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About NetIQ Corporation

We are a global, enterprise software company, with a focus on the three persistent challenges in your environment: Change, complexity and risk—and how we can help you control them.

Our Viewpoint

Adapting to change and managing complexity and risk are nothing new

In fact, of all the challenges you face, these are perhaps the most prominent variables that deny you the control you need to securely measure, monitor, and manage your physical, virtual, and cloud computing environments.

Enabling critical business services, better and faster

We believe that providing as much control as possible to IT organizations is the only way to enable timelier and cost effective delivery of services. Persistent pressures like change and complexity will only continue to increase as organizations continue to change and the technologies needed to manage them become inherently more complex.

Our Philosophy

Selling intelligent solutions, not just software

In order to provide reliable control, we first make sure we understand the real-world scenarios in which IT organizations like yours operate—day in and day out. That's the only way we can develop practical, intelligent IT solutions that successfully yield proven, measurable results. And that's so much more rewarding than simply selling software.

Driving your success is our passion

We place your success at the heart of how we do business. From product inception to deployment, we understand that you need IT solutions that work well and integrate seamlessly with your existing investments; you need ongoing support and training post-deployment; and you need someone that is truly easy to work with—for a change. Ultimately, when you succeed, we all succeed.

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About this Book

This guide describes the system requirements and installation procedure of Advanced Authentication Linux PAM Client.

Intended Audience

This book is intended for administrators who implements a secure, distributed administration model.

About Linux PAM Client

Linux PAM Client enables you to log in to Linux in a more secure way by using the authentication chains configured in Advanced Authentication.

**NOTE:** Only the users from Active Directory repository can be used for login purpose.

**NOTE:** Linux PAM Client supports offline logon (when the Advanced Authentication Server is not available) for non-local accounts for authentication chains which contains the following methods: LDAP Password, Password, HOTP, TOTP, Smartphone (offline mode), Card, FIDO U2F, and PKI.

**NOTE:** Advanced Authentication secures SSH by providing multifactor authentication for only the methods that do not require Advanced Authentication Device Service. The Smartphone method is supported in out-of-band (online) mode. This is supported only when Linux machine is a member of Active Directory domain and when you use Active Directory as a repository.
1 System Requirements

**IMPORTANT:** You must have root privileges to install and uninstall the Linux PAM Client.

Ensure that the system meets the following requirements:

- CentOS 7, SUSE Linux Enterprise Desktop 12 Service Pack1, SUSE Linux Enterprise Server 12 Service Pack1, Red Hat Enterprise Linux Client 7.2, or Red Hat Enterprise Linux Server 7.2 is installed. Gnome Display Manager (GDM) should be set as the login manager.
- DNS is configured for Advanced Authentication Server discovery (see Setting a DNS for Server Discovery) or a specific Advanced Authentication server must be specified in the configuration file.

**NOTE:** Only the Active Directory users can log in. Other repositories are not supported.
2 Configuration

This chapter contains the following information:

- Section 2.1, “Setting a DNS for Server Discovery,” on page 11
- Section 2.2, “Preparing Linux for Installing Linux PAM Client,” on page 15
- Section 2.3, “Using a Specific Advanced Authentication Server,” on page 15
- Section 2.4, “Configuration Settings for Multitenancy,” on page 15
- Section 2.5, “Selecting an Event,” on page 16

2.1 Setting a DNS for Server Discovery

1. Open a DNS Manager. To open the DNS Manager, click Start, point to Administrative Tools, and click DNS.

2. Add Host A or AAAA record and PTR record:

   2a. In the console tree, right-click the forward lookup zone that includes your domain name and click New Host (A or AAAA).

   2b. Specify a DNS name for the Advanced Authentication Server in Name.

   2c. Specify the IP address for the Advanced Authentication Server in IP address. You can specify the address in IP version 4 (IPv4) format (to add a host (A) resource record) or IP version 6 (IPv6) format (to add a host (AAAA) resource record).

   2d. Select Create associated pointer (PTR) record to create an additional pointer (PTR) resource record in a reverse zone for this host, based on the information that you provided in Name and IP address.

3. Add an SRV record:

   **NOTE**: Ensure that the LDAP SRV record exists at DNS server. If the record is not available, you must add it manually.

   For best load balancing, you need to perform the following actions only for Advanced Authentication web servers. You need not create the records for Global Master, DB Master, and DB servers.

   3a. For Advanced Authentication servers from a primary Advanced Authentication site (a site with Global Master server):

       3a1. In the console tree, locate Forward Lookup Zones and right-click on a node with domain name and click Other New Records.

       3a2. In the Select a resource record type list, click Service Location (SRV) and then click Create Record.

       3a3. Click Service and then specify _aaa.

       3a4. Click Protocol and then specify _tcp.

