PANDORAFMS

Distributed monitoring with Satellite server

27-09-2021

Distributed monitoring with Satellite server

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Satellite Server

Introduction

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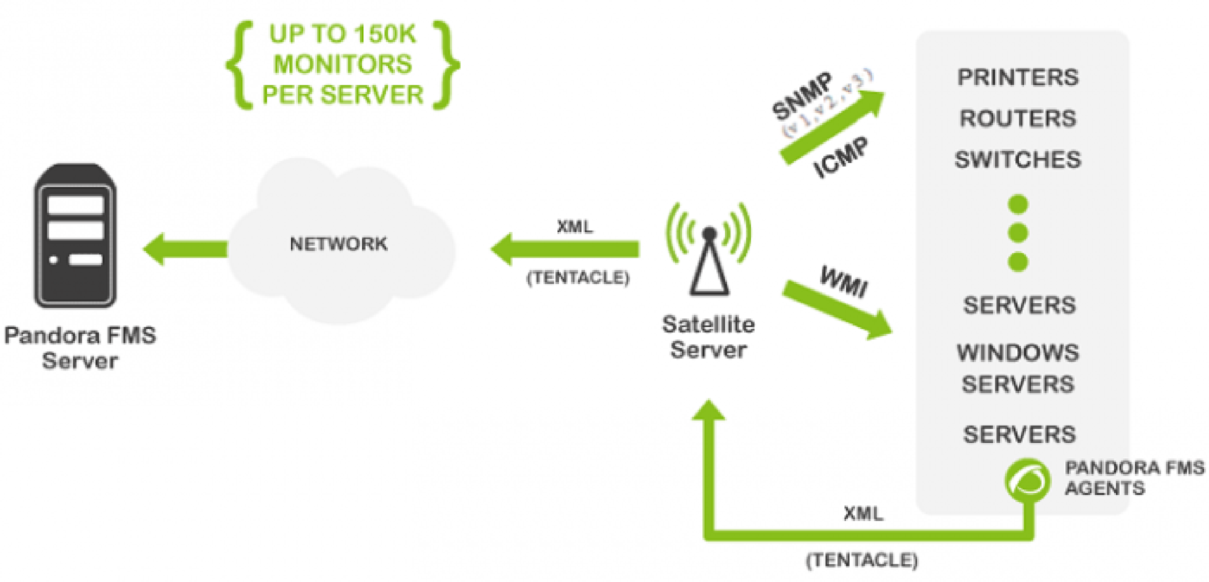
The Satellite Server is used for network and remote system both monitoring and discovery. It can discover network elements (routers, switches, etc) using SNMP or ICMP, or MS Windows® servers (using WMI) and Linux® servers (using SNMP). This is no “ordinary” server, it can be considered to be an agent in broker mode with extended features. It is particularly useful to monitor inaccessible remote networks where a software agent is not even an option from Pandora FMS server.



The Satellite server can be used in Windows® and GNU/Linux® (recommended OS) alike, and it has some features that make it more special, highly recommended in certain environments.

- It can execute network tests (ICMP, Latency and SNMP v1 and v2) at an extremely high pace (500 checks per second). For SNMP v3 configure the access credentials and due to data encryption the pace of the test will not be that fast.

- It only sends information to the server every N seconds (300 seconds by default), but it can execute latency, ICMP and SNMP tests within a smaller interval (30 seconds for example). That way, it can warn Pandora FMS Server almost instantly when there is a status change. These status changes must have been previously defined if the module type is not `*_proc` (network interfaces or general network connectivity for instance).
- It does not require connection to the database, rather **it is autonomous**. It sends all files in XML format the same way as an independent server, similar to a broker agent or an export server.
- It has an auto-discovery system for SNMP and WMI. It creates detected agents (by IP address), it detects dynamic elements (network interfaces, storage) and monitors them automatically.
- In Windows® systems, it can detect hard drives, CPUs, and memories.
- In systems with SNMP, it can detect interface status, inbound and outbound traffic for each interface and the name of the system.
- Auto-genarated modules can be modified, like every other module, managing the agent from the console as if it was an ordinary agent (in ***Mass operations menu*** > ***Satellite***).
- **Agents can be created manually** by creating an agent configuration file in the Satellite server directory for agent configuration files (explained later on).

Capacity

The maximum capacity of the **Satellite server** depends entirely on the server hardware where it runs and the type of checks you want to perform. In the test environment, 500 checks ICMP/SNMP per second have been made, but that depends a lot on the response times of remote devices (it is not the same a device which answers in 0.5ms than one that takes 2 seconds to answer back). Under ideal conditions, an amount of 150,000 checks could be monitored with a single **Satellite server**. In real conditions, it has been tested in controlled environments (LAN) made of about 50,000 modules with a single Satellite server in a low-end computer hardware (Intel i5, 2GZ, 4GB RAM).

If there are many critical modules, performance will be affected. Take into account the configured **timeout**, since there is only one check for each critical monitor for **timeout**. If there are 1000 critical modules and the **timeout** is configured to 4 seconds, it will take 4000 seconds to execute all the checks with only one thread.

Installation

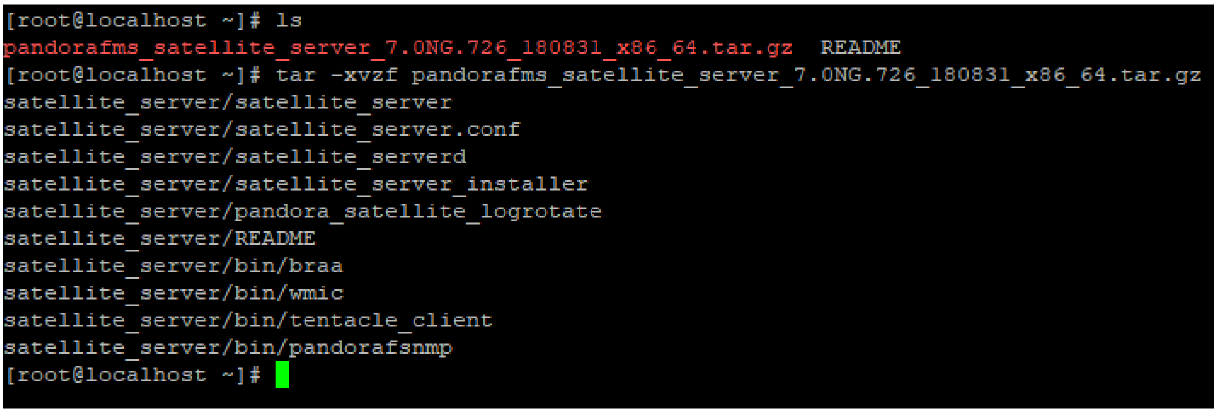
The Satellite Server is distributed as **tarball** (GNU/Linux® or `.exe` (Windows®), so there is no need to install Perl nor any additional library. It works the same in Windows® or Linux® versions. In Windows® systems, it is installed as a service, and in Linux® systems, it is installed as a daemon. The configuration file and specifications in both cases are the same.

Satellite server Linux® version depends on external packages that are specified in the corresponding version of this documentation.

Satellite Server Installation in Linux Systems

The recommended GNU/Linux OS is CentOS. Once the binary that contains the Satellite server is downloaded, go to the download directory with **root** privileges and unzip the binary:

```
tar -xvzf pandorafms_satellite_server_X.XNG.XXX_x86_64.tar.gz
```



```
[root@localhost ~]# ls
pandorafms_satellite_server_7.0NG.726_180831_x86_64.tar.gz  README
[root@localhost ~]# tar -xvzf pandorafms_satellite_server_7.0NG.726_180831_x86_64.tar.gz
satellite_server/satellite_server
satellite_server/satellite_server.conf
satellite_server/satellite_serverd
satellite_server/satellite_server_installer
satellite_server/pandora_satellite_logrotate
satellite_server/README
satellite_server/bin/braa
satellite_server/bin/wmic
satellite_server/bin/tentacle_client
satellite_server/bin/pandorafsnmp
[root@localhost ~]# 
```

Then, a folder called `satellite_server` will be created. Go there typing:

```
cd satellite_server/
```

Before proceeding with the installation, these are the main dependencies of the Satellite server: **Perl**, **Braa**, **Wmic**, **Fping** and **Nmap**.

