# PingCastle Basic Edition

Version: 3.0.0

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# Summary

# About PingCastle

## “For CISO, by CISO”

PingCastle was born based on a finding: security based only on technology does not work. That's why the company focuses on process and people rather than just technology. PingCastle does not sell products !

The company does not provide solutions to protect your infrastructure. Instead, it provides tools to discover what you have to protect, evaluate its security level and provide insights on if the budget you have provided has been successfully used.

PingCastle's objective is not to reach a perfect security but to impulse changes using the management. And with low effort, I think you'll get support to change the situation !

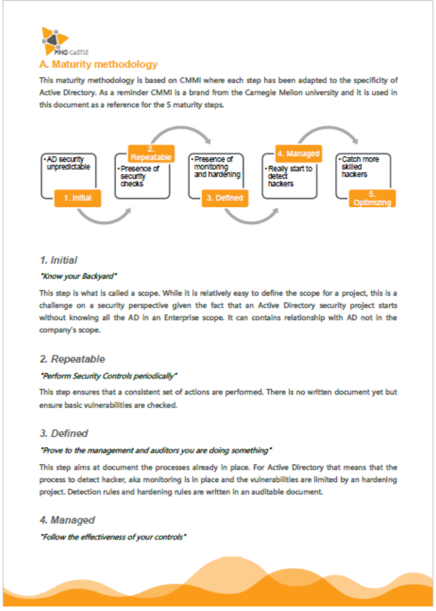
Vincent LE TOUX

## License

The source code of the program is licensed to the Non-Profit Open Software License ( “Non-Profit OSL” ) 3.0.

Regarding the binary code, **Being part of a commercial package is forbidden** except if a license is purchased. Check the "our services" section on https://www.pingcastle.com for more information.

**The program is allowed to run only during its support date**. Support can be extended by purchasing additional support.



A. Maturity methodology

This maturity methodology is based on CMMI where each step has been adapted to the specificity of Active Directory. As a reminder CMMI is a brand from the Carnegie Mellon university and it is used in this document as a reference for the 5 maturity steps.

1. Initial
- AD security unpredictable

2. Repeatable
- Presence of security checks

3. Defined
- Presence of monitoring and hardening

4. Managed
- Really start to detect hackers

5. Optimizing
- Catch more skilled hackers

*1. Initial*

*"Know your Backyard"*

This step is what is called a scope. While it is relatively easy to define the scope for a project, this is a challenge on a security perspective given the fact that an Active Directory security project starts without knowing all the AD in an Enterprise scope. It can contains relationship with AD not in the company's scope.

*2. Repeatable*

*"Perform Security Controls periodically"*

This step ensures that a consistent set of actions are performed. There is no written document yet but ensure basic vulnerabilities are checked.

*3. Defined*

*"Prove to the management and auditors you are doing something"*

This step aims at document the processes already in place. For Active Directory that means that the process to detect hacker, aka monitoring is in place and the vulnerabilities are limited by an hardening project. Detection rules and hardening rules are written in an auditable document.

*4. Managed*

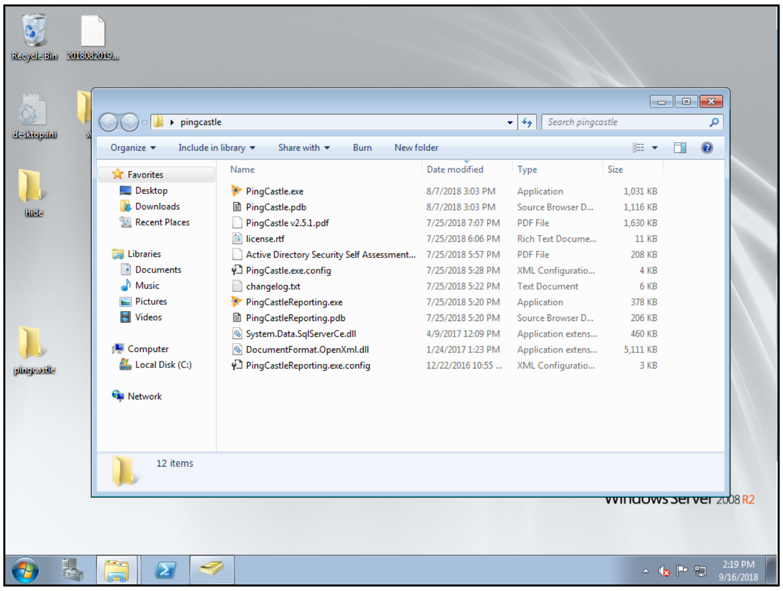
*"Follow the effectiveness of your controls"*

## Methodology

The PingCastle tool is just one part of a global methodology aiming at securing Active Directories.

You can get more information about this methodology by visiting the website https://www.pingcastle.com/methodology/

# How to use PingCastle



| Name | Date modified | Type | Size |
|---|---|---|---|
| PingCastle.exe | 8/7/2018 3:03 PM | Application | 1,031 KB |
| PingCastle.pdb | 8/7/2018 3:03 PM | Source Browser D... | 1,116 KB |
| PingCastle v2.5.1.pdf | 7/25/2018 7:07 PM | PDF File | 1,630 KB |
| license.rtf | 7/25/2018 6:06 PM | Rich Text Docume... | 11 KB |
| Active Directory Security Self Assessment... | 7/25/2018 5:57 PM | PDF File | 208 KB |
| PingCastle.exe.config | 7/25/2018 5:28 PM | XML Configuratio... | 4 KB |
| changelog.txt | 7/25/2018 5:22 PM | Text Document | 6 KB |
| PingCastleReporting.exe | 7/25/2018 5:20 PM | Application | 378 KB |
| PingCastleReporting.pdb | 7/25/2018 5:20 PM | Source Browser D... | 206 KB |
| System.Data.SqlServerCe.dll | 4/9/2017 12:09 PM | Application extens... | 460 KB |
| DocumentFormat.OpenXml.dll | 1/24/2017 1:23 PM | Application extens... | 5,111 KB |
| PingCastleReporting.exe.config | 12/22/2016 10:55 ... | XML Configuratio... | 3 KB |

## Requirements

### Active Directory Account

The PingCastle program **needs an Active Directory account to connect to the AD to audit**. No requirements is needed for this account. It can be an account without any privileges or even an account from a trusted domain. This account doesn’ t require to be part of the local administrators group.

### Server Side

There is **no requirement on the server side**.

However it is **strongly recommended (but not mandatory) for performance reasons** to install on the server side a component named “Active Directory Web service” aka ADWS. It is installed by default on any domain where at least **one** domain controller has the OS **Windows 2008 R2** or later. Having this component installed can divide the time required to compute the report by a factor of 10.

ADWS can be installed manually on Windows 2003 and Windows 2008 (require .NET Framework 3.5 SP1). The hot fix that may be needed for these OS is located here.

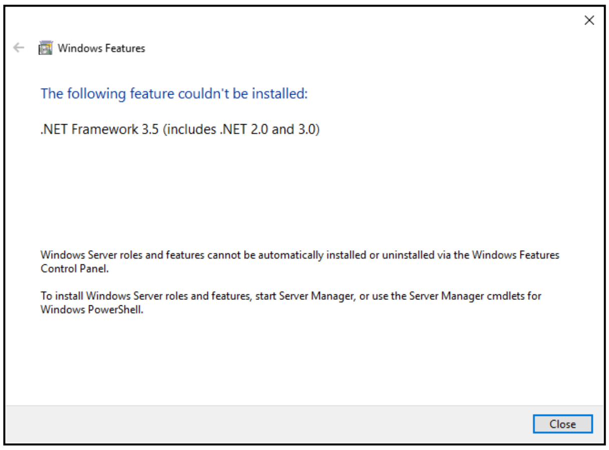
### Client side

**PingCastle requires .Net 4, available on all modern OS. However it can be compiled to run manually on .Net2. It fulfill then the following requiement:**

The program is supported on every Operating System supported by Microsoft without the installation of any component nor any local privilege. From Windows Vista to Windows 10 and Windows 2008 to Windows 2016 in both 32 and 64 bits. In addition, the program is known to be working on Windows 2000 with the .net framework 2, Windows XP and Windows 2003.

The analysis tool (PingCastle.exe) requires DotNet 3.0 (or next versions) which is available by default since Windows Vista. It can be run under DotNet 2.0 but with fewer functionalities.

Starting from PingCastle 2.7, PingCastle.exe can be run without the .config file next to the program. But in this case, the program will be run under the .Net framework where it has been compiled (and not the other .Net framework). Windows does show a popup to suggest the installation of the missing framework.



The following feature couldn't be installed:

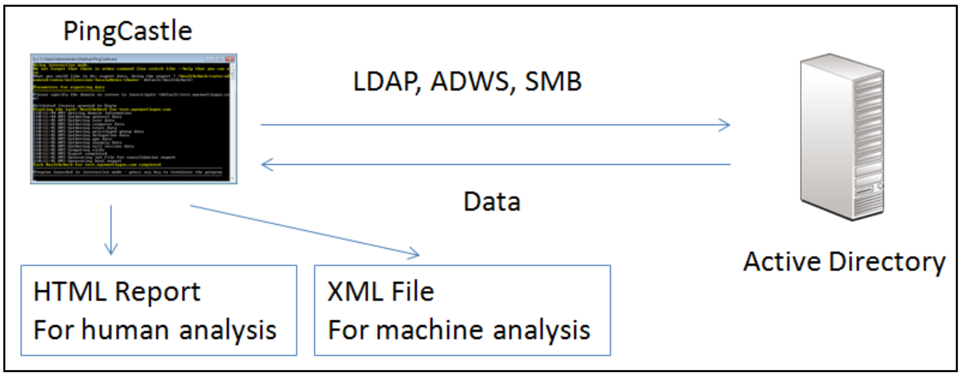
.NET Framework 3.5 (includes .NET 2.0 and 3.0)

Windows Server roles and features cannot be automatically installed or uninstalled via the Windows Features Control Panel.

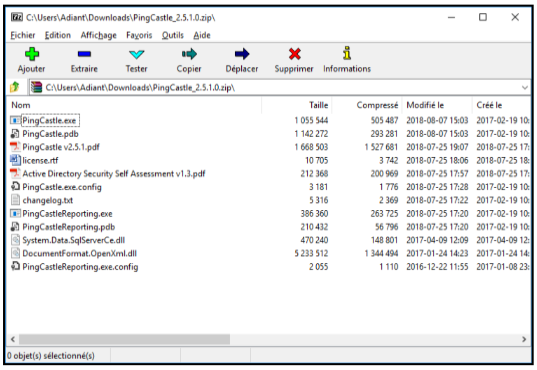
To install Windows Server roles and features, start Server Manager, or use the Server Manager cmdlets for Windows PowerShell.

## How it works

PingCastle is a standalone program (not requiring installation) which produces reports for human or machine.



PingCastle reads its own machine readable reports to build analysis or dashboard.



C:\Users\Adiant\Downloads\PingCastle_2.5.1.0.zip\
Fichier Edition Affichage Favoris Outils Aide
Ajouter
Extraire
Tester
Copier
Déplacer
Supprimer
Informations
C:\Users\Adiant\Downloads\PingCastle_2.5.1.0.zip\

| Nom | Taille | Compressé | Modifié le | Créé le |
|---|---|---|---|---|
| PingCastle.exe | 1 055 544 | 505 487 | 2018-08-07 15:03 | 2017-02-19 10: |
| PingCastle.pdb | 1 142 272 | 293 281 | 2018-08-07 15:03 | 2017-02-19 10: |
| PingCastle v2.5.1.pdf | 1 668 503 | 1 527 681 | 2018-07-25 19:07 | 2018-07-25 17: |
| license.rtf | 10 705 | 3 742 | 2018-07-25 18:06 | 2018-07-25 18: |
| Active Directory Security Self Assessment v1.3.pdf | 212 368 | 200 969 | 2018-07-25 17:57 | 2018-07-25 17: |
| PingCastle.exe.config | 3 181 | 1 776 | 2018-07-25 17:28 | 2017-02-19 10: |
| changelog.txt | 5 316 | 2 369 | 2018-07-25 17:22 | 2017-02-19 10: |
| PingCastleReporting.exe | 386 360 | 263 725 | 2018-07-25 17:20 | 2017-02-19 10: |
| PingCastleReporting.pdb | 210 432 | 56 796 | 2018-07-25 17:20 | 2017-02-19 10: |
| System.Data.SqlServerCe.dll | 470 240 | 148 801 | 2017-04-09 12:09 | 2017-04-09 12: |
| DocumentFormat.OpenXml.dll | 5 233 512 | 1 344 494 | 2017-01-24 14:23 | 2017-01-24 14: |
| PingCastleReporting.exe.config | 2 055 | 1 110 | 2016-12-22 11:55 | 2017-01-08 23: |

0 objet(s) sélectionné(s)

## Installation

PingCastle Basic Edition is provided in a zip file. You need a program such as 7zip or the native unzip program to decompress the file.

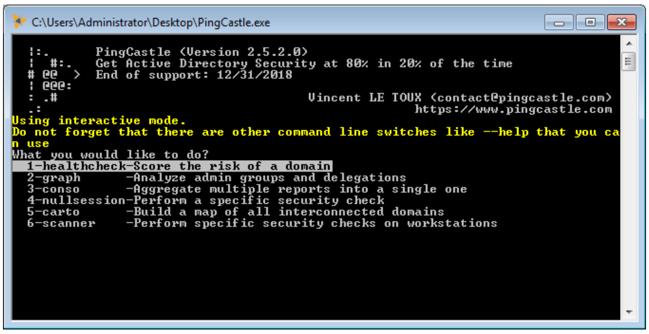
For the most operating systems, PingCastle does not need any more actions.

For Windows 2000, the dotnet framework 2.0, which is the last supported version, need to be installed.

The two files required to run scans are PingCastle.exe and PingCastle.exe.config

## Run the program

### The best way is just to double click on PingCastle.exe



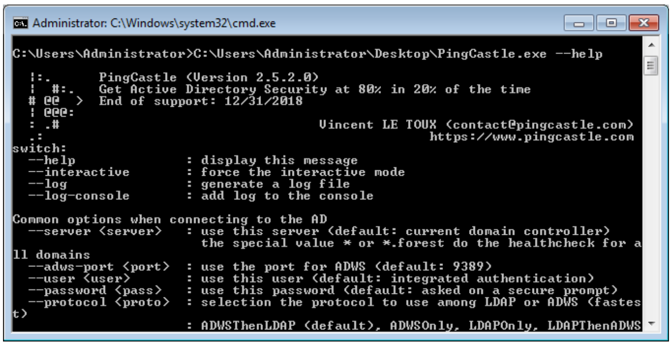
```
  |:.      PingCastle (Version 2.5.2.0)
  |  #:.   Get Active Directory Security at 80% in 20% of the time
  # @@  >  End of support: 12/31/2018
  | @@@:
  : .#                                 Vincent LE TOUX (contact@pingcastle.com)
  .:                                                 https://www.pingcastle.com
Using interactive mode.
Do not forget that there are other command line switches like --help that you ca
n use
What you would like to do?
  1-healthcheck-Score the risk of a domain
  2-graph      -Analyze admin groups and delegations
  3-conso      -Aggregate multiple reports into a single one
  4-nullsession-Perform a specific security check
  5-carto      -Build a map of all interconnected domains
  6-scanner    -Perform specific security checks on workstations
```

This run the program in a mode called the "interactive mode.

The program can be run using a command line. A command line can be run by searching for "cmd" or "command line" in the start menu.

Then a drag and drop of the file "PingCastle.exe" automatically populates the command line with the binary. The same can be done with other files ending with ".exe"

## Getting help



```
C:\Users\Administrator>C:\Users\Administrator\Desktop\PingCastle.exe --help

  |:.      PingCastle (Version 2.5.2.0)
  |  #:.   Get Active Directory Security at 80% in 20% of the time
  # @@  >  End of support: 12/31/2018
  | @@@:
  : .#                                 Vincent LE TOUX (contact@pingcastle.com)
  .:                                                 https://www.pingcastle.com
switch:
  --help                : display this message
  --interactive         : force the interactive mode
  --log                 : generate a log file
  --log-console         : add log to the console

Common options when connecting to the AD
  --server <server>     : use this server (default: current domain controller)
                          the special value * or *.forest do the healthcheck for a
ll domains
  --adws-port <port>    : use the port for ADWS (default: 9389)
  --user <user>         : use this user (default: integrated authentication)
  --password <pass>     : use this password (default: asked on a secure prompt)
  --protocol <proto>    : selection the protocol to use among LDAP or ADWS (fastes
t)
                        : ADWSThenLDAP (default), ADWSOnly, LDAPOnly, LDAPThenADWS
```

PingCastle can display its help on a command line.

