CVE-2022-35405 Zoho Password Manager Pro XML-RPC RCE - 先知社区

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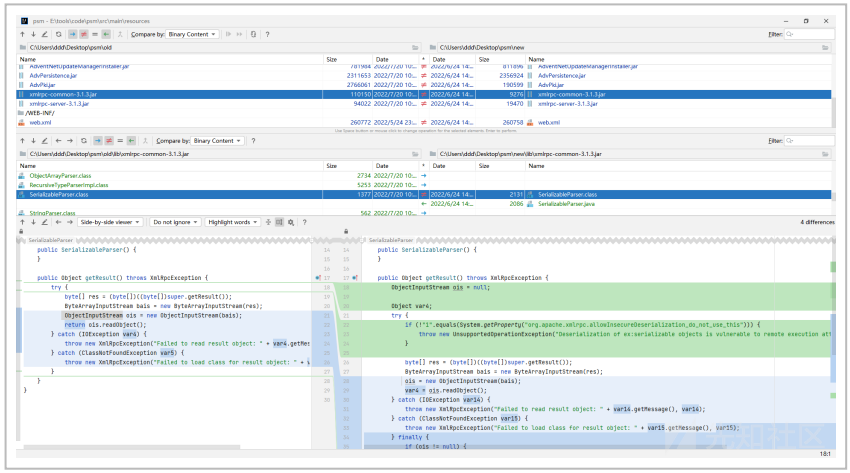
https://archives2.manageengine.com/passwordmanagerpro/12100/ManageEngine_PMP_64bit.exe (https://archives2.manageengine.com/passwordmanagerpro/12100/ManageEngine_PMP_64bit.exe)

补丁

https://archives2.manageengine.com/passwordmanagerpro/12101/ManageEngine_PasswordManager_Pro_12100_to_12101.ppm (https://archives2.manageengine.com/passwordmanagerpro/12101/ManageEngine_PasswordManager_Pro_12100_to_12101.ppm)

`org.apache.xmlrpc.parser.SerializableParser#getResult` 关了反序列化



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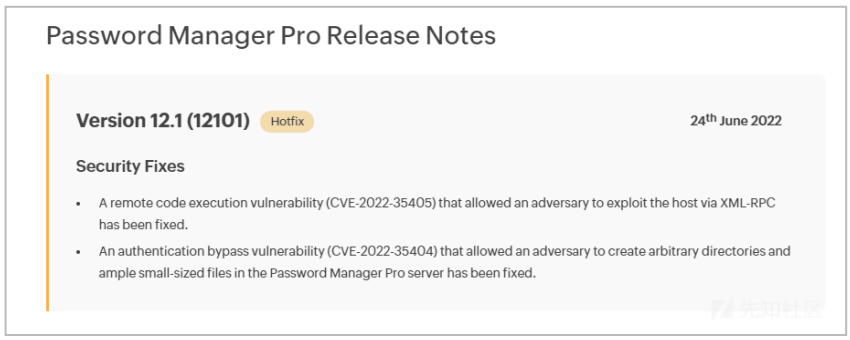
通过漏洞描述可知为 XML-RPC 的反序列化 RCE



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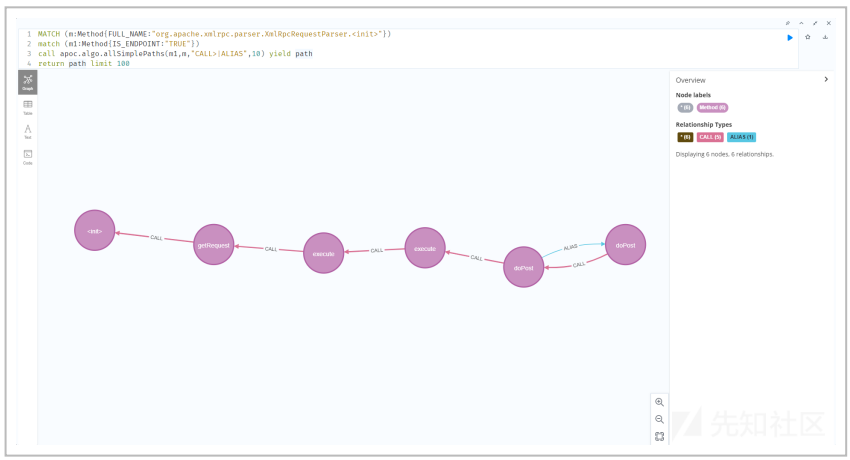
回顾 CVE-2020-9496 Apache Ofbiz XMLRPC RCE 漏洞 (https://xz.aliyun.com/t/8324) 漏洞由 XmlRpcRequestParser 解析 xml 时触发，由此我们用 tabby 来查询谁调用了 XmlRpcRequestParser