Install perl with the following command:

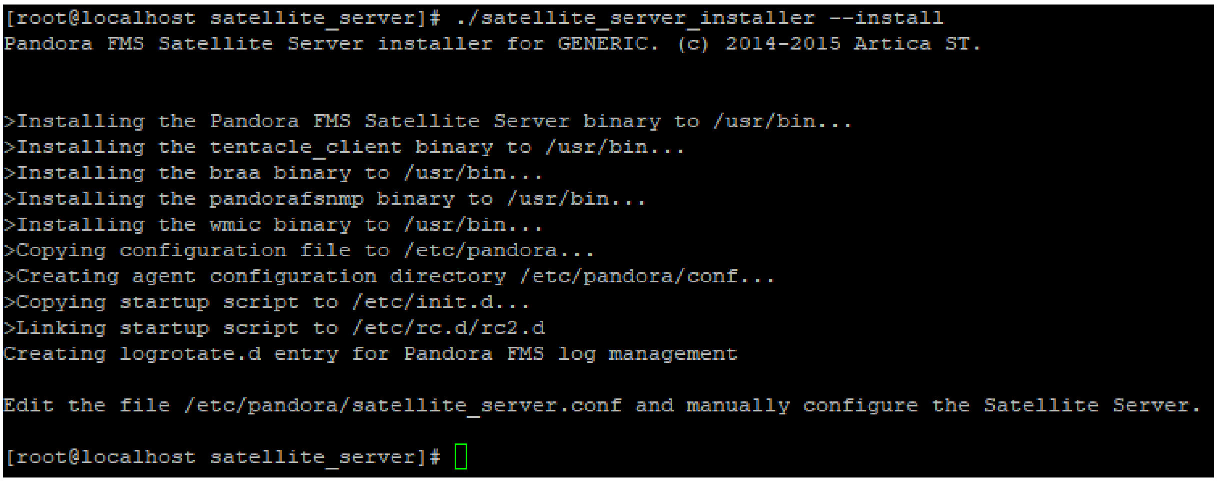
```
yum install perl.}}
```

In the installer, Braa and Wmic dependencies are included. Fping and Nmap must be installed independently:

```
yum install fping nmap
```

To install the Satellite Server, execute the installing command:

```
./satellite_server_installer --install
```



```
[root@localhost satellite_server]# ./satellite_server_installer --install
Pandora FMS Satellite Server installer for GENERIC. (c) 2014-2015 Artica ST.


>Installing the Pandora FMS Satellite Server binary to /usr/bin...
>Installing the tentacle_client binary to /usr/bin...
>Installing the braa binary to /usr/bin...
>Installing the pandorafsnmp binary to /usr/bin...
>Installing the wmic binary to /usr/bin...
>Copying configuration file to /etc/pandora...
>Creating agent configuration directory /etc/pandora/conf...
>Copying startup script to /etc/init.d...
>Linking startup script to /etc/rc.d/rc2.d
Creating logrotate.d entry for Pandora FMS log management

Edit the file /etc/pandora/satellite_server.conf and manually configure the Satellite Server.

[root@localhost satellite_server]# 
```

Once finished, edit the satellite_server.conf file located at:

```
/etc/pandora/satellite_server.conf
```

The default text editor in CentOS is **VIM**. Look for the *token* `pandora_license`, proceed to uncomment it and **enter Pandora FMS Enterprise license**. After that, save the file and activate the service, executing the following:

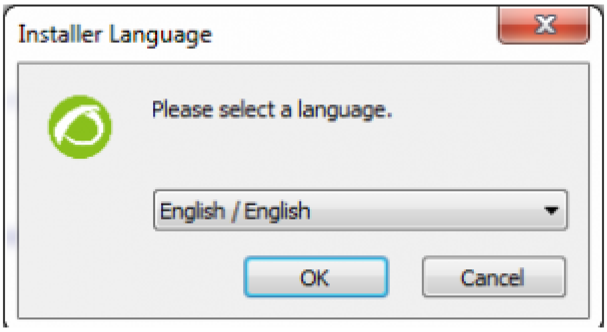
```
sudo /etc/init.d/satellite_serverd start
```

In case of failure, take a look at the log file at:

```
/var/log/satellite_server.log
```

Windows Installation

Choose the installation language:

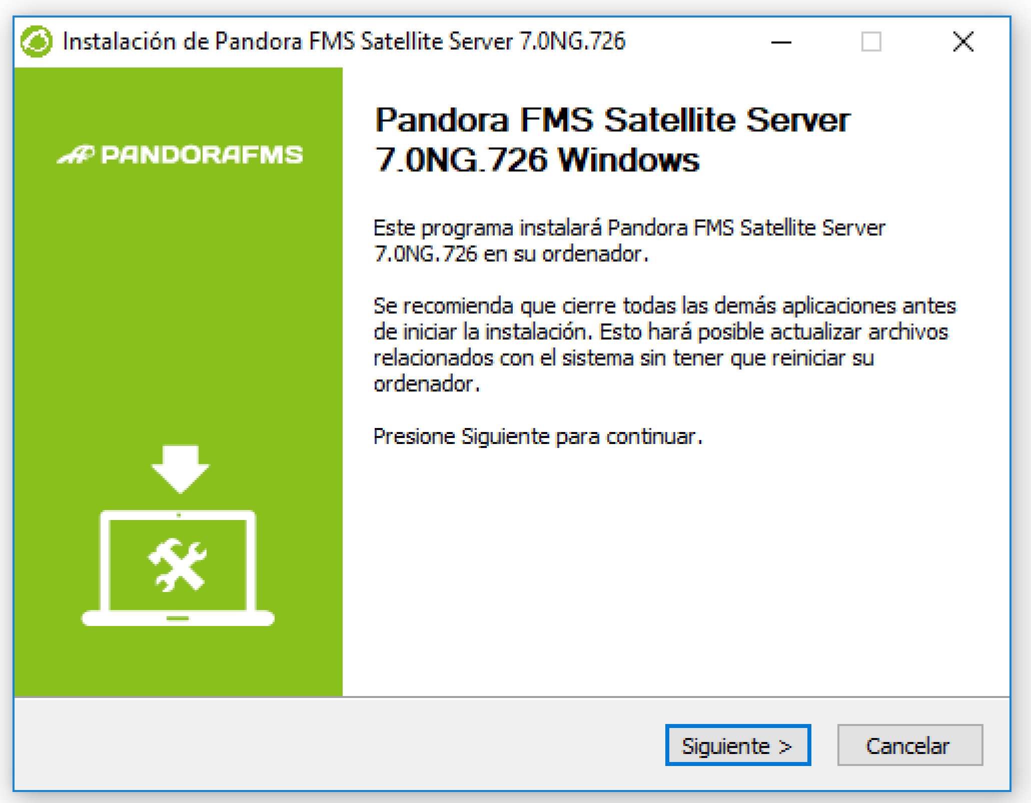


Installer Language

Please select a language.

English / English

Click Next:



Instalación de Pandora FMS Satellite Server 7.0NG.726

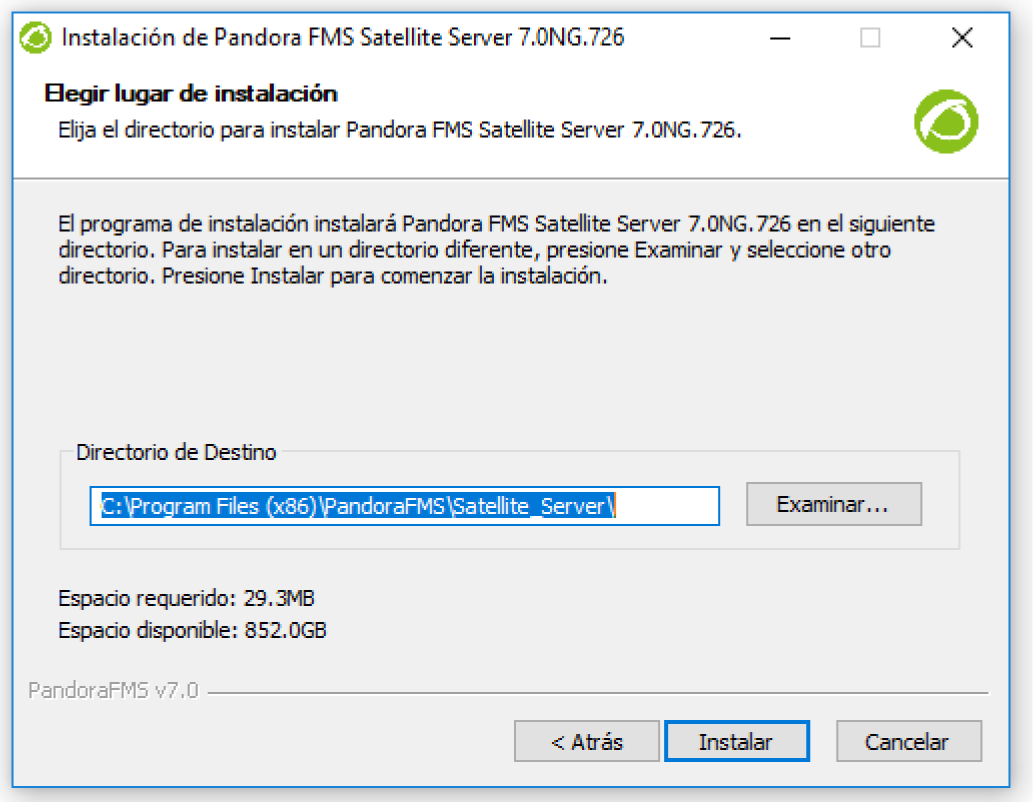
Pandora FMS Satellite Server 7.0NG.726 Windows

Este programa instalará Pandora FMS Satellite Server 7.0NG.726 en su ordenador.