Indeed PingCastle has a lot of switches which can be displayed using the command line:

```
PingCastle.exe --help
```

Do not forget also to check the website https://www.pingcastle.com or on twitter @mysmartlogon

## Generating log file for support requests

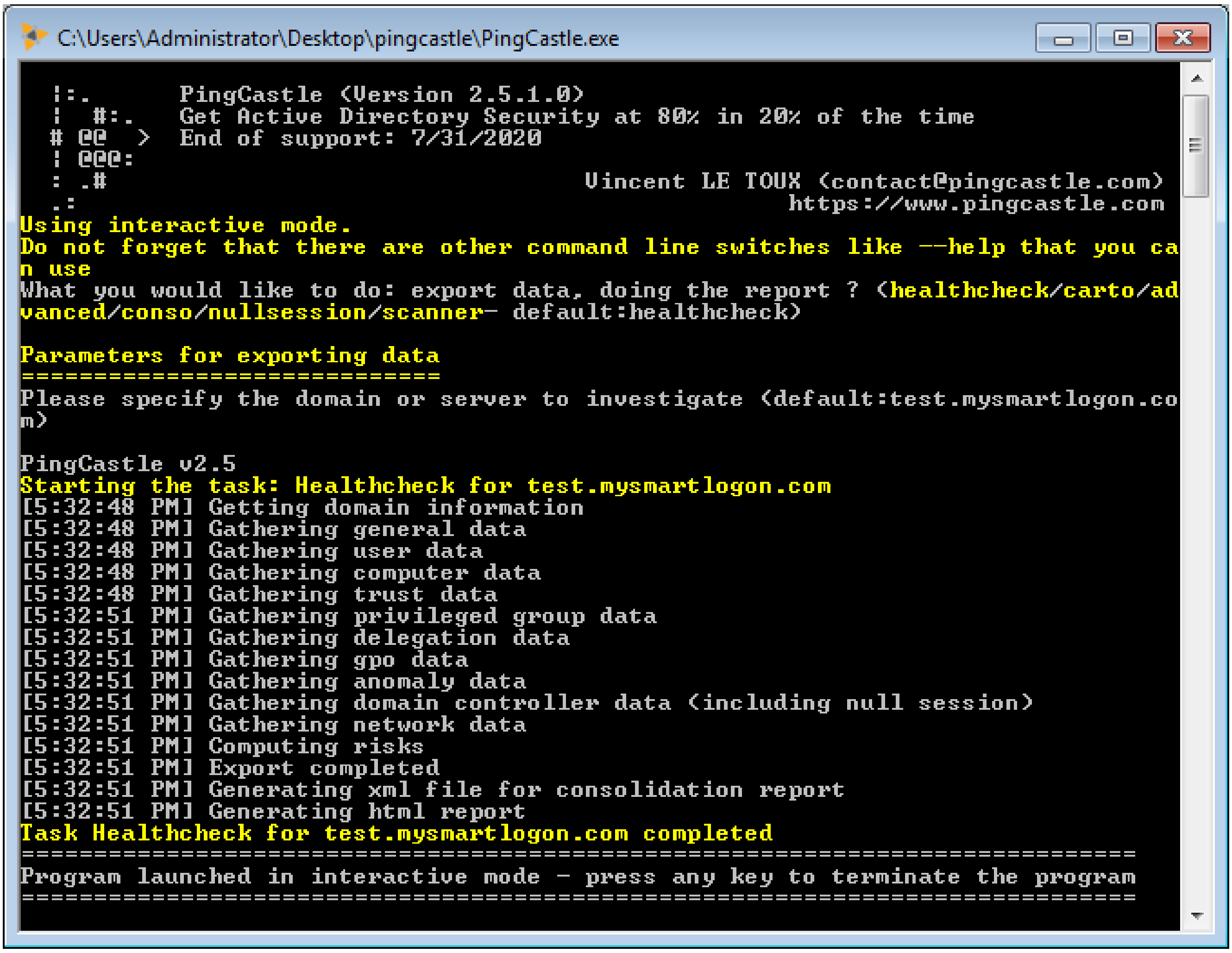
PingCastle can collect logs with the --log switch

However when a command line argument is submitted, the interactive mode is disabled and the module has to be launched manually. To avoid that, the "interactive mode" can be activated manually using the command:

```
PingCastle.exe --log --interactive
```

## Performing an Active Directory health check

**The report can be generated in the interactive mode by choosing "healthcheck" or just by pressing Enter.** Indeed it is the default analysis mode.



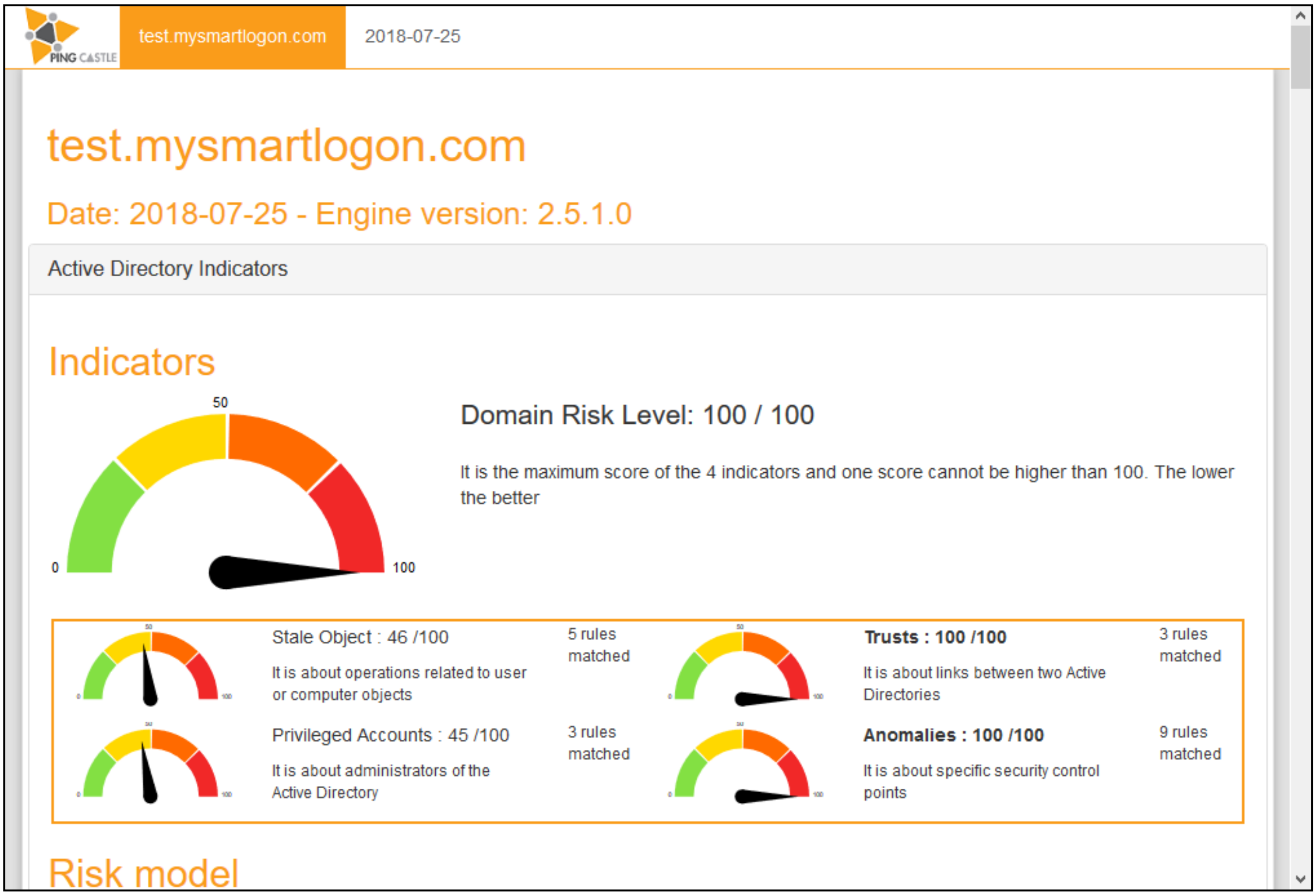
```
   |:.      PingCastle (Version 2.5.1.0)
   |  #:.   Get Active Directory Security at 80% in 20% of the time
   # @@  >  End of support: 7/31/2020
   | @@@:
   : .#                             Vincent LE TOUX (contact@pingcastle.com)
  .:                                        https://www.pingcastle.com
Using interactive mode.
Do not forget that there are other command line switches like --help that you ca
n use
What you would like to do: export data, doing the report ? (healthcheck/carto/ad
vanced/conso/nullsession/scanner- default:healthcheck)

Parameters for exporting data
=============================
Please specify the domain or server to investigate (default:test.mysmartlogon.co
m)

PingCastle v2.5
Starting the task: Healthcheck for test.mysmartlogon.com
[5:32:48 PM] Getting domain information
[5:32:48 PM] Gathering general data
[5:32:48 PM] Gathering user data
[5:32:48 PM] Gathering computer data
[5:32:48 PM] Gathering trust data
[5:32:51 PM] Gathering privileged group data
[5:32:51 PM] Gathering delegation data
[5:32:51 PM] Gathering gpo data
[5:32:51 PM] Gathering anomaly data
[5:32:51 PM] Gathering domain controller data (including null session)
[5:32:51 PM] Gathering network data
[5:32:51 PM] Computing risks
[5:32:51 PM] Export completed
[5:32:51 PM] Generating xml file for consolidation report
[5:32:51 PM] Generating html report
Task Healthcheck for test.mysmartlogon.com completed
=============================================================================
Program launched in interactive mode - press any key to terminate the program
=============================================================================
```

It can be run using the command:

```
PingCastle --healthcheck --server mydomain.com
```

### Active Directory risk level analysis

When the health check is run, an html file and an xml file are generated. The html file represent the report of the active directory. It is designed for humans. The xml contains some of the data used to generate the html file and can be used to consolidate date on multiple active directories. It is designed to be computer read (PingCastle). **The xml file is required for all analysis, including global overview or cartography.**



test.mysmartlogon.com

Date: 2018-07-25 - Engine version: 2.5.1.0

Active Directory Indicators

Indicators

Domain Risk Level: 100 / 100

It is the maximum score of the 4 indicators and one score cannot be higher than 100. The lower the better

Stale Object : 46 /100 — 5 rules matched

It is about operations related to user or computer objects

Trusts : 100 /100 — 3 rules matched

It is about links between two Active Directories

Privileged Accounts : 45 /100 — 3 rules matched

It is about administrators of the Active Directory

Anomalies : 100 /100 — 9 rules matched

It is about specific security control points

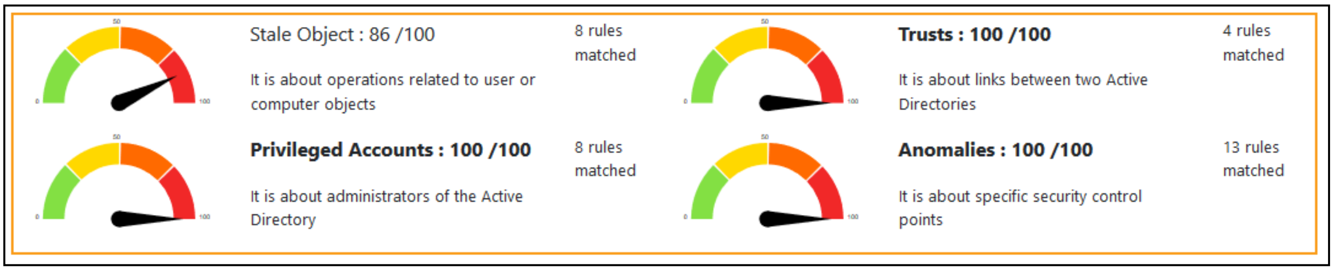
Risk model

The report is divided in 3 parts:

**1) Scores**

The Score is computed by the maximum of the 4 sub scores:

- **Privileged accounts**
  It is about administrators.
- **Trusts**
  It is about the links between Active Directories (reminder: one AD can compromise one other via trusts).
- **Stale objects**
  Stale objects represent everything about the AD objects and their life cycle: computer and user creation, delegation.
- **Security anomalies**
  Everything that doesn’ t fit into the previous categories and related to security checks



Stale Object : 86 /100

8 rules matched

It is about operations related to user or computer objects

**Trusts : 100 /100**

4 rules matched

It is about links between two Active Directories

**Privileged Accounts : 100 /100**

8 rules matched

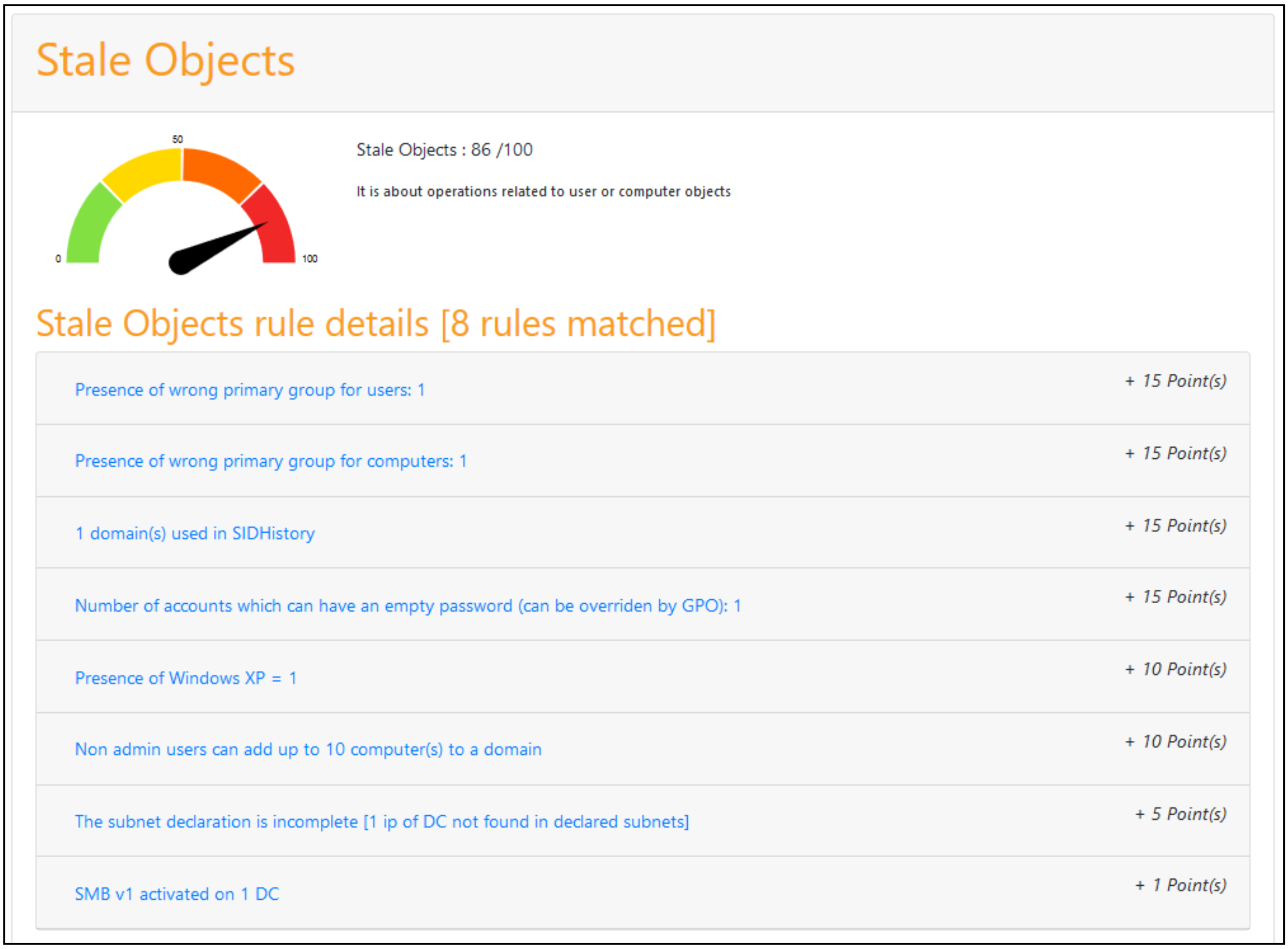
It is about administrators of the Active Directory

**Anomalies : 100 /100**

13 rules matched

It is about specific security control points

The details of the rules triggered is shown with some indication and the number of points calculated (the total cannot be above 100).



