

ePortfolio Interoperability XML Specification

Version 1.0 DRAFT

ePortaro, Incorporated

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www.epixspec.org

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Introduction

The ePortfolio Interoperability XML (EPIX) Specification was created to support a standard protocol for the integration of disparate ePortfolio (sometimes ePortfolios are referred to as web folios, digital portfolio, e-folios, or online portfolios) applications, to support the integration of ePortfolio applications with other enterprise and personal systems, as well as to manage transportability of ePortfolios and the items contained within the ePortfolio across computing devices.

EPIX is a Simple Object Access Protocol (SOAP)-based API (application program interface) that leverages both XML and web-services to specifically support the needs of ePortfolio system interaction and integration. A number of different interoperability requirements were considered during the development of this specification. The interoperability scenarios that motivated the development of this specification include:

1. A high school student is accepted at a university and wishes to take her ePortfolios with her where either
 - a. The high school ePortfolio system and the university ePortfolio system are supplied by different providers, or
 - b. The high school ePortfolio system and the university ePortfolio system are supplied by the same provider but have been configured differently (e.g., supporting different artifacts and views).
2. A graduate student is maintaining ePortfolios on multiple ePortfolio servers (one for graduate school and one supplied by her employer) and wishes to keep the ePortfolio repositories in sync.
3. An ePortfolio system implementation in an enterprise requires integration (at, for example, the artifact or data element level) with numerous enterprise applications that may or may not support standards that are specific to their function (e.g., OAGIS, IMS, SCORM).
4. An ePortfolio owner wishes to “transport” her ePortfolio or artifact repository to a personal computing device (e.g., Desktop, Laptop, Palmtop).

Hardware and software architecture independence was considered during the development of this specification. That is, the EPIX specification was designed with the recognition that the Providers (web services that conform to the EPIX Specification) and Consumers (the requesters and recipients of those web services) might be implemented using fundamentally differing enabling software architectures. Specifically, EPIX was designed to support a neutral SOAP, XML, and Web-Services architecture that will enable interoperability between J2EE (Java) Providers or Consumers, .Net (Microsoft) Producers or Consumers and any other Providers or Consumers that conform to the W3C standards for HTTP, SOAP, and XML.

This specification was not intended to mandate a full agreement of specific data elements (or operations on those data elements) among ePortfolio providers. Rather, it was intended to support a full discovery and description of meta-ePortfolio structure and meta-ePortfolio methods which subsequently allow ePortfolio providers to expose data and methods to trusted sources.

To support this intention, this specification defines three discrete SOAP methods. The first method, **discover**, supports meta-data and meta-method discovery and understanding. The second method, **execute**, supports data, meta-data, method, and meta-method manipulation (including retrieval and update). The third method, **synchronize**, supports rule- and priority-based synchronization of ePortfolio data.

Objectives

The EPIX Specification was designed around open principles to meet and support the following objectives:

- Support a technically-neutral implementation of ePortfolio integration, interoperability, and synchronization capabilities
- Provide interoperability standards for ePortfolio meta-data and meta-method discovery
- Define an extensible data set model that supports a broad set of rich integration models
- Promote a standards-based model to which third-party data providers and application developers can conform broadly to the ePortfolio application space
- Maintain a stateless integration model and optimize a loosely-coupled integration architecture
- Provide a set of optional capabilities that ePortfolio providers may choose to support as part of providing richer integration functionality
- Include specifications in support of a set of federated systems understanding of ePortfolio content as well as the projection of ePortfolio content
- Develop an extensible specification that can evolve to support the evolving ePortfolio movement
- Encourage ePortfolio application developers to standardize a key set of interoperability capabilities.

Target Audience

The EPIX specification is intended to support application developers, application designers, ePortfolio system designers and developers, requirements engineers, and integration developers and specialists. It assumes a high degree of familiarity with a number of key technologies, applications, and approaches, including:

- ePortfolio construction, composition, and implementation
- eXtensible Markup Language (XML)
- Simple Object Access Protocol (SOAP)
- Web services for integrating systems

See **Appendix A: URL Links to Technologies and Standards** for reference information regarding the technologies and standards to which this specification refers.

Design Summary

Fundamentally the design of EPIX is based around three methods which are available to web services consumers, **discover**, **execute**, and **synchronize**. All three methods are based on SOAP standards and provide a stateless, loosely coupled, interaction model between web service providers and consumers.

