Optical Storage Technology Association

MultiPhoto/Video

Manifest, Metadata and Practices for Digital Photo-Video Collections

DRAFT LOGO

XML Manifest Specification

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ABSTRACT

The XML Manifest specification defines a manifest along with minimal profile management that is used to contain the XML content.

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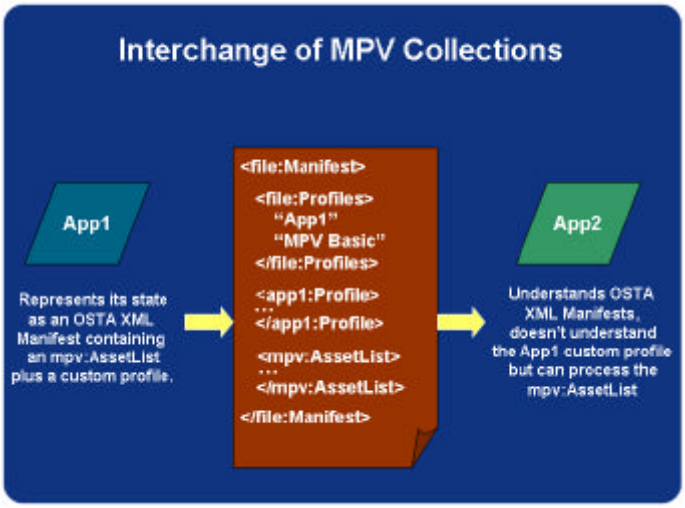
Contents

Chapter 1: Introduction

1.1 Executive Summary

The OSTA XML Manifest provides a common XML document wrapper element, defines the concept of Profiles, and defines the mechanism for embedding content from multiple Profiles within the same XML document without collision.

This specification defines the minimal mechanisms and policies that are necessary in order to allow a wide range of metadata to be encapsulated in a single document. Its initial purpose is to support the interchange of MultiPhoto/Video metadata but it can also be used to transport metadata that does not directly conform to the mechanisms and policies defined by the various specifications that make up the MultiPhoto/Video initiative.



The MultiPhoto/Video (MPV) Initiative is defining a family of open specifications that makes easier the representation, exchange, processing and playback of collections of photo-video content, including stills, stills with audio, still sequences, video clips, and audio clips.

The development and promotion of MultiPhoto/Video is sponsored by the Optical Storage Technology Assocation (OSTA). The specification development and promotion process is open to all members; all organizations and individuals are welcomed as members. The association includes over 50 member companies from all over the world that produce products that collectively represent a majority marketshare in mainstream recordable optical storage categories.

MultiPhoto/Video is not only a family of specifications. It also includes a compliance test suite and processes, compliance testing materials, a logo program for compliant products, and a website. These materials and procedures are made available and administered by OSTA at a modest cost. OSTA charges no royalty for use of the specification or logo. In addition, sample open-source code implementations of key steps in processing Manifest content may be contributed by interested parties.

1.2 Terms of Use

This section of the specification is descriptive and not intended to be complete nor definitive. Please refer to the definitive statement of licensing terms at the beginning of the MultiPhoto/Video specification document for a precise and legal description.

The MultiPhoto/Video Initiative, which includes this specification, is developed using an open process. The resulting specifications are available from OSTA. No royalty is charged by OSTA for use of the specifications. The overall desire is to develop a specification that is not subject to separate licensing requirements or royalty. During the development process, the expectation is that all participants contribute their efforts and intellectual property without any expectation or requirement for compensation. However, OSTA does not warrant that the specification is not or will not be subject to such claims by other parties.

MultiPhoto/Video is not only a family of specifications. It also includes a compliance test suite and processes, compliance testing materials, a logo program for compliant products, and a website. These materials and procedures are made available and administered by OSTA at a modest cost. OSTA charges no royalty for use of the specification or logo. In addition, some sample open-source code implementations of key steps in processing Manifest content may be contributed by interested parties.