(https://xzfile.aliyuncs.com/media/upload/picture/20220722111204-0fc02380-096c-1.png)

从路径的源头查询

`org.apache.xmlrpc.webserver.PmpApiServlet#doPost`

```
public class PmpApiServlet extends XmlRpcServlet {
    private ThreadLocal clientIpAddress = new ThreadLocal();
    private String port = null;
    private String authPort = null;

    public PmpApiServlet() {
    }

    public void doPost(HttpServletRequest request, HttpServletResponse response) throws IOException, ServletException {
        this.clientIpAddress.set(ClientUtil.getRemoteIPAddress(request));
        PMPAPIUtils.setIpAddress((String)this.clientIpAddress.get());
        this.port = "" + request.getServerPort();
        this.authPort = ClientUtil.getClientAuthPort();

        try {
            if (!FeatureRole.get("PasswordManagementAPI").isEditionSupported()) {...} else if (!this.port.equals(this.authPort)) {...} else {
                PMPAPIUtils.setErrorMessage((String)null);
                X509Certificate[] certs = (X509Certificate[])((X509Certificate[])request.getAttribute( s: "javax.servlet.request.X509Certificate"));
                if (certs != null) {...} else if ("https".equals(request.getScheme())) {
                    System.out.println("This was an HTTPS request, but no client certificate is available");
                } else {
                    System.out.println("This was not an HTTPS request, so no client certificate is available");
                }
            }

            super.doPost(request, response);
        } catch (Exception var12) {
            var12.printStackTrace();
        }

    }
}
```

(https://xzfile.aliyuncs.com/media/upload/picture/20220722111211-14300a34-096c-1.png)

调用 super 的 post 函数

`org.apache.xmlrpc.webserver.XmlRpcServlet#doPost`

```
1 override
public void doPost(HttpServletRequest pRequest, HttpServletResponse pResponse) throws IOException, ServletException
    this.server.execute(pRequest, pResponse);
}
```

(https://xzfile.aliyuncs.com/media/upload/picture/20220722111219-18cc5962-096c-1.png)

继续跟进

`org.apache.xmlrpc.webserver.XmlRpcServletServer#execute`

```
public void execute(HttpServletRequest pRequest, HttpServletResponse pResponse) throws ServletException, IOException
    XmlRpcHttpRequestConfigImpl config = this.getConfig(pRequest);
    ServletStreamConnection ssc = this.newStreamConnection(pRequest, pResponse);

    try {
        super.execute(config, ssc);
    } catch (XmlRpcException var6) {
        throw new ServletException(var6);
    }
}
```

(https://xzfile.aliyuncs.com/media/upload/picture/20220722111227-1d695fec-096c-1.png)

继续调用 `org.apache.xmlrpc.server.XmlRpcStreamServer#execute`

```
public void execute(XmlRpcStreamRequestConfig pConfig,
                    ServerStreamConnection pConnection)
        throws XmlRpcException {
    log.debug( o: "execute: ->");//NO I18N
    try {
        Object result;
        Throwable error;
        InputStream istream = null;
        try {
            istream = getInputStream(pConfig, pConnection);
            XmlRpcRequest request = getRequest(pConfig, istream);
            result = execute(request);
            istream.close();
            istream = null;
            error = null;
            log.debug( o: "execute: Request performed successfully");//NO I18N
```

(https://xzfile.aliyuncs.com/media/upload/picture/20220722111234-2190edba-096c-1.png)

其中 getRequest 函数会从原始 request 构建 XmlRpcRequest

`org.apache.xmlrpc.server.XmlRpcStreamServer#getRequest`

```
protected XmlRpcRequest getRequest(final XmlRpcStreamRequestConfig pConfig,
                                   InputStream pStream) throws XmlRpcException {
    final XmlRpcRequestParser parser = new XmlRpcRequestParser(pConfig, getTypeFactory());
    final XMLReader xr = SAXParsers.newXMLReader();
    xr.setContentHandler(parser);
    try {
        SecurityManager manager=new SecurityManager();
                manager.setEntityExpansionLimit(0);
                xr.setProperty("http://apache.org/xml/properties/security-manager",manager);
                xr.setEntityResolver(new DummyEntityResolver());
        xr.parse(new InputSource(pStream));
    } catch (SAXException e) {
```

