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Developments in Auditing NT
Practical Assignment for SNAP San Jose

Submitted by: Anil K. Jain

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Background:

Undoubtedly Auditing provides an important means to detect a potential security problem. Windows NT comes with built in extensive auditing capabilities. When auditing is enabled, the audited events are recorded in the Security Event Log which can be viewed in the Event Viewer. However many audit records lack essential information and many contain information of very little use for manual analysis. Therefore Windows NT's built in auditing capabilities turn out to be not much useful. Fortunately, Windows NT fully accommodates 3rd party audit analysis tools that can be used to overcome these limitations. There are many products available for this purpose.

For this project, I have picked one such product. It is called NtLast and it is developed by NTOBJECTives, Inc. The reason for choosing NTLast is the ease of its use, its versatility, and also the reasonable price.

Auditing with NTLast

Although information regarding logon and logoff is generated by NT in the security log and it can be viewed in the event viewer. As aforementioned, the information obtained in NT's native format is not very useful for analysis because not only it is tedious to say the least but certain information is not even available. This shortcoming can easily be overcome by the NtLast.

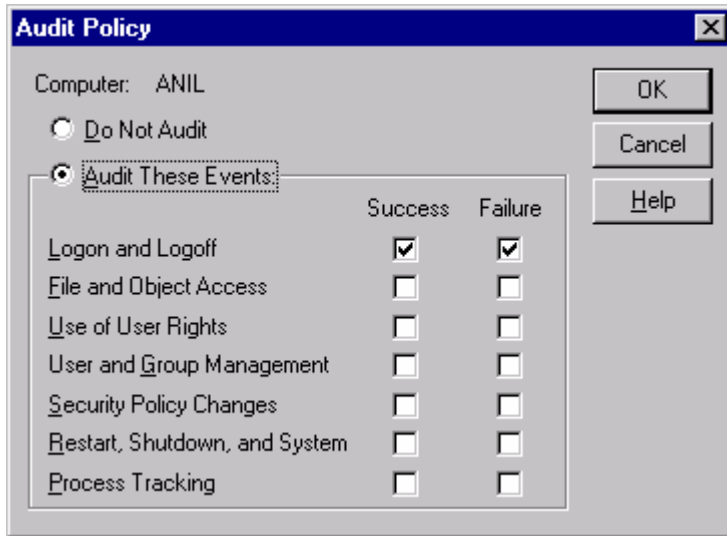
NtLast, a security audit tool for use with Windows NT, is a Win32 command utility with several switches that search the event log for logon and logoff records. It does the following major things that are not done by NT natively:

- **It can distinguish between remote and interactive logons.**
- **It matches logon times with logoff times**
- **A customized script can be created using multiple switches to generate useful reports.**

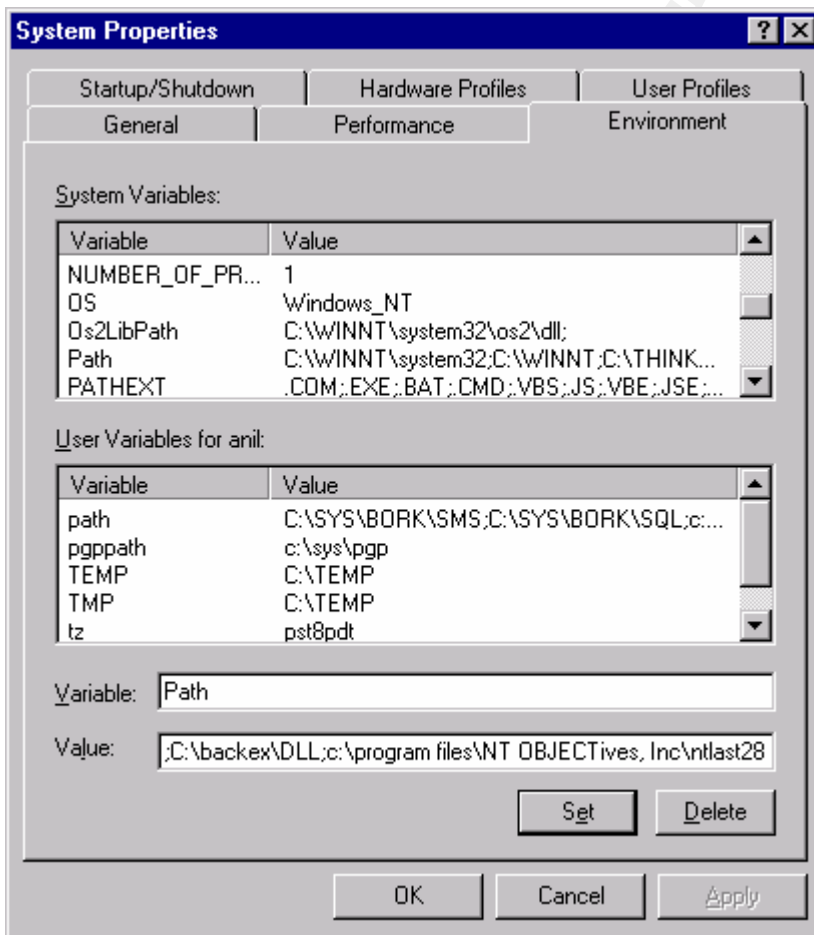
In this document, I will present the use of NTLast step by step including above listed features.

