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Third-Party Software Acknowledgement

This document is intended to help users of SafeNet products when working with third-party software, such as Oracle Access Manager R2.

Material from third-party software is being used solely for the purpose of making instructions clear. Screen images and content obtained from third-party software will be acknowledged as such.

Description

SafeNet Authentication Service delivers a fully automated, versatile, and strong authentication-as-a-service solution.

With no infrastructure required, SafeNet Authentication Service provides smooth management processes and highly flexible security policies, token choice, and integration APIs.

Oracle Access Manager delivers risk-aware end-to-end user authentication, single sign-on, and authorization protection, providing enterprises with secure access from mobile devices and seamless integration of social identities with applications. This document describes how to:

- Deploy multi-factor authentication (MFA) options in Oracle Access Manager R2 using SafeNet one-time password (OTP) authenticators managed by SafeNet Authentication Service.
- Deploy and configure Oracle Access Manager R2 using SAS agent for Oracle OAM R2.

It is assumed that the Oracle Access Manager R2 environment is already configured and working with LDAP passwords prior to implementing multi-factor authentication using SafeNet Authentication Service.

Oracle Access Manager R2 can be configured to support multi-factor authentication in several modes. The SAML authentication will be used for the purpose of working with SafeNet Authentication Service.

Applicability

The information in this document applies to:

- SafeNet Authentication Service (SAS)—SafeNet’s cloud-based authentication service
- SafeNet Authentication Service – Service Provider Edition (SAS-SPE)—A server version that is used by Service providers to deploy instances of SafeNet Authentication Service
- SafeNet Authentication Service – Private Cloud Edition (SAS-PCE)—A server version that is used to deploy the solution on-premises in the organization

Environment

The integration environment that was used in this document is based on the following software versions:

- SafeNet Authentication Service – Private Cloud Edition (SAS-PCE) — Mention only if SAS-PCE is relevant. Add version number to the SAS-PCE.
- SafeNet Authentication Service Agent for Oracle Access Manager
- Oracle Access Manager R2
Audience

This document is targeted to system administrators who are familiar with Oracle Access Manager R2, and are interested in adding multi-factor authentication capabilities using SafeNet Authentication Service.

SAS Authentication API Authentication using SafeNet Authentication Service Cloud

The image below describes the environment required to implement an OAM R2 solution using SafeNet Authentication Service (SAS).

SAS Authentication API using SafeNet Authentication Service-SPE and SafeNet Authentication Service-PCE

In addition to the pure cloud-based offering, SafeNet Authentication Service (SAS) comes with two on-premises versions:

- **SafeNet Authentication Service – Service Provider Edition (SPE)**—An on-premises version of SafeNet Authentication Service targeted at service providers interested in hosting SAS in their data center.

- **SafeNet Authentication Service – Private Cloud Edition (PCE)**—An on-premises version of SafeNet Authentication Service targeted at organizations interested in hosting SAS in their private cloud environment.

For both on-premises versions, SAS can be integrated with AD FS infrastructure, which uses a special on-premises agent called Gemalto SafeNet SAS ADFS Agent.

SAS API Authentication using SafeNet Authentication Service

Gemalto SafeNet SAS OAM Agent is an MFA adapter that provides users a way to authenticate through the OAM agent using SAS as a secondary authenticator.
The image below describes the dataflow of a multi-factor authentication transaction for Oracle Access Manager R2.

1. The user attempts to access a resource which is protected with Oracle Access Manager (OAM) R2.
2. OAM displays the SAS agent login page.
3. The user enters his or her credentials (for example, LDAP and OTP).
4. The SAS agent validates the LDAP credentials against the configured LDAP server.
5. After successful OTP validation, the user is redirected to access the protected resource.

### Configuring Oracle Access Manager R2 with SAS Agent

Configuring SAS agent on Oracle Access Manager R2 requires:

- Installing the SAS Agent Plugin, page 6
- Configuring the .ini File of the SAS Agent, page 7
- Importing the SAS Agent Plugin Using the Oracle Access Manager Console, page 7
- Creating an Authentication Module, page 10
- Creating an Authentication Scheme, page 14
- Forcing the SAS Agent Authentication Scheme on a Protected Resource, page 16
- Configuring the WebLogic Server, page 17
- Deploying the Agent on the WebLogic Server, page 18

### Installing the SAS Agent Plugin

Install the SAS agent rpm.