The first method, **discover**, supports meta-data and meta-method discovery and understanding. The second method, **execute**, supports data, meta-data, method, and meta-method manipulation. Both methods are extensible, or are, in-effect, meta methods in that the specific operation carried out is dependent upon the data parameters supplied to them. The third method, **synchronize**, supports synchronization of ePortfolio data following a set of common synchronization rules.

The set of EPIX-specified parameter values can be a subset of the full set of acceptable parameter values supported by any individual ePortfolio provider. The full set of acceptable parameter values supported by a particular ePortfolio system instance is, if implemented consistent with this specification, available to any appropriate web-services consumer through the **discover** method. The specification defines a similar, consistent, model for the exhaustive discovery of artifact-items and data elements and their associated methods by appropriate web-services consumers.

EPIX Specification

API

Execute

The **Execute** method is used for sending execution requests to the ePortfolio provider server. This includes requests involving data transfer, such as inserting, retrieving, updating or deleting data on the server. The Execute element has a mandatory attribute *type*. The action performed by the Execute method is dependent on the value specified by the value of the *type* attribute. The supported values for the type attribute are listed in the table below and can be extended to support provider-specific enumeration strings.

Enumeration value	Description
INSERT	Inserts all the Portfolios, PortfolioItems, or User's specified in the Request XML. Returns a "true" if the transaction was successful otherwise it returns EPIXError containing the error source, error description and error code.
UPDATE	Updates all the Portfolios, PortfolioItems, or Users specified in the Request XML. Returns a "true" if the transaction was successful otherwise it returns EPIXError containing the error source, error description and error code.
SAVE	If object is not already present in the system, <i>SAVE inserts</i> all the Portfolios, PortfolioItems, and Users into the ePortfolio system. If on the other hand, the object does exist, <i>Save will update</i> the object's data.
RETRIEVE	Retrieves all the information specified in the Request XML. Returns EPIXResult containing all the information that was requested. Data elements will be blank if no data was returned. If the transaction was not successful, the ePortfolio provider returns EPIXError containing the error source, error description and error code.
DELETE	Deletes all the Portfolios, PortfolioItems, or users specified in the Request XML. Returns a "true" if the transaction was

successful otherwise it returns EPIXError containing the error source, error description and error code.

Namespace

<http://www.epixspec.org/schema/epix>

Syntax

Execute (

[in] EPIXRequest

[in] Execute

[in] EPIXUser As EPIXUser,

[in] EPIXPortfolio As EPIXPortfolio,

[in] EPIXPortfolioItem As EPIXPortfolioItem,

[in] EPIXRepository As EPIXRepository,

[out] EPIXResult

[out] Execute

[out] EPIXUser As EPIXUser,

[out] EPIXPortfolio As EPIXPortfolio,

[out] EPIXPortfolioItem As EPIXPortfolioItem,

[out] EPIXRepository As EPIXRepository,

[out] EPIXWarning As EPIXWarning,

[out] EPIXError As EPIXError,

Parameters

EPIXUser

This parameter is of the EPIXUser data type and consists of a collection of User information. The user is capable of controlling some aspect of the User information such as inserting, updating or retrieving a list of users currently active in the system.

EPIXPortfolio

This parameter is of the EPIXPortfolio data type and consists of a collection of Portfolio information. The user is capable of controlling some aspect of the Portfolio information such as inserting, updating or retrieving a list of Portfolios.

EPIXPortfolioltem

This parameter is of the EPIXPortfolioltem data type and consists of a collection of Portfolioltem Information. The user is capable of controlling some aspect of the Portfolioltem information such as inserting, updating or retrieving a list of Portfolioltems.

EPIXRepository

This parameter is of the EPIXRepository data type and consists of a collection of Repository Information such as the structure of the user repository. The user is capable of controlling some aspect of the Repository information such as inserting, updating or retrieving Repository data.

EPIXWarning

This parameter is of the EPIXWarning data type and consists of a collection of Warning information. The user is capable of retrieving Warnings that were generated by the ePortfolio provider.

EPIXError

This parameter is of the EPIXError data type and consists of a collection of Error information. The user is capable of retrieving Error information that was generated by the ePortfolio provider.

EPIXResult

This parameter contains the EPIXResult result returned by the ePortfolio provider. The resulting data depends on the request Execute parameters and consists of a collection of EPIX data types.

EPIXRequest

This parameter contains the EPIXRequest element containing the information requested by the ePortfolio provider.