Requirements

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, if and where they appear in this document, are to be interpreted as described in [RFC2119].

Chapter 2: Key Concepts of the XML Manifest and Related Specifications

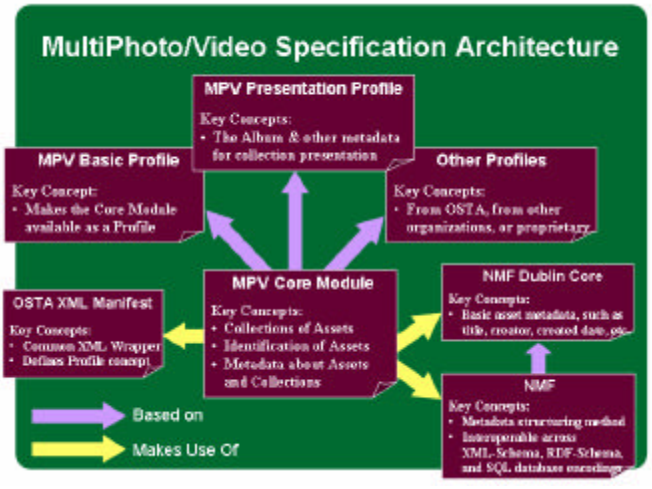
The XML Manifest is a stand-alone specification that is being developed as part of the MultiPhoto/Video (MPV) initiative. It makes use of the Normalized Metadata Format (NMF) which is another stand-alone specification which is being developed as part of the MPV initiative. It is possible to use the XML Manifest without using any other parts of the MPV initiative (other than NMF). While this is possible, it is important to note that the initial focus of the definition process for the XML Manifest is to provide a carrier for MPV based content.

Understanding the mechanisms and policies of the XML Manifest is done in the context of the MPV initiatives various components which are briefly discussed in the following sections. Complete coverage of these components can be found in the MPV specifications which are accessable from the OSTA MPV web site [OSTA-WEB]

2.1 MPV Specification Architecture

MPV is not just one specification, it is a family of related specifications. This architecture results from several principle objectives:

- MPV should be highly extensible, allowing anyone to create proprietary or open extensions to MPV without modifying the MPV specficiation itself.
- Adding extensions should not damage interoperability of the basic collection information.
- Specifications that are fundamentally separable concepts should be separated. This allows each specification to be used and evolve independently of each other.
- MPV should not define alternate representations where mainstream representations exist.



These principles result in the following characteristics of the MPV and related specifications.

- The **MPV Core** is the essence of the MPV specification. However, it cannot be used by itself; it must always be incorporated into a

Profile, which is the basic unit of extension in MPV.

- The **MPV Basic and Presentation Profiles** are extensions that utilize the MPV Core Module. **Other Profiles** are extensions organized in exactly the same way.
- MPV makes use of the **OSTA XML Manifest**, which defines the Profile concept.
- MPV makes use of the **NMF Specification** [NMF] for structured representation of arbitrary metadata. NMF is a wholly separate concept.
- MPV recommends use of the NMF-encoding of **Dublin Core**, a separate and widely adopted specification for representing basic metadata about assets of all kinds.

2.2 Profiles, Schema and Practices

The MultiPhoto/Video specifications contain the following kinds of content.

Schema define the structure of the content, providing a precise grammar and vocabulary of expression. MPV uses XML-Schema [XSCHEMA], a well-known schema definition language, to define this grammar and vocabulary in combination with prose descriptions to clarify usage and behaviour. A wide variety of commercial and open source tools support the use of XML Schema, including for schema design and schema and content validation.

In MPV, all schema are available in machine-readable form in addition to inclusion on a fragmentary basis within the specification document. The machine-readable schema in the informative definition; in the case of discrepancy, the specification document supercedes the machine-readable schema.

Practices define required and recommended behaviours in prose or pseudo code. Practices are a critical component to interoperability because they establish expectations and processes for how MPV content is handled.