Stale Objects

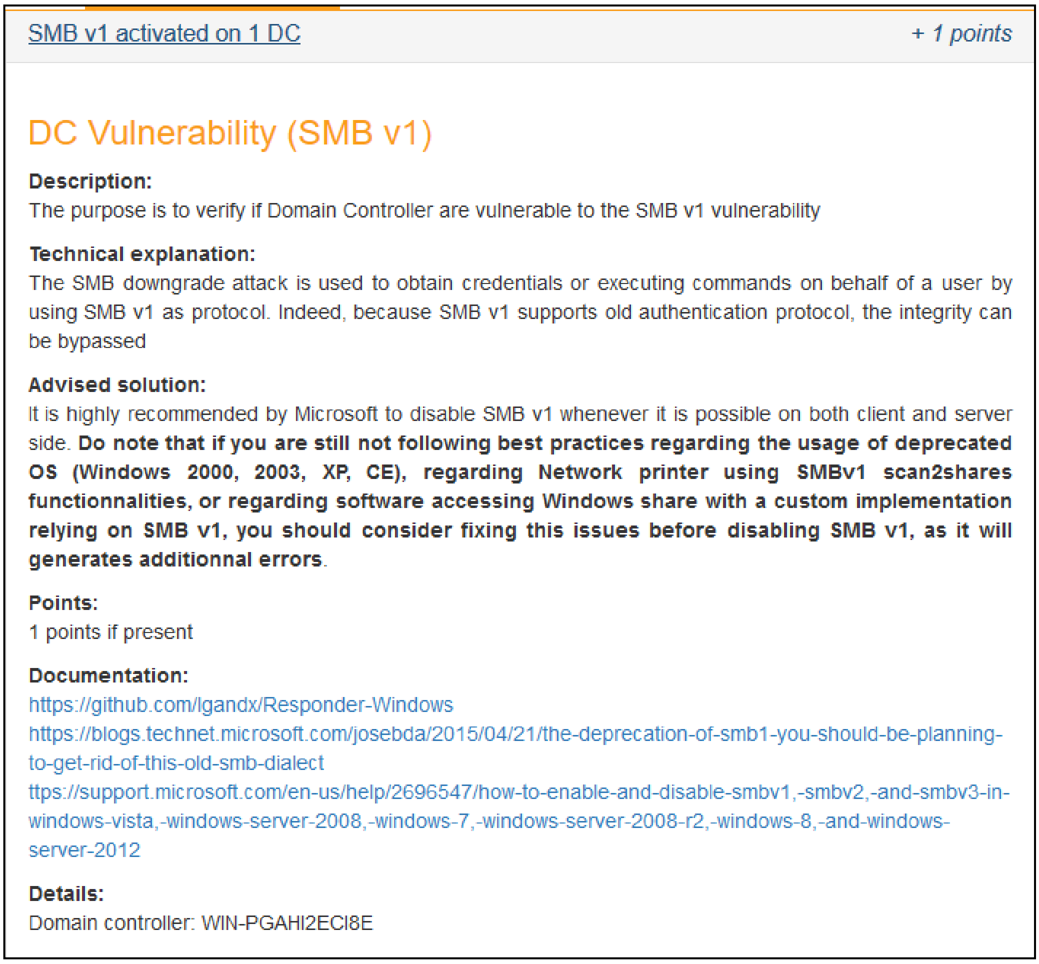
Stale Objects : 86 /100

It is about operations related to user or computer objects

Stale Objects rule details [8 rules matched]

| | |
|---|---|
| Presence of wrong primary group for users: 1 | + 15 Point(s) |
| Presence of wrong primary group for computers: 1 | + 15 Point(s) |
| 1 domain(s) used in SIDHistory | + 15 Point(s) |
| Number of accounts which can have an empty password (can be overriden by GPO): 1 | + 15 Point(s) |
| Presence of Windows XP = 1 | + 10 Point(s) |
| Non admin users can add up to 10 computer(s) to a domain | + 10 Point(s) |
| The subnet declaration is incomplete [1 ip of DC not found in declared subnets] | + 5 Point(s) |
| SMB v1 activated on 1 DC | + 1 Point(s) |

When the rule is clicked, a short explanation of the rule is shown with some indication on how to solve the situation.



SMB v1 activated on 1 DC *+ 1 points*

## DC Vulnerability (SMB v1)

**Description:**
The purpose is to verify if Domain Controller are vulnerable to the SMB v1 vulnerability

**Technical explanation:**
The SMB downgrade attack is used to obtain credentials or executing commands on behalf of a user by using SMB v1 as protocol. Indeed, because SMB v1 supports old authentication protocol, the integrity can be bypassed

**Advised solution:**
It is highly recommended by Microsoft to disable SMB v1 whenever it is possible on both client and server side. **Do note that if you are still not following best practices regarding the usage of deprecated OS (Windows 2000, 2003, XP, CE), regarding Network printer using SMBv1 scan2shares functionnalities, or regarding software accessing Windows share with a custom implementation relying on SMB v1, you should consider fixing this issues before disabling SMB v1, as it will generates additionnal errors**.

**Points:**
1 points if present

**Documentation:**
https://github.com/lgandx/Responder-Windows
https://blogs.technet.microsoft.com/josebda/2015/04/21/the-deprecation-of-smb1-you-should-be-planning-to-get-rid-of-this-old-smb-dialect
ttps://support.microsoft.com/en-us/help/2696547/how-to-enable-and-disable-smbv1,-smbv2,-and-smbv3-in-windows-vista,-windows-server-2008,-windows-7,-windows-server-2008-r2,-windows-8,-and-windows-server-2012

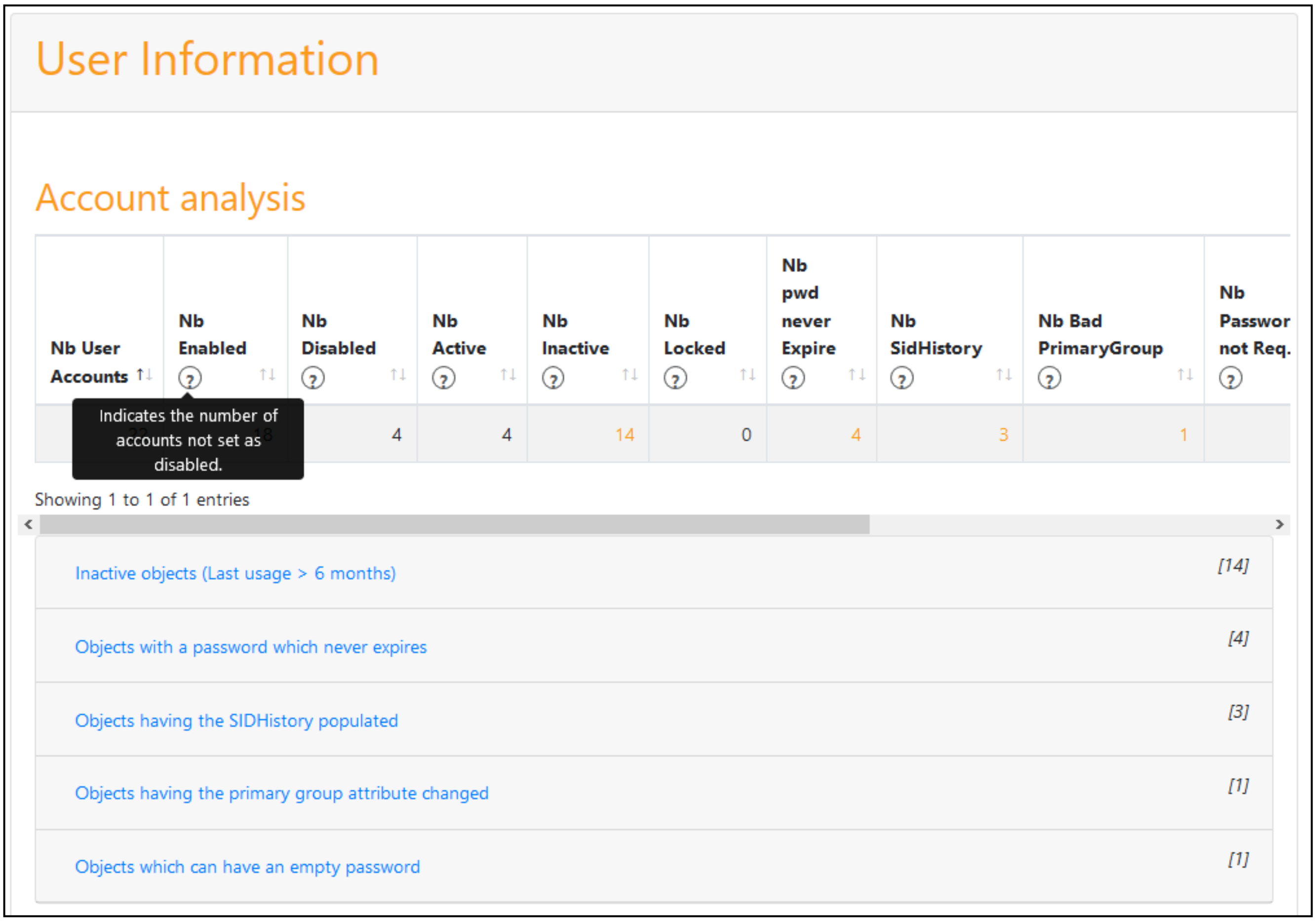
**Details:**
Domain controller: WIN-PGAHI2ECI8E

### 2) General information

Contains the generated date, domain

### 3) Details

The Detail zone shows general information about users, computers, trusts, group policies, …



# User Information

## Account analysis

| Nb User Accounts | Nb Enabled | Nb Disabled | Nb Active | Nb Inactive | Nb Locked | Nb pwd never Expire | Nb SidHistory | Nb Bad PrimaryGroup | Nb Passwor not Req. |
|---|---|---|---|---|---|---|---|---|---|
| 22 | 18 | 4 | 4 | 14 | 0 | 4 | 3 | 1 | |

Indicates the number of accounts not set as disabled.

Showing 1 to 1 of 1 entries

Inactive objects (Last usage > 6 months) [14]

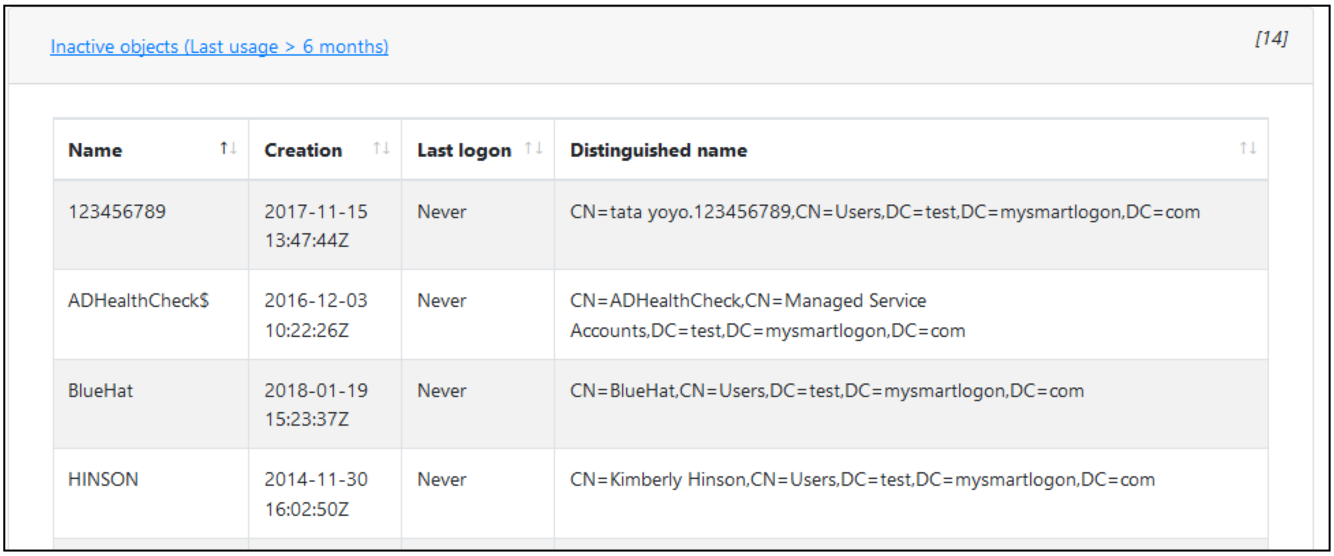
Objects with a password which never expires [4]

Objects having the SIDHistory populated [3]

Objects having the primary group attribute changed [1]

Objects which can have an empty password [1]

Some information can be seen in detail by clicking on the associated link. It contains data to help identify the underlying objects.



Inactive objects (Last usage > 6 months) [14]

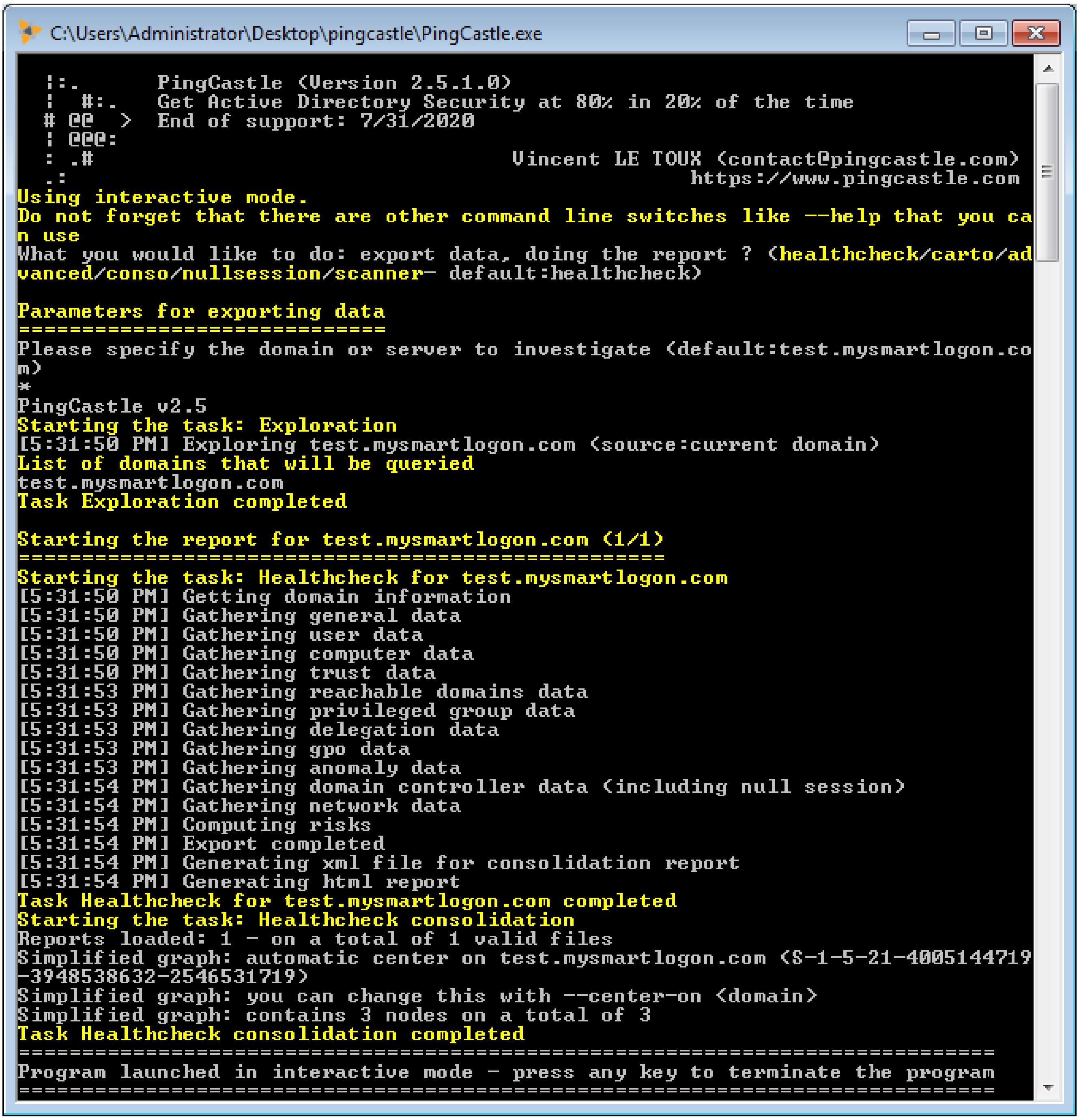
| Name | Creation | Last logon | Distinguished name |
|---|---|---|---|
| 123456789 | 2017-11-15 13:47:44Z | Never | CN=tata yoyo.123456789,CN=Users,DC=test,DC=mysmartlogon,DC=com |
| ADHealthCheck$ | 2016-12-03 10:22:26Z | Never | CN=ADHealthCheck,CN=Managed Service Accounts,DC=test,DC=mysmartlogon,DC=com |
| BlueHat | 2018-01-19 15:23:37Z | Never | CN=BlueHat,CN=Users,DC=test,DC=mysmartlogon,DC=com |
| HINSON | 2014-11-30 16:02:50Z | Never | CN=Kimberly Hinson,CN=Users,DC=test,DC=mysmartlogon,DC=com |

# Perform domain discovery

## Option 1: performing multiple health check reports (recommended)

If you want to get a quick status of your infrastructure, run the program with the “healthcheck” mode (just press enter) and enter as domain the asterisk (*).