Example

The following is an example of an **Execute** method call with *type* set to RETRIEVE. In this example, we are interested in retrieving all users registered in the system having "Frank" as FirstName. Additionally, we are interested in retrieving all Portfolioltems of type "achievement" owned by user KNORTON.

```
<?xml version="1.0"?>
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <EPIXRequest xmlns="http://www.epixspec.org/shema/spec">
      <Execute type="RETRIEVE">
        <Restrictions>
          <EPIXUser>
            <User>
              <FirstName>Frank</FirstName>
            </User>
          </EPIXUser>
        </Restrictions>
      </Execute>
    </EPIXRequest>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

```

    </User>
  </EPIXUser>

  <EPIXPortfolioItem>
    <PortfolioItem>
      <Common>
        <OwnerID>000000001</OwnerID>
        <ItemType>Form</FormType>
      </Common>
    </PortfolioItem>
  </EPIXPortfolioItem>
</Restrictions>
</Execute>
</EPIXRequest>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

The following example is the abbreviated response for the preceding method call:

```

<?xml version="1.0" encoding="utf-8" ?>
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <EPIXResult xmlns="http://www.epixspec.org/shema/spec">
      <Execute executeType="RETRIEVE">
        <EPIXPortfolioItem>
          <PortfolioItem>
            <Common>
              <ItemType>Form</ItemType>
              <ItemID>000234</ItemID>
              <OwnerID>000000001</OwnerID>
              <DateCreated>2002-01-18T18:21:27.7674336-05:00</DateCreated>
              <CreatedBy>000000001</CreatedBy>
              <DateLastModified>2003-01-18T18:21:27.7674336-05:00</DateLastModified>
              <LastModifiedBy>000000001</LastModifiedBy>
              <Description/>
              <Label/>
            </Common>
          </PortfolioItem>
          <Common>
            <ItemType>File</ItemType>
            <ItemID>000854</ItemID>
            <OwnerID>000000001</OwnerID>
            <DateCreated>2002-01-18T18:21:27.7674336-05:00</DateCreated>
            <CreatedBy>000000001</CreatedBy>
            <DateLastModified>2003-01-18T18:21:27.7674336-05:00</DateLastModified>
            <LastModifiedBy>000000001</LastModifiedBy>
            <Description/>
            <Label/>
          </Common>
          <Data name="FileType" value="PDF"/>
          <Data name="FileName" value="Achievement.PDF"/>
          <Data name="FileSize" value="300KB"/>
        </PortfolioItem>
        <Data name="PeopleSoftPersonID" value="12345678"/>
      </Execute>
    </EPIXResult>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

```
<Data name="FormType" value="Achievement"/>
<Data name="Source" value="self-reported"/>
<Data name="ItemURL" value="www.eportaro.com/knorton?itemid=000234"/>
</PortfolioItem>
</EPIXPortfolioItem>
<EPIXError>
  <Error ErrorCode="1004" ErrorId="00023">
    <Source>EPIXUser</Source>
    <Description>Insufficient Privilege</Description>
    <Message>
      You do not have sufficient privilege to retrieve a list of users.
      Please contact your system administrator if the problem persists.
    </Message>
    <Help HelpFile="http://www.epixspec.org/Help/Privilege.htm"/>
  </Error>
</EPIXError>
</Execute>
</EPIXResult>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Discover

The **Discover** method is used to retrieve ePortfolio provider Meta-Data information, such as the list of supported objects such as user Portfolios, PortfolioItems and additional ePortfolio provider specific objects and methods. Furthermore, this method can be used to retrieve a list of elements that the user can use to restrict Execute transactions. The data retrieved with the **Discover** method depends on the values of the parameters passed to it.

Namespace

<http://www.epixspec.org/shema/spec>

Syntax

Discover (

[in] EPIXRequest

[in] Discover

[in] Restrictions As Restrictions,

[in] EPIXUser As EPIXUser,

[in] EPIXPortfolio As EPIXPortfolio,

[in] EPIXPortfolioItem As EPIXPortfolioItem,

[in] EPIXRepository As EPIXRepository,

[in] EPIXAPI As EPIXAPI

[out] EPIXResult

[out] Discover

[out] Restrictions As Restrictions,

[out] EPIXUser As EPIXUser,

[out] EPIXPortfolio As EPIXPortfolio,

[out] EPIXPortfolioItem As EPIXPortfolioItem,

[out] EPIXRepository As EPIXRepository,

[out] EPIXResult As EPIXResult,

[out] EPIXPortfolioProjection As EPIXPortfolioProjection,

[out] EPIXWarning As EPIXWarning,

[out] EPIXError As EPIXError,

[out] EPIXAPI As EPIXAPI

Parameters

Restrictions

This parameter is of Restrictions data type and consists of ePortfolio provider-specific restrictions that can be applied to the Execute API call. Using restrictions, the user has the ability to, for example, retrieve only portfolios that are of type *resume* and that are owned by a specific user.

