



OSID V3 Specifications hierarchy package

Version Draft 3

This specifications represent a draft for OSID V3 interface definitions. These definitions may change at any time.

Last Modified: 4 October 2008

prepared by:
Tom Coppeto
OnTapSolutions

Copyright © 2008 Massachusetts Institute of Technology

OSID License	
Copyright	Copyright © 2008 Massachusetts Institute of Technology. All Rights Reserved.
License	<p>This Work is being provided by the copyright holder(s) subject to the following license. By obtaining, using and/or copying this Work, you agree that you have read, understand, and will comply with the following terms and conditions.</p> <p>This Work and the information contained herein is provided on an "AS IS" basis. The Massachusetts Institute of Technology, the Open Knowledge Initiative, and THE AUTHORS DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE WORK OR THE USE OR OTHER DEALINGS IN THE WORK.</p> <p>Permission to use, copy and distribute unmodified versions of this Work, for any purpose, without fee or royalty is hereby granted, provided that you include the above copyright notice and the terms of this license on ALL copies of the Work or portions thereof.</p> <p>You may modify or create Derivatives of this Work only for your internal purposes. You shall not distribute or transfer any such Derivative of this Work to any location or to any third party. For the purposes of this license, Derivative shall mean any derivative of the Work as defined in the United States Copyright Act of 1976, such as a translation or modification.</p> <p>The export of software employing encryption technology may require a specific license from the United States Government. It is the responsibility of any person or organization contemplating export to obtain such a license before exporting this Work.</p>

Package Description	osid.hierarchy package
---------------------	------------------------

Interfaces	<ul style="list-style-type: none">osid.hierarchy.HierarchyProfileosid.hierarchy.HierarchyManagerosid.hierarchy.HierarchyProxyManagerosid.hierarchy.HierarchyTraversalSessionosid.hierarchy.HierarchyDesignSessionosid.hierarchy.HierarchyLookupSessionosid.hierarchy.HierarchySearchSessionosid.hierarchy.HierarchyAdminSessionosid.hierarchy.HierarchyNotificationSessionosid.hierarchy.HierarchyStructureReceiverosid.hierarchy.Hierarchyosid.hierarchy.HierarchyRecordosid.hierarchy.HierarchyQueryosid.hierarchy.HierarchyQueryRecordosid.hierarchy.HierarchyFormosid.hierarchy.HierarchyFormRecordosid.hierarchy.HierarchySearchOrderosid.hierarchy.HierarchySearchOrderRecordosid.hierarchy.HierarchySearchosid.hierarchy.HierarchySearchRecordosid.hierarchy.HierarchySearchResultsosid.hierarchy.HierarchySearchResultsRecordosid.hierarchy.HierarchyReceiverosid.hierarchy.HierarchyListosid.hierarchy.Positionosid.hierarchy.PositionList
------------	--

Package	osid.hierarchy
Title	Hierarchy Open Service Interface Definitions
Version	3.0.0
Description	The Hierarchy OSID provides a means for accessing and managing hierarchical relationships among OSID Ids. An OSID Id may have one or more parents or children and the hierarchy itself represents a directed acyclic graph. The hierarchy service defines a set of interfaces used among other OSIDs that utilize hierarchies and can also be used to abstract a hierarchical data into a standalone service.

Interface	osid.hierarchy.HierarchyProfile	
Implements	osid.OsidProfile	
Description	The hierarchy profile describes the interoperability among hierarchy services.	
Method	supportsVisibleFederation	
Description	Tests if federation is visible. Visible federation allows for selecting among multiple hierarchies.	
Return	boolean	true if visible federation is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchyTraversal	
Description	Tests if hierarchy traversal is supported.	
Return	boolean	true if hierarchy traversal is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchyDesign	
Description	Tests if hierarchy design is supported.	
Return	boolean	true if hierarchy design is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchyStructureNotification	
Description	Tests if hierarchy structure notification is supported.	
Return	boolean	true if hierarchy structure notification is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchyLookup	
Description	Tests if a hierarchy lookup is supported.	
Return	boolean	true if hierarchy lookup is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchySearch	
Description	Tests if a hierarchy search is supported.	
Return	boolean	true if hierarchy search is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchyAdmin	
Description	Tests if a hierarchy administration is supported.	
Return	boolean	true if hierarchy administration is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsHierarchyNotification	
Description	Tests if hierarchy notification is supported. Messages may be sent when hierarchies are created, modified, or deleted.	
Return	boolean	true if hierarchy notification is supported, false otherwise
Compliance	mandatory	This method must be implemented.
Method	supportsNodeSequencing	
Description	Tests if hierarchy node sequencing for ordering nodes is supported.	
Return	boolean	true if node sequencing is supported, false otherwise
Compliance	mandatory	This method must be implemented.

