Enhancing Grid Infrastructures with
Virtualization and Cloud Technologies

StratusLab Report

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Abstract

This document defines StratusLab Core Metadata and how to sign and validate it using Java XML Digital Signature API

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Contents

List of Tables **5**

1 Introduction **6**

1.1 StratusLab Core Metadata 6

1.2 Signing and Validating StratusLab Metadata files 10

List of Tables

1.1 StratusLab Core Metadata 7
1.2 Dublin Core Metadata, source : http://dublincore.org/documents/dces/ 8
1.3 Mapping StratusLab Core Metadata to Dublin Core Metadata . . 9

1 Introduction

First part of this document defines StratusLab Core Metadata (SCM). Elements of SCM were then mapped to Dublin Core Metadata (DCM) elements, and used with RDF/XML.
Second part show how to sign and validate SCM files using Java XML Digital Signature, with both grid certificates and RSA/DSA key pair.

1.1 StratusLab Core Metadata

Table 1.1: *StratusLab Core Metadata*

Metadata	Comment
cretaed	image time creation, should respect this format : yyyy-mm-dd hour:min:sec
type	image type, could be base or grid
version	image version
arch	Image Operating System Architecture
user	User who create this images
os	Operating Sytem
osversion	Operating System version
compression	image compression format
filename	name given to the image
cheksum	md5 and sha1 cheksum of the image
comments	comments on how to deploy the image

os could be mapped to DC description element, and defined with arch, version, format and title in one one element. Operating system for example.

Table 1.2: *Dublin Core Metadata,*
source : http://dublincore.org/documents/dces/

Metadata	Comment
contributor	An entity responsible for making contributions to the resource.
coverage	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant.
creator	An entity primarily responsible for making the resource.
date	A point or period of time associated with an event in the lifecycle of the resource.
description	An account of the resource.
format	The file format, physical medium, or dimensions of the resource.
identifier	An unambiguous reference to the resource within a given context.
langage	A language of the resource.
publisher	An entity responsible for making the resource available.
relation	A related resource.
rights	Information about rights held in and over the resource.
source	A related resource from which the described resource is derived.
subject	The topic of the resource.
Title	A name given to the resource.
Type	The nature or genre of the resource.

Table 1.3: *Mapping StratusLab Core Metadata to Dublin Core Metadata*

StratusLab Core Metadata	Dublin Core Metadata
cretaed	date
type	type
version	-
arch	-
user	creator
os	description
osversion	-
compression	format
filename	title
cheksum	could be used with identifier
comments	description

Example :

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
 xmlns:dcterms="http://purl.org/dc/terms/">

 <rdf:Description rdf:about="http://appliances.stratuslab.org/images">
  <dcterms:subject rdf:resource="http://appliances.stratuslab.org/images/
  <dc:title>centos base image</dc:title>
  <dc:type>base</dc:type>
  <dc:date>2010-07-31</dc:date>
  <dc:creator>Charles Loomis</dc:creator>
  <dc:publisher/contributor>StratusLab</dc:publisher>
  <OperatingSystem>
     <Info>Specifies the operating system</Info>
     <Arch>i386</Arch>
     <dc:description>CentOS</dc:description>
     <dc:version>5.5</dc:vesrion>
     <dc:format>gz</dc:format>
     <dc:title>centos-5.5-i386-base-1.0.img.gz</dc:title>
  </OperatingSystem>
  <dc:identifier type="md5">e3a7d06ad2a79b2f57d9550e7436bfa4</dc:identifi
  <dc:identifier type="SHA1">7ac5b9ac1456b89201ef2adda376e181ece060df</dc
  <dc:description>
   Uses standard StratusLab contextualization.
```

```
   Image only has 'root' account configured.
   Only logins via ssh keys are allowed.
  </dc:description>
 </rdf:Description>
</rdf:RDF>
```

1.2 Signing and Validating StratusLab Metadata files

For signing and validating metadata files we are using XML Digital Signature API. Metadata files could be signed using p12 Grid Certificates or DSA/RSA private keys.
Verification and Validation automatically detects signature algorithm and type of private key used for signing metadata files, verify metadata file and print DN of user who signed the metadata file (In case of grid certificates).

Codes :
GenXmlSign.java for signing metadata files

Usage: java GenXmlSign [medatadalfile] [outputfile] [P12 GridCertificate] [P12 GridCertificate Passwd]

ValidateSign.java to verify and validate metadata file.

Usage : java ValidateSign signedmetadatafile

centos.xml : metadatfile for testing