EPIXUser

This parameter is of the EPIXUser data type and consists of a collection of User information. The user is capable of controlling some aspect of the User information such as inserting, updating or retrieving a list of users currently active in the system.

EPIXPortfolio

This parameter is of the EPIXPortfolio data type and consists of a collection of Portfolio information. The user is capable of controlling some aspect of the Portfolio information such as inserting, updating or retrieving a list of Portfolios.

EPIXPortfolioItem

This parameter is of the EPIXPortfolioItem data type and consists of a collection of PortfolioItem Information. The user is capable of controlling some aspect of the PortfolioItem information such as inserting, updating or retrieving a list of PortfolioItems.

EPIXPortfolioProjection

This parameter is of the EPIXPortfolioProjection data type and consists of a collection of ePortfolio system Information. The user is capable of controlling some aspect of the system information such as retrieving provider-specific information, and other aspects (e.g., updates) as defined by the provider-specific restrictions.

EPIXRepository

This parameter is of the EPIXRepository data type and consists of a collection of Repository Information such as the structure of the Repository. The user is capable of controlling some aspect of the Repository information such as inserting, updating or retrieving Repository data.

EPIXWarning

This parameter is of the EPIXWarning data type and consists of a collection of Warning information. The user is capable of retrieving Warnings that were generated by the ePortfolio provider.

EPIXError

This parameter is of the EPIXError data type and consists of a collection of Error information. The user is capable of retrieving Error information that were generated by the ePortfolio provider.

EPIXResult

This parameter contains the EPIXResult result returned by the ePortfolio provider. The resulting data depends on the request Execute parameters and consists of a collection of EPIX data types.

EPIXRequest

This parameter contains the EPIXRequest element containing the information requested by the ePortfolio provider.

EPIXAPI

This parameter contains the EPIXAPI data type and consists of a collection of API information that the ePortfolio provider supports.

Example

The following is an example of a **Discover** method call. In this example, we are interested in retrieving all restrictions that are global to all objects supported by the ePortfolio provider. Additionally, we are interested in retrieving all Portfolio types and their supported restrictions.

```
<?xml version="1.0"?>
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <EPIXRequest xmlns="http://www.epixspec.org/shema/spec">
      <Discover>
        <Restrictions/>

        <EPIXPortfolio>
          <Restrictions/>
          <Schema/>
          <Display/>
        </EPIXPortfolio>
      </Discover>
    </EPIXRequest>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

The following example is the abbreviated response for the preceding method call:

```
<?xml version="1.0"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/" SOAP-
ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <EPIXResult xmlns="http://www.epixspec.org/shema/spec">
      <Discover>
        <Restrictions>
          <Element name="OwnerID" type="xs:string"/>
          <Element name="DATE_CREATED" type="xs:string"/>
        </Restrictions>