(https://xzfile.aliyuncs.com/media/upload/picture/20220722111240-25626a68-096c-1.png)

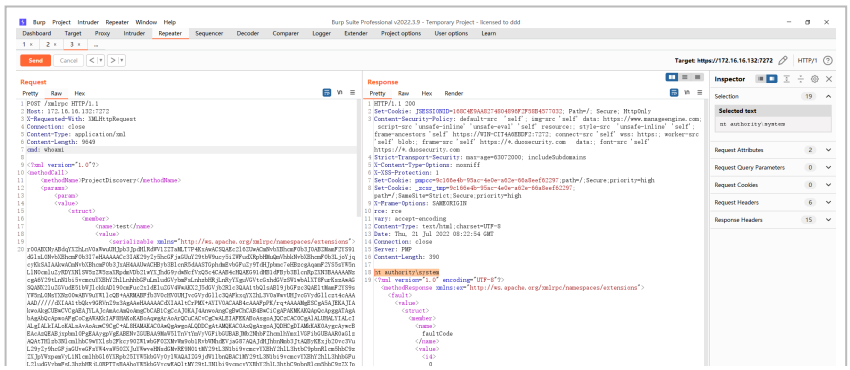
在这里就开始解析 xml，触发 rpc 了。poc 和 CVE-2020-9496 一样

贴一下堆栈。

```
getResult:36, SerializableParser
(org.apache.xmlrpc.parser)
endValueTag:78, RecursiveTypeParserImpl
(org.apache.xmlrpc.parser)
endElement:185, MapParser (org.apache.xmlrpc.parser)
endElement:103, RecursiveTypeParserImpl
(org.apache.xmlrpc.parser)
endElement:165, XmlRpcRequestParser
(org.apache.xmlrpc.parser)
endElement:-1, AbstractSAXParser
(org.apache.xerces.parsers)
scanEndElement:-1, XMLNSDocumentScannerImpl
(org.apache.xerces.impl)
dispatch:-1,
XMLDocumentFragmentScannerImpl$FragmentContentDispatcher
(org.apache.xerces.impl)
scanDocument:-1, XMLDocumentFragmentScannerImpl
(org.apache.xerces.impl)
parse:-1, XML11Configuration (org.apache.xerces.parsers)
parse:-1, XML11Configuration (org.apache.xerces.parsers)
parse:-1, XMLParser (org.apache.xerces.parsers)
parse:-1, AbstractSAXParser (org.apache.xerces.parsers)
parse:-1, SAXParserImpl$JAXPSAXParser
(org.apache.xerces.jaxp)
getRequest:76, XmlRpcStreamServer
(org.apache.xmlrpc.server)
execute:212, XmlRpcStreamServer (org.apache.xmlrpc.server)
execute:112, XmlRpcServletServer
(org.apache.xmlrpc.webserver)
doPost:196, XmlRpcServlet (org.apache.xmlrpc.webserver)
doPost:117, PmpApiServlet (org.apache.xmlrpc.webserver)
service:681, HttpServlet (javax.servlet.http)
service:764, HttpServlet (javax.servlet.http)
internalDoFilter:227, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:53, WsFilter (org.apache.tomcat.websocket.server)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
```

(org.apache.catalina.core)
doFilter:76, ADSFilter (com.manageengine.ads.fw.filter)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:300, PassTrixFilter
(com.adventnet.passtrix.client)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:414, SecurityFilter (com.adventnet.iam.security)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:34, NTLMV2CredentialAssociationFilter
(com.adventnet.authentication)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:155, NTLMV2Filter (com.adventnet.authentication)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:118, MSPOrganizationFilter
(com.adventnet.passtrix.client)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:149, PassTrixUrlRewriteFilter
(com.adventnet.passtrix.client)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:109, SetCharacterEncodingFilter
(org.apache.catalina.filters)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:32, ClientFilter (com.adventnet.cp)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:80, ParamWrapperFilter (com.adventnet.filters)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:51, RememberMeFilter
(com.adventnet.authentication.filter)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)

doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:65, AssociateCredential
(com.adventnet.authentication.filter)
internalDoFilter:189, ApplicationFilterChain
(org.apache.catalina.core)
doFilter:162, ApplicationFilterChain
(org.apache.catalina.core)
invoke:197, StandardWrapperValve
(org.apache.catalina.core)
invoke:97, StandardContextValve (org.apache.catalina.core)
invoke:540, AuthenticatorBase
(org.apache.catalina.authenticator)
invoke:135, StandardHostValve (org.apache.catalina.core)
invoke:92, ErrorReportValve (org.apache.catalina.valves)
invoke:687, AbstractAccessLogValve
(org.apache.catalina.valves)
invoke:261, SingleSignOn
(org.apache.catalina.authenticator)
invoke:78, StandardEngineValve (org.apache.catalina.core)
service:357, CoyoteAdapter (org.apache.catalina.connector)
service:382, Http11Processor (org.apache.coyote.http11)
process:65, AbstractProcessorLight (org.apache.coyote)
process:895, AbstractProtocol$ConnectionHandler
(org.apache.coyote)
doRun:1681, Nio2Endpoint$SocketProcessor
(org.apache.tomcat.util.net)
run:49, SocketProcessorBase (org.apache.tomcat.util.net)
processSocket:1171, AbstractEndpoint
(org.apache.tomcat.util.net)
completed:104,
SecureNio2Channel$HandshakeReadCompletionHandler
(org.apache.tomcat.util.net)
completed:97,
SecureNio2Channel$HandshakeReadCompletionHandler
(org.apache.tomcat.util.net)
invokeUnchecked:126, Invoker (sun.nio.ch)
run:218, Invoker$2 (sun.nio.ch)
run:112, AsynchronousChannelGroupImpl$1 (sun.nio.ch)
runWorker:1191, ThreadPoolExecutor
(org.apache.tomcat.util.threads)
run:659, ThreadPoolExecutor$Worker
(org.apache.tomcat.util.threads)
run:61, TaskThread$WrappingRunnable
(org.apache.tomcat.util.threads)
run:748, Thread (java.lang)



(https://qiita-image-store.s3.ap-northeast-1.amazonaws.com/0/593424/49289293-864f-6fe3-6e00-5c831c9de7dc.png)

poc 不放了 懂得都懂。

其实刚开始找的并不直接是漏洞点，而是在找 xml parse 的点 `com.adventnet.tools.prevalent.InputFileParser#parse`

```
private void parse(String str) throws Exception {
    SAXParserFactory factory = SAXParserFactory.newInstance();
    factory.setNamespaceAware(true);
    factory.setFeature( name: "http://javax.xml.XMLConstants/feature/secure-processing", value: true);
    factory.setFeature( name: "http://apache.org/xml/features/disallow-doctype-decl", value: true);
    factory.setFeature( name: "http://apache.org/xml/features/nonvalidating/load-external-dtd", value: false);
    factory.setFeature( name: "http://xml.org/sax/features/external-general-entities", value: false);
    factory.setFeature( name: "http://xml.org/sax/features/external-parameter-entities", value: false);
    factory.setXIncludeAware(false);
    SAXParser saxParser = factory.newSAXParser();
    File ff = new File(str);
    if (ff.exists()) {
        saxParser.parse(new File(str), dh: this);
    } else {
        if (!str.startsWith("http://")) {
            throw new Exception("License File " + str + " is invalid.");
        }

        URL fileUrl = new URL(str);
        HttpURLConnection confFileConnection = (HttpURLConnection)fileUrl.openConnection();
        InputStream fis = confFileConnection.getInputStream();
        saxParser.parse(fis, dh: this);
    }
```

(https://xzfile.aliyuncs.com/media/upload/picture/20220722111835-f8de25b2-096c-1.png)

经过多次调试发现这个类自己实现了 startElement 和 endElement，并不会调用 `endValueTag()` ，进而没有 type parse 一说，所以根本不会触发反序列化。

后来重新看了历史的漏洞文章，换了思路直接找 `org.apache.xmlrpc.webserver.XmlRpcServlet` 的引用就发现了漏洞点，瞬间感觉自己太蠢了。u1s1，静态软件分析工具还是有用。