Installing NTLast:

Installing Ntlast is straightforward. When purchased from the web, the latest version 2.8 is delivered in a package named **NtLast285.exe** which is 215 KB file. It can be launched by double clicking on this file. The suggested path for installation by the vendor is C:\Program Files\NTOBJECTives,Inc\NtLast28. Click OK to accept the suggested path. Five files will be placed in the NtLast28 folder. NtLast.exe, the program file is a 148KB. In order to use this tool, Auditing on that machine must be enabled through the use of user manager as shown below.



Add the path statement in System Properties as shown below so it can be run from any directory for the convenience.



Reboot the machine. Now, NTLIST is ready for use. Increasing the command line buffer size is also useful but it is not required.

Type ntlast with /? Switch to find various switches available for use as shown below.

```
C:\>ntlast /?
NTLast Copyright(c) 1998, NT OBJECTives, Inc. All Rights Reserved
v2.8.5 - Programming by JD Glaser
Command Line Switches
  -s   Last Successful Logons
  -f   Last Failed Logons
  -i   Last Interactive Logons
  -r   Last Remote Logons
  -u [u] Logons by User - (u) = case sensitive username
  -m [m] Name of machine to search - (m) = machine name
  -n [n] Number of Last Logons - (n) = number of records records
  -from [m] Last logons from - (\m) = upper-case UNC server name
  -c   Condensed Output - Default
  -v   Verbose Output - shows logon/logoff/duration
  -not [u] Filter out User - Case sensitive
  -null Include null sessions - Ignored by default
  -mil Military Time Output - Default matches event log time
  -file File name - Saved .evt sec log to open
  -csv Print output as CSV
  -rt Raw date/times in CSV output
  -l   Last Successful Logon
  -l:i Last Interactive Logon
  -l:r Last Remote Logon
  -iis IIS 4.0 logons only
  -ad Include entries after this date/time - Specify military time
  -bd Include entries before this date/time - Specify military time
      Switches -ad and -bd can be combined to get between date
/time(s)
  - or / Either switch statement can be used
  -? Help
```

*Note - Switch arguments are case sensitive - 'UserX' and 'userx' are different

'HOSTX' and '\HOSTX' are different

*Note - To view IIS 4.0 logons, use IIS switch - off by default

*Note - Blank spaces for user name map to NT Anonymous logons

*Note - File switch usage #1-> ntlast -m \\HOSTX -file c:\log\sec.evt

*Note - File switch usage #2-> ntlast -file \\HOSTX\log\sec.evt

*Note - Time searches use 24hr time - Sept, 20th 7am is 20/9/1999-7:0:0

Sept, 20th 7pm is 20/9/1999-19:0:0

*Note - Using the /u switch last with no username generates list of NULL logons

*Note - For best usage - Set you console buffer to 1,000 lines or more

*Note - Redirect your output to a file - 'ntlant -v > report.txt'

*Note - Append your output like this - 'ntlant -v >> report.txt'