        <EPIXPortfolio>
          <Restrictions>
            <Element name="SHARED_USER" type="xs:string"/>
            <Element name="PORTFOLIO_TYPE" type="xs:string">
              <Value>resume</Value>
              <Value>academic</Value>
              <Value>advisor</Value>
              <Value>photoalbum</Value>
            </Element>
          </Restrictions>
        </EPIXPortfolio>
      </Discover>
    </EPIXResult>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

```
</Restrictions>
  <resume>
    <Restrictions>
      <Element name="OBJECTIVE_TYPE" type="xs:string">
        <Value>academic</Value>
        <Value>professional</Value>
      </Element>
    </Restrictions>
    <Schema><!-- portfolio resume xsds goes here--></Schema>
    <Display><!-- portfolio resume XSLT goes here--></Display>
  </resume>

  <academic>
    <Schema><!-- portfolio academic xsds goes here--></Schema>
    <Display><!-- portfolio academic XSLT goes here--></Display>
  </academic>

  <advisor>
    <Schema><!-- portfolio advisor xsds goes here--></Schema>
    <Display><!-- portfolio academic XSLT goes here--></Display>
  </advisor>

  <photoalbum>
    <Schema><!-- portfolio photoalbum xsds goes here--></Schema>
    <Display><!-- portfolio photoalbum XSLT goes here--></Display>
  </photoalbum>

</EPIXPortfolio>
</Discover>
</EPIXResult>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Synchronize

The purpose of the **Synchronize** method is to synchronize entire user's Portfolios and/or Repository between ePortfolio providers. ePortfolio providers have the ability to synchronize a user's portfolio and/or Repository based on the **syncType** and/or **syncRule** associated with the Synchronize method.

The **syncType** attribute defines the type of synchronization to be performed by the synchronizing ePortfolio providers. It supports "ATTRIBUTE", "ITEM", and "ALL" as values.

The following table describes the **syncType** supported values and their description:

Enumeration value	Description
ATTRIBUTE	Synchronizes only the attributes associated with the object
ITEM	Synchronizes only the Items associated with the object
ALL	Synchronizes both Attributes and Items

The **syncRule** attribute defines the rule to which synchronization is to be performed by the synchronizing ePortfolio providers. It supports "TIME" and "MASTERSLAVE" as values.

The following table describes the **syncRule** supported values and their descriptions:

Enumeration value	Description
TIME	Synchronizes objects based on the time objects were last modified. ePortfolio systems updates the oldest object with the newest object based on a comparison of their "DateLastModified" attribute.
MASTERSLAVE	Synchronizes objects based on a Master-Slave relationship. ePortfolio "Master" system updates and replaces all objects on the "Slave" system regardless of the dates objects were last modified.

Namespace

<http://www.epixspec.org/shema/spec>

Syntax

Synchronize (

[in] EPIXRequest

[in] Synchronize

[in] EPIXPortfolio As EPIXPortfolio,

[in] EPIXPortfolioItem As EPIXPortfolioItem,

[in] EPIXRepository As EPIXRepository,

[out] EPIXResult

[out] Synchronize

[out] EPIXWarning As EPIXWarning,

[out] EPIXError As EPIXError,

Parameters

EPIXPortfolio

This parameter is of the EPIXPortfolio data type and consists of a collection of Portfolio information. The user is capable of controlling some aspect of the Portfolio information such as inserting, updating or retrieving a list of Portfolios.

EPIXPortfolioItem

This parameter is of the EPIXPortfolioItem data type and consists of a collection of PortfolioItem Information. The user is capable of controlling some aspect of the PortfolioItem information such as inserting, updating or retrieving a list of PortfolioItems.

EPIXRepository

This parameter is of the EPIXRepository data type and consists of a collection of Repository Information such as the structure of the Repository. The user is capable of controlling some aspect of the Repository information such as inserting, updating or retrieving Repository data.

EPIXWarning

This parameter is of the EPIXWarning data type and consists of a collection of Warning information. The user is capable of retrieving Warnings that were generated by the ePortfolio provider.

EPIXError

This parameter is of the EPIXError data type and consists of a collection of Error information. The user is capable of retrieving Error informations that were generated by the ePortfolio provider.

EPIXResult

This parameter contains the EPIXResult result returned by the ePortfolio provider. The resulting data depends on the request Execute parameters and consists of a collection of EPIX data types.

EPIXRequest

This parameter contains the EPIXRequest element containing the information requested by the ePortfolio provider.

Example

In this example, an ePortfolio provider initiates a synchronization with another ePortfolio provider. An ePortfolio provider requests a synchronization for user KNORTON's portfolio based on TIME rule.

The following is a simplified example XML request containing all of KNORTON's portfolio data. The system returns "true" if the transaction is successful, otherwise it returns EPIXError containing the error source, error description and error code.

```
<?xml version="1.0"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/" SOAP-
ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
  <SOAP-ENV:Body>
    <EPIXRequest xmlns="http://www.epixspec.org/shema/spec">
      <Synchronize syncType="ALL" syncRule="TIME">

        <EPIXPortfolio>
          <!-- Portfolio information goes here -->
        </EPIXPortfolio>

        <EPIXPortfolioItem>
          <!-- PortfolioItems information goes here -->
        </EPIXPortfolioItem>

        <EPIXRepository>
          <!-- Repository information goes here -->
        </EPIXRepository>

      </Synchronize>
    </EPIXRequest>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Data Types Used in EPIX

The EPIX specification supports all standard XML data types. The following alphabetical list describes EPIX data types and notes those data types that use standard XML data types. For more information about the XML Schema types, see <http://www.w3.org/TR/xmlschema-2/>. To view the schema structure, see <http://www.w3.org/2001/XMLSchema-datatypes.xsd>.

Boolean

The Boolean type uses the standard XML boolean data type.

Decimal

The Decimal type noted uses the standard XML decimal data type.

Integer

The Integer type noted in this document refers to the standard XML int data type.

String

The String type uses the standard XML string data type.

DateTime

The DateTime type uses the standard XML dateTime data type.

The following Data Types are EPIX specific data types and can all be extended by ePortfolio providers.