1. Run the following command:
   ```bash
   rpm --ivh cryptocard-oam-agent-[your installation build].x86_64.rpm
   ```
2. The installation package is installed in the /usr/local/cryptocard location.

![File Browser](image)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

Configuring the .ini File of the SAS Agent

Modify the .ini file of the SAS agent by adding the BSID server details, protocol, etc. Configure the following variables in the /usr/local/cryptocard/ini/JCryptoWrapper.ini file:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PrimaryProtocol</td>
<td>Select http/https.</td>
</tr>
<tr>
<td>PrimaryServer</td>
<td>Enter the primary SAS server host.</td>
</tr>
<tr>
<td>PrimaryServerPort</td>
<td>Enter the port number (for example, 80/443).</td>
</tr>
<tr>
<td>REDIRECT-LOCATION-AFTER-AUTHENTICATION</td>
<td>Enter the OAM redirection URL (For example, <a href="http://iamdemo.oracle.com:14100/oam/server/auth_cred_submit">http://iamdemo.oracle.com:14100/oam/server/auth_cred_submit</a>).</td>
</tr>
</tbody>
</table>

Importing the SAS Agent Plugin Using the Oracle Access Manager Console

In this section you will import the agent plugin to the OAM, using the OAM management web portal.

1. Log in to the OAM Management portal as an administrator.
2. On the OAM Management portal, under **Access Manager**, click **Plug-ins**.

   ![OAM Management Portal](image1)

   *(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*

3. On the **Plug-ins** window, click **Import Plug-in**.

   ![Plug-ins Window](image2)

   *(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*

4. The **Import Plug-in** window displayed. Click **Browse**.

   ![Import Plug-in Window](image3)

   *(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*
5. On the **File Upload** window, select the agent.jar file (for example, /usr/local/cryptocard/oam/war/CYPTOCARD0amAuthModule.jar), and then click **Open**.

![File Upload Window](image)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

6. On the **Import Plug-in** window, click **Import**.

7. The SAS agent plugin is listed. Select the SAS agent plug-in, and then click **Distribute Selected**.

![Import Plug-in Window](image)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

8. The **Activation Status** is changed to **Distributed**.

![Activation Status](image)
9. Select the SAS agent plug-in, and then click **Activate Selected**. The **Activation Status** is changed to **Activated**.

![Screen Image](image1.png)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

**Creating an Authentication Module**

Configure the authentication module that defines the type and order of the authentication. In the authentication module, you configure the OTP and LDAP authentication that will be used by the SAS agent.

1. On the OAM Management portal, under **Access Manager**, click **Authentication Modules**.

![Screen Image](image2.png)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)
2. Click **Create Authentication Module > Create Custom Authentication Module**.

![Image of Oracle Access Manager interface](image1)

*(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*

3. On the **Authentication Module** window, on the **General** tab, complete the following fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Enter a name for the module.</td>
</tr>
<tr>
<td>Description</td>
<td>Enter a description for the module.</td>
</tr>
</tbody>
</table>

![Image of filled fields](image2)

*(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*
4. Click the **Steps** tab, and then click the + icon to add a new step to the authentication module.

5. Perform the following three steps:
   a. On the **Add new step** window, for **OTP**, complete the following fields, and then click **OK**.

<table>
<thead>
<tr>
<th>Step Name</th>
<th>Enter a name for the module.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug-in Name</td>
<td>Select <strong>CRYPTOCardOamAuthModule</strong>.</td>
</tr>
</tbody>
</table>

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)
b. For **User Identification** (LDAP Identification), complete the following fields, and the click **OK**.

<table>
<thead>
<tr>
<th>Step Name</th>
<th>Enter a name for the module.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug-in Name</td>
<td>Select <code>UserIdentificationPlugin</code>.</td>
</tr>
</tbody>
</table>

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

C. For **User Authentication** (LDAP Authentication), complete the following fields, and then click **OK**.

<table>
<thead>
<tr>
<th>Step Name</th>
<th>Enter a name for the module.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug-in Name</td>
<td>Select <code>UserAuthenticationPlugin</code>.</td>
</tr>
</tbody>
</table>

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

6. Click the **Steps Orchestration** tab, and then in the **Initial Step** field, select **OTP** to be the first step you added (refer to step 5 a), and then fill the steps as follows.

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

7. Click **Apply**.
Creating an Authentication Scheme

Create the authentication scheme that will use the authentication module that is created in the previous section.

