

TESTE DE PERFORMANCE

Versão: 1.0 | 31/08/17



> 1. INTRODUÇÃO

Este documento contém os resultados de um estudo sobre a performance do sistema Rest PKI, desenvolvido para auxiliar no dimensionamento de servidores para o sistema.

> 2. METODOLOGIA

Foi utilizada a versão do Rest PKI mais recente disponível à época do teste, **1.13.2**.

O sistema foi instalado em uma máquina virtual com as seguintes especificações:

- Sistema operacional: Windows Server 2016
- CPU: 2 cores (E5-2660 @ 2.20 GHz)
- RAM: 3.5 GB

O sistema foi exercitado utilizando um utilitário desenvolvido especificamente para provocar altos índices de utilização no sistema ("stress test").

Em cada teste realizado, exercitou-se apenas um tipo de transação. Foi escolhido um número de threads específico para cada teste de modo a deixar a utilização de CPU do servidor próximo dos 100%.

Em cada teste, exercitou-se o Rest PKI por 5 minutos.

2.1. Limitações

O teste foi executado sobre um link de apenas 50 Mbps downstream / 6 Mbps upstream. Tipicamente, uma aplicação cliente do Rest PKI executaria em um ambiente com rede mais rápida, portanto esse fator contribui para que o desempenho apontado nos resultados esteja subestimado.

As transações foram realizadas com um mesmo certificado. Tipicamente, diferentes certificados são utilizados, exigindo o download de LCRs (listas de certificados revogados) de diferentes ACs (autoridades certificadoras). Portanto, esse fator contribui para que o desempenho apontado nos resultados esteja superestimado.

As transações foram feitas sobre um mesmo arquivo PDF de 137 KB. Uma determinada aplicação pode ter tamanho médio dos documentos maior ou menor do que esse valor. Portanto, esse fator pode contribuir para que o desempenho apontado nos resultados esteja subestimado ou superestimado, dependendo do tamanho médio dos documentos do sistema em questão comparado com o tamanho supracitado.

> 3. RESULTADOS

3.1. Assinatura CAAdES

- Tempo de execução: 5 minutos
- Threads: 4 x 10
- Transações efetuadas: 919 (229 + 228 + 233 + 229)
- **Resultado: 183 assinaturas / minuto**

3.2. Assinatura PAdES

- Tempo de execução: 5 minutos
- Threads: 2 x 10
- Transações efetuadas: 852 (436 + 416)

- **Resultado: 170 assinaturas / minuto**

3.3. Autenticação (login) com certificado

- Tempo de execução: 5 minutos
- Threads: 4 x 10
- Transações efetuadas: 3.749 (939 + 938 + 943 + 929)
- **Resultado: 750 autenticações / minuto**

> 4. APÊNDICE

Essa seção contém o resultado de cada execução do aplicativo utilizado nos testes ("stress test").

4.1. Assinatura CADES

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CADES	CADES-T	PAdES	PAdES-T	Timestamp
Threads: 0	Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 0	Operations: 230	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 0	Successes: 229	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 1	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:00	Avg duration: 00:00:12.93t	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:00	Max duration: 00:00:42.26t	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00

Log for CADES: 18:10:44 [7]: Start
18:10:44 [25]: Success (00:00:00)
18:10:44 [7]: Start
18:10:44 [7]: Start
18:10:44 [18]: Success (00:00:00)
18:10:44 [18]: Start

Stack Trace: at System.Runtime.Com at System.Runtime.Com at RestPkiStressTest.Test
--- End of stack trace from at System.Runtime.Com at System.Runtime.Com at RestPkiStressTest.Test

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CADES	CADES-T	PAdES	PAdES-T	Timestamp
Threads: 0	Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 0	Operations: 228	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 0	Successes: 228	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:00	Avg duration: 00:00:13.18t	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:00	Max duration: 00:00:35.34t	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00

Log for CADES: 18:10:45 [37]: Start
18:10:45 [22]: Success (00:00:00)
18:10:45 [22]: Start
18:10:46 [22]: Success (00:00:00)
18:10:46 [22]: Start
18:10:46 [22]: Success (00:00:00)
18:10:46 [22]: Start

Log for CADES: 18:05:53 [1]: Record high
18:05:56 [1]: Record high
18:06:08 [1]: Record high
18:06:09 [1]: Record high
18:06:09 [1]: Record high
18:06:14 [1]: Record high
18:06:46 [1]: Record high

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAcES	PAcES-T	Timestamp
Threads: 0	Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 0	Operations: 233	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 0	Successes: 233	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:00	Avg duration: 00:00:12.53	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:00	Max duration: 00:00:31.40	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00
18:05:50 [1]: Starting 0 thr	18:10:45 [16]: Start 18:10:45 [16]: Success (00: 18:10:45 [16]: Start 18:10:47 [17]: Success (00: 18:10:47 [17]: Start 18:10:47 [16]: Success (00: 18:10:47 [16]: Start	18:05:50 [1]: Starting 0 thr	18:05:50 [1]: Starting 0 thr	18:05:50 [1]: Starting 0 thr	18:05:50 [1]: Starting 0 thr