All reachable domains will be scanned, the reachable mode will be activated and the consolidation report will be made automatically. This takes from a few minutes to one hour.



C:\Users\Administrator\Desktop\pingcastle\PingCastle.exe

```
  ¦:.       PingCastle (Version 2.5.1.0)
  ¦  #:.    Get Active Directory Security at 80% in 20% of the time
  # @@  >   End of support: 7/31/2020
  ¦ @@@:
  : .#                                Vincent LE TOUX (contact@pingcastle.com)
  .:                                                https://www.pingcastle.com
Using interactive mode.
Do not forget that there are other command line switches like --help that you ca
n use
What you would like to do: export data, doing the report ? (healthcheck/carto/ad
vanced/conso/nullsession/scanner- default:healthcheck)

Parameters for exporting data
=============================
Please specify the domain or server to investigate (default:test.mysmartlogon.co
m)
*
PingCastle v2.5
Starting the task: Exploration
[5:31:50 PM] Exploring test.mysmartlogon.com (source:current domain)
List of domains that will be queried
test.mysmartlogon.com
Task Exploration completed

Starting the report for test.mysmartlogon.com (1/1)
===================================================
Starting the task: Healthcheck for test.mysmartlogon.com
[5:31:50 PM] Getting domain information
[5:31:50 PM] Gathering general data
[5:31:50 PM] Gathering user data
[5:31:50 PM] Gathering computer data
[5:31:50 PM] Gathering trust data
[5:31:53 PM] Gathering reachable domains data
[5:31:53 PM] Gathering privileged group data
[5:31:53 PM] Gathering delegation data
[5:31:53 PM] Gathering gpo data
[5:31:53 PM] Gathering anomaly data
[5:31:54 PM] Gathering domain controller data (including null session)
[5:31:54 PM] Gathering network data
[5:31:54 PM] Computing risks
[5:31:54 PM] Export completed
[5:31:54 PM] Generating xml file for consolidation report
[5:31:54 PM] Generating html report
Task Healthcheck for test.mysmartlogon.com completed
Starting the task: Healthcheck consolidation
Reports loaded: 1 - on a total of 1 valid files
Simplified graph: automatic center on test.mysmartlogon.com (S-1-5-21-4005144719
-3948538632-2546531719)
Simplified graph: you can change this with --center-on <domain>
Simplified graph: contains 3 nodes on a total of 3
Task Healthcheck consolidation completed
=============================================================================
Program launched in interactive mode - press any key to terminate the program
=============================================================================
```

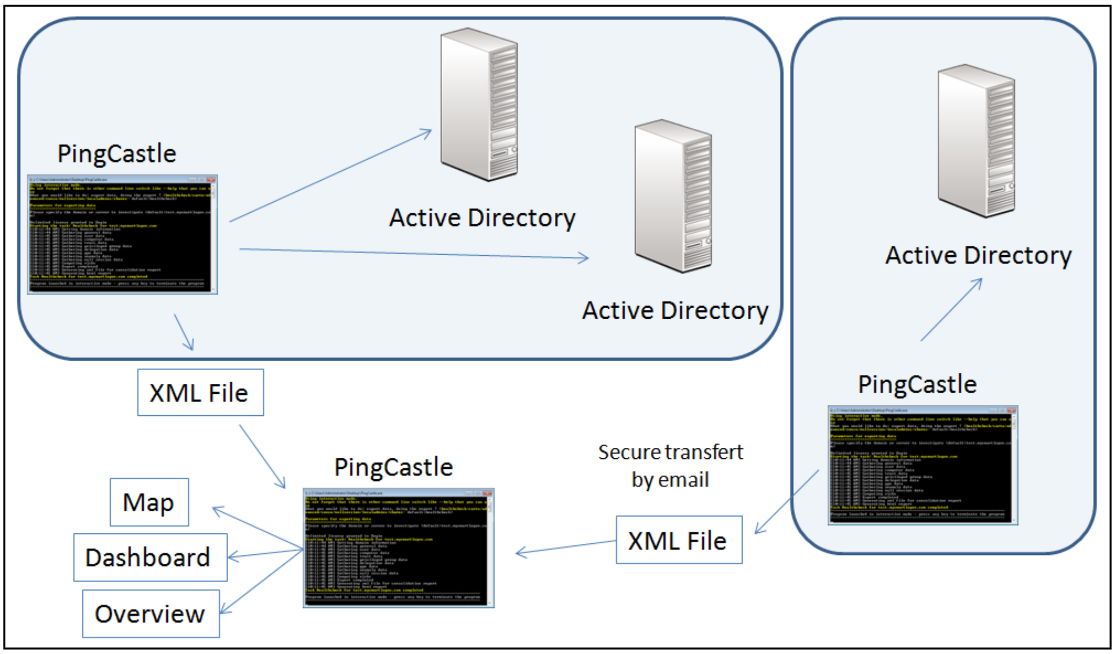
Then open the cartography reports (see below).

**Important:** xml reports generated from multiple point of view can be used to have a consolidated map.

Do not forget to check the Getting an overview or dashboard section.

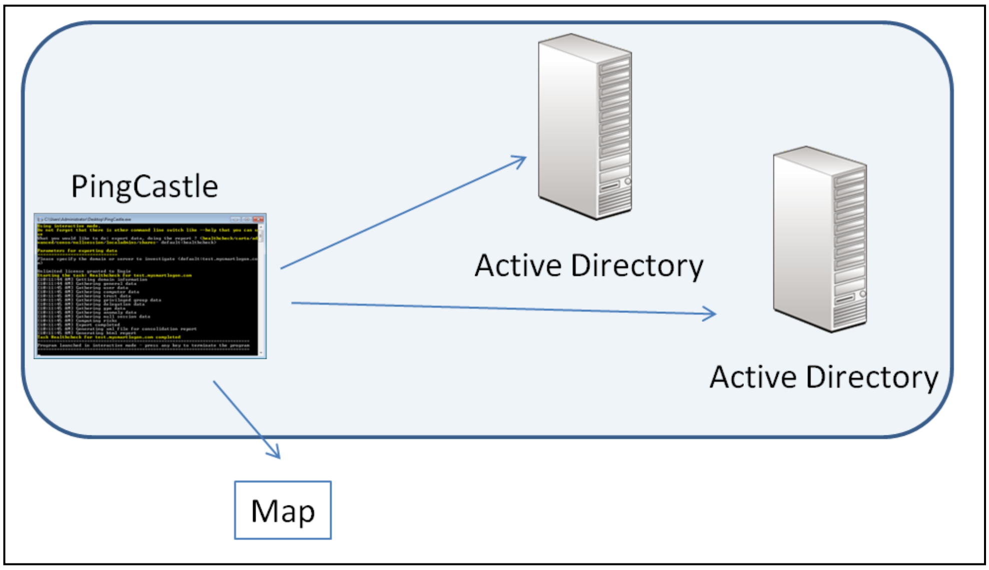
## Option 2: when having existing health check reports

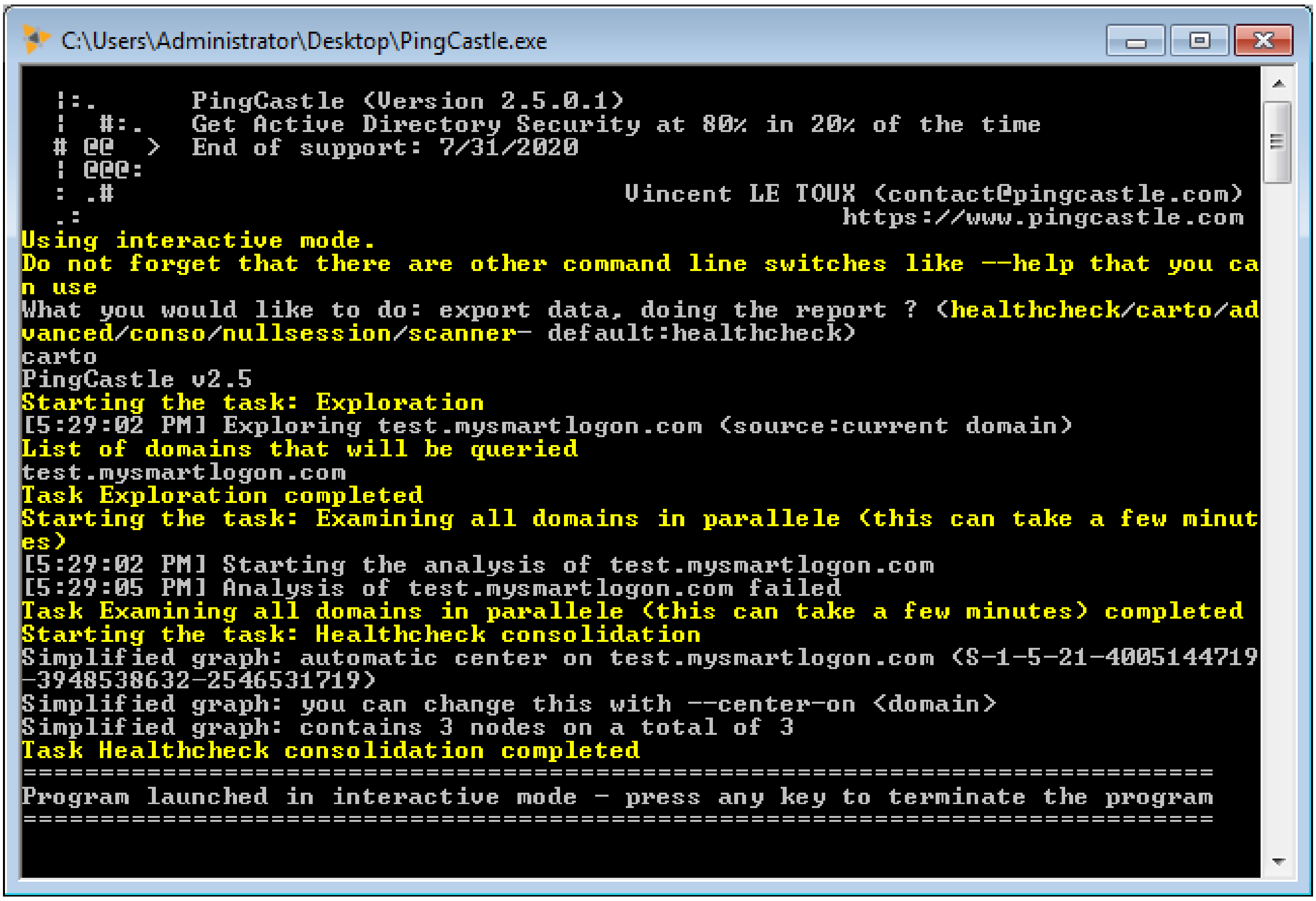
**The map can be generated in the interactive mode by choosing “conso” .** This mode performs the consolidation report and build the maps.



## Option 3: perform a quick domain exploration (fastest but not scalable)

If you need only a quick map (< 5 minutes of execution), enter “carto” when using the interactive mode or run the program with the switch --carto.





C:\Users\Administrator\Desktop\PingCastle.exe

```
  |:.      PingCastle (Version 2.5.0.1)
  |  #:.   Get Active Directory Security at 80% in 20% of the time
  # @@  >  End of support: 7/31/2020
  | @@@:
  :  .#                             Vincent LE TOUX (contact@pingcastle.com)
  .:                                        https://www.pingcastle.com
Using interactive mode.
Do not forget that there are other command line switches like --help that you ca
n use
What you would like to do: export data, doing the report ? (healthcheck/carto/ad
vanced/conso/nullsession/scanner- default:healthcheck)
carto
PingCastle v2.5
Starting the task: Exploration
[5:29:02 PM] Exploring test.mysmartlogon.com (source:current domain)
List of domains that will be queried
test.mysmartlogon.com
Task Exploration completed
Starting the task: Examining all domains in parallele (this can take a few minut
es)
[5:29:02 PM] Starting the analysis of test.mysmartlogon.com
[5:29:05 PM] Analysis of test.mysmartlogon.com failed
Task Examining all domains in parallele (this can take a few minutes) completed
Starting the task: Healthcheck consolidation
Simplified graph: automatic center on test.mysmartlogon.com (S-1-5-21-4005144719
-3948538632-2546531719)
Simplified graph: you can change this with --center-on <domain>
Simplified graph: contains 3 nodes on a total of 3
Task Healthcheck consolidation completed
=============================================================================
Program launched in interactive mode - press any key to terminate the program
=============================================================================
```

The program discovers all the reachable domains, does a light scan and produce the same map than in the health check consolidation mode. The SID Filtering status is accurate but the individual scores are not available. Scans are performed in parallel. Cartography reports cannot be combined when run on more than one point of view. If you need to combine data from multiple AD, you should run the healthchecking reports and consolidate their reports.

## Maps

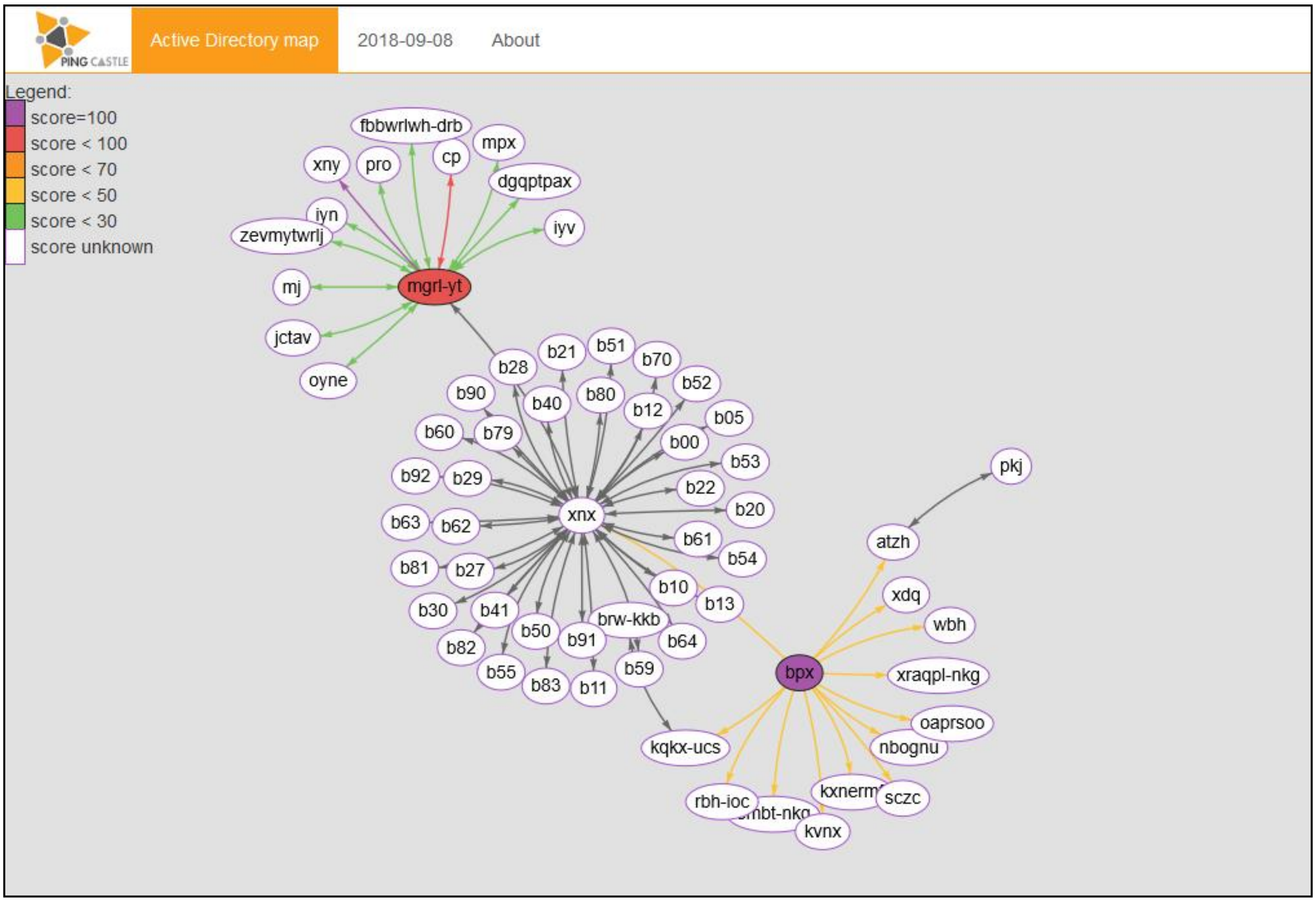
There are two kinds of map. The first one is the most complete but can be difficult to read. To avoid this difficulty, a simplified most exists where a domain is connected to others only using a single trust. It builds a hierarchy.