Sample uses of NTLast

NTLast by default lists the ten last successful logons.

```
C:\>ntlast -m \\edfdc
SMSClient_ED5  \\DC-BACKUP      ALLEDF      Wed Jun 14 11:16:02am 2000
SMSAdminNC     \\EDFNC              ALLEDF      Wed Jun 14 11:00:55am 2000
SMSAdminCO     \\EDFCO              ALLEDF      Wed Jun 14 11:00:52am 2000
SMSAdminCA     \\EDFCA2             ALLEDF      Wed Jun 14 11:00:07am 2000
SMSServer_ED5  \\EDFDC              ALLEDF      Wed Jun 14 10:50:51am 2000
SPETTAWAY     \\RECEPTION          ALLEDF      Wed Jun 14 10:48:07am 2000
JHOWARD        \\JHOWARD             ALLEDF      Wed Jun 14 10:47:13am 2000
JHOWARD        \\JHOWARD             ALLEDF      Wed Jun 14 10:47:12am 2000
JHOWARD        \\JHOWARD             ALLEDF      Wed Jun 14 10:47:11am 2000
AHO            \\AHO                 ALLEDF      Wed Jun 14 10:47:05am 2000

C:\>
```

In the above example, 10 last successful logons have been listed from the server edfdc.

The **-n** switch allows to specify the number of records desired.

```
C:\>ntlast -m \\edfdc -f -n 20
NED            \\LAURIEK      GO2!0NIAN   Mon Jun 12 03:09:29pm 2000
LAURAG         \\LGASSLER     Fri Jun 09 04:53:21am 2000
ARCServeAdminDC EDFDC      EDFDC       Tue May 23 10:08:30pm 2000
SPETTAWAY     \\RECEPTION    Fri May 19 09:19:03am 2000
CARLOS         \\CRINCON      Fri May 19 08:41:14am 2000
MICHAELR      \\MREPLOGLE    Mon May 15 10:52:36am 2000
SSPENCER      \\SSPENCER     Mon May 15 08:43:18am 2000
SSPENCER      \\SSPENCER     Mon May 15 08:42:35am 2000
RTYLER        \\TOSHIMG      Fri May 12 10:08:02am 200
RTYLER        \\TOSHIMG      Fri May 12 10:07:59am 200
RTYLER        \\TOSHIMG      Fri May 12 10:07:40am 200
ARCServeAdminDC EDFDC      EDFDC       Thu May 11 10:01:23pm 2000
JACKIE        \\JACKIE       Thu May 04 10:22:10am 2000
anilrajankumar EDFDC      ALLEDF      Thu May 04 08:52:53am 2000
MB            \\MBEAN        Thu May 04 08:30:24am 2000
anilrajankumar EDFDC      ALLEDF      Thu May 04 07:55:35am 2000
KOLSON        \\KOLSON       Thu May 04 06:47:28am 2000
SPETTAWAY     \\RECEPTION    Thu May 04 06:15:10am 2000
WARD          \\DWARD        Thu May 04 05:59:15am 2000
HROSEN        \\HROSEN       Thu May 04 05:16:42am 2000

C:\>
```

In the above example, 20 failed logon records are listed on the server edfdc.

Retrieving Interactive logons with -i switch.

```
C:\>ntlast -m \\edfdc -i
anil      EDFDC      ALLEDF      Wed Jun 14 11:52:01am 2000
- End Of File -

C:\>
```

In the above example, the last interactive logon record is retrieved from the edfdc server.

Retrieving interactive failed logon records with -i and -f switch.

```
C:\>ntlast -m \\edfdc -i -f
ARCServeAdminDC EDFDC      EDFDC      Tue May 23 10:08:30pm 2000
ARCServeAdminDC EDFDC      EDFDC      Thu May 11 10:01:23pm 2000
anilrajankumar EDFDC      ALLEDF     Thu May 04 08:52:53am 2000
anilrajankumar EDFDC      ALLEDF     Thu May 04 07:55:35am 2000
ARCServeAdminDC EDFDC      EDFDC      Tue May 02 10:02:14pm 2000
ARCServeAdminDC EDFDC      EDFDC      Fri Mar 24 10:01:13pm 2000
- End Of File -

C:\>
```

Retrieving detailed record with -v switch.

```
C:\>ntlast -m \\edfdc -i -v
Record Number: 5618
ComputerName: EDFDC
EventID: 528 - Successful Logon
Logon: Wed Jun 14 11:52:01am 2000
Logoff: Not Recorded
Details -
  ClientName:  anil
  ClientID:    (0x0,0xE334321)
  ClientMachine: EDFDC
  ClientDomain: ALLEDF
  LogonType:   Interactive

- End Of File -

C:\>
```

In the above example, the detailed record for the last interactive successful logon on server edfdc is retrieved. Please note that it indicates that the user has not logoff yet. This information can be very useful for intrusion detection.