Se recomienda que cierre todas las demás aplicaciones antes de iniciar la instalación. Esto hará posible actualizar archivos relacionados con el sistema sin tener que reiniciar su ordenador.

Presione Siguiente para continuar.

Choose where to install the program:



Instalación de Pandora FMS Satellite Server 7.0NG.726

Elegir lugar de instalación

Elija el directorio para instalar Pandora FMS Satellite Server 7.0NG.726.

El programa de instalación instalará Pandora FMS Satellite Server 7.0NG.726 en el siguiente directorio. Para instalar en un directorio diferente, presione Examinar y seleccione otro directorio. Presione Instalar para comenzar la instalación.

Directorio de Destino: C:\Program Files (x86)\PandoraFMS\Satellite_Server\

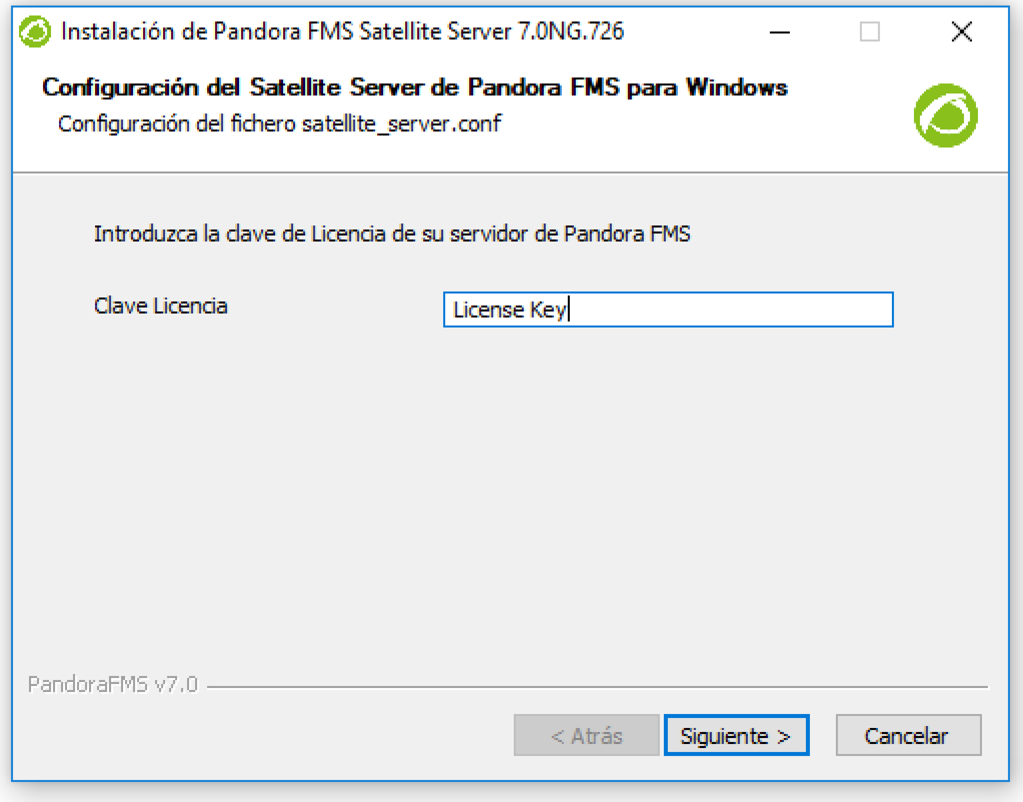
Espacio requerido: 29.3MB
Espacio disponible: 852.0GB

WinPCap installation is required. The installation window will appear at this step of the installation process:

Configure WinPCap to start when the system starts.

Once WinPCap installation is finished, this window will appear:

Enter Pandora FMS license number to continue the installation:



Instalación de Pandora FMS Satellite Server 7.0NG.726

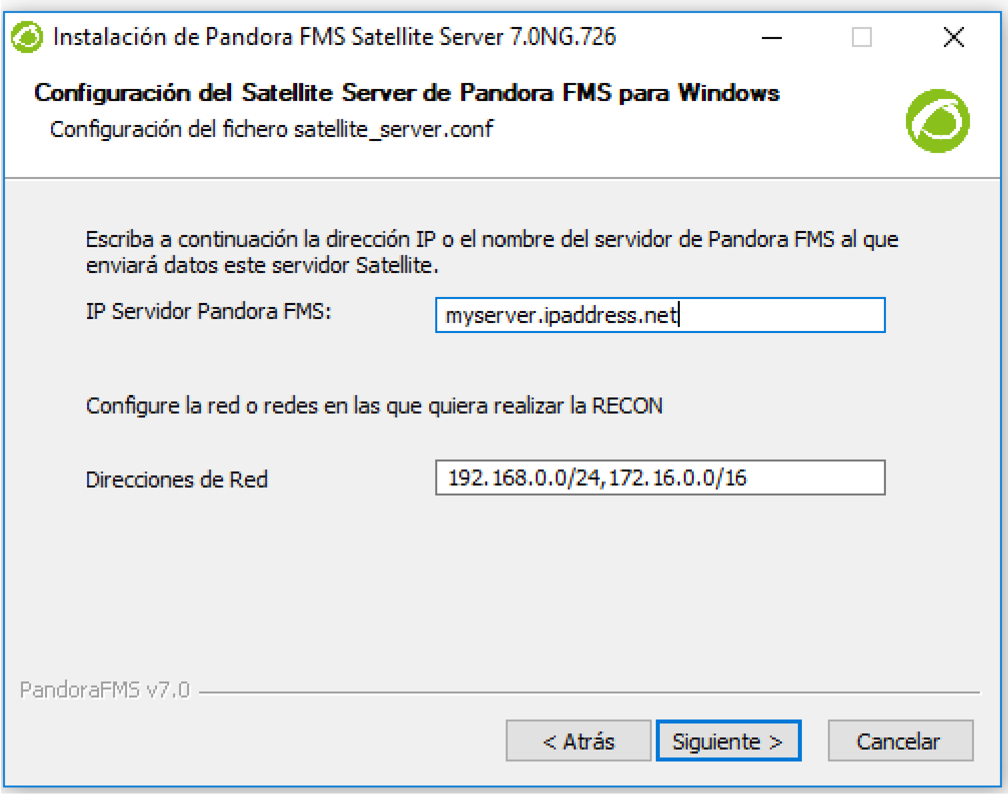
Configuración del Satellite Server de Pandora FMS para Windows

Configuración del fichero satellite_server.conf

Introduzca la clave de Licencia de su servidor de Pandora FMS

Clave Licencia: License Key

Then, set Pandora FMS server address to send data. Define the network recon rules for Satellite server:



Instalación de Pandora FMS Satellite Server 7.0NG.726

Configuración del Satellite Server de Pandora FMS para Windows

Configuración del fichero satellite_server.conf

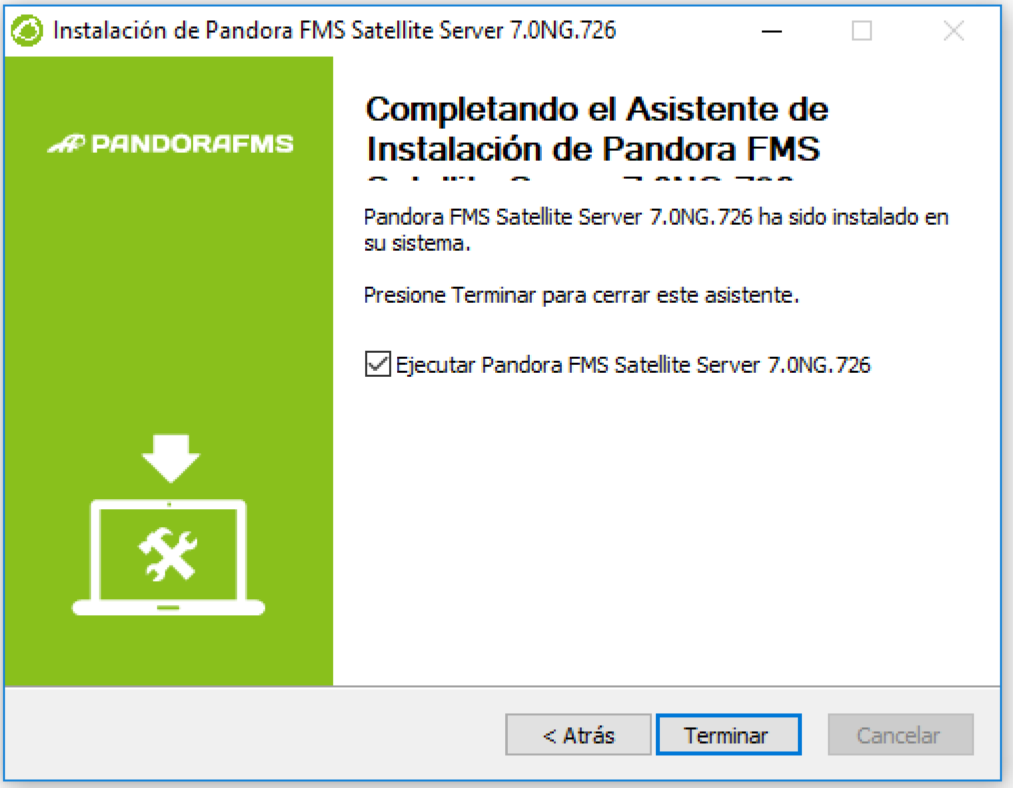
Escriba a continuación la dirección IP o el nombre del servidor de Pandora FMS al que enviará datos este servidor Satellite.