When available, the Active Directory health check score is displayed and colored by on it. Trusts are also colored based on the SID Filtering state.

### Full domain map

The full domain map is represented by the files xxx_full_node_map.html. Each map is a dynamic map. Each node can be moved.

Example of graph produced by the tool



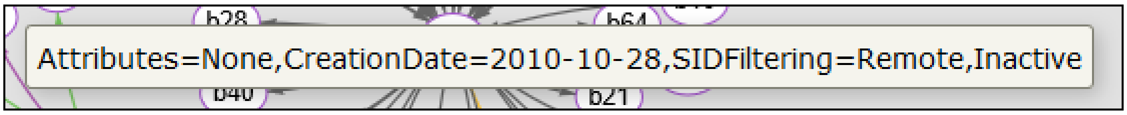
The colored circles are the domain on which the reports have been run. The color depends on the score. The purple bordered circles are the domains on which the script has not been run but that they program found using trust link.

Legend:

| | | | |
|---|---|---|---|
| → | Intra forest trust | ● | Domain with a score = 100 |
| → | Trust without SID Filtering | ● | Domain with a score > 70 and < 100 |
| → | Trust with SID Filtering | ● | Domain with a score > 50 and <= 70 |
| → | Inactive trust | ● | Domain with a score > 30 and <= 50 |
| → | Unidirectional trust without SID Filtering info | ● | Domain with a score <= 30 |
| → | trust used for migration (declared in dashboard) | ○ | Domain without a report |

When the mouse is on a circle, the full name of the domain appears:

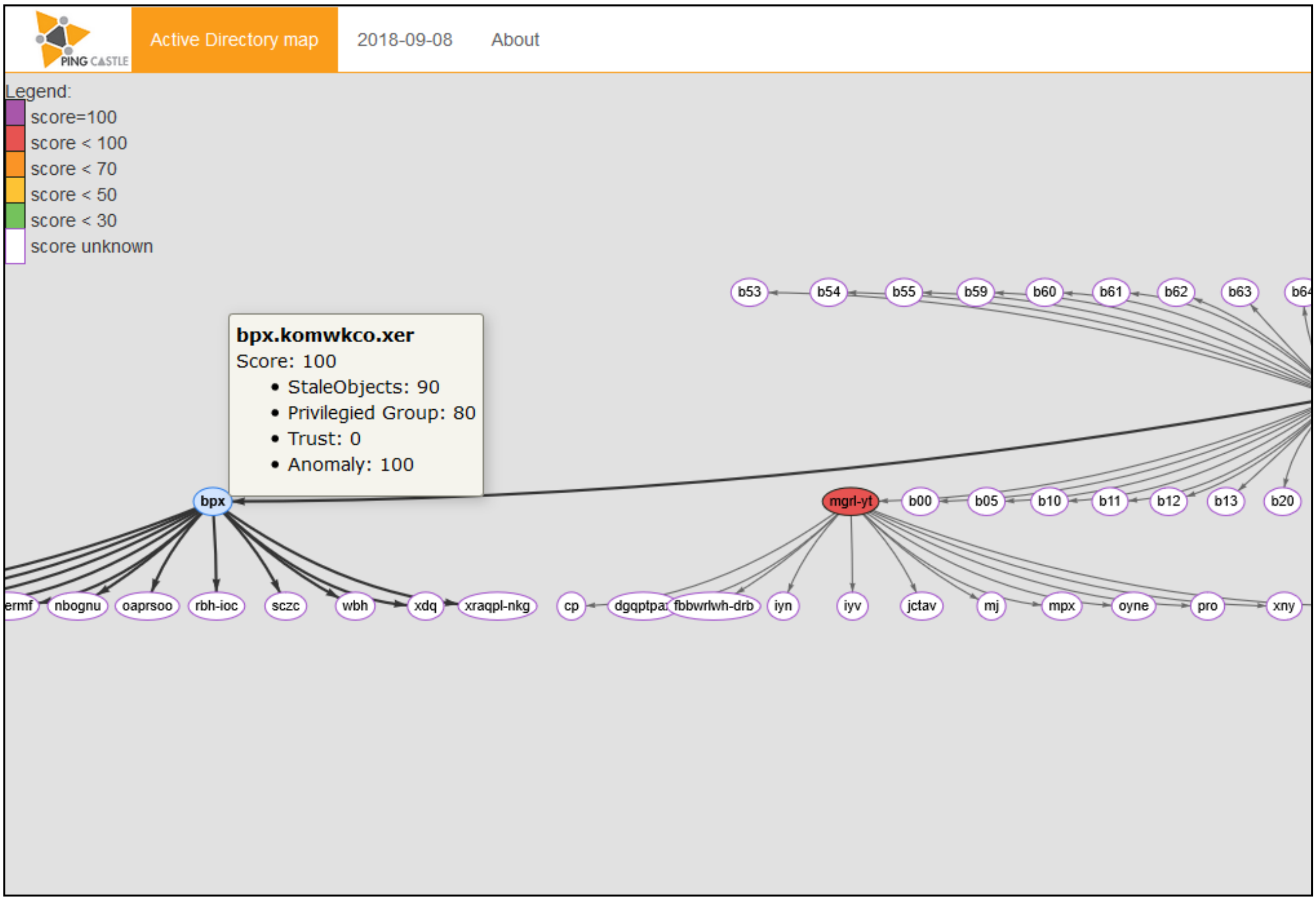
If the mouse is hold on a trust, the detail is shown in a popup:



Attributes=None,CreationDate=2010-10-28,SIDFiltering=Remote,Inactive

### Simple domain map

The simple domain map is represented by the files xxx_simple_node_map.html.



**bpx.komwkco.xer**
Score: 100

- StaleObjects: 90
- Privilegied Group: 80
- Trust: 0
- Anomaly: 100

This is the same map except that a domain is present only one time in the graph and connected with only one trust. The domain which has the most trust is automatically selected to be at the center of the graph. The domain at the center can be specified manually.

### Hilbert map

The simple domain map is represented by the files xxx_hilbert_map.html.

Networks are big and it can be difficult to have a visual representation of them. This report displays what is called a Hilbert map. Indeed, fractal functions are used to compress a 1D space (IP addresses of the networks), into 2D for a visual representation. Each square represent a network. It can be used to detect non occupied space or networks which are overlapping.

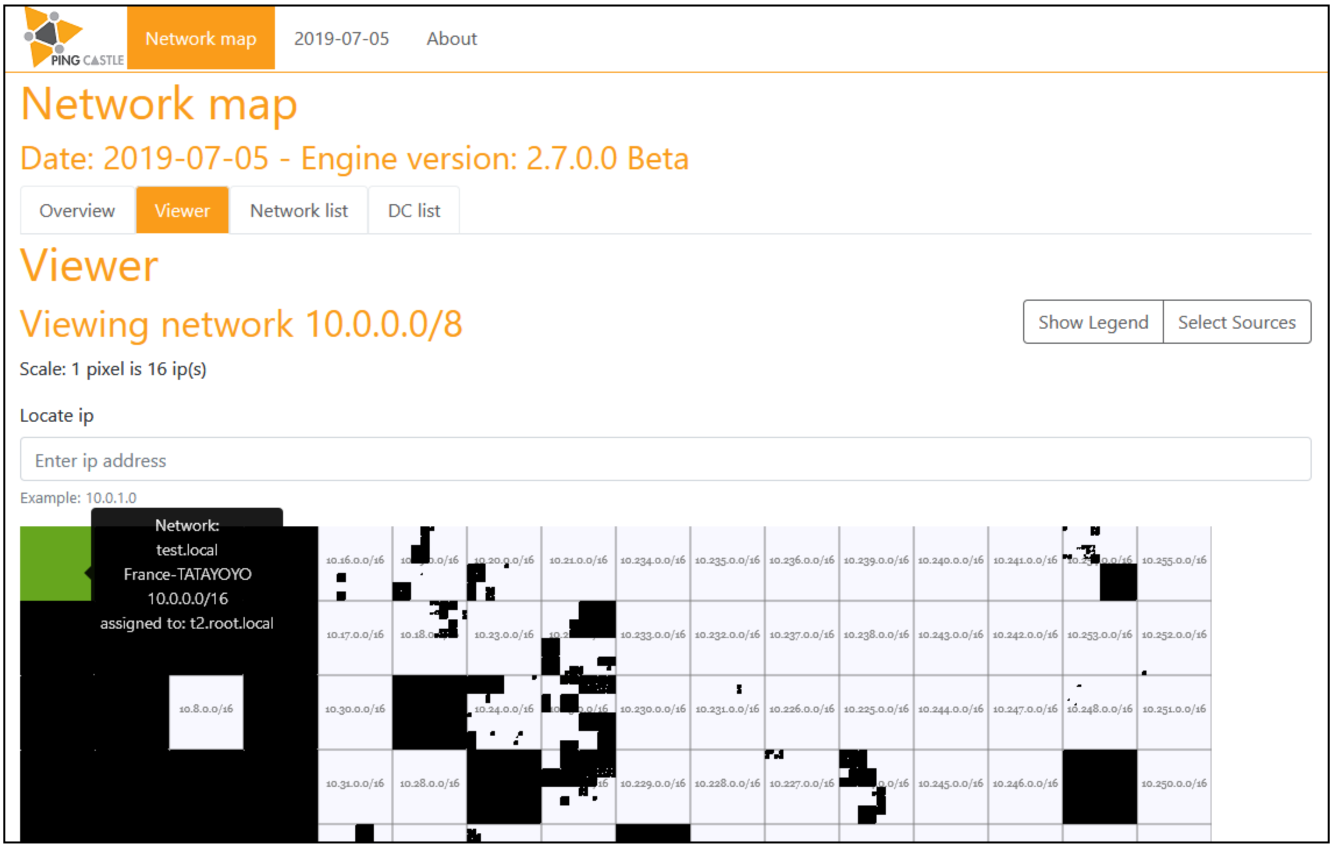
This report is divided into 4 areas:

- the first one give an overview of all the networks
- the second one zoom deeper into the selected network
- the first one displays the list of networks

- the last one show the list of domain controllers identified

On the viewer Window, sources can be selected to avoid an overlapping with two sources.

There is a mouse over popup which gives you detail about a select IP (and the networks where it does belong) and a search function can be use to find a specific IP address.



Network map

Date: 2019-07-05 - Engine version: 2.7.0.0 Beta

Viewer

Viewing network 10.0.0.0/8

Scale: 1 pixel is 16 ip(s)

Locate ip

Enter ip address

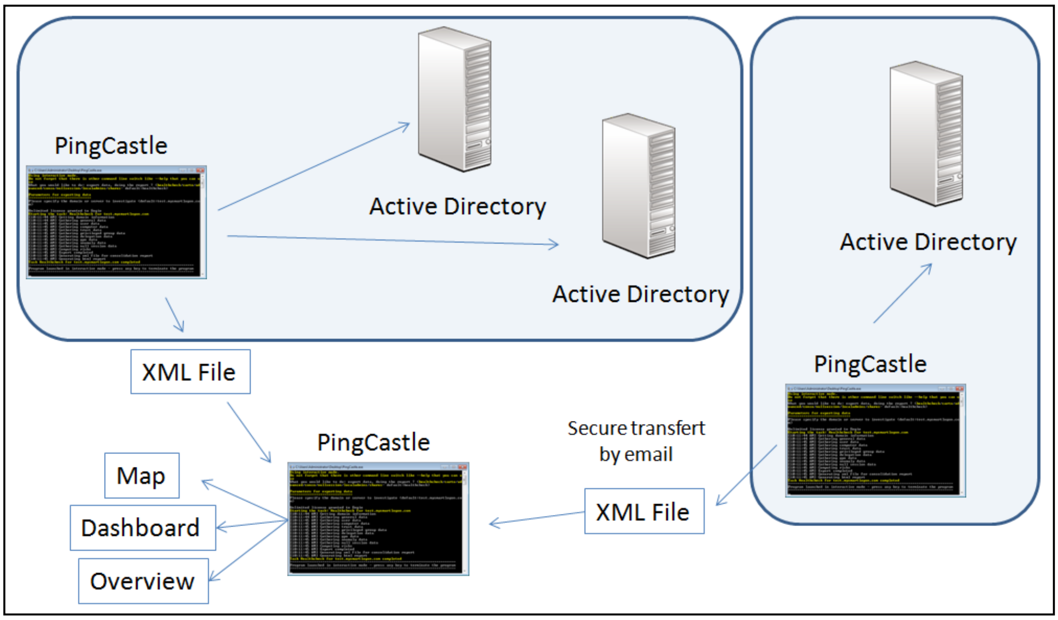
Example: 10.0.1.0

Network:
test.local
France-TATAYOYO
10.0.0.0/16
assigned to: t2.root.local

# Deploying PingCastle

PingCastle has been designed to be **scalable** and used in a **decentralized architecture**.

To be the most effective, PingCastle needs to have the risk reports for all domains. Because **PingCastle doesn' t need an account in the domain to audit**, you can take benefits of trusts to perform this task.



## Involvement of the management

**The management involvement is a critical factor of success**. Here is how you can proceed.

You can start the project by running the tool without notifying the domain administrators to get a first overview. The healthcheck mode run on all trusted server (server set as "*" ) or the carto mode can help built a big picture of all domains involved.

Then you can **deploy officially in a small perimeter** and **use the report results to challenge the domain administrators**. Based on the risk indicators or on the delay required to fix the problems, you can take the opportunity to **involve the management here**.

Here some arguments which can help you involve the management about this kind of project:

- **Active Directory' s security is crucial**: the probability that an auditor compromise an Active Directory is about 90%
- Management has to **prove to external auditors** that actions are being made on that topic
- The tool doesn't need any setup, installation, server, project, … **Cost & effort are minimal**
- The risk indicators can be used to **prove that the situation has been improved** and it can be used for benchmarking (an effective management method)
- The tool returns anomalies which 80% of them **can be fixed within 5 minutes**

**Decision to take**

We recommend that the decision made by the management is about:

- **Deploy the tool on 100% of the domains**
  For example set the initial deadline to 3 months and assign discovered trusted domain to the AD owner.
- **Request the implementation of SID Filtering on 100% of the trusts** except official migrations
  For example set a list of critical domains and list the trusts linked to that domains without SID Filtering.
- **Follow the progress of these actions on the management meetings**.
  For example set a monthly follow up meeting with the people involved.

**Getting to 100%**

Below is a list of reasons an entity can invoke (or remain silent) to be excepted:

- Minority share holding company
- Migration and removal of the domain in the upcoming months
- Regulations
- “Confidential information” included in the script

To handle the migration cases, PingCastleReporting **supports a “migration” status** for the domain auditing & a “migration” status for SID Filtering. In the SID Filtering case, an end date has to be defined. We recommend 3 to 12 months. Migration should be an excuse for removing anomalies, not running the script (a 5 minutes effort !).

For “confidential information”, the **xml report doesn’t include any personal information nor administrator accounts**. If the level of information included is too high, a configuration switch exists to lower the level of information. If the problem is about the transfer of the data in an unsafe channel, the tool can encrypt the xml report to solve this problem.

For other issues, we recommend to **insist if there are trusts to existing domains**. Indeed, a trust facilitates the attacker job because he knows that there is a domain via the trust information, that there can be credentials in memory (mimikatz) or that he can absuse network connection (LLMR spoofing with Python Responder). If you can’t get a report, we suggest to remove the trust to these domains.

Then for domains without a trust, you can **formally transfer the responsibility of the Active Directory compromise** and put the domain status to “Out Of Scope”.

**Deploying PingCastle in decentralized locations**

PingCastle **can be run on every domain of a company** using the command:

```
PingCastle --healthcheck
```

Reports can then be regrouped to produce a global view. See below for the technics (encryption, transfert by email) to centralize the reports.

## Deploying PingCastle in centralized locations

PingCastle **can be run on a Bastion Active Directory**, generally used to perform administration tasks. In this case, all the domains will be scanned.

```
PingCastle --healthcheck --server *
```

The program **can be run on every forest root** and be limited to that perimeter

```
PingCastle --healthcheck --server *.forest.root
```

The tool **can be run on every forest child** and explore the child and its trusted domains. In this case the forest root is excluded.

```
PingCastle --healthcheck --explore-trust --server child.forest.root
```

PingCastle can explore all the domains of all the trusted forests from another forest. This is useful when the root and child doesn’ t share the same name.

```
PingCastle --healthcheck --explore-forest-trust --server anotherforest.root
```

If needed, exceptions can be set to not scan domains. For example to not scan the Bastion domain multiple times. In this case use the option --explore-exception <domains> where domains are comma separated domain name.

