README

Addressing the Java Deserialization Vulnerability for SAS Software

Note: *If you have applied SAS Security Update 2015-11 or 2016-02 and the hot fixes associated with them, you should still apply SAS Security Update 2016-06 and its associated hot fixes. SAS Security Update 2016-06 and its associated hot fixes address additional fixes for this Java vulnerability.*

If you downloaded a SAS 9.4_M3 order after October 18, 2016 or any SAS 9.4_M4 order, the fixes in SAS Security Update 2016-06 are included in your order. The SAS Deployment Wizard will install SAS Security Update 2016-06 during your software deployment or update. You can skip steps 1-3 in this document, but you should still perform step 4.

This document describes the steps you should take in order to apply SAS Security Update 2016-06 and the hot fixes associated with it. It is critical that the steps be performed in the order they appear in this document. It is also critical that you perform all of the steps the first time that you apply the update and hot fixes.

These steps may direct you to apply a hot fix you have already applied outside this process. If so, follow the instructions and re-apply the hot fix. The SAS Deployment Manager will determine if any hot fix has been previously applied and tell you what hot fixes it did apply. If it finds that a hot fix has been previously applied, you do not have to perform any of the post-installation steps for that hot fix.

Note: *If your deployment is an upgrade, the Y09003 hotfix and SAS Security Update must be applied, in any order, between the install and configuration steps.*

Section 1 — Apply SAS Security Update 2016-06

Note: *To determine if you have already applied this version of the SAS security update, locate and examine the contents of these files:*

```
SASHome\InstallMisc\utilities\installqual\9.4\serialization_hotfix.properties
SASHome\instqualtool\serialization_hotfix.properties
```

If the file does not exist in either location or it lists the version of the SAS security update as less than 3.0, you do not have this latest version of the update.

Note: *If your middle tier is horizontally clustered, complete Sections 1-4 on the primary middle tier machine or machines first and then complete Section 5 for the secondary middle tier cluster nodes.*

Use the following steps to apply the security update. These instructions should be followed for every machine in your deployment (except the secondary middle tier cluster nodes which will return you to this section after some preliminary steps are completed), either by putting the update individually on each machine or running the update from a networked location that each machine has access to.

1. Before beginning, ensure all active SAS sessions, daemons, spawners, servers, and agents are terminated. In addition, SAS strongly recommends that you back up your system before applying the hot fix.
2. Download the security update from http://ftp.sas.com/techsup/download/hotfix/HF2/Java-deserialization_update.html#update
3. Unzip `sas-security-update-2016-06.zip` into a directory of your choice. On UNIX, using `unzip` is the best option, but if you use WinZip or the `jar xvf` command, you must also use the following command in order to preserve the appropriate permissions:

   ```
   chmod a+x install.sh
   ```

   If the install ID differs from the security update directory owner, make the directory writable by all IDs in the same group with the following command:

   ```
   chmod -R g+w /<security directory>/sas-security-update-2016-06
   ```
4. From the directory into which you've unpacked the software, go to the `sas-security-update-2016-06` directory.
5. In that directory, run the appropriate script using the same user ID that was used to install the software. The script requires one argument, the full path to the SASHOME where the hot fix is going to be applied.

   Windows

   ```
   install.bat "<SASHOME>"
   ```

   Windows Example

   ```
   install.bat "C:\Program Files\SASHome"
   ```

   Note: *Depending on your settings, you may have to use the* ***Run as administrator*** *option.*

   UNIX

   ```
   ./install.sh "<SASHOME>"
   ```

   UNIX Example

   ```
   ./install.sh "/usr/lpp/SAS"
   ```
6. The tool runs and applies the hot fix to all the files in the SASHOME and SASConfig that need to be updated. When the tool finishes making the updates, it provides a message that says the updates are complete and then exits.
7. If you plan to deploy other hot fixes from the location where you placed this zip file, you will need to remove it from this location. The SAS Deployment Manager, which is used for deploying other hot fixes, will not recognize this file and will issue an error.

Section 2 — Apply Hot Fix Y09003 - Supplemental Hot Fix for SAS Security Update 2016-06

Hot fix Y09003 is a container hot fix that contains fixes for several products. Your deployment may not contain all of the products included in this hot fix container: the tools will skip updates if they do not apply to your deployment. We have packaged these together to make the update simpler.