1. On the OAM Management portal, under **Access Manager**, click **Authentication Schemes**.

   ![Authentication Schemes](image1)

   *(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*

2. Click **Create Authentication Scheme**.

   ![Create Scheme](image2)

   *(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*
3. Complete the following fields, and then click **Apply**.

<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Enter a name for the authentication scheme.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authentication Level</strong></td>
<td>Select 2.</td>
</tr>
<tr>
<td><strong>Challenge Method</strong></td>
<td>Select <strong>FOAM</strong>.</td>
</tr>
<tr>
<td><strong>Challenge Redirect URL</strong></td>
<td>Enter <code>/oam/server/</code>.</td>
</tr>
<tr>
<td><strong>Authentication Module</strong></td>
<td>Select the authentication module (for example, <strong>SAS Agent</strong>) that you created earlier in step 3 of “Creating an Authentication Module” on page 10.</td>
</tr>
<tr>
<td><strong>Challenge URL</strong></td>
<td>Enter the URL of the credentials collector (for example, <code>http://oamserver1.localdomain:14100/Login/Login.jsp</code>).</td>
</tr>
<tr>
<td><strong>Context Type</strong></td>
<td>Select <strong>external</strong>.</td>
</tr>
</tbody>
</table>

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)
Forcing the SAS Agent Authentication Scheme on a Protected Resource

Force the SAS agent authentication scheme on the protected resource in OAM.

1. On the OAM Management portal, under Access Manager, click Application Domains.

   ![Screen Image 1](image1.png)
   (The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

2. Click Search, and then under Search Results, click on the protected resource (for example, RREG_OAM11G).

   ![Screen Image 2](image2.png)
   (The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

![Image of Oracle Access Manager interface showing Authentication Policies]

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

4. In the Authentication Scheme field, select the authentication scheme (for example, SAS Agent), and then click Apply.

![Image of Oracle Access Manager interface showing Authentication Scheme]

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

Configuring the WebLogic Server

Add the LD_LIBRARY_PATH to the WebLogic Server (WLS) using SSH.

1. Log in to your Linux server hosting WLS using SSH.

2. Add LD_LIBRARY_PATH to the WLS startup scripts at the following locations:
   a. In the `<WLS INSTALL PATH>/oracle/Middleware/wlserver_xx/common/bin/commEnv.sh` file, at the end, just before resetFD, add the following, and then save the file.
LD_LIBRARY_PATH=/user/local/cryptocard/oam/bin/x64:{LD_LIBRARY_PATH}
export LD_LIBRARY_PATH

b. In the `<WLS INSTALL PATH>/oracle/Middleware/user_projects/domains/OAMdomain/bin/setDomainEnv.sh` file, at the end, just after `export BEA_JAVA_HOME`, add the following, and then save the file.
LD_LIBRARY_PATH=/user/local/cryptocard/oam/bin/x64:{LD_LIBRARY_PATH}
export LD_LIBRARY_PATH

3. Restart the OAM and WLS services.

**Deploying the Agent on the WebLogic Server**

Deploy the agent `.war` file on the WebLogic Server (WLS).

1. Log in to the WLS web interface.

![WLS Web Interface](image1.png)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

2. In the left pane, under **Domain Structure**, click **Deployments**, and then in the right pane, click **Install**.

![Deployments in WLS](image2.png)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)
3. On Install Application Assistant, select the CRYPTOCardOamLogin.war file from the agent installation folder (/usr/local/cryptocard/oam/war), and then click Next.

4. Under Choose targeting style, select Install this deployment as an application, and then click Next.
5. Under **Select deployment targets**, select the OAM server, and then click **Next**.

![Screenshot of Select deployment targets](image1)

*(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*

6. Under **Optional Settings**, do not change the default configuration. Click **Finish**.

![Screenshot of Optional settings](image2)

*(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)*
7. In the left pane, under **Domain Structure**, click **Deployments**. Then, in the right pane under **Deployments**, validate if the **State** of the CRYPTOCardOamLogin agent is **Active**.

![Image of Oracle Access Manager interface](image-url)

(The screen image above is from Oracle Access Manager. Trademarks are the property of their respective owners.)

