 10 requests per second. When the SRS detects that a registrar is sending more than 10 requests per second (as a "rolling average") it will begin to reject their requests. It will then continue to reject all of their requests until the rolling average drops below the threshold.

To assist registrars with managing their transactions, the SRS will provide an additional HTTP response header to registrars as part of the communications. It is not required that registrars use this header, but it will provide information to assist them to tune their applications to get the best throughput possible from the SRS – if that matters to them.

There should be no impact to the normal day to day operation of registrars by this change and current transaction rates, with the exception of the release domains period, are well inside this limit of 10 transactions per second.

Over time more complex rules may be introduced (after consultation with registrars) to shape the volumes of traffic the SRS must handle to maximise the available resources.

Examples

An example of the HTTP response header:

```
HTTP/1.1 200 OK
Date: Mon, 12 Feb 2007 22:50:31 GMT
Server: Apache
X-resource-consent: RegistrarRequestLimit,2,4
Connection: close
Content-Type: application/x-www-form-urlencoded
```

In this example you can see the **RegistrarRequestLimit** returned and has two values. The first value is the number of requests per second received at the front end and the second value is the current limit. So in this example we have a rate of 2 requests per second for this registrar and the limit is 4 requests per second.

An example of the XML error response returned if the rate is exceeded:

```
<NZSRSResponse VerMajor="1" VerMinor="38">
<Error Hint="INVALID_REQUEST_ERROR" ErrorId="CONSENT_ERROR" Severity="err">
<Description><![CDATA[Request denied due to resource limits being exceeded]]></Description>
<ErrorDetails><![CDATA[RegistrarRequestLimit,7,5]]></ErrorDetails>
</Error>
</NZSRSResponse>
```

In this example you can see the **RegistrarRequestLimit** returned has a rate of 7 requests per second for this registrar and the limit is 5 requests per second.

Note: The rate limit value is rounded down to the nearest whole number.

Time Frame

The implementation date of this change is the February 2007 release.
The RPS test system will be made available in late January for registrar testing.

Important Additional Notes

The performance overhead of asking a (new) process for permission to proceed will cause a minor degradation of performance for all transactions in the SRS.

This change should remove the requirement for registrars to hit the SRS with excessive transaction loads. It will NOT make the SRS impervious to “denial of service” level loads!

If you have any comments or suggestions about this change, please send them to me at support@nzrs.net.nz

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