



Verifying XML Signatures

Technical Note

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Table of Contents

1 Introduction	4
1.1 Document Purpose	4
1.2 Intended Audience	4
2 Kemp Digital Signatures	5
3 XML Signature Validation	6
3.1 SHA-256 Checksum Comparison	6
3.2 Verifying the XML Digital Signature	7
3.2.1 XML 7.2.50 and below	7
3.2.2 XML 7.2.51 and above & 7.2.48.3 LTS and above	7
Last Updated Date	9

1 Introduction

1.1 Document Purpose

The purpose of this document is to outline how to manually validate the digital signatures of resources provided by Kemp. Resources such as firmware, patches and add-ons have associated XML files which contain the MD5 and SHA-256 checksums of the resource and are digitally signed by Kemp.

XML checksum files are currently not provided for LoadMaster templates.

As of firmware version 7.2.49, you can automatically validate digital signatures easily using the LoadMaster Web User Interface (WUI). Simply enable the **Display Verify Update Option** check box in **System Configuration > Miscellaneous Options > WUI Settings**. This provides an option to upload the XML verification file when updating the LoadMaster software or installing an add-on file on the **System Configuration > System Administration > Update Software** page.

1.2 Intended Audience

This document is intended to guide any LoadMaster administrator or corporate security officer through the options to validate the integrity and authenticity of downloaded Kemp resources.

2 Kemp Digital Signatures

Kemp provides digital signatures as XML signature files (known as detached signatures) as defined by the World Wide Web Consortium (W3C) recommendation for XML Signature Syntax and Processing. Kemp XML signatures prior to version 7.2.51 use a Kemp certificate issued by a public CA (Certification Authority) . XML signatures version 7.2.51 and above and 7.2.48.3 LTS and above use a Kemp certificate issued by our internal Kemp Certificate Authority.