### Configuring SafeNet Authentication Service

The deployment of multi-factor authentication using SafeNet Authentication Service (SAS) with Oracle Access Manager R2 using SAML authentication requires:

- Creating Users Stores in SafeNet Authentication Service, page 21
- Assigning an Authenticator in SafeNet Authentication Service, page 22
- Configuring SafeNet Authentication Service Auth Node, page 22

### Creating Users Stores in SafeNet Authentication Service

Before SafeNet Authentication Service (SAS) can authenticate any user in your organization, you need to create a user store in SAS that reflects the users that would need to use multi-factor authentication. User records are created in the SAS user store using one of the following methods:

- Manually, one user at a time, using the Create User shortcut
- Manually, by importing one or more user records via a flat file
- Automatically, by synchronizing with your Active Directory / LDAP server using the SAS Synchronization Agent

For additional details on importing users to SafeNet Authentication Service, refer to “Creating Users” in the SafeNet Authentication Service Subscriber Account Operator Guide:


All SafeNet Authentication Service documentation can be found on the SafeNet Knowledge Base site.
Assigning an Authenticator in SafeNet Authentication Service

SafeNet Authentication Service (SAS) supports a number of authentication methods that can be used as a second authentication factor for users who are authenticating through Oracle Access Manager R2.

The following authenticators are supported:

- eToken PASS
- RB-1 keypad token
- KT-4 token
- SafeNet GOLD
- SMS tokens
- MP-1 software token
- GrIDsure
- MobilePASS

Authenticators can be assigned to users in two ways:

- **Manual provisioning**—Assign an authenticator to users one at a time.
- **Provisioning rules**—The administrator can set provisioning rules in SAS so that the rules will be triggered when group memberships and other user attributes change. An authenticator will be assigned automatically to the user.

Refer to “Provisioning Rules” in the *SafeNet Authentication Service Subscriber Account Operator Guide* to learn how to provision the different authentication methods to the users in the SAS user store.


Configuring SafeNet Authentication Service Auth Node

In the event that the SafeNet Authentication Service (SAS) server is not installed on the same machine as AD, the following steps must be performed:

1. Log in to the SAS console as the account operator.
2. Click **Virtual Servers > Comms > Auth Nodes**.
3. Click the **Auth Nodes** link, and then click **Add**.
4. Complete the following fields, and then click Save.

<table>
<thead>
<tr>
<th>Agent Description</th>
<th>Type a description for this node (for example, DC).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Name</td>
<td>Type a host name.</td>
</tr>
<tr>
<td>Low IP Address In Range</td>
<td>Type the low IP address.</td>
</tr>
<tr>
<td>High IP Address In Range</td>
<td>Type the high IP address. (The low and high IP addresses may be the same since the node is referencing a single machine.)</td>
</tr>
<tr>
<td>Exclude from PIN change requests</td>
<td>Do not select this check box.</td>
</tr>
</tbody>
</table>

**Running the Solution**

Once the configurations are done, log in to the protected resource and test the solution.

1. Open a browser and go to the protected resource.
2. You will be redirected to the SafeNet Authentication Service (SAS) login window. Enter your user name, LDAP password, and one-time password (OTP), and then click **Login**.
After successful authentication you will be redirected to the protected resource

Appendix: Troubleshooting

The following issues can occur during the integration:

- Setting File and Directory Permissions, page 24
- WebLogic Server SSL Errors (SSL connection to SAS), page 24
- WebLogic Agent Deployment Error, page 25
- String Truncation, page 25

Setting File and Directory Permissions

Administrators must secure file and directory access permissions.

For example,

- The READONLY access permission must be set on the INI file for the WLS or OAM process owner. The Plugin and web applications will require READONLY permissions for the INI file, key file, and resource directory, as well as files in that directory.

- The WRITE access permission must be set on log directory for the WLS/OAM process owner.

WebLogic Server SSL Errors (SSL connection to SAS)

As the certificate policy is different in WebLogic than it is in a stand-alone Java program, it is advised to use a Sun implementation instead of WebLogic.

http://webtech-kapil.blogspot.com/2010/06/javalangclasscastexception.html

Start WebLogic with the following flag:

-DUseSunHttpHandler=true

The standard Sun SSL implementation will be used.

When SOAP transport in the INI file via Java code, on WLS, you might encounter SSL connection, certificate validation, and SSL handshake errors. These errors can be prevented by adding the following to your WLS startup script below the comments block:

<WLS INSTALL PATH>/oracle/Middleware/user_projects/domains/OAMdomain/bin/setDomainEnv.sh
WebLogic Agent Deployment Error

When deploying the agent on the Weblogic server (refer to Deploying the Agent on the WebLogic Server, on page 18), there could be an error (Java exception) which states that JCryptoWrapper cannot be loaded using the following installation path:

javax.servlet.ServletException: JCryptoWrapper loading FAILED using installation path[/usr/local/cryptocard/oam/bin/x64/libJCryptoWrapper.so] and System Path.