Filtering records with –not switch.

```
C:\>ntlast -m \\edfdc -i -f -n 20 -v -not ARCServeAdminDC
Record Number: 4664
ComputerName: EDFDC
EventID: 529 - Failed Logon Attempt
Time Attempted: - Thu May 04 08:52:53am 2000
Details -
    ClientName: anilrajankumar
    ClientMachine: EDFDC
    ClientDomain: ALLEDF
    LogonType: Interactive

Record Number: 4660
ComputerName: EDFDC
EventID: 529 - Failed Logon Attempt
Time Attempted: - Thu May 04 07:55:35am 2000
Details -
    ClientName: anilrajankumar
    ClientMachine: EDFDC
    ClientDomain: ALLEDF
    LogonType: Interactive

- End Of File -

C:\>
```

In the example of retrieving failed interactive logons, if ARCServeadminDC is not a suspicious logon so we might want to filter this record and obtain the detailed information only about the rest of the failed interactive logons on the server edfdc as shown above.

Saving the output in a file.

```
C:\>ntlast -m \\edfdc >c:\output.txt

C:\>type output.txt
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:39:28pm 2000
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:39:11pm 2000
BILLIE     \\BILLIEJ   ALLEDF      Wed Jun 14 12:39:03pm 2000
BILLIE     \\BILLIEJ   ALLEDF      Wed Jun 14 12:39:00pm 2000
BILLIE     \\BILLIEJ   ALLEDF      Wed Jun 14 12:38:57pm 2000
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:38:54pm 2000
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:38:37pm 2000
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:38:21pm 2000
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:37:59pm 2000
DCGUEST    \\GRAP      ALLEDF      Wed Jun 14 12:37:44pm 2000

C:\>
```


Gathering logon and logoff information from various servers and writing it in one file.

```
C:\>ntlast -m \\edfdc
```

```
SMSAdminNC    \\EDFNC      ALLEDF      Wed Jun 14 06:01:00pm 2000
SMSAdminCO    \\EDFCO      ALLEDF      Wed Jun 14 06:00:46pm 2000
SMSAdminMA    \\EDFMA      ALLEDF      Wed Jun 14 06:00:11pm 2000
SMSAdminCA    \\EDFCA2     ALLEDF      Wed Jun 14 06:00:10pm 2000
SMSAdmin      \\EDFNY3     ALLEDF      Wed Jun 14 06:00:09pm 2000
SMSAdminTX    \\EDFTX      ALLEDF      Wed Jun 14 06:00:08pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:07pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:03pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:03pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:03pm 2000
```

```
C:\>ntlast -m \\dc-backup
```

```
anil          \\ANIL       ALLEDF      Wed Jun 14 06:07:58pm 2000
SMSAdminTX    \\EDFTX      ALLEDF      Wed Jun 14 06:01:41pm 2000
SMSAdminCO    \\EDFCO      ALLEDF      Wed Jun 14 06:01:33pm 2000
SMSAdminNC    \\EDFNC      ALLEDF      Wed Jun 14 06:00:51pm 2000
SMSAdminDC    \\EDFDC      ALLEDF      Wed Jun 14 06:00:11pm 2000
SMSAdminMA    \\EDFMA      ALLEDF      Wed Jun 14 06:00:03pm 2000
SMSAdminCA    \\EDFCA2     ALLEDF      Wed Jun 14 06:00:03pm 2000
SMSAdmin      \\EDFNY3     ALLEDF      Wed Jun 14 06:00:03pm 2000
SMSAdminDC    \\EDFDC      ALLEDF      Wed Jun 14 05:29:53pm 2000
SMSAdminCO    \\EDFCO      ALLEDF      Wed Jun 14 05:01:41pm 2000
```

```
C:\>ntlast -m \\edfdc >c:\output.txt
```

```
C:\>ntlast -m \\dc-backup >>c:\output.txt
```

```
C:\>type output.txt
```

```
SMSAdminNC    \\EDFNC      ALLEDF      Wed Jun 14 06:01:00pm 2000
SMSAdminCO    \\EDFCO      ALLEDF      Wed Jun 14 06:00:46pm 2000
SMSAdminMA    \\EDFMA      ALLEDF      Wed Jun 14 06:00:11pm 2000
SMSAdminCA    \\EDFCA2     ALLEDF      Wed Jun 14 06:00:10pm 2000
SMSAdmin      \\EDFNY3     ALLEDF      Wed Jun 14 06:00:09pm 2000
SMSAdminTX    \\EDFTX      ALLEDF      Wed Jun 14 06:00:08pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:07pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:03pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:03pm 2000
WILD          \\WILD       ALLEDF      Wed Jun 14 05:45:03pm 2000
anil          \\ANIL       ALLEDF      Wed Jun 14 06:07:58pm 2000
SMSAdminTX    \\EDFTX      ALLEDF      Wed Jun 14 06:01:41pm 2000
SMSAdminCO    \\EDFCO      ALLEDF      Wed Jun 14 06:01:33pm 2000
SMSAdminNC    \\EDFNC      ALLEDF      Wed Jun 14 06:00:51pm 2000
SMSAdminDC    \\EDFDC      ALLEDF      Wed Jun 14 06:00:11pm 2000
SMSAdminMA    \\EDFMA      ALLEDF      Wed Jun 14 06:00:03pm 2000
SMSAdminCA    \\EDFCA2     ALLEDF      Wed Jun 14 06:00:03pm 2000
SMSAdmin      \\EDFNY3     ALLEDF      Wed Jun 14 06:00:03pm 2000
SMSAdminDC    \\EDFDC      ALLEDF      Wed Jun 14 05:29:53pm 2000
SMSAdminCO    \\EDFCO      ALLEDF      Wed Jun 14 05:01:41pm 2000
```

```
C:\>
```