Method	getHierarchyRecordTypes		
Description	Gets the supported Hierarchy types.		
Return	osid.type.TypeList		a list containing the supported Hierarchy record types
Compliance	mandatory		This method must be implemented.
Method	supportsHierarchyRecordType		
Description	Tests if the given Hierarchy record type is supported.		
Parameters	osid.type.Type	hierarchyRecordType	a Type indicating a Hierarchy record type
Return	boolean		true if the given record Type is supported, false otherwise
Compliance	mandatory		This method must be implemented.
Method	getHierarchySearchRecordTypes		
Description	Gets the supported Hierarchy search record types.		
Return	osid.type.TypeList		a list containing the supported Hierarchy search record types
Compliance	mandatory		This method must be implemented.
Method	supportsHierarchySearchRecordType		
Description	Tests if the given Hierarchy search record type is supported.		
Parameters	osid.type.Type	hierarchySearchRecordType	a Type indicating a Hierarchy search record type
Return	boolean		true if the given Type is supported, false otherwise
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyManager	
Implements	osid.OsidManager	
	osid.hierarchy.HierarchyProfile	
Description	<p>The hierarchy manager provides access sessions to traverse and manage hierarchies of Ids. The sessions included in this manager are:</p> <ul style="list-style-type: none"> • HierarchyTraversalSession: a basic session traversing a hierarchy • HierarchyDesignSession: a session to design a hierarchy • HierarchyStructureNotificationSession: a session for notifications within a hierarchy structure • HierarchyLookupSession: a session looking up hierarchies • HierarchySearchSession: a session for searching for hierarchies • HierarchyAdminSession: a session for creating and deleting hierarchies • HierarchyNotificationSession: a session for subscribing to changes in hierarchies 	
Method	getHierarchyTraversalSession	
Description	Gets the OsidSession associated with the hierarchy traversal service.	
Return	osid.hierarchy.HierarchyTraversalSession	a HierarchyTraversalSession
Errors	OPERATION_FAILED	unable to complete request
	UNIMPLEMENTED	supportsHierarchyTraversal() is false
Compliance	optional	This method must be implemented if supportsHierarchyTraversal() is true.
Method	getHierarchyTraversalSessionForHierarchy	
Description	Gets the OsidSession associated with the hierarchy traversal service for the given hierarchy.	
Parameters	osid.id.Id hierarchyId	the Id of the hierarchy
Return	osid.hierarchy.HierarchyTraversalSession	the new HierarchyTraversalSession
Errors	NOT_FOUND	hierarchyId not found
	NULL_ARGUMENT	hierarchyid is null
	OPERATION_FAILED	unable to complete request
	UNIMPLEMENTED	supportsHierarchyTraversal() or supportsVisibleFederation() is false
Compliance	optional	This method must be implemented if supportsHierarchyTraversal() and supportsVisibleFederation() are true.
Method	getHierarchyDesignSession	
Description	Gets the OsidSession associated with the hierarchy design service.	
Return	osid.hierarchy.HierarchyDesignSession	a HierarchyDesignSession
Errors	OPERATION_FAILED	unable to complete request
	UNIMPLEMENTED	supportsHierarchyDesign() is false
Compliance	optional	This method must be implemented if supportsHierarchyDesign() is true.
Method	getHierarchyDesignSessionForHierarchy	
Description	Gets the OsidSession associated with the topology design service using for the given hierarchy.	
Parameters	osid.id.Id hierarchyId	the Id of the graph
Return	osid.hierarchy.HierarchyDesignSession	a HierarchyDesignSession
Errors	NOT_FOUND	hierarchyId is not found
	NULL_ARGUMENT	hierarchyId is null
	OPERATION_FAILED	unable to complete request
	UNIMPLEMENTED	supportsHierarchyDesign() or supportsVisibleFederation() is false
Compliance	optional	This method must be implemented if supportsHierarchyDesign() and supportsVisibleFederation() are true.