Ensure that all active SAS sessions, daemons, spawners, servers, and agents remain terminated. Then follow these instructions to apply hot fix Y09003.

1. Go to http://ftp.sas.com/techsup/download/hotfix/HF2/Java-deserialization_update.html#Y09003
2. Use the instructions in the Y09003pt.pdf file at that location to apply hot fix Y09003 to every machine, except secondary middle tier cluster machines, in your deployment.

Section 3 — Rebuild and Redeploy Web Applications

After the update and hot fixes have been applied, you must rebuild and redeploy every web application on each middle tier machine in order to assure the hot fixes can take effect. The instructions for rebuilding and redeploying can be found in the following locations:

Rebuilding - refer to the "Rebuilding the SAS Web Applications" topic in the "Administering SAS Web Applications" section of the "Middle-Tier Applications" chapter of the *SAS 9.4 Intelligence Platform: Middle-Tier Administration Guide* located at http://support.sas.com/documentation/onlinedoc/intellplatform/tabs/admin94.html

Redeploying - refer to the "Redeploying the SAS Web Applications" topic in the "Administering SAS Web Applications" section of the "Middle-Tier Applications" chapter of the *SAS 9.4 Intelligence Platform: Middle-Tier Administration Guide* located at http://support.sas.com/documentation/onlinedoc/intellplatform/tabs/admin94.html

Section 4 — Product-Specific Hot Fixes

Apply product-specific hot fixes using the following steps.

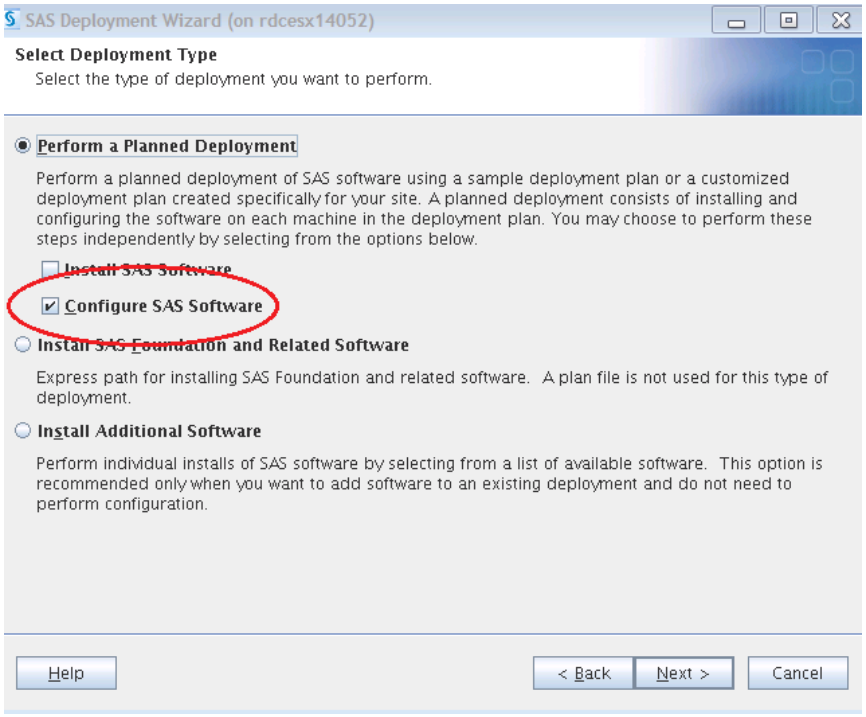
1. Go to http://ftp.sas.com/techsup/download/hotfix/HF2/Java-deserialization_update.html#prodhotfix to review a list of product-specific Java Deserialization hot fixes.
2. Click on the links for the hot fixes that apply to your deployment.
3. Read the documentation about applying the hot fixes you will apply.
4. Optionally, run the HFADD tool to generate a report of other hot fixes that you may want to apply to your deployment.

   Note: *If you use the HFADD tool, SAS Security Update 2016-06 and hot fix Y09003 will never be included in the results. SAS Security Update 2016-06 and hot fix Y09003 must always be applied manually according to the instructions above.*
5. Once you have determined all the hot fixes to apply to your deployment, download them and place them in a directory on each machine or in a shared location each machine can access per the instructions provided in the *SAS Deployment Wizard and SAS Deployment Manager 9.4: User's Guide*.
6. Perform any pre-installation tasks in the documentation that accompanies each hot fix.
7. Apply the hot fixes.
8. Perform any post-installation tasks in the documentation that accompanies each hot fix.

