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Thursday, 20 April 2017

Trend Micro Threat Discovery Appliance - Session Generation Authentication Bypass (CVE-2016-8584)

In the last few months, I have been testing several Trend Micro products with Steven Seeley (@steventseeley). Together, we have found more than 200+ RCE (Remote Code Execution) vulnerabilities and for the first time we presented the outcome of our research at Hack In The Box 2017 Amsterdam in April.

The presentation is available as a PDF or as a Slideshare.

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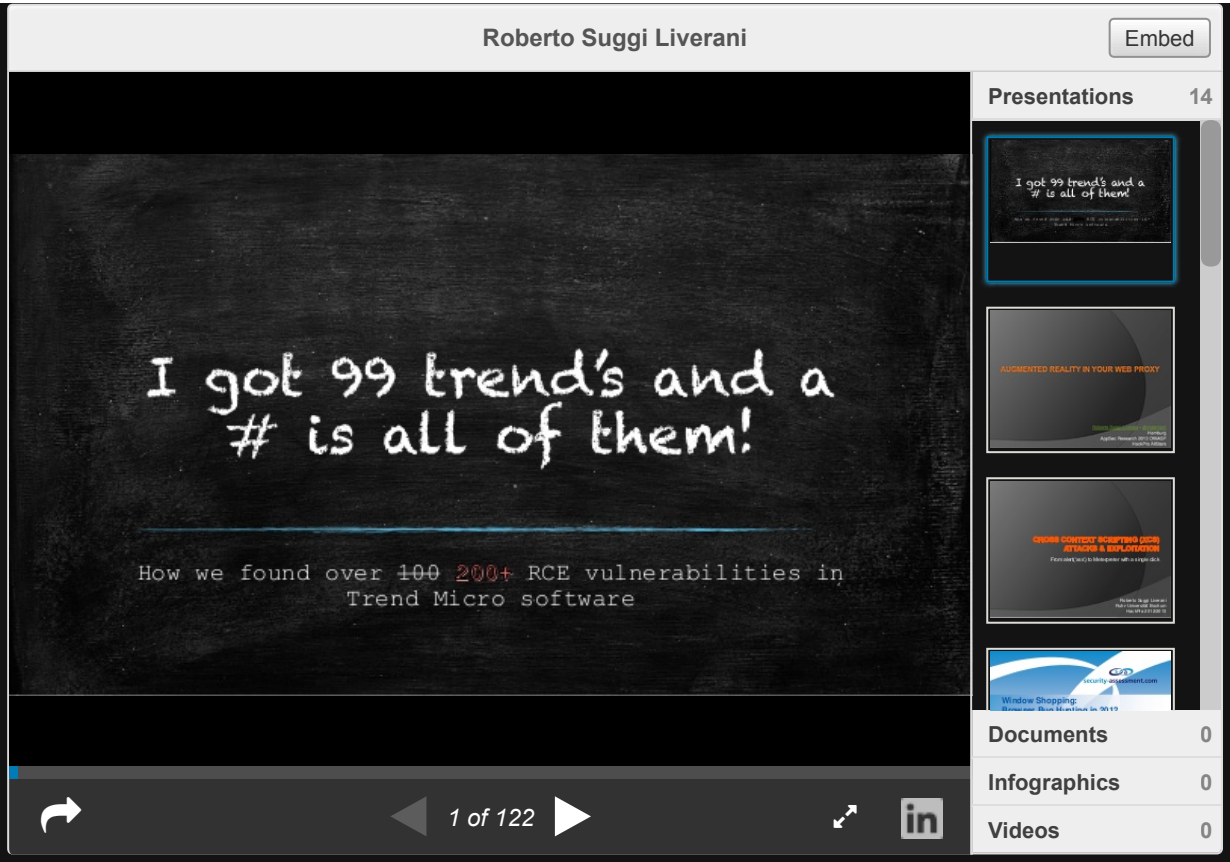

I got 99 trends and a # is all of them 4,271

Since it was not possible to cover all discovered vulnerabilities with a single presentation, this blog post will cover and analyze a further vulnerability that did not make it to the slides, and which affects the Trend Micro Threat Discovery Appliance (TDA) product.