Method	getHierarchyStructureNotificationSession		
Description	Gets the session for subscribing to notifications of changes within a hierarchy structure.		
Return	osid.hierarchy.HierarchyStructureNotificationSession		a HierarchyStructureNotificationSession
Errors	OPERATION_FAILED		unable to complete request
	UNIMPLEMENTED		supportsHierarchyStructureNotification() is false
Compliance	optional		This method must be implemented if supportsHierarchyStructureNotification() is true.
Method	getHierarchyStructureNotificationSessionForHierarchy		
Description	Gets the session for subscribing to notifications of changes within a hierarchy structure for the given hierarchy.		
Parameters	osid.id.Id	hierarchyId	the Id of the graph
Return	osid.hierarchy.HierarchyStructureNotificationSession		a HierarchyStructureNotificationSession
Errors	NOT_FOUND		hierarchyId is not found
	NULL_ARGUMENT		hierarchyId is null
	OPERATION_FAILED		unable to complete request
	UNIMPLEMENTED		supportsHierarchyStructureNotification() or supportsVisibleFederation() is false
Compliance	optional		This method must be implemented if supportsHierarchyStructureNotification() and supportsVisibleFederation() are true.
Method	getHierarchyLookupSession		
Description	Gets the OsidSession associated with the hierarchy lookup service.		
Return	osid.hierarchy.HierarchyLookupSession		a HierarchyLookupSession
Errors	OPERATION_FAILED		unable to complete request
	UNIMPLEMENTED		supportsHierarchyLookup() is false
Compliance	optional		This method must be implemented if supportsHierarchyLookup() is true.
Method	getHierarchySearchSession		
Description	Gets the OsidSession associated with the hierarchy search service.		
Return	osid.hierarchy.HierarchySearchSession		a HierarchySearchSession
Errors	OPERATION_FAILED		unable to complete request
	UNIMPLEMENTED		supportsHierarchySearch() is false
Compliance	optional		This method must be implemented if supportsHierarchySearch() is true.
Method	getHierarchyAdminSession		
Description	Gets the hierarchy administrative session.		
Return	osid.hierarchy.HierarchyAdminSession		a HierarchyAdminSession
Errors	OPERATION_FAILED		unable to complete request
	UNIMPLEMENTED		supportsHierarchyAdmin() is false
Compliance	optional		This method must be implemented if supportsHierarchyAdmin() is true.
Method	getHierarchyNotificationSession		
Description	Gets a hierarchy notification session.		
Parameters	osid.hierarchy.HierarchyReceiver	receiver	notification callback
Return	osid.hierarchy.HierarchyNotificationSession		a HierarchyNotificationSession
Errors	OPERATION_FAILED		unable to complete request
	UNIMPLEMENTED		supportsHierarchyNotification() is false
Compliance	optional		This method must be implemented if supportsHierarchyNotification() is true.