## Updating PingCastle

Since PingCastle 2.7, a new update program is delivered. It downloads the latest release from the github official releases. In option, it can download the beta release or wait that the release has reached a specific age.

Here is the options available:

```
  --api-url http://xx : use an alternative url for checking for updates
  --force-download     : download the latest release even if it is not the most recent.
Useful for tests
  --use-preview       : download preview release if it is the most recent
  --wait-for-days  30 : ensure the releases has been made public for at least X days
```

# Centralizing reports

### Encryption

Sometimes, domains are unconnected or it is not possible to make the schedule tasks centralize in a single share all the reports. To deal with this case, **PingCastle can encrypt the reports to send them in an unsafe channel**.

A RSA key pair need to be generated and the public key needs to be shared with all the instance of the program. When producing risks reports and generating the .xml files, add the flag --encrypt to perform the encryption.

You can generate a keypair using the following command and copy the public key in the .config file to be deployed.

```
PingCastle.exe --generate-key
```

```
Starting the task: Generate Key
Public Key (used on the encryption side):
<encryptionSettings encryptionKey="default">
 <RSAKeys>
 <!-- encryption key -->
 <KeySettings name="default" publicKey="&lt;RSAKeyValue&gt;&lt;Modulus&gt;h
4smrLAZZ30QwWXHcT1oNz3hH3Ax2R9T75DlioGFCIdLb0QhUn3N8NWgJ2ZgyUNXn4qU1b0DslOIhK+Cq
oqCPvXuHjK6TGrMyphtcbZvvgbLxfyalJemczx1+pOuBlqqVdalE94rnnnBr761WIJJnkJdZ0rzYsebn
DwGuk9kiw8=&lt;/Modulus&gt;&lt;Exponent&gt;AQAB&lt;/Exponent&gt;&lt;/RSAKeyValue
&gt;"/>
 <!-- end -->
 </RSAKeys>
</encryptionSettings>
Private Key (used on the decryption side):
<encryptionSettings encryptionKey="default">
 <RSAKeys>
 <!-- decryption key -->
 <KeySettings name="39b5d076-17be-4999-b43e-b894a55446a1" privateKey="&lt;R
SAKeyValue&gt;&lt;Modulus&gt;h4smrLAZZ30QwWXHcT1oNz3hH3Ax2R9T75DlioGFCIdLb0QhUn3
N8NWgJ2ZgyUNXn4qU1b0DslOIhK+CqoqCPvXuHjK6TGrMyphtcbZvvgbLxfyalJemczx1+pOuBlqqVda
lE94rnnnBr761WIJJnkJdZ0rzYsebnDwGuk9kiw8=&lt;/Modulus&gt;&lt;Exponent&gt;AQAB&lt
;/Exponent&gt;&lt;P&gt;uwgX794pe7O3vIiQR5v03WK3Ug5LUAbXpPF6Xq4qGb3TGprZaJQq5rZ2u
J4qwRanOa5pI/zv7RhG/4ItesBuAw==&lt;/P&gt;&lt;Q&gt;uYaNLEp9Vh8F29tSH+M4z+OjxPl+UL
```

```
LRjLrssFLTTNsdnrHgAtdJ1lxfIm/gTUa0qPLa9Y/xkUb1khK/+tV3BQ==&lt;/Q&gt;&lt;DP&gt;Fd
feI8+IfMACh2xTnWljca+jxVuSBCioasUhC4m/tP3sd8D5/zK+x+8rcmhWifKBWUU7Vk6mHsSlFhY4BY
wPzQ==&lt;/DP&gt;&lt;DQ&gt;gzfwh8AT0CLXEP6ZomYi257lST8xoUAoyEG5gKjEPJrJ42Fp0HiXB
9+Dhibc3atBwjEqvv5VXGx06iEK2g27RQ==&lt;/DQ&gt;&lt;InverseQ&gt;HRKFjYwrXqgO4v8Q+J
SOqR6lSvQ15Z6V4AE23i4xfeuIYWwVf0t8AwgkDfFRQnEyh24byuh5PPzUbDOsUY+eYg==&lt;/Inver
seQ&gt;&lt;D&gt;QQ6pIXnkt6dvw2P2toOi4eDxjQVs56oBv5rske5YzB8kNeOdmtqHXnEqzb519iQ8
incZuP1gKNevTwBu1yxkFuFh0dzjS3iBjHvYGtDo5mARiZ1nN8QNI2zKE+Q6qXF8Z+wN3Fv3oBDQXATI
6IQbgkAxLTMo4CUmtUQ6GvjwFwE=&lt;/D&gt;&lt;/RSAKeyValue&gt;"/>
 <!-- end -->
 </RSAKeys>
</encryptionSettings>
Done
Task Generate Key completed
```

Then copy the private key section in the PingCastle and PingCastleReporting configuration file (.config) used to consolidate the results. PingCastle will perform the decryption automatically.

The program can generate an encrypted copy of a report (public key needed) and a decrypted copy of a report (private key needed) using the following commands:

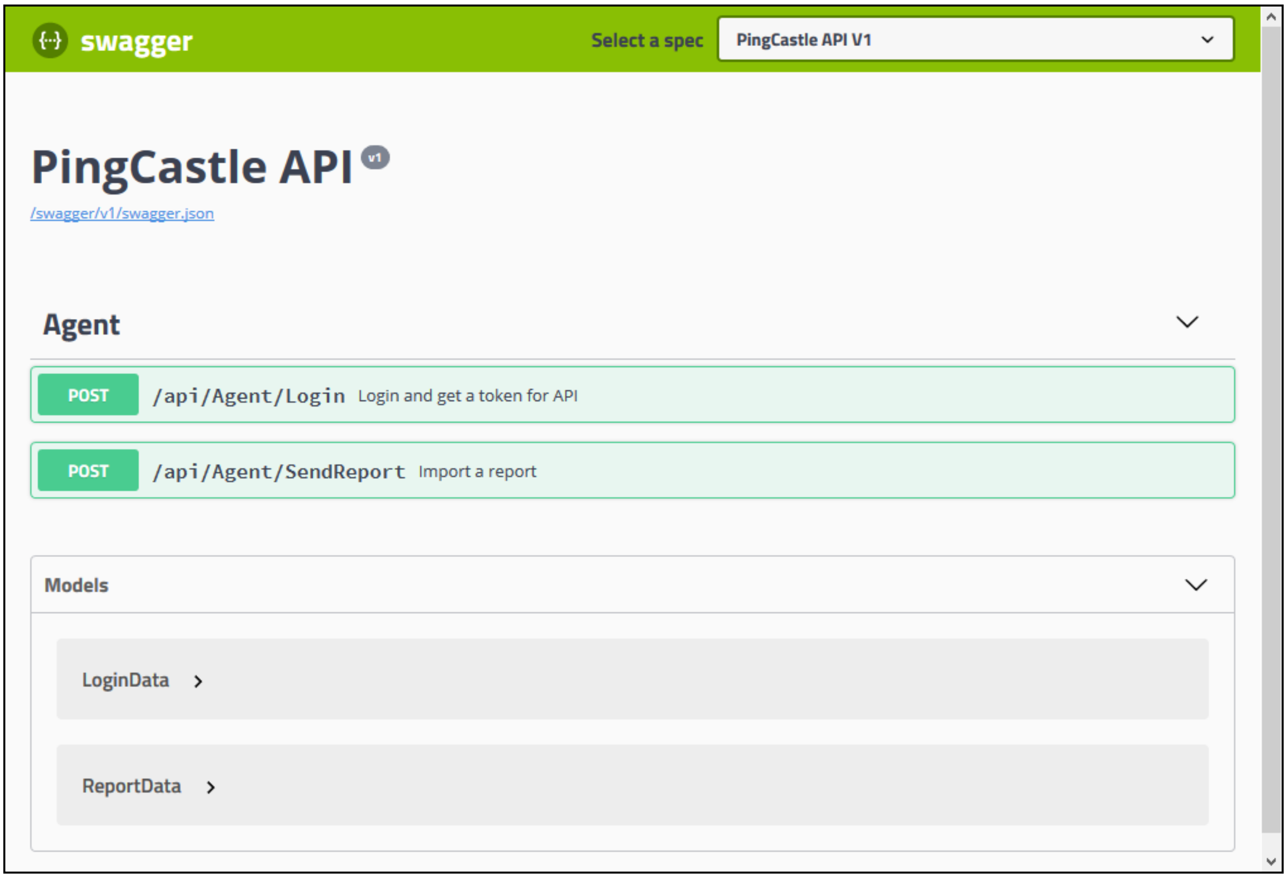
```
PingCastle --reload-report report.xml --encrypt
PingCastle --reload-report encrypted-report.xml
```

Note: Only one key can be specified for encryption but multiple keys can be used for decryption. Their selection is automatic.

### Email

PingCastle can contact if specified a SMTP server to **send the reports by email**. If the encryption is set, the program will encrypt the reports. Use --sendXmlTo <email> to send only the xml report, --sendHtmlTo <email> to send only the html report and --sendAllTo <email> to send both html and xml report. Email addresses are comma separated ones and the previous flags can be combined.

# API



PingCastle API v1

/swagger/v1/swagger.json

Agent

POST /api/Agent/Login Login and get a token for API

POST /api/Agent/SendReport Import a report

Models

LoginData

ReportData

PingCastle can send the report (encrypted or not) using an API.

You can query a PingCastle API server or build a client or server from Swagger.

The description of the API in swagger format can be found here.

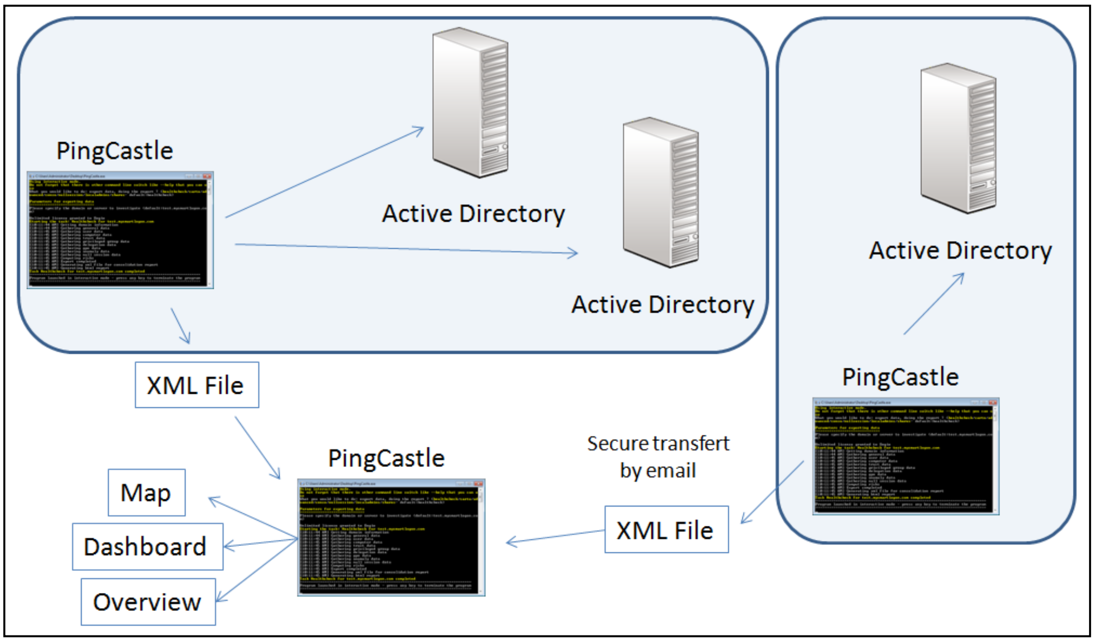
## Getting an overview with multiple reports

How much users or computers to you have ? Should you purchase additional support for Windows XP or Windows 2003 ? Should you plan an administrator cleanup ? Are the requirement for a 8 characters password enforced ?

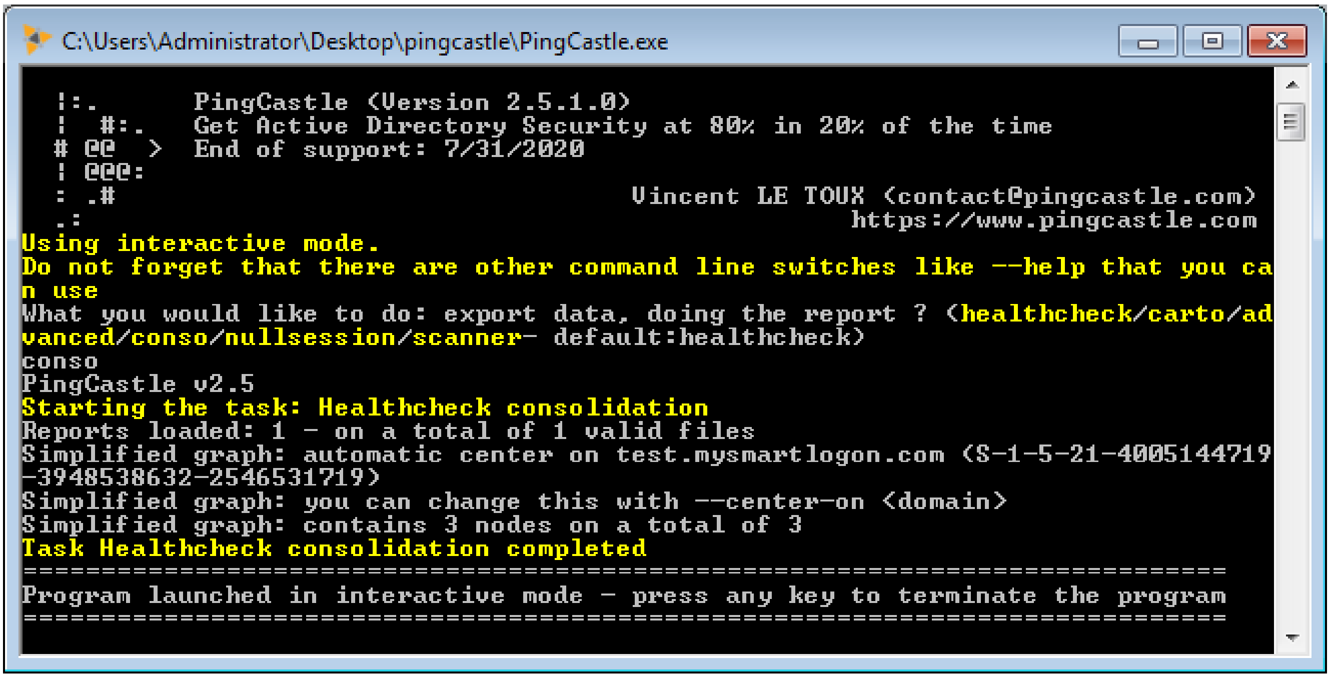
This is the kind of questions you can answer with the simplest consolidation. Indeed, the program can be used to aggregate the report results.

### Operations to perform

The consolidation process is working on the xml files generated by the consolidation report. By default, the files are picked in the directory (or sub directory) where the program is run. If there are duplicate reports, only the most recent is used.