IP Servidor Pandora FMS: myserver.ipaddress.net

Configure la red o redes en las que quiera realizar la RECON

Direcciones de Red: 192.168.0.0/24,172.16.0.0/16

Restart the machine so that all changes are applied.



Completando el Asistente de Instalación de Pandora FMS

Pandora FMS Satellite Server 7.0NG.726 ha sido instalado en su sistema.

Presione Terminar para cerrar este asistente.

☑ Ejecutar Pandora FMS Satellite Server 7.0NG.726

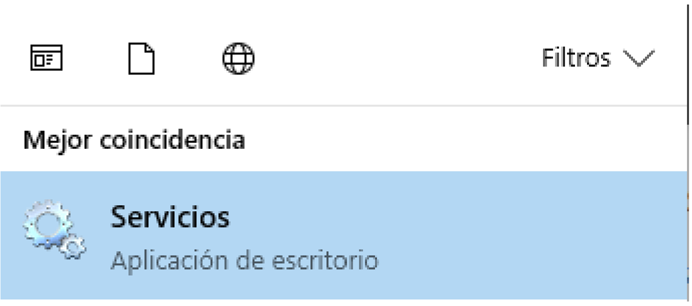
Once ther process is finished, start and stop the Pandora FMS Satellite server from the Windows® Start menu.

WMI module operation in some Windows versions

For Windows® security reasons, some versions have limited users who can carry out remote WMI queries. If these queries were not carried out, the solution would be to run the Satellite server service as an **Administrator** user.

The process to follow is:

Open the services:



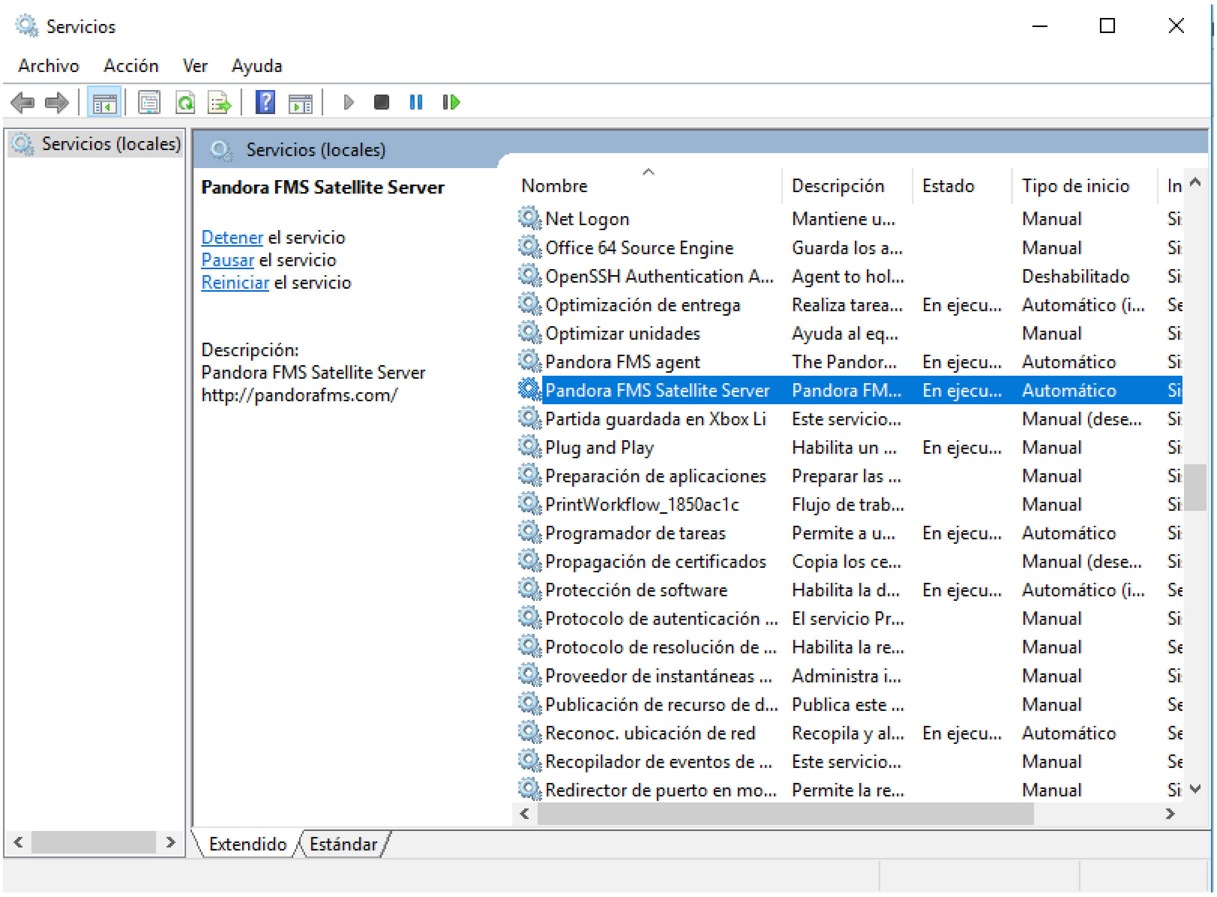
Filtros

Mejor coincidencia

Servicios

Aplicación de escritorio

Right click on the service and go to **Properties**:



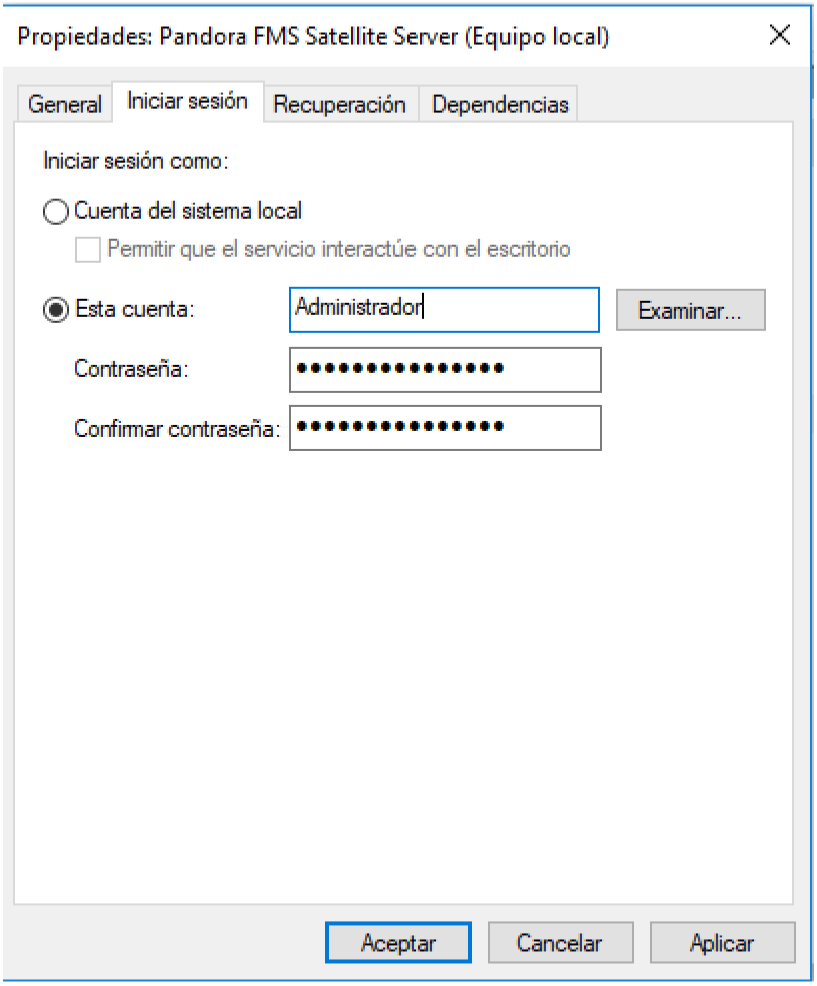
Pandora FMS Satellite Server

Detener el servicio
Pausar el servicio
Reiniciar el servicio

Descripción:
Pandora FMS Satellite Server
http://pandorafms.com/

Nombre	Descripción	Estado	Tipo de inicio	In
Net Logon	Mantiene u...		Manual	Si
Office 64 Source Engine	Guarda los a...		Manual	Si
OpenSSH Authentication A...	Agent to hol...		Deshabilitado	Si
Optimización de entrega	Realiza tarea...	En ejecu...	Automático (i...	Se
Optimizar unidades	Ayuda al eq...		Manual	Si
Pandora FMS agent	The Pandor...	En ejecu...	Automático	Si
Pandora FMS Satellite Server	Pandora FM...	En ejecu...	Automático	Si
Partida guardada en Xbox Li	Este servicio...		Manual (dese...	Si
Plug and Play	Habilita un ...	En ejecu...	Manual	Si
Preparación de aplicaciones	Preparar las ...		Manual	Si
PrintWorkflow_1850ac1c	Flujo de trab...		Manual	Si
Programador de tareas	Permite a u...	En ejecu...	Automático	Si
Propagación de certificados	Copia los ce...		Manual (dese...	Si
Protección de software	Habilita la d...	En ejecu...	Automático (i...	Se
Protocolo de autenticación ...	El servicio Pr...		Manual	Si
Protocolo de resolución de ...	Habilita la re...		Manual	Se
Proveedor de instantáneas ...	Administra i...		Manual	Si
Publicación de recurso de d...	Publica este ...		Manual	Se
Reconoc. ubicación de red	Recopila y al...	En ejecu...	Automático	Se
Recopilador de eventos de ...	Este servicio...		Manual	Se
Redirector de puerto en mo...	Permite la re...		Manual	Si

On the **Log In** window, select an account with Administrator permissions and apply changes:



Propiedades: Pandora FMS Satellite Server (Equipo local)

Iniciar sesión como:

○ Cuenta del sistema local

□ Permitir que el servicio interactúe con el escritorio

● Esta cuenta: Administrador

Contraseña: •••••••••••••••

Confirmar contraseña: •••••••••••••••

Finally, restart the service to apply the changes.

Configuration

All parameters that require a timeout or some time are specified in seconds, (for example 300 = 5 minutes).

It is important to keep in mind that the latency and snmp intervals are specific for the status change. In case of Boolean checks (port or machine status) the threshold that defines the status change is automatic. For numerical values (latency, network traffic in an interface, disk space, CPU, etc), it is based on a threshold that must be defined in each module.

agent_interval xxx

```
agent_interval xxx
```

300 seconds by default (5 minutes). After that time, information is sent to the server. Regardless of checks done by the network server having a lower interval. If necessary and by default, it creates agents in the corresponding Pandora FMS server according to the specified time.

agent_theads xxx

```
agent_threads xxx
```

Number of threads used for sending XML data files.

xxxxxx_interval

```
xxxxxx_interval xxx
```

It executes all checks (latency, snmp, etc) every xxx seconds. If the collected data is different compared to the previous one, it sends it right away. If it is the same, it will send it when the agent interval says so. It is useful to perform intesive checks and notify **only in case of status change**.

xxxxx_retries

```
xxxxx_retries xxx
```

Number of xxx retries in checks (latency, snmp, ping...).

xxxxx_timeout

```
xxxxx_timeout xxx
```

Timeout in seconds for SNMP, Latency and Ping checks.

xxxxx_block

```
xxxxx_block xxx
```

It forces the server to execute checks into blocks of XXX checks. The higher the number

(500 tops) the more capacity it will have, but at the expense of an increased latency. Sometimes, it might be recommended to lower that number (latency, ping and snmp).

xxxxx_threads

```
xxxxx_threads n
```

Number of n assigned threads to every type of check. It depends on the capacity (CPY and RAM) of the machine. The higher the threads, the higher the load on the machine but the processing capacity will be higher. The performance may become poor when exceeding 20 threads, depending on each system.

log_file

```
log_file <path_file>
```

It indicates the file where the Satellite server log is written, by default the path is`/var/log/satellite_server.log`.

recon_task xxxxx ,yyyy

```
recon_task xxxxx[,yyyy]
```

IP networks and addresses for autodiscovery separated by commas, for example:

```
192.168.50.0/24,10.0.1.0/22,192.168.70.64/26
```

server_ip

```
server_ip <IP>
```

IP address or DNS name of Pandora FMS Server where the information is sent. It is done using the Tentacle protocol, so communication with the system must be possible through Tentacle port `41121/tcp`.

recon_mode

```
recon_mode <mode_discovery>
```

Autodiscovery mode (<`mode_discovery`>). The system will use the following protocols to discover systems:

- `icmp`: It will just check whether the host is alive (**ping**) and measure latency time.
- `snmp`: If it is capable of communicating by SNMP (only v1 and v2), it will look for all the interfaces and get its trafic from all of them, as well as its operative status and device name and location. It will try different communities provided in the configuration file to connect. To use SNMPv3 whose recognition is required, check this link on how to configure the known access credentials.
- `wmi`: Similar to the previous case, but in this case showing CPU usage, memory and hard drives (all available ones).

recon_community

```
recon_community <aaa>,<bbb>,<ccc>...
```

It states a list of SNMP <xxx> communities to be used in SNMP discovery, separated by commas. It will use this list in SNMP exploration: for each IP found, it will try to see whether it responds to any of these communities.

wmi_auth

```
wmi_auth Administrator%password[,user%pass]
```

It specifies a list of user credential pairs, each of them in **<username>%<password>**format and separated by commas.

For example: `admin%1234,super%qwerty`.It will use this list for WMI exploration. For each IP found, it will try to see whether it responds to any of the combinations.

wmi_ntlmv2

```
wmi_ntlmv2 [0|1]
```

It enables (1) or disables (0) authentication with W protocol NTLMv2 for WMI.

agent_conf_dir

```
agent_conf_dir <path>
```

Path (`<path>`) to the directory automatically created and stored by the configuration files of each agent created by the Sattellite server. By default `/etc/pandora/conf`. Said agents can also be created manually.

group <grupo>

```
group <group_name>
```

It specifies the default group name `<group_name>` for agents created by the Satellite Server. For instance: “Servers”.

daemon

```
daemon [1|0]
```

When set to 1, it starts the daemon in the background (value by default).

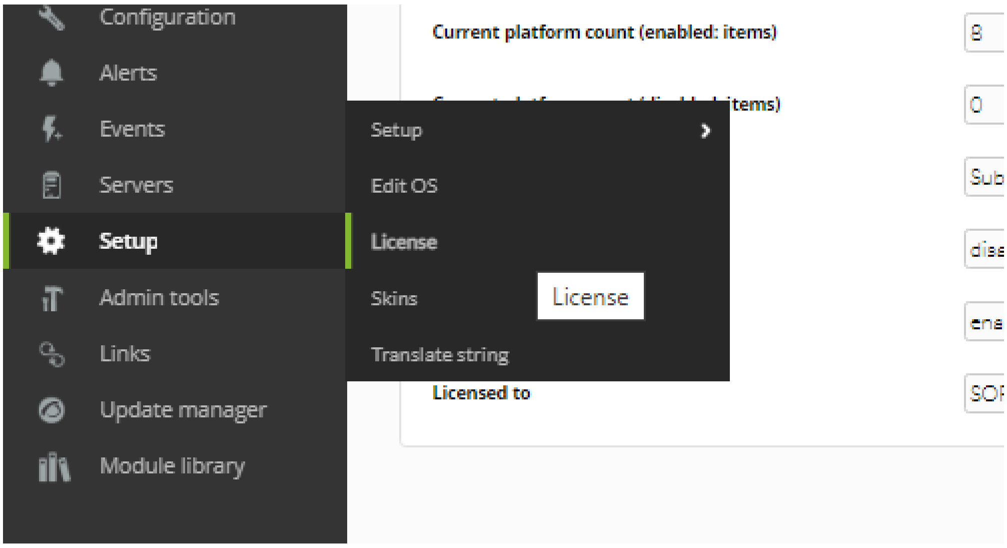
hostfile <file>

It is an alternative/complementary method for network scanning. A file is provided with an adress in each line. It can include the hostname followed by the IP as well, so that the agent created bears that name and uses that IP for modules (e.g. 193.168.0.2 hostname). It must be possible to send and fping to those addresses for them to be valid.

pandora_license xxxxxxx

```
pandora_license xxxxxxx
```

Type in store Pandora FMS Enterprise server license, as shown in the section **Setup** → **License** from Pandora FMS console.