Restrictions

Object	Description	Attributes	Comments
Restrictions	Contains a List of Restrictions.Elements. This can only be used within the Discover method	None	Element shall appear 0 or 1 time.
Restrictions.Element	Contains elements that can be used to restrict Execute call. This can only be used within the Discover method	<ul style="list-style-type: none"> name - name of object that can be used to restrict type - object's data type 	Element shall appear 0 or more times
Restrictions.Element.Value	Contains the values that are supported by this element. This can only be used within the Discover method.	None	Element shall appear 0 or more times
Restrictions.Element.Attribute	Contains the attribute names that are supported by the	<ul style="list-style-type: none"> name - name of the attribute that can be used 	Element shall appear 0 or more times

	element. This can only be used within the Discover method	to restrict	times
		<ul style="list-style-type: none"> type - attributes data type 	
Restrictions.Element	Contains the values that are supported by this attribute. This can only be used within the Discover method	None	Element shall appear 0 or more times
.Attribute.Value			

```

<xs:element name="Restrictions">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Element">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Value" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name="Attribute">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Value" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="name" type="xs:string"/>
          <xs:attribute name="type" type="xs:string"/>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

EPIXUser

Object	Description	Attributes	Comments
EPIXUser	Contains a List of User Elements	None	Element shall appear 0 or 1 time
EPIXUser.User	Contains User information	<ul style="list-style-type: none"> name - name of object that can be used to restrict type - data type supported by object 	Element shall appear 0 or more times
EPIXUser.User.UserName	Contains the user's username	None	Element shall appear 1 time

EPIXUser.User.FirstName	Contains User first name	None	Element shall appear 1 time
EPIXUser.User.LastName	Contains User last name	None	Element shall appear 1 time
EPIXUser.User.Role	Contains User role	None	Element shall appear 1 or more times
EPIXUser.User.UserId	Contains User ID	None	Element shall appear 1 time

```

<xs:element name="EPIXUser">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="User" minOccurs="0" maxOccurs="unbounded">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Username" type="xs:string"/>
            <xs:element name="Firstname" type="xs:string"/>
            <xs:element name="Lastname" type="xs:string"/>
            <xs:element name="Role" type="xs:string" maxOccurs="unbounded" / >
            <xs:element name="UserID" type="xs:ID"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

EPIXPortfolio

Object	Description	Attributes	Comments
EPIXPortfolio	Contains a list of Portfolio Elements	None	Element shall appear 1 time
EPIXPortfolio.Portfolio	Contains Portfolio information	None	Element shall appear 1 or more times
EPIXPortfolio.Portfolio.Common	Contains Common PortfolioItem data	None	Element shall appear 1 time
EPIXPortfolio.Portfolio.PortfolioItemRef	Contains a list of PortfolioItems references associated with the Portfolio	None	Element shall appear 0 or more times
EPIXPortfolio.Portfolio	Contains the PortfolioItem ID to	None	Element shall appear 1 time

.PortfolioItemRef.ItemID reference

appear 1 time

```

<xs:element name="EPIXPortfolio">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Portfolio" minOccurs="0" maxOccurs="unbounded">
        <xs:complexType>
          <xs:sequence>
            <xs:element ref="Common"/>
            <xs:element ref="PortfolioItemRef" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="PortfolioItemRef">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="ItemID" type="xs:integer"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

EPIXPortfolioItem

Object	Description	Attributes	Comments
EPIXPortfolioItem	Contains a list of PortfolioItem Elements	None	Element shall appear 1 time
EPIXPortfolioItem .PortfolioItem	Contains PortfolioItem information	None	Element shall appear 1 or more times
EPIXPortfolioItem .PortfolioItem .Common	Contains Common PortfolioItem data	None	Element shall appear 1 time
EPIXPortfolioItem .PortfolioItem .PortfolioItem	Contains the complex type PortfolioItem associated with the PortfolioItem. PortfolioItems can be composed of other POrtfolioItems	None	Element shall appear 0 or more times
EPIXPortfolioItem. .PortfolioItem	Contains the implementation specific data	name: represents the name associated with the	Element shall appear 0 or more times

.Data	elements that are provided about the PortfolioItem (e.g., PeopleSoftPersonID, ItemURL)	portfolio item data element (e.g., street address 1) value: represents the value associated with the portfolio item data element (e.g., 123 Main Street)
-------	--	---

```

<xs:element name="EPIXPortfolioItem">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="PortfolioItem" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="Data">
  <xs:complexType >
    <xs:attribute name="name" use="required"/>
    <xs:attribute name="value" use="required"/>
  </xs:complexType>
</xs:element>
<xs:element name="PortfolioItem">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Common"/>
      <xs:element ref="PortfolioItem" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Data" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