In this scenario, it is recommended to edit the following files and add the hardcoded path:

1. Edit the following files:
   `/etc/ld.so.conf.d`
   `-oracle/.bash_profile`
2. Add the following to both files:

   `LD_LIBRARY_PATH=<OAM Agent Path>
   export LD_LIBRARY_PATH`

   For example,  
   `LD_LIBRARY_PATH=/usr/local/cryptocard/oam/bin/x64:$(LD_LIBRARY_PATH)
   export LD_LIBRARY_PATH`
3. Save both the files.
4. Restart the machine.

String Truncation

In OAM R2, by default, the maximum size of a parameter that can be sent to a custom plugin is 500 characters. This can cause an error message to appear after a successful authentication with SAS is done.

This is a data sanitization feature to control what OAM send to a 3rd part plugin.
Data sanitization can be done by updating directly the oam-config.xml file, but it has to be done very carefully, otherwise the changes will roll back at AdminServer startup.

1. Shut down the entire domain, including the WebLogic Admin server and all the OAM managed servers.
2. Create a backup of the existing file before editing them.
3. In the oam-config.xml file, locate the version number that needs to be incremented by one to ensure that the changes are not overwritten by the console. The version number will occur near the top of the file.
   ```xml
   <Setting xmlns="http://www.w3.org/2001/XMLSchema" Name="NGAMConfiguration" Type="htf:map">
     ...
     <Setting Name="Version" Type="xsd:integer">175</Setting>
     ...
   </Setting>
   ```
4. In the oam-config.xml file, locate the profile node under the NGAMServer node.
   ```xml
   <Setting xmlns="http://www.w3.org/2001/XMLSchema" Name="NGAMConfiguration" Type="htf:map">
     ...
     <Setting Name="Server" Type="htf:map">
       <Setting Name="NGAMServer" Type="htf:map">
         ...
         <Setting Name="Profile" Type="htf:map">
           ...
           </Setting>
         ...
       </Setting>
     ...
   </Setting>
   ```
5. After the Profile Node, mentioned in step 4, add the following XML code:
   ```xml
   <Setting xmlns="http://www.w3.org/2001/XMLSchema" Name="NGAMConfiguration" Type="htf:map">
     ...
     <Setting Name="Server" Type="htf:map">
       <Setting Name="NGAMServer" Type="htf:map">
         ...
         <Setting Name="Profile" Type="htf:map">
           ...
           <Setting Name="Security" Type="htf:map">
             <Setting Name="TrustedInput" Type="htf:map">
               <Setting Name="DEFAULT" Type="xsd:string">4000-null-false</Setting>
               <Setting Name="DEFAULT_PARAMETER" Type="xsd:string">4000-null-false</Setting>
             </Setting>
           ...
           </Setting>
         ...
       </Setting>
     ...
   </Setting>
   ```
6. Save the changes and then, restart the WebLogic Admin server, followed by the OAM managed servers.

7. As a verification step, check `<DOMAIN_HOME>/config/fmwconfig/oam-config.xml` on each of the OAM managed server nodes, to ensure that the updated version has been propagated correctly.

## Support Contacts

If you encounter a problem while installing, registering, or operating this product, please make sure that you have read the documentation. If you cannot resolve the issue, contact your supplier or Gemalto Customer Support. Gemalto Customer Support operates 24 hours a day, 7 days a week. Your level of access to this service is governed by the support plan arrangements made between Gemalto and your organization. Please consult this support plan for further information about your entitlements, including the hours when telephone support is available to you.

<table>
<thead>
<tr>
<th>Contact Method</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Gemalto</td>
</tr>
<tr>
<td></td>
<td>4690 Millennium Drive</td>
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<td></td>
<td>Belcamp, Maryland 21017 USA</td>
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<tr>
<td>Phone</td>
<td>United States 1-800-545-6608</td>
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<td></td>
<td>International 1-410-931-7520</td>
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<tr>
<td>Technical Support</td>
<td><a href="https://serviceportal.safenet-inc.com">https://serviceportal.safenet-inc.com</a></td>
</tr>
<tr>
<td>Customer Portal</td>
<td>Existing customers with a Technical Support Customer Portal account can log in to manage incidents, get the latest software upgrades, and access the Gemalto Knowledge Base.</td>
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</table>