Current platform count (enabled: items) 8

items) 0

Sub

disa

ena

Licensed to SOF

You may use the same license in as many Satellite Servers as you need, since the total of agents that use the license is verified in Pandora FMS server not the Satellite Server.

remote_config

```
remote_config [1|0]
```

It enables remote configuration in detected agents by default. It is mandatory if you wish yo manage them from the console after detecting them. It also activates Satellite server remote configuration. To find out more, see Remote configuration.

temporal_min_size

```
temporal_min_size xxx
```

If the free space (in MB) in the partition where the temporary directory is located is smaller than this value, data packages are not generated anymore. It prevents the disk from becoming full if the connection with the server is lost during an extended interval for some reason.

xml_buffer

```
xml_buffer [0|1]
```

The default value is 0. If set to 1, the agent will save any XML data files that could not be sent to retry it later on.

In a safe UNIX environment, consider changing the temporal directory, since `/tmp` gives writting permissions to all users.

snmp_version

```
snmp_version xx
```

SNMP version to use by default (only 1 and 2c are supported). 1 by default. To use SNMP v3 check this link on how to configure the known access credentials.

Some modules could stop working if you change this value.

braa <path to braa>

```
braa <path>
```

Path (`<path>`) to the braa binary. Value `/usr/bin/braa` by default.

fping <path to fping>

```
fping <path>
```

Path (`<path>`) to the Fping binary. Value by default `/usr/sbin/fping`.

fsnmp <path a fsnmp>

```
fsnmp <path>
```

Path (`<path>`) to the Fsnmp binary. Value by default `/usr/bin/pandorafsnmp`.

latency_packets xxx

```
latency_packets xxx
```

Number of xxx ICMP packages sent by latency request.

nmap <path to nmap>

```
nmap <path>
```

Path (`<path>`) to the Nmap binary. Value by default `/usr/bin/nmap`.

nmap_timing_template xxx

```
nmap_timing_template x
```

A value xxx that specifies the level of agressiveness of Nmap, from 1 to 5. 1 means slower but more reliable, 5 means faster but less reliable. Default value: 2.

ping_packets xxx

```
ping_packets xxx
```

Number of ICMP packages sent for each ping.

recon_enabled 0|1

```
recon_enabled [0|1]
```

It enables (1) or disables (0) equipment autodiscovery.

recon_timing_template xxx

```
recon_timing_template xxx
```

Like nmap_timing_template but applied to network scanning.

server_port xxxxx

```
server_port xxxxx
```

Tentacle server port.

server_name xxxxx

```
server_name xxxxx
```

Name of the Satellite server (by default it takes the machine's *hostname*).

server_path xxxxx

```
server_path <path>
```

Path <path> where XML files are copied if transfer_mode is in local (by default `/var/spool/pandora/data_in`).

server_opts

Server parameters sent to Tentacle.

transfer_mode XXX

```
transfer_mode [tentacle|local]
```

File transfer mode. It can be Tentacle or local (by default Tentacle).

Secondary Server

```
secondary_mode [on_error|always]
```

An special kind of general configuration parameter is the definition of a secondary server. This allows defining a server to send data to, in a complementary way to the server defined the standard way. The secondary server mode works in two different ways:

- **on_error**: It sends data to the secondary server only when it cannot send them to the primary one.
- **always**: It always sends data to the secondary server, both if it can contact the main server or not.

Configuration example:

```
secondary_server_ip     192.168.1.123
secondary_server_path   /var/spool/pandora/data_in
secondary_mode          on_error
secondary_transfer_mode tentacle
secondary_server_port   41121
```

snmp_verify 0|1

```
snmp_verify [0|1]
```

It enables (1) or disables (0) the verification of SNMPv1 modules that make braa fail in real time. These modules will be discarded and stop being executed. See both snmp2_verify and snmp3_verify.

snmp2_verify

```
snmp2_verify [0|1]
```

It enables (1) or disables (0) the verification of SNMPv2 module that make braa fail in real time. These modules will be discarded and stop being executed. See both snmp2_verify and snmp3_verify.

> Verifying SNMP version 2 modules can take lots of time!

snmp3_verify

```
snmp3_verify [0|1]
```

It enables (1) or disables (0) the verification of SNMPv3 modules that make **braa** fail in real time. These modules will be discarded and stop being executed. See both snmp2_verify and snmp3_verify.

startup_delay

```
startup_delay xxx
```

It waits xxx seconds before sending XML data files for the first time.

temporal

```
temporal <directory>
```

Temporal directory where XML files are created, `/tmp` by default.

tentacle_client

```
tentacle_client <path>
```

Full <path> to the Tentacle client (`/usr/bin/tentacle_client` by default).

wmi_client

```
wmi_client <path>
```

Full <path> to the wmic (`/usr/bin/wmi` by default).

snmp_blacklist

```
snmp_blacklist <path>
```

Path (<path>) to the SNMP module blacklist file (`/etc/pandora/satellite_server.blacklist` by default).

add_host

```
add_host <dir_IP> [agent_name]
```

It adds the given host to the list of monitored agents. The name for the agent can be specified after the IP address. Multiple hosts may be added, one per line. For example:

```
 add host 192.168.0.1
 add host 192.168.0.2 localhost.localdomain
```

ignore_host

```
ignore_host <agent_name>
```

It removes the given host from the list of monitored agents, even if it is found in a network scan by a recon task. The host must be identified by agent name. Multiple hosts may be ignored, one per line. For example:

```
 ignore host 192.168.0.1
 ignore host localhost.localdomain
```

keepalive

```
keepalive xxx
```

Satellite Server reports its status and checks remote configuration changes (from agents and its own) every xxx seconds. It is 30 seconds by default.

credential_pass

```
credential_pass xxx
```

Password used to encrypt credential box passwords. It must match the one defined in Pandora FMS console. The hostname is used by default.

timeout_bin <path to timeout>

```
timeout_bin <path>
```

If defined, the **timeout** program (usually `/usr/bin/timeout`) will be used to call the Tentacle client.

timeout_seconds

```
timeout_seconds xxx
```

Timeout in seconds for the **timeout** command. The timeout_bin parameter must be configured.

proxy_traps_to

```
proxy_traps_to <dir_IP[:port]>
```

It redirects SNMP traps received by the Satellite server to the given address (and port). Port 162 is used by default.

proxy_tentacle_from

```
proxy_tentacle_from <dir_IP[:port]>
```

It redirects data received by Tentacle server from the specified address and port. Port 41121 is used by default.

proxy_tentacle_to

```
proxy_tentacle_to <dir_IP[:port]>
```

It redirects Tentacle client requests received by the Satellite Server to the given address (and port). Port 41121 is used by default.

This option may be in conflict with remote agent configuration.

This happens if the Satellite server is intended to be used as proxy for some software agents and monitor them remotely from the Satellite server itself (ICMP, SNMP, etc.) and remote configuration is enabled in both cases.

In this situation, it is necessary to either use different agents for the performed checks (i.e. with different agent_name), or leave the remote configuration enabled only on one of them (Satellite Server or software agents).

dynamic_inc

```
dynamic_inc [0|1]
```

When set to 1, it moves dynamic auto-discovered modules (SNMP, WMI...) to separate files so that they do not interfere with remote agent configuration.

vlan_cache_enabled

```
vlan_cache_enabled [0|1]
```

It enables (1) or disables (0) the VLAN cache in the auto-discovered hosts.

verbosity

```
verbosity <0-10>
```

Detail log level, where 10 is the highest information detail level.

agents_blacklist_icmp

Version NG 713 or superior.

```
agents_blacklist_icmp 10.0.0.0/24[,8.8.8.8/30]
```

ICMP check blacklist. This field can be configured with a list of IPs, using CIDR notation to prevent ICMP-type modules from running. To specify multiple subnets, separating them with commas.

agents_blacklist_snmp

Version NG 713 or superior.

```
agents_blacklist_snmp 10.0.0.0/24[,8.8.8.8/30] (Version> 7.0OUM713)
```

SNMP check blacklist. This field can be configured with a list of IPs, using CIDR notation to prevent SNMP-type modules from running. You may specify multiple subnets separating them with commas.

agents_blacklist_wmi

Version NG 713 or superior.

```
agents_blacklist_wmi 10.0.0.0/24[,8.8.8.8/30]
```

WMI Check blacklist. This field can be configured with a list of IPs, using the CIDR notation to prevent WMI-type modules from running. You may specify multiple subnets by separating them with commas.

general_gis_exec

Versión NG 734 o superior.

```
general_gis_exec xxx
```

By enabling this option, a GIS positioning script will be used for all agents detected by the Satellite server. The script must have running permissions and must print on screen the coordinates with the format **<longitude>,<latitude>,[<altitude>]**. The third parameter, altitude, is optional.

Agent creation in Satellite Server

There are three ways of creating an agent in the Satellite server: **Recon Task**, **Satellite_hosts.txt** file, or **manually** creating the .conf of the agents to monitor.