CVS format file can be opened in Excel or Access for further analysis and for the presentation of data.

```
C:\>ntlast -m \\edfdc >c:\output.txt -csv
```

```
C:\>type output.txt
```

```
SMSAdminNC,\\EDFNC,ALLEDF,Wed Jun 14 06:01:00pm 2000
SMSAdminCO,\\EDFCO,ALLEDF,Wed Jun 14 06:00:46pm 2000
SMSAdminMA,\\EDFMA,ALLEDF,Wed Jun 14 06:00:11pm 2000
SMSAdminCA,\\EDFCA2,ALLEDF,Wed Jun 14 06:00:10pm 2000
SMSAdmin,\\EDFNY3,ALLEDF,Wed Jun 14 06:00:09pm 2000
SMSAdminTX,\\EDFTX,ALLEDF,Wed Jun 14 06:00:08pm 2000
WILD,\\WILD,ALLEDF,Wed Jun 14 05:45:07pm 2000
WILD,\\WILD,ALLEDF,Wed Jun 14 05:45:03pm 2000
WILD,\\WILD,ALLEDF,Wed Jun 14 05:45:03pm 2000
WILD,\\WILD,ALLEDF,Wed Jun 14 05:45:03pm 2000
```

```
C:\>
```

In the above example, the data is provided in the csv format that can easily be imported in Excel as shown below.

	A	B	C	D
1	SMSAdminNC	\\EDFNC	ALLEDF	Wed Jun 14 06:01:00pm 2000
2	SMSAdminCO	\\EDFCO	ALLEDF	Wed Jun 14 06:00:46pm 2000
3	SMSAdminMA	\\EDFMA	ALLEDF	Wed Jun 14 06:00:11pm 2000
4	SMSAdminCA	\\EDFCA2	ALLEDF	Wed Jun 14 06:00:10pm 2000
5	SMSAdmin	\\EDFNY3	ALLEDF	Wed Jun 14 06:00:09pm 2000
6	SMSAdminTX	\\EDFTX	ALLEDF	Wed Jun 14 06:00:08pm 2000
7	WILD	\\WILD	ALLEDF	Wed Jun 14 05:45:07pm 2000
8	WILD	\\WILD	ALLEDF	Wed Jun 14 05:45:03pm 2000
9	WILD	\\WILD	ALLEDF	Wed Jun 14 05:45:03pm 2000
10	WILD	\\WILD	ALLEDF	Wed Jun 14 05:45:03pm 2000

Conclusion:

NList, a 3rd party product developed by NTOBJECTIVES, Inc. enhances Windows NT's built in capability of auditing logon and logoff events significantly. As shown in this document by examples, NList distinguishes between remote and interactive logons. It also matches logon times with logoff times. NList allows data from various machines to be gathered in one single file. Finally, NList allows data to be presented in csv format which can easily be imported in many applications.

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