**To generate the report, enter “conso” in the interactive mode**.



```
  |:.      PingCastle (Version 2.5.1.0)
  |  #:.   Get Active Directory Security at 80% in 20% of the time
  # @@  >  End of support: 7/31/2020
  | @@@:
  : .#                                 Vincent LE TOUX (contact@pingcastle.com)
  .:                                          https://www.pingcastle.com
Using interactive mode.
Do not forget that there are other command line switches like --help that you ca
n use
What you would like to do: export data, doing the report ? (healthcheck/carto/ad
vanced/conso/nullsession/scanner- default:healthcheck)
conso
PingCastle v2.5
Starting the task: Healthcheck consolidation
Reports loaded: 1 - on a total of 1 valid files
Simplified graph: automatic center on test.mysmartlogon.com (S-1-5-21-4005144719
-3948538632-2546531719)
Simplified graph: you can change this with --center-on <domain>
Simplified graph: contains 3 nodes on a total of 3
Task Healthcheck consolidation completed
=============================================================================
Program launched in interactive mode - press any key to terminate the program
=============================================================================
```

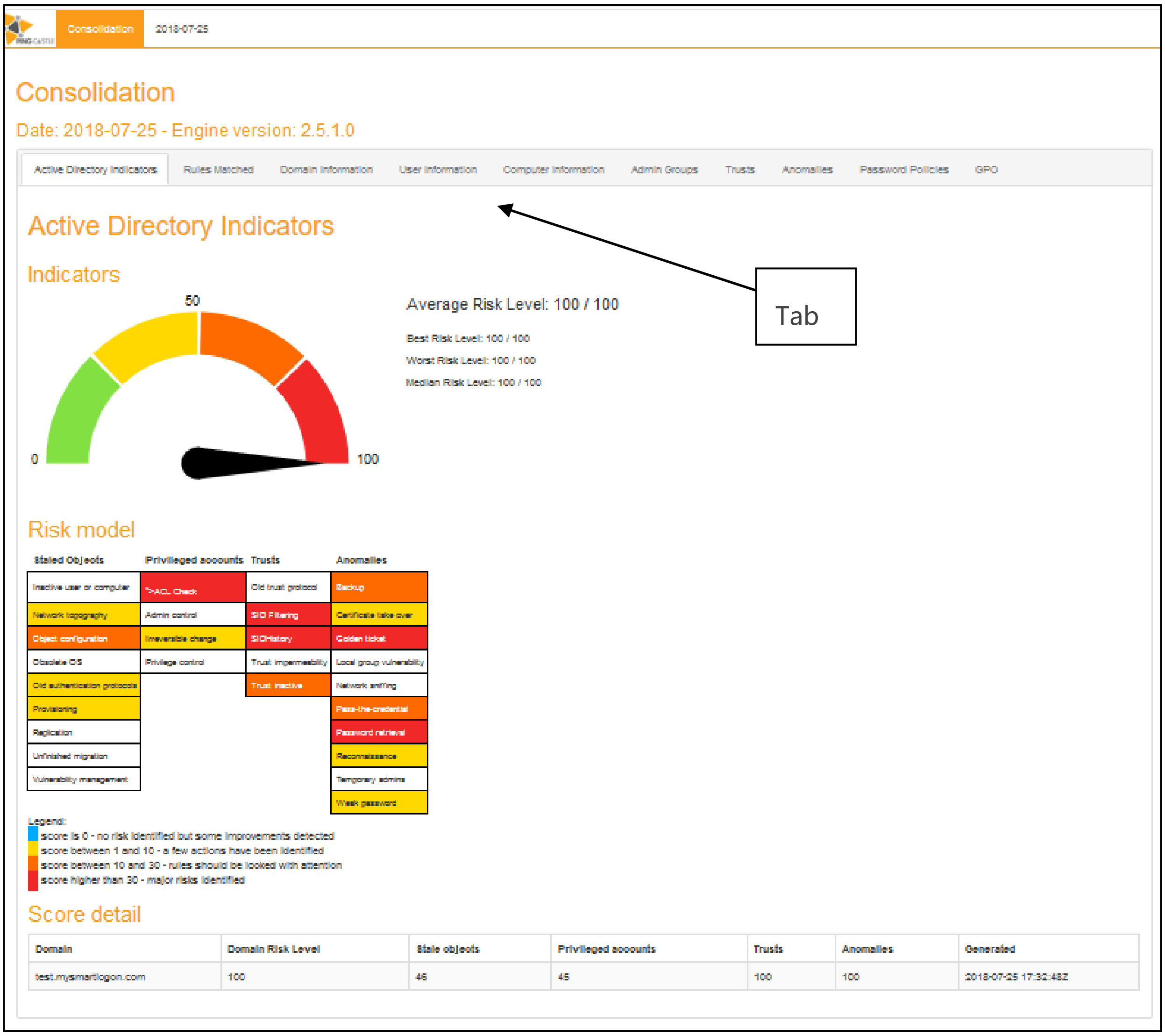
Or type the following command line:

```
PingCastle --hc-conso
```

Note: This report is generated automatically when the healthcheck is performed with the server "*"

### Consolidation report

The consolidation report is a concatenation of all data contained in the report, without the detail. It follows the same plan than a simple report.



Consolidation 2018-07-25

## Consolidation

Date: 2018-07-25 - Engine version: 2.5.1.0

Active Directory Indicators | Rules Matched | Domain Information | User Information | Computer Information | Admin Groups | Trusts | Anomalies | Password Policies | GPO

## Active Directory Indicators

### Indicators

Average Risk Level: 100 / 100

Best Risk Level: 100 / 100

Worst Risk Level: 100 / 100

Median Risk Level: 100 / 100

### Risk model

| Staled Objects | Privileged accounts | Trusts | Anomalies |
|---|---|---|---|
| Inactive user or computer | ?-ACL Check | Old trust protocol | Backup |
| Network topography | Admin control | SID Filtering | Certificate take over |
| Object configuration | Irreversible change | SIDHistory | Golden ticket |
| Obsolete OS | Privilege control | Trust impermeability | Local group vulnerability |
| Old authentication protocols | | Trust inactive | Network sniffing |
| Provisioning | | | Pass-the-credential |
| Replication | | | Password retrieval |
| Unfinished migration | | | Reconnaissance |
| Vulnerability management | | | Temporary admins |
| | | | Weak password |

Legend:

🟦 score is 0 - no risk identified but some improvements detected

🟨 score between 1 and 10 - a few actions have been identified

🟧 score between 10 and 30 - rules should be looked with attention

🟥 score higher than 30 - major risks identified

### Score detail

| Domain | Domain Risk Level | Stale objects | Privileged accounts | Trusts | Anomalies | Generated |
|---|---|---|---|---|---|---|
| test.mysmartlogon.com | 100 | 46 | 45 | 100 | 100 | 2018-07-25 17:32:48Z |

When the consolidation is made, 3 html files are generated.

**File ad_hc_summary.html**

The first one contains the summary of all the reports: It keeps the same structure than the detailed reports but with a higher level of detail.

Example

**ad_hc_summary_full_node_map.html**

The second file is a map build on all trusts. See domain discovery.

Example

**ad_hc_summary_simple_node_map.html**

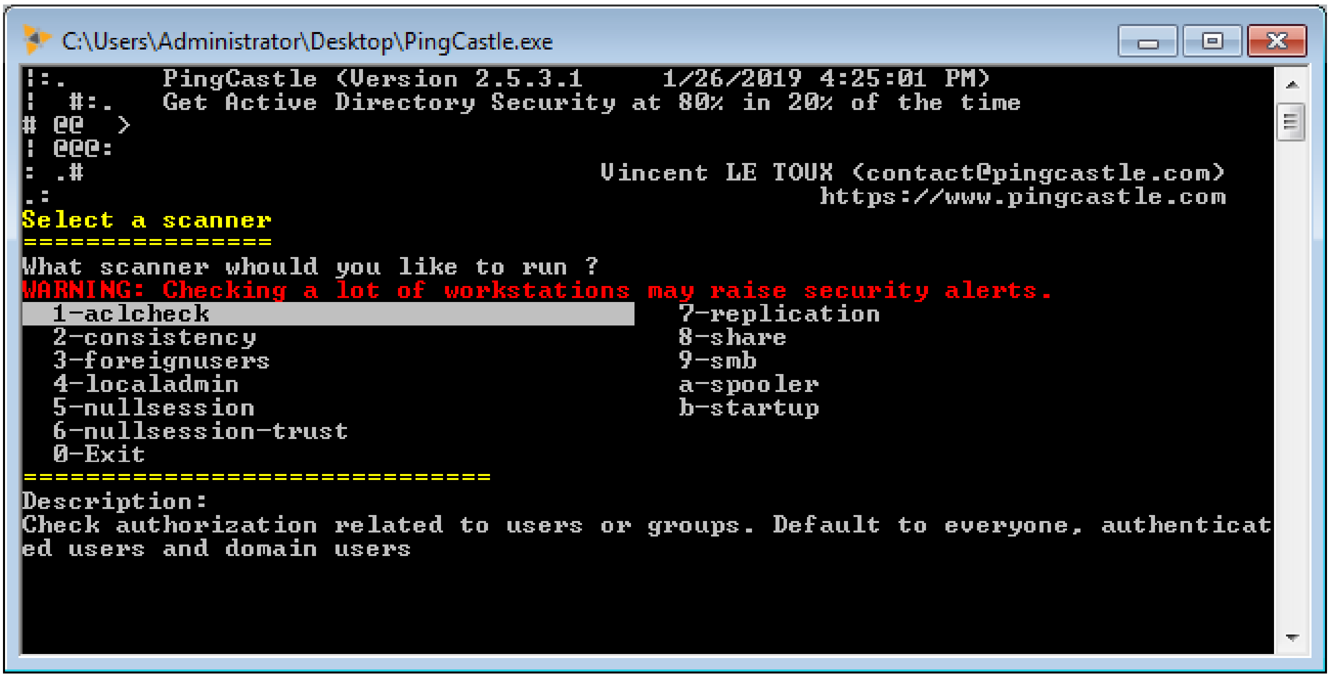
The third file is a map build on all trusts. See domain discovery.

Example

## Scanners

PingCastle has some builtin program to check for specific features. These programs are called "scanners" and are accessible from the "scanner" item on the main menu.

When selected, a menu is displayed to select the program. At the bottom, a scanner description is shown.



```
|:.      PingCastle (Version 2.5.3.1     1/26/2019 4:25:01 PM)
|  #:.   Get Active Directory Security at 80% in 20% of the time
# @@  >
| @@@:
: .#                                  Vincent LE TOUX (contact@pingcastle.com)
.:                                           https://www.pingcastle.com
Select a scanner
================
What scanner whould you like to run ?
WARNING: Checking a lot of workstations may raise security alerts.
  1-aclcheck                                 7-replication
  2-consistency                              8-share
  3-foreignusers                             9-smb
  4-localadmin                               a-spooler
  5-nullsession                              b-startup
  6-nullsession-trust
  0-Exit
==============================
Description:
Check authorization related to users or groups. Default to everyone, authenticat
ed users and domain users
```

Here are the main scanners

### Check for specific user in global permissions

The AclCheck scanner is used to hunt for write permission given to objects on a domain. It is default to the "authenticated users", "domain users", "everyone" groups.

```
PingCastle --scanner aclcheck --server <domainToExplore>
```

### Local administrators

The local administrator accounts can be used in an attack to recover passwords in memory with tools like mimikatz. You can enumerate most of them without any privilege with PingCastle with the following command:

```
PingCastle --scanner localadmin --server <domainToExplore>
```

### Local shares

Local shares can be opened to everyone and be storing confidential information like login and passwords or backups. PingCastle can do a quick scan without any privilege and locate open share using the following command:

```
PingCastle --scanner share --server <domainToExplore>
```

### Start time

Any authenticated users can get the start time of a computer in the domain and even unauthenticated ones if SMB v2 is activated. PingCastle can do a quick scan without any privilege and gather the start time of all computers of the domain:

```
PingCastle --scanner startup --server <domainToExplore>
```

**SMB version**

PingCastle can do a quick scan without any privilege to know which version is supported as server for each computer of a domain:

```
PingCastle --scanner smb --server <domainToExplore>
```

**Null sessions**

Null sessions are an old Windows NT4 problem. It should have been disappears but is still present on 20-30% of the domains. When it is enabled, an auditor with no account on the domain can use this to enumerate all the account of the domain. Then this list can be used to generated wrong authentication attempts and lock the accounts. Or perform brute-force attacks.

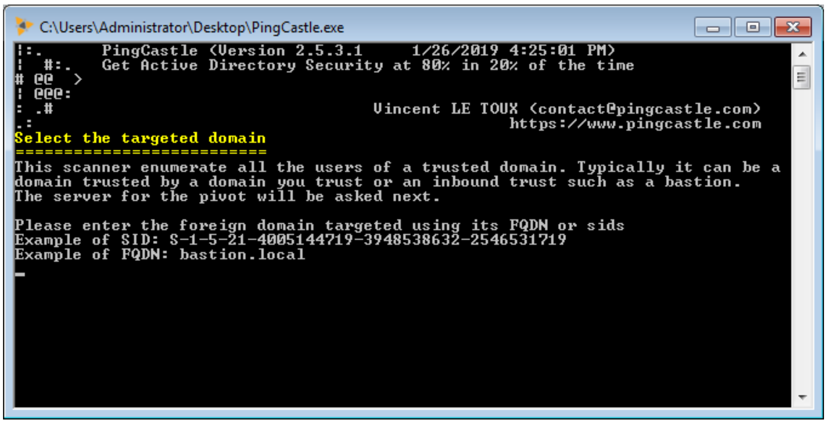
You can use PingCastle to attempt to extract a list of user account using this functionality. Run the following command:

```
PingCastle --scanner nullsession --server <servertotest>
```

**foreignusers**

A inbound trust ( an unidirectional trust) is understood as a diode. Nothing is supposed to be extracted. But this is not true. PingCastle can extract the list of users  from an inbound trust via a MS-LSAT enumeration.

First, enter the domain to enumerate (eg: the bastion or a domain which is very far)



```
|:.      PingCastle (Version 2.5.3.1     1/26/2019 4:25:01 PM)
|  #:.   Get Active Directory Security at 80% in 20% of the time
# @@  >
| @@@:
: .#                                 Vincent LE TOUX (contact@pingcastle.com)
.:                                           https://www.pingcastle.com
Select the targeted domain
==========================
This scanner enumerate all the users of a trusted domain. Typically it can be a
domain trusted by a domain you trust or an inbound trust such as a bastion.
The server for the pivot will be asked next.

Please enter the foreign domain targeted using its FQDN or sids
Example of SID: S-1-5-21-4005144719-3948538632-2546531719
Example of FQDN: bastion.local
_
```

Then enter the domain which will be used as a pivot

```
PingCastle --scanner foreignusers --foreigndomain <remote domain or sid> --server <pivot
domain>
```

# Annex

## Command line reference

Here is a short description of the main tasks performed by the program.

*Health check*

- run the health check :

```
PingCastle --healthcheck --server mydomain.com
```

- run the consolidation of the health check reports:

```
PingCastle --hc-conso
```

- export rule list:

```
PingCastle --export-hc-rule
```

*Overview:*

- Run the report on all reachable domains and built a cartography:

```
PingCastle --healthcheck --server * --reachable --hc-conso
```

- Built only a cartography without scores:

```
PingCastle --carto
```

*Advanced mode:*

- run the export:

```
PingCastle --advanced-export --server mydomain.com
```

- build the reports:

```
PingCastle --advanced-report --database thegeneratedsdffile.sdf
```

*Other investigations:*

- Check the presence of null session:

```
PingCasle --nullsession --server servertotest
```

- Scan the domains for local administrators:

```
PingCastle --localadmins --server domainToExplore
```

- Scan the presence of local shares:

```
PingCastle --shares --server domainToExplore
```

- The available switches can be obtained using the “--help” switch.

```
PingCastle --help
```