Interface	osid.hierarchy.HierarchyProxyManager		
Implements	osid.OsidProxyManager		
	osid.hierarchy.HierarchyProfile		
Description	The hierarchy manager provides access sessions to traverse and manage hierarchies of Ids. Methods in this manager accept an Authentication object for the purpose of proxy authentication. The sessions included in this manager are: <ul style="list-style-type: none">• HierarchyTraversalSession: a basic session traversing a hierarchy• HierarchyDesignSession: a session to design a hierarchy• HierarchyStructureNotificationSession: a session for notifications within a hierarchy structure• HierarchyLookupSession: a session looking up hierarchies• HierarchySearchSession: a session for searching for hierarchies• HierarchyAdminSession: a session for creating and deleting hierarchies• HierarchyNotificationSession: a session for subscribing to changes in hierarchies		
Method	getHierarchyTraversalSession		
Description	Gets the OsidSession associated with the hierarchy traversal service.		
Parameters	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyTraversalSession a HierarchyTraversalSession		
Errors	NULL_ARGUMENT		authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyTraversal() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyTraversal() is true.
Method	getHierarchyTraversalSessionForHierarchy		
Description	Gets the OsidSession associated with the hierarchy traversal service for the given hierarchy.		
Parameters	osid.id.Id	hierarchyId	the Id of the hierarchy
	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyTraversalSession a HierarchyTraversalSession		
Errors	NOT_FOUND		hierarchyid not found
	NULL_ARGUMENT		hierarchyId or authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyTraversal() or supportsVisibleFederation() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyTraversal() and supportsVisibleFederation() are true.
Method	getHierarchyDesignSession		
Description	Gets the OsidSession associated with the hierarchy design service.		
Parameters	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyDesignSession a HierarchyDesignSession		
Errors	NULL_ARGUMENT		authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyDesign() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyDesign() is true.

Method	getHierarchyDesignSessionForHierarchy		
Description	Gets the OsidSession associated with the topology design service using for the given hierarchy.		
Parameters	osid.id.Id	hierarchyId	the Id of the hierarchy
	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyDesignSession		
Errors	NULL_ARGUMENT		hierarchyid or authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyDesign() or supportsVisibleFederation() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyDesign() and supportsVisibleFederation() are true.
Method	getHierarchyStructureNotificationSession		
Description	Gets the session for subscribing to notifications of changes within a hierarchy structure.		
Parameters	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyStructureNotificationSession		
Errors	NULL_ARGUMENT		authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyStructureNotification() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyStructureNotification() is true.
Method	getHierarchyStructureNotificationSessionForHierarchy		
Description	Gets the session for subscribing to notifications of changes within a hierarchy structure for the given hierarchy.		
Parameters	osid.id.Id	hierarchyId	the Id of the hierarchy
	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyStructureNotificationSession		
Errors	NULL_ARGUMENT		hierarchyid or authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyStructureNotification() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyStructureNotification() and supportsVisibleFederation() are true.
Method	getHierarchyLookupSession		
Description	Gets the OsidSession associated with the hierarchy lookup service.		
Parameters	osid.authentication.Authentication	authentication	proxy authentication
Return	osid.hierarchy.HierarchyLookupSession		
Errors	NULL_ARGUMENT		authentication is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authentication is invalid
	UNIMPLEMENTED		supportsHierarchyLookup() is false
	UNSUPPORTED		the authentication service is not supported
Compliance	optional		This method must be implemented if supportsHierarchyLookup() is true.

Method	getHierarchySearchSession	
Description	Gets the OsidSession associated with the hierarchy search service.	
Parameters	osid.authentication.Authentication	authentication proxy authentication
Return	osid.hierarchy.HierarchySearchSession	a HierarchySearchSession
Errors	NULL_ARGUMENT	authentication is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authentication is invalid
	UNIMPLEMENTED	supportsHierarchySearch() is false
	UNSUPPORTED	the authentication service is not supported
Compliance	optional	This method must be implemented if supportsHierarchySearch() is true.
Method	getHierarchyAdminSession	
Description	Gets the hierarchy administrative session.	
Parameters	osid.authentication.Authentication	authentication proxy authentication
Return	osid.hierarchy.HierarchyAdminSession	a HierarchyAdminSession
Errors	NULL_ARGUMENT	authentication is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authentication is invalid
	UNIMPLEMENTED	supportsHierarchyAdmin() is false
	UNSUPPORTED	the authentication service is not supported
Compliance	optional	This method must be implemented if supportsHierarchyAdmin() is true.
Method	getHierarchyNotificationSession	
Description	Gets the hierarchy notification session.	
Parameters	osid.hierarchy.HierarchyReceiver	receiver notification callback
	osid.authentication.Authentication	authentication proxy authentication
Return	osid.hierarchy.HierarchyNotificationSession	a HierarchyNotificationSession
Errors	NULL_ARGUMENT	authentication is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authentication is invalid
	UNIMPLEMENTED	supportsHierarchyNotification() is false
	UNSUPPORTED	the authentication service is not supported
Compliance	optional	This method must be implemented if supportsHierarchyNotification() is true.