           Click Port Number and then specify 443.
In **Host offering this service**, specify the FQDN of the server that is added. For example, authsrv.mycompany.com.

Click **OK**.

For Advanced Authentication servers from other Advanced Authentication sites:

1. In the console tree, locate **Forward Lookup Zones**, switch to a node with domain name then to _sites node, right-click on an appropriate site name and click **Other New Records**.
2. In the **Select a resource record type** list, click **Service Location (SRV)** and then click **Create Record**.
3. Click **Service** and then specify _aaa.
4. Click **Protocol** and then specify _tcp.
5. Click **Port Number** and then specify 443.
6. In **Host offering this service**, specify the FQDN of the server that is added. For example, authsrv.mycompany.com.
7. Click **OK**.

Repeat steps 2 to 3 for all the authentication servers. The Priority and Weight values for different servers may vary. For best load balancing, you need to have records only for Advanced Authentication web servers and you do not need to have the records for Global Master, DB Master, and DB servers.

The DNS server contains **SRV entries _service._proto.name TTL class SRV priority weight port target**. The following descriptions define the elements available in the DNS server:

- **Service**: symbolic name of an applicable service.
- **Proto**: transport protocol of an applicable service. Mostly, TCP or UDP.
- **Name**: domain name for which this record is valid. It ends with a dot.
- **TTL**: standard DNS time to live field.
- **Class**: standard DNS class field (this is always IN).
- **Priority**: priority of the target host. Lower value indicates that it is more preferable.
- **Weight**: a relative weight for records with the same priority. Higher value indicates that it is more preferable.
- **Port**: TCP or UDP port on which the service is located.
- **Target**: canonical host name of the machine providing the service. It ends with a dot.

**Configuring Authentication Server Discovery on Client**

You can use the following options for server discovery on the client side:

- **discovery.Domain**: DNS name of the domain. For a Windows Client, this value is used if workstation is not connected to the domain.
- **discovery.subDomains**: list of additional sub domains separated by a semicolon. You can use them on a MacOS Client or Linux Client to list AD sites.
- **discovery.useOwnSite**: set the value to True to use the local site (Windows Client only).
- **discovery.dnsTimeout**: timeout for the DNS queries. The default value is 15 seconds.

**Authentication Server Discovery Flow**

**Windows Client**

The feature is not supported in Windows Client.
MacOS Client/ Linux PAM Module

1. Get servers from the sub domains listed in discovery.subDomain.
2. Get servers from the domain specified in discovery.Domain (global list).

Path for the configuration file is as follows:

- **MacOS Client**: /Library/Security/SecurityAgentPlugins/aucore_login.bundle/Contents/etc/aucore_login.conf.
- **Linux PAM module**: /opt/pam_aucore/etc/pam_aucore.conf.
The following diagram illustrates the server discovery workflow graphically.

SRV entries

_request_aaa_tcp.yourdomain.com 86400 IN SRV 0 5 5060 server1.yourdomain.com
_request_aaa_tcp.yourdomain.com 86400 IN SRV 0 5 5060 server2.yourdomain.com

Client PC

Request an SRV record _aaa_tcp.yourdomain.com

Receive list of records sorted by weight and priority

REST request to verify server status

Server1.yourdomain.com

REST request to verify server status

Server2.yourdomain.com
2.2 Preparing Linux for Installing Linux PAM Client

You must disable SELinux and configure networking before installing Linux PAM Client.

To disable SELinux, perform the following steps:

1. Open the configuration file `sudo nano /etc/selinux/config`.
2. Change `SELINUX=enforcing` to `SELINUX=disabled`.
3. Save the changes in the file.
4. Reboot your system.

To configure networking, perform the following steps:

1. Ensure that DNS is properly configured for server discovery.
2. Set Search Domains to FQDN.
   For example, in CentOS 7, you can set `/etc/sysconfig/network-scripts/ifcfg-eth0` by adding `DOMAIN=mycompany.com`.

2.3 Using a Specific Advanced Authentication Server

You can specify a certain Advanced Authentication server on a workstation that can be used when a workstation is joined to a domain, but user wants to force connection to a specific Advanced Authentication server and when a workstation with a Linux Client is not joined to a domain.

In the `/opt/pam_aucore/etc/pam_aucore.conf` file, configure `discovery.host = <IP_address|domain_name>`.

For example, `discovery.host = 192.168.20.40` or `discovery host = auth2.mycompany.local`.

You can specify a port number (optional parameter) for the client-server interaction: `discovery.port = <portnumber>`.

**NOTE:** For the Linux logon event, select the OS Logon (local) Event type if you want to use Linux Client on non-domain joined workstations.