## Full command line options

```
switch:
  --help               : display this message
  --interactive        : force the interactive mode
  --log                : generate a log file
  --log-console        : add log to the console

Common options when connecting to the AD
  --server <server>    : use this server (default: current domain controller)
                         the special value * or *.forest do the healthcheck for all domains
  --port <port>        : the port to use for ADWS or LDPA (default: 9389 or 389)
  --user <user>        : use this user (default: integrated authentication)
  --password <pass>    : use this password (default: asked on a secure prompt)
  --protocol <proto>   : selection the protocol to use among LDAP or ADWS (fastest)
                       : ADWSThenLDAP (default), ADWSOnly, LDAPOnly, LDAPThenADWS

  --carto              : perform a quick cartography with domains surrounding

  --healthcheck        : perform the healthcheck (step1)
    --api-endpoint <> : upload report via api call eg: http://server
    --api-key  <key>  : and using the api key as registered
    --explore-trust    : on domains of a forest, after the healthcheck, do the hc on all
trusted domains except domains of the forest and forest trusts
    --explore-forest-trust : on root domain of a forest, after the healthcheck, do the hc
on all forest trusts discovered
    --explore-trust and --explore-forest-trust can be run together
    --explore-exception <domains> : comma separated values of domains that will not be
explored automatically

    --encrypt          : use an RSA key stored in the .config file to crypt the content of
the xml report
```

```
    --level <level>   : specify the amount of data found in the xml file
                      : level: Full, Normal, Light
    --no-enum-limit   : remove the max 100 users limitation in html report
    --reachable       : add reachable domains to the list of discovered domains
    --sendXmlTo <emails>: send xml reports to a mailbox (comma separated email)
    --sendHtmlTo <emails>: send html reports to a mailbox
    --sendAllTo <emails>: send html reports to a mailbox
    --notifyMail <emails>: add email notification when the mail is received
    --smtplogin <user>: allow smtp credentials ...
    --smtppass <pass> : ... to be entered on the command line
    --smtptls         : enable TLS/SSL in SMTP if used on other port than 465 and 587
    --skip-null-session: do not test for null session
    --webdirectory <dir>: upload the xml report to a webdav server
    --webuser <user>  : optional user and password
    --webpassword <password>

--rules                 : Generate an html containing all the rules used by PingCastle. Do
not forget PingCastleReporting includes a similar option but for .xslx

  --generate-key      : generate and display a new RSA key for encryption

  --hc-conso          : consolidate multiple healthcheck xml reports (step2)
    --center-on <domain> : center the simplified graph on this domain
                         default is the domain with the most links
    --xmls <path>     : specify the path containing xml (default: current directory)
    --filter-date <date>: filter report generated after the date.

  --regen-report <xml> : regenerate a html report based on a xml report
  --reload-report <xml> : regenerate a xml report based on a xml report
                          any healthcheck switches (send email, ..) can be reused
    --level <level>   : specify the amount of data found in the xml file
                      : level: Full, Normal, Light (default: Normal)
    --encrypt          : use an RSA key stored in the .config file to crypt the content of
the xml report
                        the absence of this switch on an encrypted report will produce a
decrypted report

  --graph             : perform the light compromise graph computation directly to the AD
    --encrypt          : use an RSA key stored in the .config file to crypt the content of
the xml report
```

```
    --max-depth       : maximum number of relation to explore (default:30)
    --max-nodes       : maximum number of node to include (default:1000)
    --node <node>     : create a report based on a object
                      : example: "cn=name" or "name"
    --nodes <file>    : create x report based on the nodes listed on a file


  --scanner <type>     : perform a scan on one of all computers of the domain (using --
server)
aclcheck
Check authorization related to users or groups. Default to everyone, authenticated users
and domain users
antivirus
Check for computers without known antivirus installed. It is used to detect unprotected
computers but may also report computers with unknown antivirus.
corruptADDatabase
Try to detect corrupted AD database. To run only when requested by PingCastle support.
foreignusers
Use trusts to enumerate users located in domain denied such as bastion or domains too far
away.
laps_bitlocker
Check on the AD if LAPS and/or BitLocker has been enabled for all computers on the domain.
localadmin
Enumerate the local administrators of a computer.
nullsession
Check if null sessions are enabled and provide example(s).
nullsession-trust
Dump the trusts of a domain via null session if possible
share
List all shares published on a computer and determine if the share can be accessed by
anyone
smb
Scan a computer and determine the smb version available. Also if SMB signing is active.
spooler
Check if the spooler service is remotely active. The spooler can be abused to get computer
tokens when unconstrained delegations are exploited.
startup
Get the last startup date of a computer. Can be used to determine if latest patches have
been applied.
  options for scanners:
    --scmode-single   : force scanner to check one single computer
    --nslimit <number>: Limit the number of users to enumerate (default: 5)
    --foreigndomain <sid> : foreign domain targeted using its FQDN or sids
                        Example of SID: S-1-5-21-4005144719-3948538632-2546531719


  --upload-all-reports: use the API to upload all reports in the current directory
    --api-endpoint <> : upload report via api call eg: http://server
    --api-key  <key>  : and using the api key as registered
                        Note: do not forget to set --level Full to send all the
information available
```

## List of open source software used

PingCastle uses a set of open source components to perform its job.

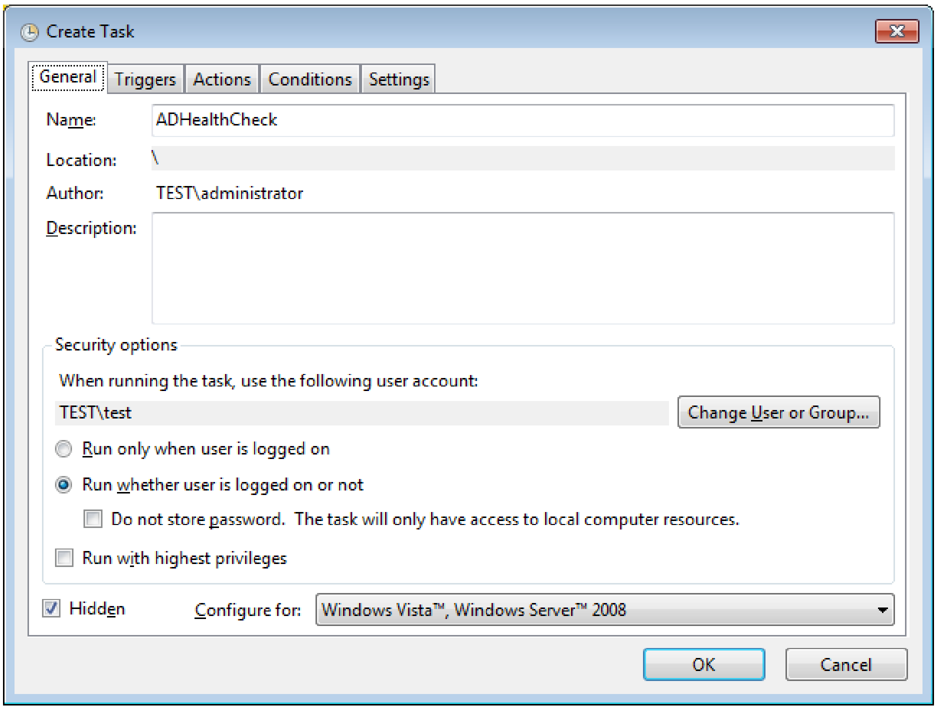
The list of components used by PingCastle, but not limited to, is:

- Bootstrap licensed under the MIT license
- DataTables licensed under the MIT license
- Popper.js licensed under the MIT license
- JQuery licensed under the MIT license
- vis.js licensed under the MIT license

# Scheduling PingCastle report

The program is compatible with the "managed service account" available since Windows 2008 R2 and if the scheduled task is run on Windows 2012.

Important setting: check "run whether user is logged on or not" and choose a service account running under the domain (not a local account). Check hidden to hide the console.



Name: ADHealthCheck

Location: \

Author: TEST\administrator

Description:

Security options

When running the task, use the following user account:

TEST\test

○ Run only when user is logged on

● Run whether user is logged on or not

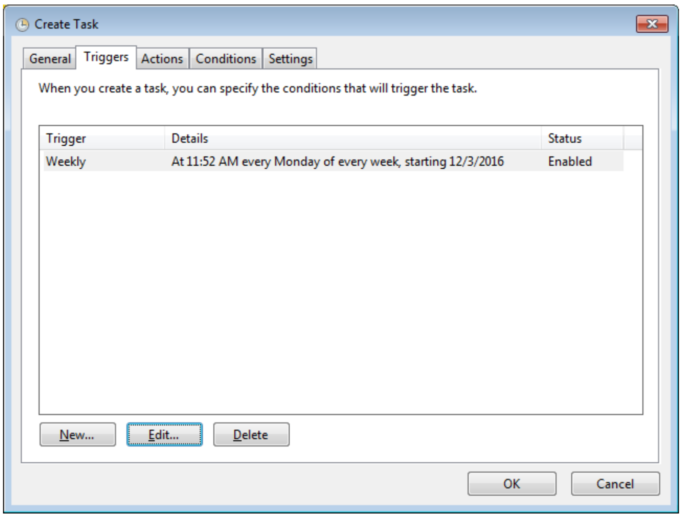
□ Do not store password. The task will only have access to local computer resources.

□ Run with highest privileges

☑ Hidden

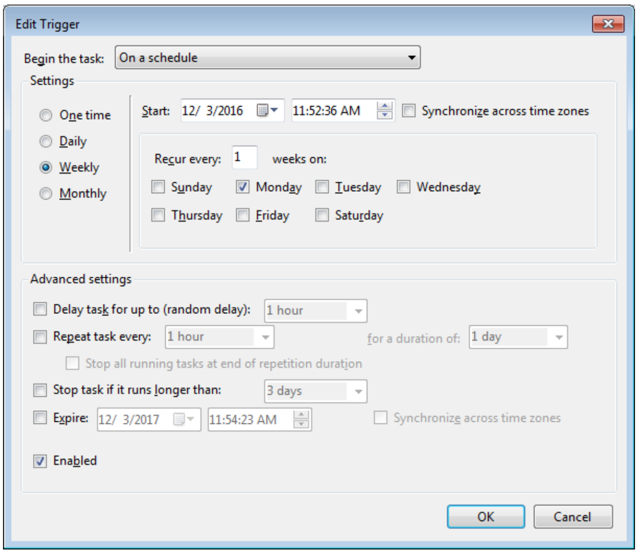
Configure for: Windows Vista™, Windows Server™ 2008

Set the schedule:



When you create a task, you can specify the conditions that will trigger the task.

| Trigger | Details | Status |
|---|---|---|
| Weekly | At 11:52 AM every Monday of every week, starting 12/3/2016 | Enabled |



Begin the task: On a schedule

Settings

○ One time

○ Daily

● Weekly

○ Monthly

Start: 12/ 3/2016 11:52:36 AM □ Synchronize across time zones

Recur every: 1 weeks on:

□ Sunday ☑ Monday □ Tuesday □ Wednesday

□ Thursday □ Friday □ Saturday

Advanced settings

□ Delay task for up to (random delay): 1 hour

□ Repeat task every: 1 hour for a duration of: 1 day

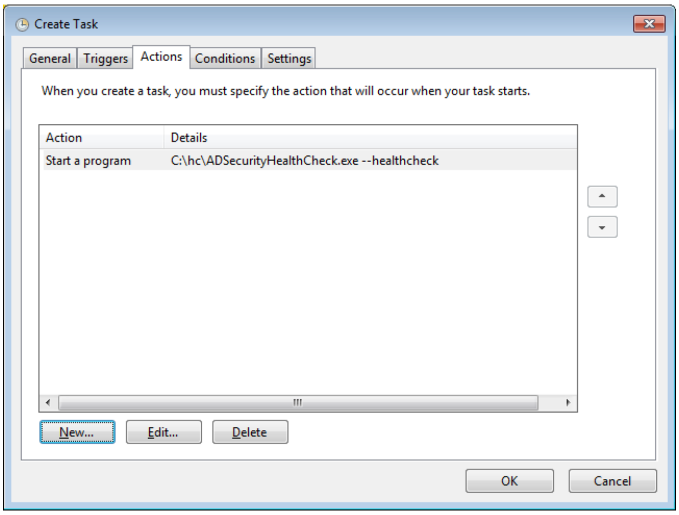
□ Stop all running tasks at end of repetition duration

□ Stop task if it runs longer than: 3 days

□ Expire: 12/ 3/2017 11:54:23 AM □ Synchronize across time zones

☑ Enabled

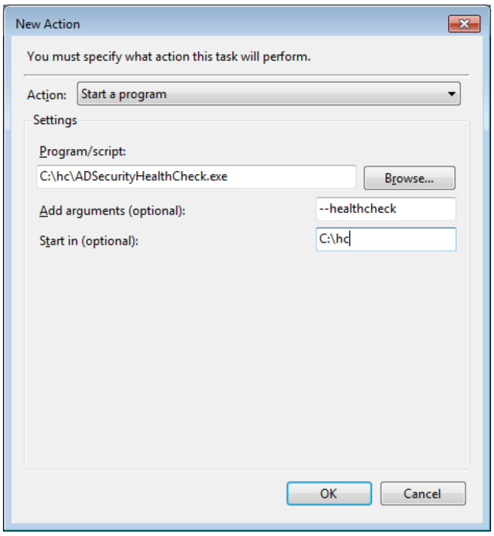
Set the command line:



Create Task

When you create a task, you must specify the action that will occur when your task starts.

| Action | Details |
|---|---|
| Start a program | C:\hc\ADSecurityHealthCheck.exe --healthcheck |



New Action

You must specify what action this task will perform.

Action: Start a program

Settings

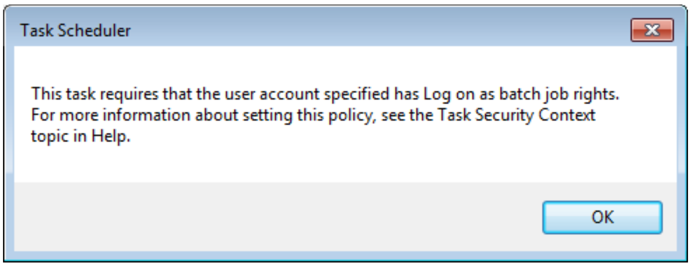
Program/script: C:\hc\ADSecurityHealthCheck.exe

Add arguments (optional): --healthcheck

Start in (optional): C:\hc

Be sure that the service account has the right to write the report in the current directory.

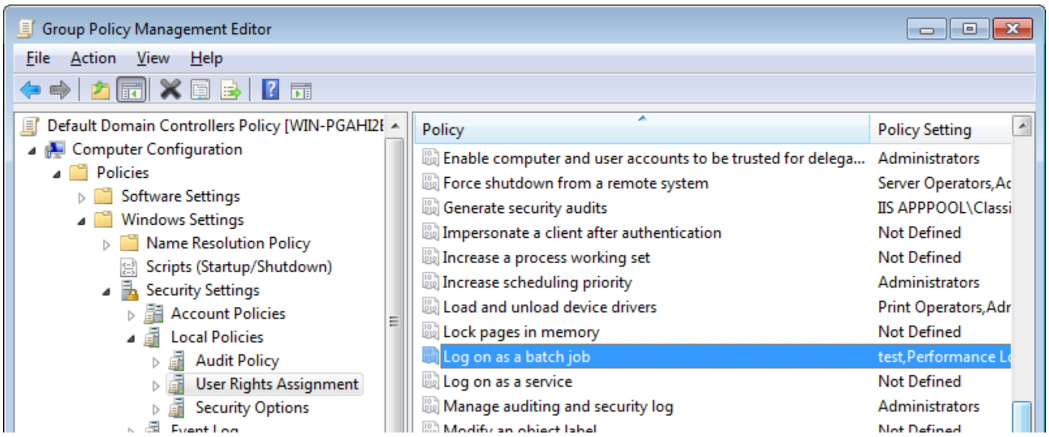
If you get the following message, be sure that the user as the right to logon as batch job.



Task Scheduler

This task requires that the user account specified has Log on as batch job rights. For more information about setting this policy, see the Task Security Context topic in Help.

This can be modified in the security policies:



Group Policy Management Editor

- Default Domain Controllers Policy [WIN-PGAHI2E
  - Computer Configuration
    - Policies
      - Software Settings
      - Windows Settings
        - Name Resolution Policy
        - Scripts (Startup/Shutdown)
        - Security Settings
          - Account Policies
          - Local Policies
            - Audit Policy
            - User Rights Assignment
            - Security Options
          - Event Log

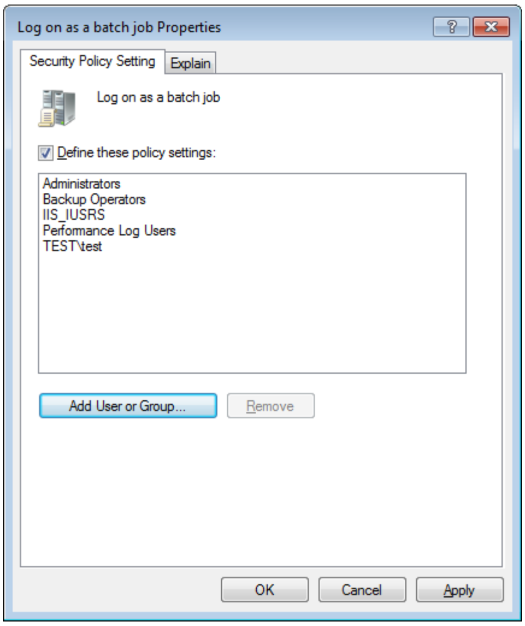
| Policy | Policy Setting |
|---|---|
| Enable computer and user accounts to be trusted for delega... | Administrators |
| Force shutdown from a remote system | Server Operators,Ac |
| Generate security audits | IIS APPPOOL\Classi |
| Impersonate a client after authentication | Not Defined |
| Increase a process working set | Not Defined |
| Increase scheduling priority | Administrators |
| Load and unload device drivers | Print Operators,Adr |
| Lock pages in memory | Not Defined |
| Log on as a batch job | test,Performance Lo |
| Log on as a service | Not Defined |
| Manage auditing and security log | Administrators |
| Modify an object label | Not Defined |

Select "Local Policies" in MSC snap in

Select "User Rights Assignment"

Right click on "Log on as batch job" and select Properties

Click "Add User or Group", and include the relevant user.



Log on as a batch job

☑ Define these policy settings:

Administrators
Backup Operators
IIS_IUSRS
Performance Log Users
TEST\test

If the button "Add User or Group" is grayed, that means that the setting is overridden by a GPO (by default, the Domain Controller Policy). You can find the GPO by running rsop.msc, locate the setting and look at the "Policy" sheet.