CVE-2016-8584 - TDA Session Generation Authentication Bypass

This was an interesting vulnerability, discovered after observing that two consecutive login attempts against the web interface returned the same session_id token. Following this observation, our inference was that time factor played a role. After further analysis and reversing of the TDA libraries, the session management was found to be defined in the following library: /opt/TrendMicro/MinorityReport/lib/mini_httpd/utils.so

Within this library, the create_session() function is of particular interest, as shown below.

```
; int __cdecl create_session(char *dest, int)
public create_session
create_session proc near

path= byte ptr -87Dh
var_46C= dword ptr -46Ch
s= byte ptr -414h
var_10= dword ptr -10h
var_8= dword ptr -8
dest= dword ptr  8
arg_4= dword ptr  0Ch

push    ebp
mov     ebp, esp
push    ebx
sub     esp, 894h
call    sub_2AB7
add     ebx, 3DAFh
lea     eax, [ebp+s]
mov     edx, eax
mov     eax, 400h
mov     [esp+8], eax    ; n
mov     dword ptr [esp+4], 0 ; c
mov     [esp], edx      ; s
call    _memset
call    _get_curtime
mov     [ebp+var_8], eax
mov     dword ptr [esp], 0 ; timer
call    _time
mov     [esp], eax      ; seed
```

```
mov     [esp], eax      ; seed
call    _srand
call    _rand
mov     [ebp+var_10], eax
mov     eax, [ebp+var_10]
mov     [esp+0Ch], eax
lea     eax, (aI - 8298h)[ebx] ; "%i"
mov     [esp+8], eax    ; format
mov     dword ptr [esp+4], 400h ; maxlen
mov     eax, [ebp+dest]
mov     [esp], eax      ; s
call    _snprintf
mov     eax, [ebp+dest]
mov     [esp], eax      ; dest
call    _do_md5
mov     eax, [ebp+arg_4]
mov     edx, [eax+28h]
lea     eax, [ebp+s]
mov     [esp+8], eax    ; char *
mov     [esp+4], edx    ; int
mov     eax, [ebp+dest]
mov     [esp], eax      ; int
call    _get_session_ID
```

This function performs the following actions:

- Gets current time
- Use time as “seed”
- Use srand() with above seed
- MD5 hash the rest

All these functions can be shortened as the following: *session_id = md5(srand(get_curtime()))*

The vulnerability is that the seed is predictable, and therefore an attacker can generate session IDs issued in the past.

However, there are two conditions which affect exploitation of this vulnerability:

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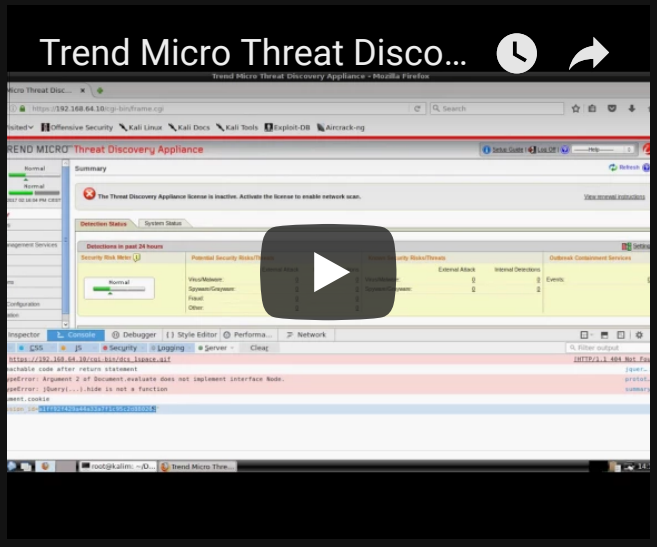
1) A legitimate user has to be authenticated - a session token is associated with an IP address when a user logs in
2) Attacker needs to perform the attack with the same IP address of legitimate user

The second condition is not an issue in a NATed environment but in a different environment it's definitely the most significant constraint.