Interface	osid.hierarchy.HierarchyTraversalSession	
Implements	osid.OsidSession	
Description	<p>This session defines methods for traversing a hierarchy. Each node in the hierarchy is a unique OSID Id. The hierarchy may be traversed recursively to establish the tree structure through <code>getParents()</code> and <code>getChildren()</code>. To relate these Ids to another OSID, <code>getAncestors()</code> and <code>getDescendants()</code> can be used for retrievals that can be used for bulk lookups in other OSIDs.</p> <p>Any Id available in an associated OSID is known to this hierarchy. A lookup up a particular Id in this hierarchy for the purposes of establishing a starting point for traversal or determining relationships should use the Id returned from the corresponding OSID object, not an Id that has been stored, to avoid problems with Id translation or aliasing.</p> <p>A user may not be authorized to traverse the entire hierarchy. Parts of the hierarchy may be made invisible through omission from the returns of <code>getParents()</code> or <code>getChildren()</code> in lieu of a <code>PERMISSION_DENIED</code> error that may disrupt the traversal through authorized pathways.</p>	
Method	getHierarchyId	
Description	Gets the hierarchy Id associated with this session.	
Return	osid.id.Id	the hierarchy Id associated with this session
Compliance	mandatory	This method must be implemented.
Method	getHierarchy	
Description	Gets the hierarchy associated with this session.	
Return	osid.hierarchy.Hierarchy	the hierarchy associated with this session
Errors	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.
Method	canAccessHierarchy	
Description	Tests if this user can perform hierarchy queries. A return of true does not guarantee successful authorization. A return of false indicates that it is known all methods in this session will result in a <code>PERMISSION_DENIED</code> . This is intended as a hint to an application that may opt not to offer lookup operations.	
Return	boolean	false if lookup methods are not authorized, true otherwise
Compliance	mandatory	This method must be implemented.
Method	getRoots	
Description	Gets the root nodes of this hierarchy.	
Return	osid.id.IdList	the root nodes
Errors	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.
Method	hasParents	
Description	Tests if this Id contains any parents.	
Parameters	osid.id.Id id	the Id to query
Return	boolean	true if this Id contains parents, false otherwise
Errors	NOT_FOUND	id is not found
	NULL_ARGUMENT	id is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.

Method	isParent		
Description	Tests if an Id is a direct parent of another.		
Parameters	osid.id.Id	id	the Id to query
	osid.id.Id	parentId	the Id of a parent
Return	boolean		true if this parentId is a parent of id, false otherwise
Errors	NOT_FOUND		id is not found
	NULL_ARGUMENT		id or parentId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Provider Notes	If parentId not found return false.		
Method	getParents		
Description	Gets the parents of the given id.		
Parameters	osid.id.Id	id	the Id to query
Return	osid.id.IdList		the parents of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	isAncestor		
Description	Tests if an Id is an ancestor of another.		
Parameters	osid.id.Id	id	the Id to query
	osid.id.Id	ancestorId	the Id of an ancestor
Return	boolean		true if this ancestorId is a parent of id, false otherwise
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id or ancestorId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Provider Notes	If ancestorId not found return false.		
Method	getAncestors		
Description	Gets the ancestors of the given id.		
Parameters	osid.id.Id	id	the Id to query
	cardinal	levels	the maximum number of levels to include. A value of 1 returns the same set as getParents().
Return	osid.id.IdList		the ancestors of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Method	hasChildren		
Description	Tests if this Id has any children.		
Parameters	osid.id.Id	id	the Id to query
Return	boolean		true if this Id has children, false otherwise
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	isChild		
Description	Tests if a node is a direct child of another.		
Parameters	osid.id.Id	id	the Id to query
	osid.id.Id	childId	the Id of a child
Return	boolean		true if this childId is a child of the Id, false otherwise
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id or childId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Provider Notes	If childId not found return false.		
Method	getChildren		
Description	Gets the children of the given Id.		
Parameters	osid.id.Id	id	the Id to query
Return	osid.id.IdList		the children of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	isDescendant		
Description	Tests if a node is a descendant of another.		
Parameters	osid.id.Id	id	the Id to query
	osid.id.Id	decendantId	the Id of a descendant
Return	boolean		true if this descendantId is a child of the Id, false otherwise
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id or descendant is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Provider Notes	If not found return false.		