Agent creation through Recon Task

The creation of agents through Recon Task is the most used by Pandora FMS users. To be able to do it, go to the Satellite server configuration file and set the following parameters:

- **recon_community**: Specify a list of SNMP communities to use in SNMP discovery separated by commas (in case of performing a recon of the SNMP type).
- **recon_enabled**: It must be set to 1 to enable the recon task of the Satellite server.
- **recon_interval**: Time interval where a certain network is scanned, in seconds (604800 seconds by default, 7 days).
- **recon_mode**:Recon task mode (snmp,icmp,wmi) separated by commas.
- **recon_task**: List of networks to be recognized, separated by commas.
- **recon_timing_template**: A value that specifies how aggressive nmap must be, from 1 to 5. 1 means slower but more reliable, 5 means faster but less reliable (3 by default).

An example of Recon Task would be:

```
recon_community public
recon_enabled 1
recon_interval 604800
recon_mode icmp,snmp,wmi
recon_task 192.168.0.0/24,192.168.1.0/24
recon_timing_template 3
```

Once the data has been configured, run the satellite server using the command:

```
/etc/init.d/satellite_serverd start
```

Agents without modules in their configuration files will be ignored by the Satellite Server.

Agent creation through Satellite_hosts.txt

First, in order to create an agent through the satellite_hosts.txt file, go to the configuration file of the Satellite server and uncomment the line:

```
host_file /etc/pandora/satellite_hosts.txt
```

Secondly, create the file satellite_hosts.txt with the IP of the host that you wish to create by entering IP and name of the agent to create:

```
 192.168.10.5 Server.5
 192.168.10.6 Server.6
 192.168.10.7 Server.7
```

In order for these IPs to be created, it is necessary to be able to make the fping call to each one of the IPs in the list, otherwise it will not be created.

Once the data has been configured, run the satellite server using the command:

```
/etc/init.d/satellite_serverd start
```

The reading of the indicated file is done every recon_interval seconds.

Manual Agent Creation

Firstly, look at the configuration file of the Satellite server in the `/etc/pandora/conf` directory, which is where the new agent configuration files are created. Open a terminal and go to that folder:

```
cd /etc/pandora/conf
```

Once this path is located, create a `.conf` for example “archivo.conf”. Fill in the following fields:

- **agent_name**: Agent name.
- **agent_alias**: Agent alias.
- **address**: IP of the element to monitor.
- **group**: Group to assign the agent to.
- **gis_exec**: Positioning script (optional). It overwrites the general_gis_exec location of the Satellite server.
- Modules to be monitored by the agent.

An example would be:

```
agent_name Example1
agent_alias It is an example
address X.X.X.X
group Servers
module_begin
module_name Ping
module_ping
module_end
module_begin
module_name Latency
module_latency
module_end
```

Once the data has been configured, run the Satellite server using the command:

```
/etc/init.d/satellite_serverd start
```

Agent removal in Satellite Server

You may fully remove the agents or delete them partially.

First back up the folders and their files before proceeding.

For agent **total removal**, take into account the method used in agent creation.

- **Manual**: First remove the `.conf` files from the agents created in the `/etc/pandora/conf` folder and then remove the agents from the console.
- **Satellite_hosts.txt file**: Delete the file as well as the `.conf` that have been created in the folder `/etc/pandora/conf` and later delete the agents from the console.
- **Recon_task**: Deconfigure the `recon_task` from the `.conf` file of the Satellite server, then remove the `.conf` created in the folder `/etc/pandora/conf` and then remove the agents from the console.

For agent **partial removal** also take into account the method used in the agent creation.

- **Manual**: First of all, remove the `.conf` files from the agents you wish to delete in the `/etc/pandora/conf` folder and then remove the agents from the console.

- **Satellite_hosts.txt file**: Delete the lines of the IPs from the file as well as the `.conf` that have been created in the folder `/etc/pandora/conf` with those IPs and then delete the agents from the console.
- **Recon_task**: Configure the blacklist of the `recon_task` in the conf file of the Satellite server, then remove the `.conf` created in the folder `/etc/pandora/conf` with those IPs and then remove the agents from the console.

Custom settings (by agent)

In addition to “automatic” modules, all kinds of available TCP, SNMP or WMI tests can be added, using a similar syntax to the local modules in software agents. Here are some module examples valid for Satellite server, just as they are autogenerated after being detected by the system.

Make sure OIDs **start with a dot**, otherwise SNMP modules will not work!

Interface status through SNMP. The Satellite server detects automatically each interface.

```
 module_begin
 module_name if eth1 OperStatus
 module_description IP address N/A. Description: The current
operational state of the interface. The testing(3) state indicates
that no operational packets can be passed.
 module_type generic_data_string
 module_snmp 192.168.70.225
 module_oid .1.3.6.1.2.1.2.2.1.8.3
 module_community artica06
 module_end
```

To force the module to use SNMP version 2c, add the line:

```
module_version 2c
```

To force the module to use SNMP version 1, add the line:

```
module_version 1
```

For example:

```
 module_begin
 module_name if eth1 OperStatus
 module_description IP address N/A. Description: The current
operational state of the interface. The testing(3) state indicates
that no operational packets can be passed.
 module_type generic_data_string
 module_snmp 192.168.70.225
 module_version 2c
 module_oid .1.3.6.1.2.1.2.2.1.8.3
 module_community artica06
 module_end
```

Conectivity to a machine (using PING)

```
 module_begin
 module_name ping
 module_type generic_data
 module_ping 192.168.70.225
 module_end
```

Port check (using TCP)

```
 module_begin
 module_name Port 80
 module_type generic_proc
 module_tcp
 module_port 80
 module_end
```

General SNMP check. In this case, the server retrieves automatically the traffic from each interface with its“real” descriptive name.

```
 module_name if eth0 OutOctets
 module_description The total number of octets transmitted out of
the interface, including framing characters.
 module_type generic_data_inc
 module_snmp 192.168.70.225
 module_oid .1.3.6.1.2.1.2.2.1.16.2
 module_community artica06
 module_end
```

CPU WMI usage check (percentage).

```
 module_begin
 module_name CPU
```

```
module_type generic_data
module_wmicpu 192.168.30.3
module_wmiauth admin%none
module_end
```

Memory free WMI check (percentage).

```
module_begin
module_name FreeMemory
module_type generic_data
module_wmimem 192.168.30.3
module_wmiauth admin%none
module_end
```

General WMI Query

```
module_begin
module_name GenericWMI
module_type generic_data_string
module_wmi 192.168.30.3
module_wmiquery SELECT Name FROM Win32_ComputerSystem
module_wmiauth admin%none
module_end
```

Generic SSH command:

```
module_begin
module_name GenericSSH
module_type generic_data
module_ssh 192.168.30.3
module_command ls /tmp | wc -l
module_end
```

To add a threshold, do it both in the module's text definition and threshold definition in the web interface (`module_min_warning`, `module_min_critical`). For example:

```

module_begin
module_name latency
module_type generic_data
module_latency 192.168.70.225
module_min_warning 80
module_min_critical 120
module_end
```

Execution modules can be created manually. The scripts or commands executed by the Satellite server must be previously established and available for the server to use. It works the same as an agent `module_exec`. Bear in mid that the use of `module_exec` can make the performance of the Satellite server to become poor.

```
module_begin
module_name Sample_Remote_Exec
module_type generic_data
module_exec /usr/share/test/test.sh 192.168.50.20
module_min_warning 90
module_min_critical 95
module_end
```

From Pandora FMS version 7 on, plugins can be added. Like those, note that the plugins will run on the machine where the Satellite server is running. **Therefore, it will be necessary to implement in these plugins some method to connect to the remote computer you wish to monitor**. The advantage over the previous ones is their great flexibility. That way, preconditions and other mechanisms for which a `module_exec` falls short can be implemented. The syntax is the same as that of the agents. An example of using a plugin might be as follows:

```
module_plugin /usr/share/pandora/remote_advanced_checks.sh
192.168.0.1
```

SNMPv3

To configure an SNMPv3 module, set module_version to 3 and specify

`module_seclevel`: Security level (`noauth`, `authnopriv` or `authpriv`).

`module_secname`: Security name.

`module_authproto`: Authentication protocol (`md5` or `sha`).

`module_authpass`: Authentication password.

`module_privproto`: Security protocol (`aes` or `des`).