2.4 Configuration Settings for Multitenancy

If Multi-tenancy is enabled, you must add the parameter `tenant_name` with a used tenant name as value in the configuration file: `/opt/pam_aucore/etc/pam_aucore.conf`. For example, specify `tenant_name=TOP` for the TOP tenant in the file. If the configuration file does not exist, you must create it.

**NOTE:** If you do not add the parameter `tenant_name`, you might get an error Tenant not found.
2.5 Selecting an Event

By default Linux logon event is used. However, in some cases it is required to create a separate event. For example, when the predefined event is used for domain joined workstations, you can create a custom event with type \texttt{Generic} for the non-domain joined workstations. In this case you will need to point these [non-domain] workstations to the custom event using the following parameter in the \texttt{event\_name: \langle CustomEventName\rangle} configuration file:

\verb+/opt/pam_aucore/etc/pam_aucore.conf/+
You can install and uninstall Linux PAM Client on the following platforms:

- Installing and Uninstalling Linux PAM Client on CentOS, Red Hat Enterprise Linux Client, and Server 7.2
- Installing and Uninstalling Linux PAM Client on SUSE Linux Enterprise Desktop and Server 12

**NOTE:** You cannot upgrade the Linux PAM Client. To install the latest client, you must uninstall the previous version and install the new client. For more information on installing Linux Client, see Installing and Uninstalling Linux PAM Client.

You can find the Linux PAM Client in the Advanced Authentication Enterprise Edition distributive package.

### 3.1 Installing and Uninstalling Linux PAM Client on CentOS, Red Hat Enterprise Linux Client, and Server 7.2

To install Linux PAM Client on CentOS, RHEL Client, and Server 7.2, perform the following steps:

1. Run the following command:
   ```bash
   sudo yum install -y ./naaf-linuxpamclient-centos-release-<version>.rpm.
   ```
2. Run the following configuration script:
   ```bash
   sudo chmod +x /opt/pam_aucore/bin/bind-to-ad.sh
   sudo /opt/pam_aucore/bin/bind-to-ad.sh MYCOMPANY mycompany.com Administrator
   ```
   where **MYCOMPANY** is your domain name and **mycompany.com** is your FQDN. Administrator is a domain account that contains permissions to integrate the machines to the domain.
3. If your Linux workstation is bound to a domain, ensure that you select **OS Logon (domain)** as the **Event type** for the **Linux logon event** and you complete the configuration:
   ```bash
   su username
   ```
   where, **username** is the user name of any user account from a domain.
   Else select **OS Logon (local)** as **Event type** for the **Linux logon event**.

To uninstall Linux PAM Client on CentOS, perform the following steps:

1. Run the following command:
   ```bash
   cd /opt/pam_aucore/bin/sudo ./uninstall
   ```
2. Open Advanced Authentication - Administrative Portal. Switch to **Endpoints** section. Find and remove endpoint for the Linux PAM Client instance.
3.2 Installing and Uninstalling Linux PAM Client on SUSE Linux Enterprise Desktop and Server 12

To install Linux PAM Client on SUSE Linux Enterprise Desktop and Server 12, perform the following steps:

1. Run the following command:
   ```bash
   rpm -i naaf-linuxpamclient-suse-release-<version>.rpm
   ```
2. Run the following command:
   If Linux machine is not bound to a domain and you select **OS logon (local)** type as the **Linux logon event**:  
   ```bash
   sudo /opt/pam_aucore/bin/activate-nondomain.sh
   ```
   If Linux machine is **bound to a domain** and you select **OS logon (domain)** type as the **Linux logon event**:  
   ```bash
   sudo /opt/pam_aucore/bin/activate.sh mycompany.com
   ```
   where **mycompany.com** is your FQDN.

To uninstall Linux PAM Client on SUSE Linux Enterprise Desktop, perform the following steps:

1. Run the following commands:
   ```bash
   sudo /opt/pam_aucore/bin/deactivate.sh
   sudo rpm -e pam_aucore
   ```
2. Open Advanced Authentication - Administrative Portal. Switch to **Endpoints** section. Find and remove endpoint for the Linux PAM Client instance.
4 Troubleshooting

To investigate the possible issues, analyze the debug logs.

The logs are placed in the /opt/pam_aucore/var/log/pam_aucore folder.

The logs are also recorded in the files:

- /var/log/messages
- /var/log/secure

4.1 Endpoint Not Found

Issue

After installing the client component and rebooting, the client reports Endpoint not found error and it is not possible to login.

Reason

An endpoint for the client already exists on server or in configuration file on the client.

Solution

1. Remove the endpoint for the client on the server in Administrative Portal - Endpoints section (if it exists).
2. Boot in Safe mode and remove endpoint_id, endpoint_name and endpoint_secret parameters from /opt/pam_aucore/etc/pam_aucore.conf.
3. Reboot.