Method	getDescendants		
Description	Gets the descendants of the given id.		
Parameters	osid.id.Id	id	the Id to query
	cardinal	levels	the maximum number of levels to include. A value of 1 returns the same set as <code>getChildren()</code> .
Return	osid.id.IdList		the descendants of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	traverseUpBreadthFirst		
Description	Traverses the hierarchy from the start node upward. A hierarchy with multiple parents may return multiple positions for the same Id at different levels of the hierarchy.		
Parameters	osid.id.Id	startNodeId	the Id of the start node
	cardinal	levels	the maximum number of levels to include
Return	osid.hierarchy.PositionList		the ancestors of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	traverseUpDepthFirst		
Description	Traverses the hierarchy from the start node upward. A hierarchy with multiple parents may return multiple positions for the same Id at different levels of the hierarchy.		
Parameters	osid.id.Id	startNodeId	the Id of the start node
	cardinal	levels	the maximum number of levels to include
Return	osid.hierarchy.PositionList		the ancestors of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	traverseDownBreadthFirst		
Description	Traverses the hierarchy from the start node downward. A hierarchy with multiple parents may return multiple positions for the same Id at different levels of the hierarchy.		
Parameters	osid.id.Id	startNodeId	the Id of the start node
	cardinal	levels	the maximum number of levels to include
Return	osid.hierarchy.PositionList		the descendants of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Method	traverseDownDepthFirst		
Description	Traverses the hierarchy from the start node downward. A hierarchy with multiple parents may return multiple positions for the same Id at different levels of the hierarchy.		
Parameters	osid.id.Id	startNodeId	the Id of the start node
	cardinal	levels	the maximum number of levels to include
Return	osid.hierarchy.PositionList		the descendants of the id
Errors	NOT_FOUND		id not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyDesignSession		
Implements	osid.OsidSession		
Description	This session provides methods to manage a hierarchy. Each node is expressed as an OSID Id that represents an external object. The hierarchy only expresses relationships among these Ids. However, changing the hierarchy may have implications, such as inherited data, in the associated OSID.		
Method	getHierarchyId		
Description	Gets the hierarchy Id associated with this session.		
Return	osid.id.Id	the hierarchy Id associated with this session	
Compliance	mandatory	This method must be implemented.	
Method	getHierarchy		
Description	Gets the hierarchy associated with this session.		
Return	osid.hierarchy.Hierarchy	the hierarchy associated with this session	
Errors	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	
Method	canModifyHierarchy		
Description	Tests if this user can change the hierarchy. A return of true does not guarantee successful authorization. A return of false indicates that it is known performing any update will result in a PERMISSION_DENIED. This is intended as a hint to an application that may opt not to offer these operations to an unauthorized user.		
Return	boolean	false if changing this hierarchy is not authorized, true otherwise	
Compliance	mandatory	This method must be implemented.	
Method	addRoot		
Description	Adds a root node.		
Parameters	osid.id.Id	id	the Id of the node
Errors	ALREADY_EXISTS	id is already in hierarchy	
	NOT_FOUND	id not found	
	NULL_ARGUMENT	id is null	
	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	
Method	addChild		
Description	Adds a child to a Id.		
Parameters	osid.id.Id	id	the Id of the node
	osid.id.Id	childId	the Id of the new child
Errors	NOT_FOUND	id or childId not found	
	NULL_ARGUMENT	id or childId is null	
	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	