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAcES	PAcES-T	Timestamp
Threads: 0	Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 0	Operations: 229	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 0	Successes: 229	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:00	Avg duration: 00:00:12.85	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:00	Max duration: 00:00:34.12	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00
18:05:46 [1]: Starting 0 thr	18:10:45 [17]: Start 18:10:45 [25]: Success (00: 18:10:45 [25]: Start 18:10:45 [25]: Success (00: 18:10:45 [25]: Start 18:10:47 [22]: Success (00: 18:10:47 [22]: Start	18:05:46 [1]: Starting 0 thr	18:05:46 [1]: Starting 0 thr	18:05:46 [1]: Starting 0 thr	18:05:46 [1]: Starting 0 thr

4.2. Assinatura PAcES

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAcES	PAcES-T	Timestamp
Threads: 0	Threads: 0	Threads: 0	Threads: 10	Threads: 0	Threads: 0
Operations: 0	Operations: 0	Operations: 0	Operations: 436	Operations: 0	Operations: 0
Successes: 0	Successes: 0	Successes: 0	Successes: 436	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:06.88	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:14.32	Max duration: 00:00:00	Max duration: 00:00:00
18:12:34 [1]: Starting 0 thr	18:12:34 [1]: Starting 0 thr	18:12:34 [1]: Starting 0 thr	18:17:34 [28]: Start 18:17:35 [41]: Success (00: 18:17:35 [41]: Start 18:17:35 [41]: Success (00: 18:17:35 [41]: Start 18:17:37 [28]: Success (00: 18:17:37 [28]: Start	18:12:34 [1]: Starting 0 thr	18:12:34 [1]: Starting 0 thr

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAdES	PAdES-T	Timestamp
Threads: 0	Threads: 0	Threads: 0	Threads: 10	Threads: 0	Threads: 0
Operations: 0	Operations: 0	Operations: 0	Operations: 416	Operations: 0	Operations: 0
Successes: 0	Successes: 0	Successes: 0	Successes: 416	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:07.13	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:13.40	Max duration: 00:00:00	Max duration: 00:00:00

18:12:36 [1]: Starting 0 thr

4.3. Autenticação (login) com certificado

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAdES	PAdES-T	Timestamp
Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 939	Operations: 0	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 939	Successes: 0	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:03.16	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:12.37	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00

18:02:09 [15]: Start
18:02:10 [15]: Success (00:00:01)
18:02:10 [15]: Start
18:02:10 [15]: Success (00:00:01)
18:02:10 [15]: Start
18:02:10 [15]: Success (00:00:01)
18:02:10 [15]: Start

17:57:14 [1]: Record high
17:57:15 [1]: Record high
17:57:16 [1]: Record high
17:57:17 [1]: Record high
17:57:40 [1]: Record high
18:01:31 [1]: Record high

17:57:09 [1]: Starting 0 thr

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAdES	PAdES-T	Timestamp
Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 938	Operations: 0	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 938	Successes: 0	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:03.20	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:12.12	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00

18:02:09 [38]: Start
18:02:09 [22]: Success (00:00:01)
18:02:09 [22]: Start
18:02:09 [36]: Success (00:00:01)
18:02:09 [36]: Start
18:02:10 [43]: Success (00:00:01)
18:02:10 [43]: Start

17:57:12 [1]: Record high
17:57:12 [1]: Record high
17:57:13 [1]: Record high
17:57:13 [1]: Record high
17:57:21 [1]: Record high
17:58:47 [1]: Record high
18:00:23 [1]: Record high

17:57:07 [1]: Starting 0 thr

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAcES	PAcES-T	Timestamp
Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 943	Operations: 0	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 943	Successes: 0	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:03.14	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:08.78	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00
<pre> 18:02:10 [9]: Start 18:02:10 [21]: Success (00: 18:02:10 [9]: Start 18:02:10 [9]: Success (00:0 18:02:11 [9]: Start 18:02:11 [9]: Success (00:0 </pre>	<pre> 17:57:13 [1]: Starting 0 thr </pre>	<pre> 17:57:13 [1]: Starting 0 thr </pre>	<pre> 17:57:13 [1]: Starting 0 thr </pre>	<pre> 17:57:13 [1]: Starting 0 thr </pre>	<pre> 17:57:13 [1]: Starting 0 thr </pre>

TestSuiteWindow

Pause Resume Test started. Press Pause to halt or close the window to stop.

Authentication	CAdES	CAdES-T	PAcES	PAcES-T	Timestamp
Threads: 10	Threads: 0	Threads: 0	Threads: 0	Threads: 0	Threads: 0
Operations: 929	Operations: 0	Operations: 0	Operations: 0	Operations: 0	Operations: 0
Successes: 929	Successes: 0	Successes: 0	Successes: 0	Successes: 0	Successes: 0
Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0	Errors: 0
Avg duration: 00:00:03.17	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00	Avg duration: 00:00:00
Max duration: 00:00:08.92	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00	Max duration: 00:00:00
<pre> 18:02:10 [11]: Start 18:02:10 [11]: Success (00: 18:02:10 [11]: Start 18:02:10 [11]: Success (00: 18:02:11 [19]: Start 18:02:11 [19]: Success (00: </pre>	<pre> 17:57:14 [1]: Starting 0 thr </pre>	<pre> 17:57:14 [1]: Starting 0 thr </pre>	<pre> 17:57:14 [1]: Starting 0 thr </pre>	<pre> 17:57:14 [1]: Starting 0 thr </pre>	<pre> 17:57:14 [1]: Starting 0 thr </pre>