EPIXPortfolioProjection

Object	Description	Attributes	Comments
EPIXPortfolioProjection	Contains a list of PortfolioProjection Elements	None	Element shall appear 1 time
EPIXPortfolioProjection .PortfolioProjection	Contains ePortfolio provider system specific information	None	Element shall appear 1 or more times

```

<xs:element name="EpixPortfolioProjection">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="PortfolioProjection" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

```

</xs:element>

EPIXRepository

Object	Description	Attributes	Comments
EPIXRepository	Contains a list of Repository Elements	None	Element shall appear 0 or 1 time
EPIXRepository.Repository	Contains Repository information	None	Element shall appear 1 or more times

```
<xs:element name="EpixRepository">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Repository" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

EPIXWarning

Object	Description	Attributes	Comments
EPIXWarning	Contains a list of Warning Elements	None	Element shall appear 0 or 1 time
EPIXWarning.Warning	Contains Warning Information	<ul style="list-style-type: none"> WarningCode - Contains the Warning Code associated with the Warning type WarningId - Contains the Warning id 	Element shall appear 1 or more times
EPIXWarning.Warning.Source	Contains the source of the Warning	None	Element shall appear 0 or 1 time
EPIXWarning.Warning.Description	Contains a description of the Warning type	None	Element shall appear 0 or 1 time
EPIXWarning.Warning.Message	Contains a message as defined by the	None	Element shall appear 0 or 1 time

	ePortfolio provider		time
EPIXWarning.Warning.Help	Contains help information	HelpFile - Contains a link to an external help file associated with the Warning type	Element shall appear 0 or 1 time
EPIXWarning.Warning.LastWarning	Contains the last Warning(s)	Count - the number of Warnings to be returned from the stack	Element shall appear 0 or more times Optional

```
<xs:element name="EPIXWarning">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Warning">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Source" type="xs:string"/>
            <xs:element name="Description" type="xs:string"/>
            <xs:element name="Message" type="xs:string"/>
            <xs:element name="Help" type="xs:string"/>
            <xs:element name="LastWarning" type="xs:string"/>
          </xs:sequence>
          <xs:attribute name="WarningCode" type="xs:integer"/>
          <xs:attribute name="WarningID" type="xs:integer"/>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

EPIXError

Object	Description	Attributes	Comments
EPIXError	Contains a list of Error Elements	None	Element shall appear 0 or 1 time
EPIXError.Error	Contains Error Information	<ul style="list-style-type: none"> • ErrorCode - Contains the Error Code associated with the error type • Errorid - Contains the unique Error id 	Element shall appear 1 or more times

EPIXError.Error.Source	Contains the source of the error	None	Element shall appear 0 or 1 time
EPIXError.Error.Description	Contains a description of the error type	None	Element shall appear 0 or 1 time
EPIXError.Error.Message	Contains a message as defined by the ePortfolio provider	None	Element shall appear 0 or 1 time
EPIXError.Error.Help	Contains help information	HelpFile - Contains a link to an external help file associated with the error type	Element shall appear 0 or 1 time
EPIXError.Error.LastError	Contains the last error(s)	Count - the number of error to be returned from the stack	Element shall appear 0 or more times

```

<xs:element name="EPIXError">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Error" maxOccurs="unbounded">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Source" type="xs:string"/>
            <xs:element name="Description" type="xs:string"/>
            <xs:element name="Message" type="xs:string"/>
            <xs:element name="Help" type="xs:string"/>
            <xs:element name="LastError" type="xs:string"/>
          </xs:sequence>
          <xs:attribute name="ErrorCode" type="xs:integer"/>
          <xs:attribute name="ErrorID" type="xs:integer"/>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

EPIXResult

Object	Description	Attributes	Comments
EPIXResult	Contains the Execute or Discover result data	None	Element shall appear 1 time
EPIXResult.Execute	Contains data	<ul style="list-style-type: none"> Type - the type 	Element shall

	for Execute API call	of action to be performed by the Execute call	appear 1 time
EPIXResult.Execute.[type]	Type of action to be performed by the Execute call	Supported values: <ul style="list-style-type: none"> • INSERT • UPDATE • RETRIEVE • DELETE • SAVE 	Element shall appear 1 time
EPIXResult.Discover	Contains data for Discover API call	None	Element shall appear 1 time
EPIXResult.Synchronize	Contains data for synchronizing objects between ePortfolio systems	syncType - synchronization type of the action to be performed by the Synchronize call syncRule - synchronization rule of the action to be performed by the Synchronize call	Element shall appear 1 time
EPIXResult.Synchronize.[syncType]		Supported values: <ul style="list-style-type: none"> • ATTRIBUTE • ITEM • ALL 	Element shall appear 1 time
EPIXResult.Synchronize.[syncRule]		Supported values: <ul style="list-style-type: none"> • TIME • MASTERSLAVE 	Element shall appear 1 time