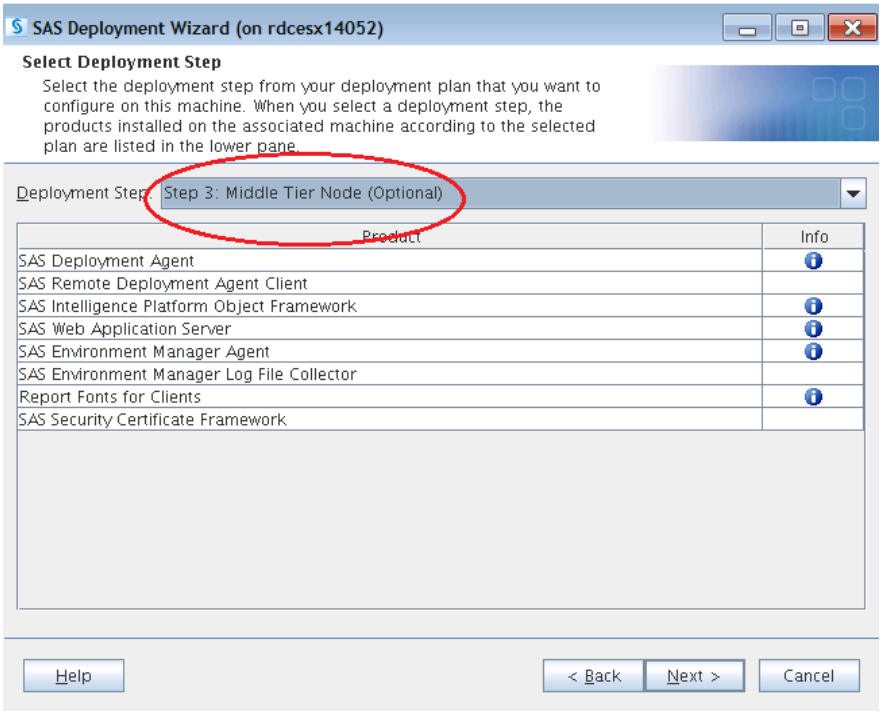
Section 5 — Apply the Java Deserialization Fix to a Horizontal Middle-Tier Cluster Node

Note: *Before performing this step on a horizontal middle tier cluster node, be sure you have completed Sections 1-4 on the primary middle tier machine.*

1. On each secondary middle tier cluster node, shut down all SAS sessions, daemons, spawners, servers, and agents except for the SAS Deployment Agent which should remain started/running.
2. If you haven't already, ensure the primary middle tier (non-horizontal cluster Web Application Server) has been started along with the supporting required components (such as WIP Data Server, Metadata Server, Web Server, Gemfire cache locator, and JMS Broker) as well as the SAS Deployment Agent.
3. On each secondary cluster node, run the SAS Deployment Wizard and go through the screens as you would otherwise.
   a. When you reach the **Select Deployment Type** panel, select **Configure SAS Software**.