Profiles are a set of Schema and Practices and additional content and are the principle unit of formal specification, of specification implementation and of specification compliance. Products can implement or not implement profiles. Each profile in MultiPhoto/Video defines only those schema and practices that are necessary for the key tasks targeted by the profile.

Referenced Specifications are other specifications used by the MPV specifications. These specifications may be from OSTA or other organizations.

2.3 NMF-structured Metadata

MPV makes use of a format called Normalized Metadata Format. NMF is an approach to structuring metadata that has the advantage of being mechanically interchangeable across several important metadata encodings: XML Schema-based, RDF-Schema-based, and SQL database tables. NMF can be used to structure any kind of metadata and this is the preferred mechanism for representing metadata in MPV because it provides for ready interchange across supported encodings. NMF metadata schema and content are validatable using commonly available XML-Schema-based tools.

MPV recommends that new metadata schema be designed using this format. In addition, existing schema may be encoded in this format as well. One such schema is Dublin Core [DC], a widely adopted schema for describing asset properties such as title, creator, created date, etc. MPV recommends use of DC for representing this information in MPV documents.

2.4 More about Profiles

Profiles are the most important unit of modular extension in the interchange standards that make use of the XML Manifest. Any number of profiles can co-exist within an XML Manifest.

The minimum requirement that the XML Manifest makes of profiles is that they provide a single namespace identifier for the profile which corresponds to the namespace of the top-level schema of the profile.This namespace must then be declared via the mechanism described in the next chapter.

Profiles can make use of other profiles in which case, these profiles are considered to be embedded in the using profile. Embedded profiles do not need to be declared, except if interoperability is desired with consumers of embedded profiles and can be meaningfully processed independent of the top-level profile. Top level profiles MUST be declared.

The XML manifest metadata schema provides a property for specifying the profiles that are being transported in the Manifest. This list of profiles MUST be produced and SHOULD be processed by every Manifest-aware application. Applications processing a manifest that encounter valid content not expected by the Profiles they are processing should leave it untouched and carry it forward.

There are no rules in the XML Manifest regarding the design of Profile schema, but consistency with existing design practices is recommended. It is important to recognize the purpose of the XML Manifest wrapper element. A wrapper element is required of all XML documents. The XML Manifest defines a wrapper element that can be conveniently recognized by Manifest-aware applications.

2.5 XML Usage

XML LEVERAGE

Manifest content is well-formed XML. This allows the XML Manifest to be processed using standard XML processing tools and environments. For example, when opened in the Microsoft Internet Explorer 5.5 and above web browser, a XML Manifest with associated style sheet can present an attractive user interface for playback of MPV photo-video collections. Similarly, straight forward XSLT translation can convert an XML Manifest into a SMIL-based presentation for playback with an appropriate player. MPV can also be easily utilized within other XML specifications.

NAMESPACES

XML namespaces are a means to allow XML elements of the same name that exist in different schema to co-exist within the same document.

MPV requires the use of namespaces. By convention, all elements and attributes in MPV are used with their prefixes in all XML encodings. MPV does not support namespace-unaware processing. Most modern XML tools support namespace-aware processing.

Chapter 3: Overall Required and Best Practices

The following required and best practices apply to all Manifest content in all profiles unless explicitly stated otherwise.

3.1 Processing an XML Manifest

An XML Manifest may be processed in any manner that complies with XML processing conventions and is consistent with the XML specification and the XML Schema specifications. XML processing instructions shall be permitted; if the processor cannot honor the processing instructions, they may be ignored.

Significantly, processors shall support the DOCTYPE and external parameter entity constructs that allow XML content to be inserted inline from one file into another. This is supported by most commercially available and open source parsers.

A variety of commercial and open source tools are available for processing XML content. For example, many firmware and application software implementations utilize expat [EXPAT], a C language open source XML parser that is namespace aware.

3.2 Character Set

All Manifest content shall use the UTF-8 character set [UTF-8]. Content is further constrained by XML allowable characters.