A further conclusion is that although the attacker is able to technically predict "future" session_id tokens, there is no point in doing that, since condition (1) has to be to met first and an association between an IP address and session_id has to exist in the database.

The exploit Proof-of-Concept (poc) has been published here and below a video showing the attack in action:



The exploits for all the other TDA vulnerabilities that were discovered as part of this research can be found below:

CVE-2016-8584 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 (latest) Session Generation Authentication Bypass Vulnerability

CVE-2016-7547 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 dlp_policy_upload.cgi Information Disclosure Vulnerability

Alcatel Lucent Omnivista or: How I learned GIOP and gained Unauthenticated Remote Code Execution (CVE-2016-9796) - 12/1/2016

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Microsoft Windows PDF Library Information Disclosure Vulnerability - CVE-2016-3374 (MS16-115) - 9/14/2016

CVE-2016-7552 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 logoff.cgi Directory Traversal Authentication Bypass Vulnerability

CVE-2016-8585 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 admin_sys_time.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8586 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 detected_potential_files.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8587 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 dlp_policy_upload.cgi Remote Code Execution Vulnerability

CVE-2016-8588 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 hotfix_upload.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8589 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 log_query_dae.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8590 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 log_query_dlp.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8591 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 (latest) log_query.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8592 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 (latest) log_query_system.cgi Command Injection Remote Code Execution Vulnerability

CVE-2016-8593 - Trend Micro Threat Discovery Appliance <= 2.6.1062r1 (latest) upload.cgi Remote Code Execution Vulnerability

A Metasploit module has been developed and added to the master branch:

https://github.com/rapid7/metasploit-framework/blob/master/modules/exploits/multi/http/trendmicro_threat_discovery_admin_sys_time_cmdi.rb

Posted by Roberto Suggi Liverani at 09:59:00

Labels: 0day, exploit, hitb2017ams, trend micro, trendmicro

2 comments:

Anonymous 22 April 2017 at 16:12

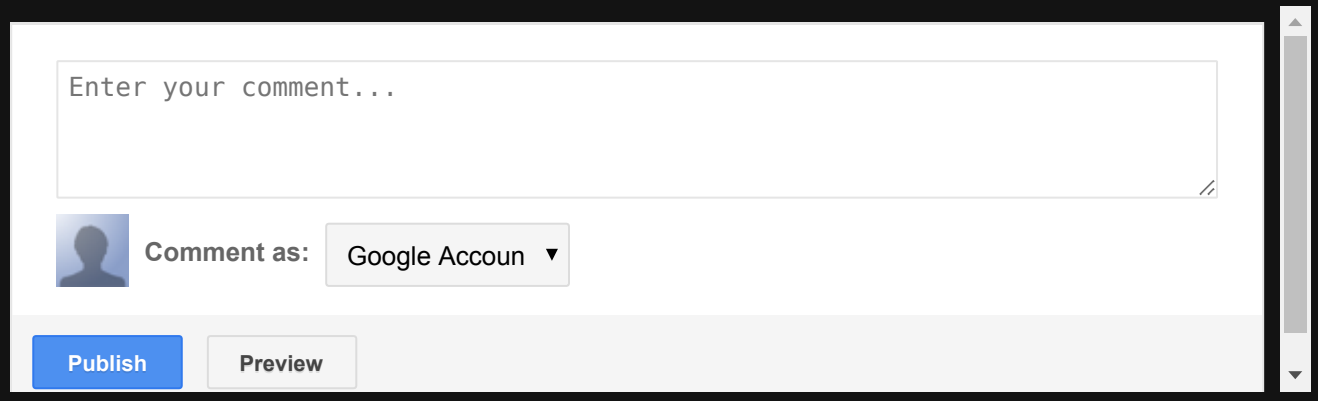
That product is no longer relvent and is no longer sold

Reply

Roberto Suggi Liverani 26 April 2017 at 13:38

Yes, product is EOL (End Of Life), as stated in the slides of the presentation as well. A further reason to disclose associated vulnerabilities.

Reply



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