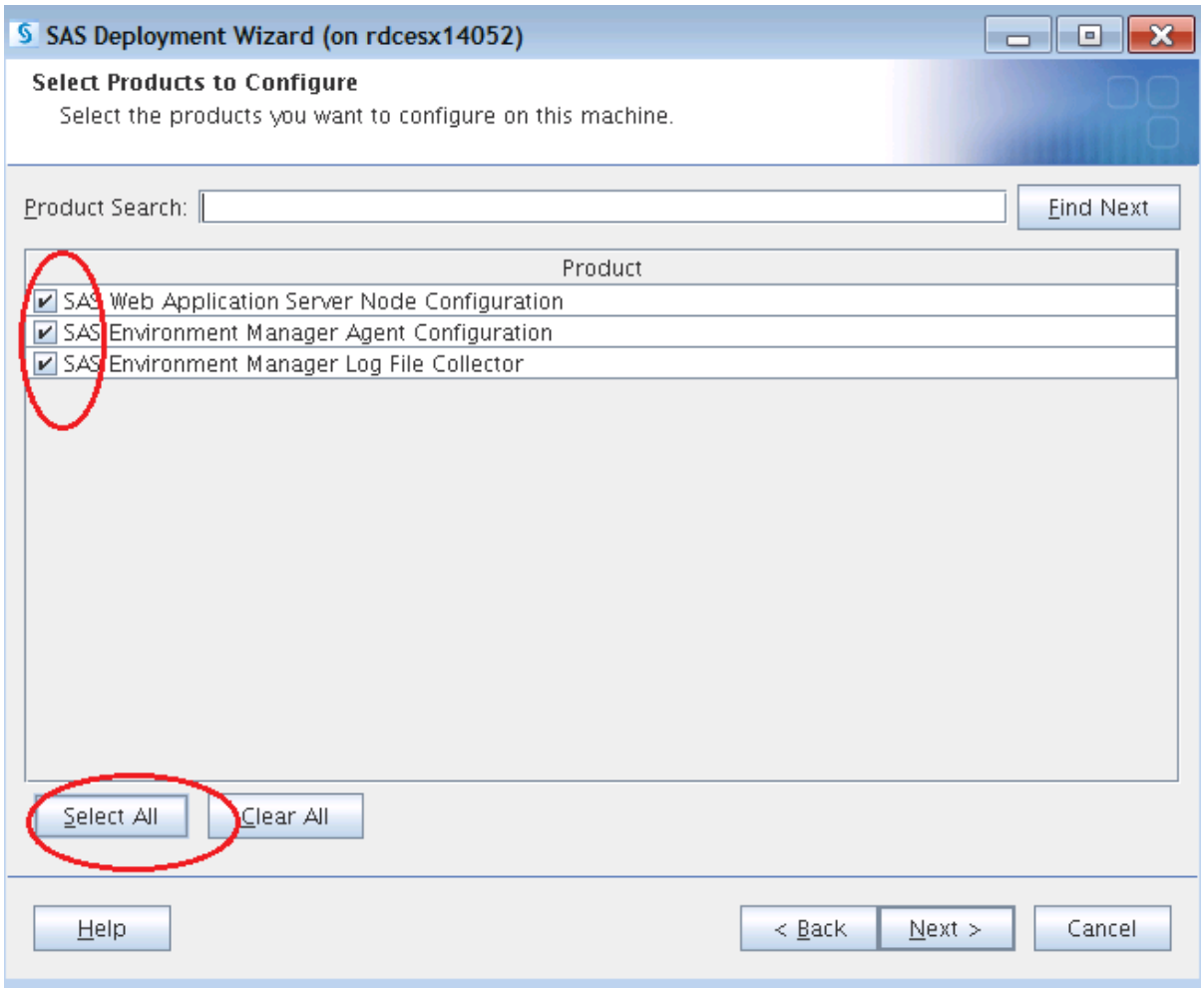


b. At the **Select Deployment Step** panel, select **Middle Tier Node (Optional)** from the dropdown list.



c. On each middle tier horizontal cluster node, after specifying the configuration directory you will get the following warning. Click **Yes** to continue.

d. At the **Select Products to Configure** panel, check **Select All** to configure all the products on the middle tier horizontal cluster node.



e. Finish running the SAS Deployment Wizard.

4. Perform the procedure described in "Section 1 — Apply SAS Security Update 2016-02" above on each secondary cluster node.
5. Check to see if you installed one of the following hot fixes:
   - V77008
   - S47007
   - S48006
   - S46005

   If you did install a hot fix from that list, complete the following manual instructions on each cluster node.
   a. Copy the following files from the corresponding primary node to each cluster node. Note that the "x" is a single digit that varies depending on the version of SAS Environment Manager you are using.
      - `<config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/plugins/scripting/groovy-all-2.3.7.jar`
      - `<config>/LevX/Web/Scripts/SASEnvironmentManagerAgent/lib/groovy-all-1.7.0.jar`