```

<xs:simpleType name="syncType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ATTRIBUTE"/>
    <xs:enumeration value="ITEM"/>
    <xs:enumeration value="ALL"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="syncRule">
  <xs:restriction base="xs:string">
    <xs:enumeration value="TIME"/>
    <xs:enumeration value="MASTERSLAVE"/>
  </xs:restriction>
</xs:simpleType>
<xs:element name="Synchronize">

```

```

<xs:complexType>
  <xs:sequence>
    <xs:element ref="EPIXPortfolio" minOccurs="0"/>
    <xs:element ref="EPIXPortfolioItem" minOccurs="0"/>
    <xs:element ref="EPIXError" minOccurs="0"/>
    <xs:element ref="EPIXWarning" minOccurs="0"/>
    <xs:element ref="EPIXRepository" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="syncType" type="syncType"/>
  <xs:attribute name="syncRule" type="syncRule"/>
</xs:complexType>
</xs:element>

```

Common

Object	Description	Attributes	Comments
ItemType	Contains the Type of the object	None	Element shall appear 1 time
ItemID	Contains the item ID	None	Element shall appear 1 time
OwnerID	Contains the owner id of object's owner	None	Element shall appear 1 time
DateCreated	Contains the Date the Item was created	None	Element shall appear 1 time
CreatedBy	Contains the owner id of the user that created this object	None	Element shall appear 1 time
DateLastModified	Contains the Date the Item was last modified	None	Element shall appear 1 time
LastModifiedBy	Contains the user ID of the user to modify the Item last	None	Element shall appear 1 time
Description	Contains the description associated with the Item	None	Element shall appear 1 time
Label	Contains the Item label	None	Element shall appear 1 time
Other	Contains additional information	None	Element shall appear 0 or 1 time
Schema	Contains the schema associated with the object	None	Element shall appear 0 or 1 time
Display	Contains the xslt associated with the object	None	Element shall appear 0 or 1 time

```

<xs:element name="Common">
  <xs:complexType>
    <xs:sequence>

```

```

<xs:element name="ItemType" type="xs:integer"/>
<xs:element name="ItemID" type="xs:integer"/>
<xs:element name="OwnerID" type="xs:integer"/>
<xs:element name="DateCreated" type="xs:dateTime"/>
<xs:element name="CreatedBy" type="xs:integer"/>
<xs:element name="DateLastModified" type="xs:dateTime"/>
<xs:element name="Type" type="xs:string" minOccurs="0"/>
<xs:element name="LastModifiedBy" type="xs:string"/>
<xs:element name="Description" type="xs:string"/>
<xs:element name="Label" type="xs:string"/>
<xs:element name="Other" type="xs:string" minOccurs="0"/>
<xs:element name="Schema" type="xs:string" minOccurs="0"/>
<xs:element name="Display" type="xs:string" minOccurs="0"/>
</xs:sequence>
</xs:complexType>
</xs:element>

```

EPIXAPI

Object	Description	Attributes	Comments
EPIXAPI	Contains a list of API Elements	None	Element shall 0 or 1 time
EPIXAPI. API	Contains API method information	None	Element shall appear 1 or more times

```

<xs:element name="EPIXAPI">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="API" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```


Appendix A: URL Links to Technologies and Standards

Reference information regarding the technologies and standards to which this specification refers. Items are listed alphabetically.

J2EE

Java 2 Platform, Enterprise Edition information can be obtained at:
<http://java.sun.com/j2ee/>

J2EE web services information can be obtained at:
<http://java.sun.com/webservices/>

.NET

The Microsoft .NET framework is described at:
<http://msdn.microsoft.com/net/>

SOAP

Information on the Simple Object Access Protocol can be obtained at:
<http://www.w3.org/tr/soap/>

UDDI

Information on Universal description, Discovery, and Integration is available at:
<http://www.uddi.com>

WSDL

Information on the Web Services Description Language is available at:
<http://www.w3.org/tr/wsdl/>

XML

Information on, and specifications for, eXtensible Markup Language is available at:
<http://www.w3.org/xml/>