3.3 Allowable Characters

XML documents are encoded in text format and parsed; binary offsets are not used. This places constraints on the allowable characters of element and attribute names and values. In particular, string values need to be transformed on writing and reading to encode and decode disallowed characters.

Chapter 4: XML Manifest Structure

This chapter defines the mechanisms and policies that encompass the XML Manifest. The XML Manifest makes use of a set of XML constructs that are defined in several schemas. The top-level schema for the XML manifest (which in turn includes the other schemas) is identified by the following information:

Schema group	Namespace Identifier	Schema Location	Conventional Namespace Prefix
XML Manifest	http://ns.osta.org/manifest/1.0/	manifest/manifest.xsd	file:

Note that the preferred namespace prefix for the overall manifest schema is "file". This prefix is not required but is used throughout the documentation and in many examples.

The XML manifest groups all the MPV and other top-level components into a single XML document. It is defined to allow any well-formed XML content inside of it. In practice, specific profiles will define implied content models that describe what elements should occur as top-level elements in the manifest.

In typical usage, a XML manifest is stored in a stand-alone file. Any application that produces or consumes MPV content stored in stand-alone files in a storage filesystem shall be compliant with the Manifest schema and practices specification.

By implication of terminology, an XML manifest contains reference to all the content that is relevant – it makes manifest the content.

4.1 Root Element: <file:Manifest>

The top-level element of an XML manifest MUST have a namespace of http://ns.osta.org/manifest/1.0/ and a localname of "Manifest". This element SHOULD be the root element of the XML document.

This element is the outer element of a Manifest document. It wraps any top-elements that are defined by profiles that are being transported in the manifest.

The file:Manifest element uses an open content model which means that it can contain any element irrespective of the namespace or localname of the element. This is done in order to allow a wide range of content to be transported as top-level child elements of the Manifest and also in order to support partial validation.

Partial validation refers to the ability of an XML Manifest processor to apply either strict or lax validation to elements that occur as children of the Manifest element. These two levels of validation are specified using the processContents attribute of the xs:any element. They are:

strict

the XML processor must obtain the schema for the required namespaces and validate any element from those namespaces.

lax

The XML processor attempts to obtain the schema for the required namespaces and validate any element from those namespaces; however, if the schema cannot be obtained, no errors will occur.

NMF provides two versions of a utility schema that defines group elements for all the open content models that are used in NMF schema. This includes the open content model used by the Manifest element.

One version uses lax validation and is intended for runtime and production environments. The other uses strict validation and is intended for development environments.

4.1.1 element Manifest, type ManifestType, group ManifestAny

Manifest is the top-level element of an XML Manifest document. The contents of the manifest are defined by the profiles used by the manifest.

Note: The ManifestAny helper group element is from the production environment version of the utility schema and therefore have the value of lax for their processContents attributes.

diagram

namespace http://ns.osta.org/manifest/1.0/

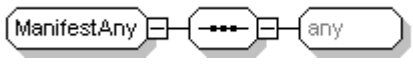
type **ManifestType**

source
```
<xs:element name="Manifest" type="ManifestType"/>
```

source
```
<xs:complexType name="ManifestType">
  <xs:sequence>
    <xs:group ref="ext:ManifestAny" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
```

group **ManifestAny**

diagram



namespace http://ns.osta.org/manifest/1.0/ext/

used by complexType **ManifestType**

source
```
<xs:group name="ManifestAny">
  <xs:sequence>
    <xs:any processContents="lax"/>
```



```
  </xs:sequence>
</xs:group>
```