- <config>/LevX/Web/Scripts/SASEnvironmentManagerAgent/lib/commons-collections.jar
- <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/httpclient-4.5.1.jar
- <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/httpcore-4.4.3.jar
- <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/httpmime-4.5.1.jar
- <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/spring-oxm-3.0.5.RELEASE.jar
- <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/commons-collections.jar
- <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/plugins/scripting/groovy-all-1.7.0.jar
- <config>/LevX/Web/Scripts/AppServer/lib/commons-collections.jar
- <config>/LevX/Web/Scripts/AppServer/lib/groovy-all-1.7.0.jar

b. Delete the following files. Note that the "x" is a single digit that varies depending on the version of SAS Environment Manager you are using.
   - <config>/LevX/Web/Scripts/SASEnvironmentManagerAgent/lib/groovy-all.jar
   - <config>/LevX/Web/Scripts/AppServer/lib/groovy-all.jar
   - <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/commons-collections-3.2.1.jar
   - <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/httpclient-4.1.1.jar
   - <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/httpcore-4.1.jar
   - <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/pdk/lib/httpmime-4.1.1.jar

c. Locate the <config>/LevX/Web/SASEnvironmentManager/agent-5.x.0-EE/bundles/agent-5.x.0/bin/ directory (note that the "x" is a single digit that varies depending on the version of SAS Environment Manager you are using). Make the following modifications based on the operating system the cluster is running on.
   - **For Windows**, open the file hq-agent.bat file. Change the following two lines

     ```
     set
     CLIENT_CLASSPATH=%CLIENT_CLASSPATH%;%PDK_LIB%\httpclient-
     4.1.1.jar
     set CLIENT_CLASSPATH=%CLIENT_CLASSPATH%;%PDK_LIB%\httpcore-
     4.1.jar
     ```

     to

     ```
     set
     CLIENT_CLASSPATH=%CLIENT_CLASSPATH%;%PDK_LIB%\httpclient-
     4.5.1.jar
     set CLIENT_CLASSPATH=%CLIENT_CLASSPATH%;%PDK_LIB%\httpcore-
     4.4.3.jar
     ```

- **For UNIX**, open the file `hq-agent.sh` file. Change the following two lines

```
CLIENT_CLASSPATH="${CLIENT_CLASSPATH}:${PDK_LIB}/httpclient
-4.1.1.jar"
CLIENT_CLASSPATH="${CLIENT_CLASSPATH}:${PDK_LIB}/httpcore-
4.1.jar"
```

  to

```
CLIENT_CLASSPATH="${CLIENT_CLASSPATH}:${PDK_LIB}/httpclient
-4.5.1.jar"
CLIENT_CLASSPATH="${CLIENT_CLASSPATH}:${PDK_LIB}/httpcore-
4.4.3.jar"
```

6. Check to see if you installed one of the following hot fixes:
   - W43003
   - R94002
   - P38002

   If you did install a hot fix from that list, complete the following manual instructions on each cluster node.
   a. Copy all the delivered JAR files from the folder `<SASHOME>/SASWebApplicationServer/9.4/hotfix` on the main node to the following location on each cluster node: `<config>/Web/WebAppServer/SASServerX_X/lib`
   b. Update `<config>/Web/WebAppServer/SASServerX_X/conf/server.xml` by replacing all occurrences of "`org.apache.activemq.pool.AmqJNDIPooledConnectionFactory`" with "`org.apache.activemq.pool.PooledConnectionFactory`".
   c. Find `<config>/Web/WebAppServer/SASServerX_X/bin/setenv.sh` (for UNIX) or `<config>/Web/WebAppServer/SASServerX_X/bin/setenv.bat` (for Windows) on the primary cluster node. Copy the entry in the file that begins as described below, then paste it into the file with the same name in each secondary cluster node.
      - **For Windows**:

        ```
        set JAVA_WHITELIST=<…>
        ```

      - **For UNIX:**

        ```
        JAVA_WHITELIST="<…>"
        ```

   d. Find `<config>/Web/WebAppServer/SASServerX_X/conf/wrapper.conf` on the primary node. Copy the entry in the file that begins as described below, then paste it into the file with the same name in each secondary cluster node.

      ```
      wrapper.java.additional.##=<…>
      ```

7. Start the SAS web application servers on each secondary middle tier cluster node.

Contacting SAS Technical Support

If you need assistance with the software, we ask that only SAS support personnel call our Technical Support Division.

- For U.S. and Canadian customers, support is provided from our corporate headquarters in Cary, North Carolina. You may call (919) 677-8008, Monday through Friday.
- Customers outside of the U.S. can obtain local-language technical support through the local office in their countries. Customers in these locations should contact their local office for specific support hours. See http://support.sas.com/techsup/contact/index.html for contact information for local offices.