Method	moveAhead		
Description	Reorders nodes at the same hierarchy level for sequencing by moving a node ahead of a reference node.		
Parameters	osid.id.Id	id	the Id of the node to move
	osid.id.Id	referenceId	id is ordered in front of this reference node
Errors	INVALID_ARGUMENT		id or referenceId not in a sequence
	NOT_FOUND		id or referenceId not found
	NULL_ARGUMENT		id or referenceId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	optional		This method must be implemented if HierarchyManager.supportsNodeSequencing() is true.

Method	moveBehind		
Description	Reorders nodes at the same hierarchy level for sequencing by moving a node behind a reference node.		
Parameters	osid.id.Id	id	the Id of the node to move
	osid.id.Id	referenceId	id is ordered behind this reference node
Errors	INVALID_ARGUMENT		id or referenceId not in a sequence
	NOT_FOUND		id or referenceId not found
	NULL_ARGUMENT		id or referenceId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	optional		This method must be implemented if HierarchyManager.supportsNodeSequencing() is true.

Method	removeRoot		
Description	Removes a root node.		
Parameters	osid.id.Id	id	the Id of the node
Errors	NOT_FOUND		id was not found or not in hierarchy
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Method	removeChild		
Description	Removes a child from an Id.		
Parameters	osid.id.Id	id	the Id of the node
	osid.id.Id	childId	the Id of the child to remove
Errors	NOT_FOUND		id or childId was not found
	NULL_ARGUMENT		id or childId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Method	removeChildren		
Description	Removes all children from an Id.		
Parameters	osid.id.Id	id	the Id of the node
Errors	NOT_FOUND		an node identified by the given Id was not found
	NULL_ARGUMENT		id is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyStructureNotificationSession	
Implements	osid.OsidSession	
Description	<p>This session defines methods to receive notifications on adds/changes to a hierarchical structure. This session is intended for consumers needing to synchronize their state with this service without the use of polling. Notifications are cancelled when this session is closed.</p> <p>Notifications are triggered with changes to the structure of a hierarchy. For notifications of changes to the Hierarchy object use HierarchyNotificationSession.</p>	
Method	getHierarchyId	
Description	Gets the hierarchy Id associated with this session.	
Return	osid.id.Id	the hierarchy Id associated with this session
Compliance	mandatory	This method must be implemented.
Method	getHierarchy	
Description	Gets the Hierarchy associated with this session.	
Return	osid.hierarchy.Hierarchy	the Hierarchy associated with this session
Errors	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.
Method	canRegisterForHierarchyStructureNotifications	
Description	Tests if this user can register for Hierarchy node notifications. A return of true does not guarantee successful authorization. A return of false indicates that it is known all methods in this session will result in a PERMISSION_DENIED. This is intended as a hint to an application that may opt not to offer notification operations.	
Return	boolean	false if notification methods are not authorized, true otherwise
Compliance	mandatory	This method must be implemented.
Method	registerForNewHierarchyNodes	
Description	Register for notifications of new hierarchy nodes. HierarchyStructureReceiver.newNode() is invoked when a new Hierarchy node is added.	
Errors	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.
Method	registerForChangedAncestor	
Description	Registers for notification of an updated hierarchy structure that impacts the ancestors of the specified node. HierarchyStructureReceiver.newAncestor() or HierarchyStructureReceiver.deletedAncestor() is invoked when the specified hierarchy node experiences a change in ancestry.	
Parameters	osid.id.Id nodeId	the Id of the hierarchy node to monitor
Errors	NOT_FOUND	a hierarchy node was not found identified by the given Id
	NULL_ARGUMENT	nodeId is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.