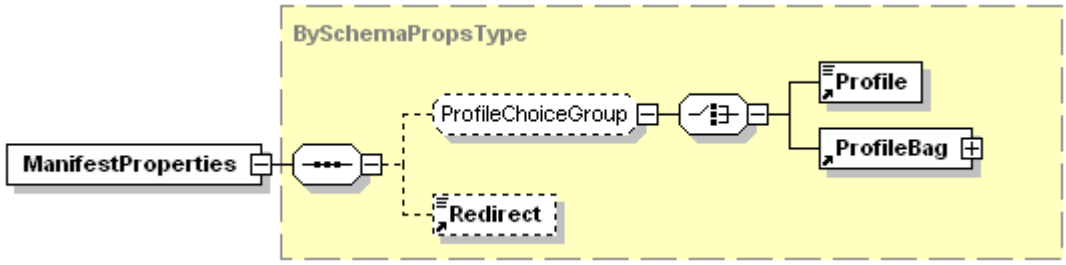
4.2 XML Manifest Metadata

The XML Manifest defines a single NMF based properties schema. An XML Manifest MUST contain a single instance of this properties schema. This properties schema MUST be contained in an nmf:Metadata element which in turn MUST occur as the first child of the file:Manifest element[1].

4.2.1 Properties: ManifestProperties

The ManifestProperties element can contain two properties, one of which is required, and the other which is optional. The required property is the Profile property. This property is decribed in section 4.2.2. The optional property is the redirect property which is described in section 4.2.3.

ELEMENT MANIFESTPROPERTIES, COMPLEXTYPE BYSCHEMAPROPSTYPE

diagram	
namespace	http://ns.osta.org/manifest/1.0/
type	**BySchemaPropsType**
children	**Profile ProfileBag Redirect**
source	`<xs:element name="ManifestProperties" type="BySchemaPropsType" substitutionGroup="nmf:BySchemaPropsBase"/>`

source	`<xs:complexType name="BySchemaPropsType">`
	`  <xs:complexContent>`
	`  <xs:extension base="nmf:BySchemaPropsType">`
	`  <xs:sequence>`
	`  <xs:group ref="ProfileChoiceGroup" minOccurs="0"/>`
	`  <xs:element ref="Redirect" minOccurs="0"/>`
	`  </xs:sequence>`
	`  </xs:extension>`
	`  </xs:complexContent>`
	`</xs:complexType>`

[1] This is not enforced directly by the XML schema of the Manifest but is still the required behavior. The compliance test suite for the XML Manifest will contain software that will check for compliance with this requirement.

4.2.2 Property: Profile

The Profile property is used to indicate that there is content in the Manifest that conforms to a profile that is identified by the URI which is the value of the property.

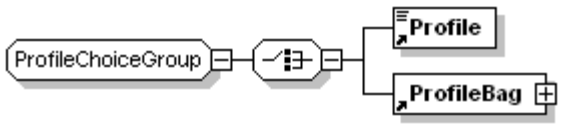
There are two variations of the Profile property. The base property, with a localname of “Profile”, is used to indicate the value of a single profile. If more than one profile is present in the manifest, the unordered array wrapper version of the base property should be used which has a localname of “PropertyBag”.

practice

an application that adds content to an XML Manifest that conforms to a profile SHOULD make sure that there is a profile property whose value is equal to the profile namespace.

4.2.2.1 group ProfileChoiceGroup

The ProfileChoiceGroup provides the alternate versions of the Profile property, Profile for the single profile case, and ProfileBag for the multiple profile case.

diagram	
namespace	http://ns.osta.org/manifest/1.0/
children	**Profile** **ProfileBag**
used by	complexType **BySchemaPropsType**
source	<xs:group name="ProfileChoiceGroup"> <xs:choice> <xs:element ref="Profile"/> <xs:element ref="ProfileBag"/> </xs:choice> </xs:group>

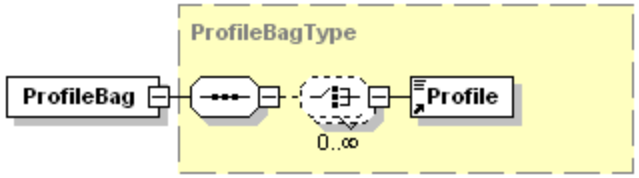
4.2.2.2 element Profile, complexType ProfileType