`module_privpass`: Privacy password, if needed. For example:

```
 module_begin
 module_name snmp_authnopriv
 module_type generic_data_string
 module_snmp 127.0.0.1
 module_version 3
 module_oid .1.3.6.1.2.1.1.2.0
 module_seclevel authnopriv
 module_secname snmpuser
 module_authproto md5
 module_authpass 12345678
 module_end
```

```
 module_begin
 module_name snmp_authpriv
 module_type generic_data_string
 module_snmp 127.0.0.1
 module_version 3
 module_oid .1.3.6.1.2.1.1.2.0
 module_seclevel authpriv
 module_secname snmpuser
 module_authproto sha
 module_authpass 12345678
 module_privproto aes
 module_privpass 12345678
 module_end
```

SNMPv3 specific configuration can be shared between modules by placing it outside the module declaration, in case it is the same for all of them (it can also be shared between agents by moving it to the Satellite's configuration file):

```
agent_name snmp
address 127.0.0.1

seclevel authpriv
secname snmpuser
authproto md5
authpass 12345678
privproto des
privpass 12345678

module_begin
module_name snmp_authpriv_1
module_type generic_data_string
module_snmp
module_version 3
```

```
module_oid .1.3.6.1.2.1.1.1.0
module_end

module_begin
module_name snmp_authpriv_2
module_type generic_data_string
module_snmp
module_version 3
module_oid .1.3.6.1.2.1.1.2.0
module_end
```

Credential boxes

Unless key-based authentication is configured with private and public keys, SSH modules require a username (`<user>`) and a password (`<pass>`) in order to work. These are configured in the main configuration file, `satellite_server.conf`, using credential boxes (`credential_box`) with the following format:

```
 credential_box network/mask,username,password
 credential_box network/mask,username,[[encrypted password|]]
```

For example:

```

 credential_box 192.168.1.1/32,user,pass1
 credential_box 192.168.1.0/24,user,pass2
```

Credential boxes are searched from more restrictive to less restrictive masks.

Passwords can be encrypted using Blowfish in ECB mode. Make sure credential_pass is defined, otherwise the hostname will be used as the default encryption password. The hexadecimal representation of the ciphertext should be enclosed in double brackets:

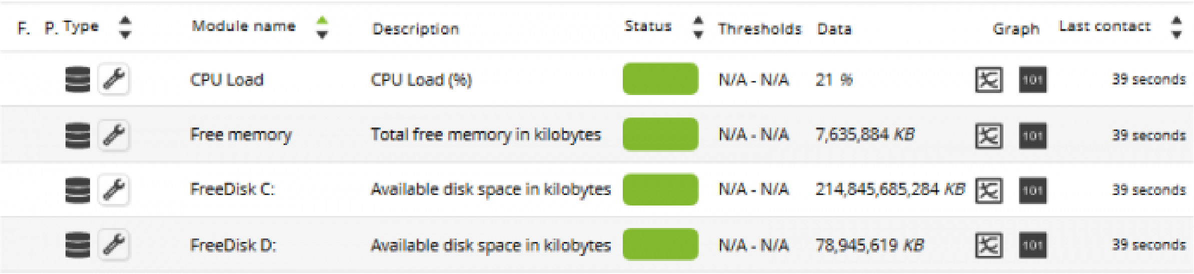
```

credential_box 192.168.1.0/24,user,[[80b51b60786b3de2|]]
```

General view of all agents in the console

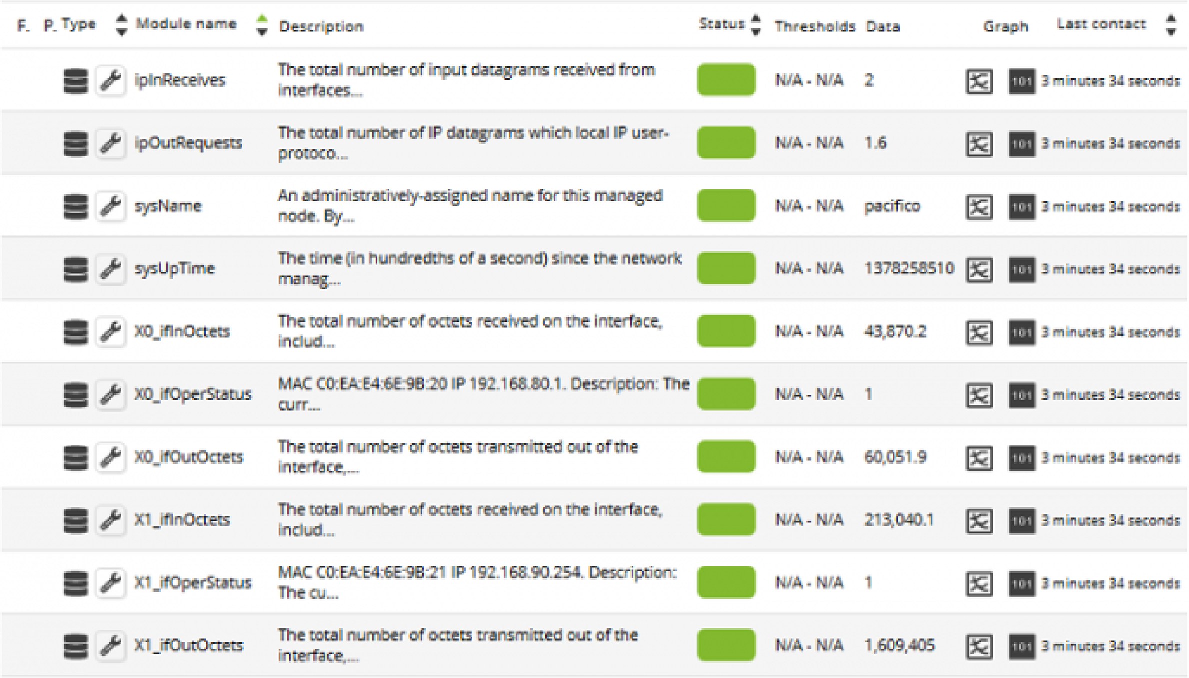
If the configuration of the satellite server is correct, you should an aent view similar to this one:

Generally, in all machines ICMP (Ping and Latency) modules will be created, but in some machines SNMP and WMI modules can be created. In machines where WMI is enabled, the following modules will be generated if available:



F.	P.	Type	Module name	Description	Status	Thresholds	Data	Graph	Last contact
			CPU Load	CPU Load (%)	🟩	N/A - N/A	21 %		39 seconds
			Free memory	Total free memory in kilobytes	🟩	N/A - N/A	7,635,884 *KB*		39 seconds
			FreeDisk C:	Available disk space in kilobytes	🟩	N/A - N/A	214,845,685,284 *KB*		39 seconds
			FreeDisk D:	Available disk space in kilobytes	🟩	N/A - N/A	78,945,619 *KB*		39 seconds

In machines with SNMP enabled, the following modules will be generated if available:



F.	P.	Type	Module name	Description	Status	Thresholds	Data	Graph	Last contact
			ipInReceives	The total number of input datagrams received from interfaces...	🟩	N/A - N/A	2		3 minutes 34 seconds
			ipOutRequests	The total number of IP datagrams which local IP user-protoco...	🟩	N/A - N/A	1.6		3 minutes 34 seconds
			sysName	An administratively-assigned name for this managed node. By...	🟩	N/A - N/A	pacifico		3 minutes 34 seconds
			sysUpTime	The time (in hundredths of a second) since the network manag...	🟩	N/A - N/A	1378258510		3 minutes 34 seconds
			X0_ifInOctets	The total number of octets received on the interface, includ...	🟩	N/A - N/A	43,870.2		3 minutes 34 seconds
			X0_ifOperStatus	MAC C0:EA:E4:6E:9B:20 IP 192.168.80.1. Description: The curr...	🟩	N/A - N/A	1		3 minutes 34 seconds
			X0_ifOutOctets	The total number of octets transmitted out of the interface,...	🟩	N/A - N/A	60,051.9		3 minutes 34 seconds
			X1_ifInOctets	The total number of octets received on the interface, includ...	🟩	N/A - N/A	213,040.1		3 minutes 34 seconds
			X1_ifOperStatus	MAC C0:EA:E4:6E:9B:21 IP 192.168.90.254. Description: The cu...	🟩	N/A - N/A	1		3 minutes 34 seconds
			X1_ifOutOctets	The total number of octets transmitted out of the interface,...	🟩	N/A - N/A	1,609,405		3 minutes 34 seconds

In the massive operations menu of Pandora FMS console, there is a specific section for the Satellite server where different edition and deletion actions can be performed on agents and modules massively.

SNMP blacklist

When monitoring big networks, SNMP modules that return invalid data may affect the performance of the Satellite server and many modules may become Unknown. To avoid that, the Satellite Server can read a blacklist of SNMP modules that will be discarded at startup before execution.

To create a new blacklist, edit the `/etc/pandora/satellite_server.conf` configuration file and make sure `snmp_blacklist` is uncommented and configured with the path of the file where blacklist modules are saved. Then run:

```
satellite_server -v /etc/pandora/satellite_server.conf
```

Restart the Satellite server. The blacklist can be regenerated as many times as needed.

The format of the blacklist file is:

```
 agent:OID
 agent:OID
 ...
```

For example:

```
 192.168.0.1:.1.3.6.1.4.1.9.9.27
 192.168.0.2:.1.3.6.1.4.1.9.9.27
```

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