The Kemp XML signature filenames include the original resource filename as a prefix with the extension .checksum.xml and are provided as separate file downloads when downloading the original Kemp resource.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<file name="LoadMaster-Patch-64bit.zip">
  <checksum>
    <sha256>ce7e1e92c1544061bb26ab0e14fc7dc512584ba37fd6c71e28e46e61ac2e41ba</sha256>
    <md5>79cf19cfa053f54e620c7d3de2cd690f</md5>
  </checksum>
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
    <SignedInfo>
      <CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
      <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-sha384"/>
      <Reference URI="">
        <Transforms>
          <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
        </Transforms>
        <DigestMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#sha384"/>
        <DigestValue>YukhB51PcSB3DsyMCTKaQsJu9L4ca7qCS/ygBUNgLzkSH5+tlCL+2TJHN7n7iIW2</DigestValue>
      </Reference>
    </SignedInfo>
    <SignatureValue>KnRlRanWC7dj9pG3/S/dh1FVVndTPmLMHDJzeyDkEzQ9tX5OLLG3J5p+YaX79UJW6
S1TbDULx/QSuWhQtjhoq+piC66Yp5FLY3EmFQ0GpGhG0oShW7Iwzwaah4JGjrse</SignatureValue>
  </KeyInfo>
  <X509Data>
    <X509Certificate>MIICWzCCAEKgAwIBAgICEAAwCgYIKoZIzj0EAwMwYDELMAKGA1UEBhMCVVmxCzAJ
BgNVBAGMAK5ZRR8wHQYDVQKDBZLZW1wIFRlY2hub2xvZ2ZlLcyBjBmMuMSMwIQYD
VQKDDbP1LZW1wIENlcnRpZmljYXRlIEF1dGhvcml0eTAeFw0yMDA1MjcwODA4MzVa
Fw0yMjA1MjcwODA4MzVaMFcxZCZAJBgNVBAYTA1VMTQswCQYDVQIDDAJOWTEFMBBG
A1UECgwWS2VtcCBUZWVobm9sb2dpZCXMgS5JlJEAuMBGGA1UEAwwRS2VtcCBDB2RL
IFNpZ25pbmcwdjAQBgcqhkjOPQIBBgUrgQQAIIgNiAARNGCQDbbxI6sFZ5L7amUVUL
h+w4r+0L/a5YvsrQZzDf4L/ExgtQFdlMzqN0e0bQC85eu5E5RdEtUqQFYgRuIIdH
vd0+ceN6K2uF283EV/OVLJ2v0wN+zj fahi6YacptxmGjEDB2MB0GA1UdDgQWBBSG
UYGDdfxIAMD/YDNDdFdHvhwArDzAFBgNVHSMEGDAWgBSfMgZnt3X/uM39yELYI/7
WwWxLjAMBgNVHRMBA4EAEjAAMA4GA1UdDwEB/wQEAWIHDABWBgNVHUSBA4f8EDDAK
BggrBgEFBQcDAZAKBgghkjOPQDDAwNnADBKAjBkGsfjH5ESe0eTOKdK1/L0SNp4
QuM6hXbUHeNTJnHeHoxEwKJCJM/Esm52Siz6E9ICME8C01LkYk8tita3WGJYogW
sLUNeLBEu0ih8hcfxXpKpXwEhxFKSuKd5wXCNjAhW==</X509Certificate>
  </X509SubjectName>CN=Kemp Computer Data Signing, O=Kemp Technologies Inc., ST=NY, C=US</X509SubjectName>
  <X509IssuerSerial>
    <X509IssuerName>CN=Kemp Certificate Authority, O=Kemp Technologies Inc., ST=NY, C=US</X509IssuerName>
    <X509SerialNumber>4096</X509SerialNumber>
  </X509IssuerSerial>
</X509Data>
  </KeyInfo>
</Signature>
</file>
```

3. If the checksums match, validate the digital signature of the XML signature file.

3.2 Verifying the XML Digital Signature

A number of tools exist to validate detached XML signatures as provided by Kemp. Kemp recommends using the XMLSec Library (<https://www.aleksey.com/xmlsec/>) to verify the authenticity of XML signature files. This site provides sources and downloadable binaries for Windows platforms. This tool is available on many Linux environments as the `xmlsec1` command.

3.2.1 XML 7.2.50 and below

Verify the authenticity of the digital signature for XML files version 7.2.50 and below using the following `xmlsec1` command.

`xmlsec1 --verify <XMLSignatureFile>`

If there are any errors in the output of the above command, the XML signature file has been altered and should not be trusted.

3.2.2 XML 7.2.51 and above & 7.2.48.3 LTS and above

Since version 7.2.51 and 7.2.48.3 LTS, we have changed the method of digitally signing the XML files. These XML files are signed using a Kemp certificate issued by our internal Kemp Certificate Authority. Therefore, to verify the authenticity of the XML digital signature, you must first download the Kemp certificate bundle using the link [here](#)

This downloads a zip archive with three certificates:

1. `root.kemp.crt` – Root Kemp CA certificate
2. `ca.kemp.crt` – Intermediate Kemp CA certificate
3. `codesign.kemp.crt` – Kemp code signing certificate

Unzip the archive into a desired location.

```
→ Downloads xmlsec1 --verify 7.2.49.1.18450.RELEASE.PATCH-64-MULTICORE.checksum.xml
OK
SignedInfo References (ok/all): 1/1
Manifests References (ok/all): 0/0
```

3 XML Signature Validation

Verify the authenticity of the digital signature for XML files version 7.2.51 / 7.2.48.3 LTS and above using the following xmlsec1 command.

```
xmlsec1 --verify --trusted-pem <KempRootCert> --trusted-pem <KempCACert> --trusted-pem  
<KempCodesignCert> <XMLSignatureFile>
```

If there are any errors in the output of the above command, the XML signature file has been altered and should not be trusted.

```
→ Downloads unzip kemp-certs.zip
Archive:  kemp-certs.zip
  inflating: ca.kemp.crt
  inflating: codesign.kemp.crt
  inflating: root.kemp.crt
→ Downloads ls
LoadMaster-Patch-64bit.zip  LoadMaster-Patch-64bit.zip.checksum.xml  ca.kemp.crt  codesign.kemp.crt  kemp-certs.zip  root.kemp.crt
```

```
→ Downloads xmlsec1 --verify --trusted-pem root.kemp.crt --trusted-pem ca.kemp.crt --trusted-pem cod
esign.kemp.crt LoadMaster-Patch-64bit.zip.checksum.xml
OK
SignedInfo References (ok/all): 1/1
Manifests References (ok/all): 0/0
```


Last Updated Date

This document was last updated on 29 July 2023.