The Profile element is used to specify the value of a single profile. It is an instance of ProfileType which is derived from xs:anyURI. The profile value must be a valid URI.

diagram	
namespace	http://ns.osta.org/manifest/1.0/
type	**ProfileType**
used by	complexType **ProfileBagType** group **ProfileChoiceGroup**
source	<xs:element name="Profile" type="ProfileType"/>

source	<xs:complexType name="ProfileType"> <xs:simpleContent> <xs:extension base="xs:anyURI"/> </xs:simpleContent> </xs:complexType>

4.2.2.3 element ProfileBag, complexType ProfileBagType

diagram	
namespace	http://ns.osta.org/manifest/1.0/
type	**ProfileBagType**
children	**Profile**
used by	group **ProfileChoiceGroup**
source	<xs:element name="ProfileBag" type="ProfileBagType"/>
source	<xs:complexType name="ProfileBagType"> <xs:complexContent> <xs:extension base="nmf:BagPropType"> <xs:sequence> <xs:choice minOccurs="0" maxOccurs="unbounded"> <xs:element ref="Profile"/> </xs:choice> </xs:sequence> </xs:extension> </xs:complexContent> </xs:complexType>

4.2.3 Property: Redirect

The Redirect property is an optional property that is used to specify a URL at which the actual manifest can be found. The Redirect property SHOULD be honored by an Manifest-aware processor. It instructs the processor to redirect its processing operations to the referenced document

4.2.3.1 element Redirect, complexType RedirectType

diagram	
namespace	http://ns.osta.org/manifest/1.0/
type	**RedirectType**
used by	complexType **BySchemaPropsType**
source	<xs:element name="Redirect" type="RedirectType"/>
source	<xs:complexType name="RedirectType"> <xs:simpleContent> <xs:extension base="xs:anyURI"/> </xs:simpleContent> </xs:complexType>

Chapter 5: XML Manifest Practices

An XML Manifest can contain top-level elements from zero or more profiles. A profile is identified by a namespace URI. The top-level elements used by the profile do not need to use the same namespace as the one used to identify the profile.

5.1 Finding an XML Manifest File

Specifications that make use of the XML Manifest as their interchange container SHOULD define specific practices for the placement and location of the XML Manifest. An example of the definition of such practices is the provided in the MPV Core Specification.

5.2 Top-level Elements

A profile MAY define its top-level elements (elements that are children of the Manifest root element) using the same namespace as the profile. This allows processors to reliably ignore top-level children from namespaces that aren't recognized based on namespace matching.

5.3 Extending Profiles

There are two mechanisms that are available to allow processors to recognize whether they can accept a particular XML Manifest document. One mechanism is based on the namespaces that are used by the various elements and attributes that are contained in the document. The other is based on the Profile URI that are specified in the Profile properties contained in the nmf:Metadata (see section 4.2.2).

When a profile is extended, use of namespaces as a versioning mechanism SHOULD only be used for incompatible changes to the syntax or semantics of the profile. If all of the extensions are backwards compatible with the existing profile, then the namespaces used for the elements and attributes SHOULD be left alone in order to not break any existing processors.

This then leaves the question of how backwards compatible changes should be communicated to the consumers of a profile contained in an XML Manifest. The alternatives are either to replace the existing profile announcer or add an additional profile announcer. Changing the existing profile would break any processors that key off the profile

announcer in order to determine if they can process the document. This is why backwards compatible extensions to profiles SHOULD be announced via one or more additional Profile properties. These profile announcers MAY use a common syntactic convention in their profile URI (the value of the Profile property).

In the example below, a Profile identified by the URI value of http://www.companyA.com/Profile1/1.0/ has now been extended by a 2.0 version that is backwards compatible. This new version is identified by the URI value of http://www.companyA.com/Profile1/2.0/ . This extension defines some new elements that are in a new namespace with the URI value of http://www.companyA/Profile1/2.0/newElems/. This shows that the profile URI don't have to be used for any element or attribute naming but simply as an announcer for the profile.

```
<?xml version="1.0" encoding="UTF-8"?>
<file:Manifest
        xmlns:file=”http://ns.osta.org/manifest/1.0/”
        xmlns:mpv=”http://ns.osta.org/mpv/1.0/”
        xmlns:nmf="http://ns.osta.org/nmf/1.0/"
        xmlns:Profile1_1=”http://www.companyA.com/Profile1/1.0/”
        xmlns:Profile1_2=”http://www.companyA.com/Profile1/2.0/”
        xmlns:newElems=”http://www.companyA.com/Profile1/2.0/newElems/”>
  <nmf:Metadata>
    <ManifestProperties xmlns=”http://ns.osta.org/manifest/1.0/”>
      <ProfileBag>
          <Profile>http://ns.osta.org/mpv/basic/1.0/</Profile>
          <Profile>http://www.companyA.com/Profile1/1.0/</Profile>
          <Profile>http://www.companyB.com/Profile1/2.0/</Profile>
      <ProfileBag >
    </ManifestProperties>
  </nmf:Metadata>

  <Profile1_1:Outer1>
     …
     <newElems:FooRef />
  </Profile1_1:Outer1>

  …

  <mpv:AssetList>
     …
     <newElems:Foo>
      …
     </newElems:Foo>
  </mpv:AssetList>

</file:Manifest>
```


Chapter 6: Examples

6.1 Single Profile

This example shows a manifest that contains a contents from a single profile which is identified by the namespace URI of http://www.companyA.com/Profile1/1.0/.

```
<?xml version="1.0" encoding="UTF-8"?>
<file:Manifest
          xmlns:file="http://ns.osta.org/manifest/1.0/"
          xmlns:nmf="http://ns.osta.org/nmf/1.0/"
          xmlns:Profile1=”http://www.companyA.com/Profile1/1.0/” >
  <nmf:Metadata>

    <ManifestProperties xmlns=”http://ns.osta.org/manifest/1.0/”>
      <Profile>http://ns.osta.org/mpv/basic/1.0/</Profile>
    </ManifestProperties>
  </nmf:Metadata>

  <Profile1:Outer1>
     …
  </Profile1:Outer1>

</file:Manifest>
```

6.2 MPV with multiple profiles

This example shows the use of the MPV Basic profile along with several other profiles. Note that while the namespace used to identify the profile (and the top-level schema) is often used for the top-level elements from the profile, this is not necessary.

Top-level profiles can incorporate other profiles as embedded profiles. In these cases, the elements from the embedded profiles will use their own top-level namespace for elements that they may define as direct children of the Manifest.


```
<?xml version="1.0" encoding="UTF-8"?>
<file:Manifest
        xmlns:file=”http://ns.osta.org/manifest/1.0/”
        xmlns:mpv=”http://ns.osta.org/mpv/1.0/”
        xmlns:nmf="http://ns.osta.org/nmf/1.0/"
        xmlns:Profile1=”http://www.companyA.com/Profile1/1.0/”
        xmlns:Profile2=”http://www.companyB.com/Profile2/3.5/” >
  <nmf:Metadata>
    <ManifestProperties xmlns=”http://ns.osta.org/manifest/1.0/”>
      <ProfileBag>
          <Profile>http://ns.osta.org/mpv/basic/1.0/</Profile>
          <Profile>http://www.companyA.com/Profile1/1.0/</Profile>
          <Profile>http://www.companyB.com/Profile2/3.5/</Profile>
      <ProfileBag >
    </ManifestProperties>
  </nmf:Metadata>

  <Profile1:Outer1>
     …
  </Profile1:Outer1>

  <Profile2:Outer2>
     …
  </Profile2:Outer2>

  …

  <mpv:AssetList>
     …
  </mpv:AssetList>

</file:Manifest>
```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