Method	registerForChangedDescendant		
Description	Registers for notification of an updated hierarchy structure that impacts the descendants of the specified node. HierarchyStructureReceiver.newDescendant() or HierarchyStructureReceiver.deletedDescendant() is invoked when the specified hierarchy node experiences a change in offspring.		
Parameters	osid.id.Id	nodeId	the Id of the hierarchy node to monitor
Errors	NOT_FOUND		a hierarchy node was not found identified by the given Id
	NULL_ARGUMENT		nodeId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	registerForDeletedHierarchyNodes		
Description	Registers for notification of deleted hierarchy nodes. HierarchyStructureReceiver.deletedNode() is invoked when a hierarchy ndoe is deleted.		
Errors	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	registerForDeletedHierarchyNode		
Description	Registers for notification of a deleted hierarchy node. HierarchyStructureReceiver.deletedNode() is invoked when the specified hierarchy node is deleted.		
Parameters	osid.id.Id	nodeId	the Id of the Hierarchy node to monitor
Errors	NOT_FOUND		a hierarchy node was not found identified by the given Id
	NULL_ARGUMENT		nodeId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyLookupSession	
Implements	osid.OsidSession	
Description	<p>This session provides methods for retrieving Hierarchy objects. The Hierarchy represents a structure of OSID Ids.</p> <p>This session defines views that offer differing behaviors when retrieving multiple objects.</p> <ul style="list-style-type: none"> • comparative view: elements may be silently omitted or re-ordered • plenary view: provides a complete set or is an error condition <p>Generally, the comparative view should be used for most applications as it permits operation even if there is data that cannot be accessed. For example, a browsing application may only need to examine the Hierarchies objects it can access, without breaking execution. However, an assessment may only be useful if all Hierarchy objects referenced by it are available, and a test-taking application may sacrifice some interoperability for the sake of precision.</p>	
Method	canLookupHierarchies	
Description	Tests if this user can perform Hierarchy lookups. A return of true does not guarantee successful authorization. A return of false indicates that it is known all methods in this session will result in a PERMISSION_DENIED. This is intended as a hint to an application that may opt not to offer lookup operations to unauthorized users.	
Return	boolean	false if lookup methods are not authorized, true otherwise
Compliance	mandatory	This method must be implemented.
Method	useComparativeHierarchyView	
Description	The returns from the lookup methods may omit or translate elements based on this session, such as authorization, and not result in an error. This view is used when greater interoperability is desired at the expense of precision.	
Compliance	mandatory	This method is must be implemented.
Method	usePlenaryHierarchyView	
Description	A complete view of the Hierarchy returns is desired. Methods will return what is requested or result in an error. This view is used when greater precision is desired at the expense of interoperability.	
Compliance	mandatory	This method is must be implemented.
Method	getHierarchy	
Description	Gets the Hierarchy specified by its Id. In plenary mode, the exact Id is found or a NOT_FOUND results. Otherwise, the returned Hierarchy may have a different Id than requested, such as the case where a duplicate Id was assigned to a Hierarchy and retained for compati	
Parameters	osid.id.Id	hierarchyId
Return	osid.hierarchy.Hierarchy	the returned Hierarchy
Errors	NOT_FOUND	no Hierarchy found with the given Id
	NULL_ARGUMENT	hierarchyId is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.

Method	getHierarchiesByIds		
Description	Gets a Hierarchy corresponding to the given IdList. In plenary mode, the returned list contains all of the hierarchies specified in the Id list, in the order of the list, including duplicates, or an error results if an Id in the supplied list is not found or inaccessible. Otherwise, inaccessible Hierarchy objects may be omitted from the list and may present the elements in any order including returning a unique set.		
Parameters	osid.id.IdList	hierarchyIdList	the list of Ids to relieve
Return	osid.hierarchy.HierarchyList		the returned Hierarchy list
Errors	NOT_FOUND		an Id was not found
	NULL_ARGUMENT		hierarchyIdList is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	getHierarchiesByGenusType		
Description	Gets a HierarchyList corresponding to the given genus Type which does not include hierarchies of types derived from the specified Type. In plenary mode, the returned list contains all known hierarchies or an error results. Otherwise, the returned list may contain only those repositories that are accessible through this session. In both cases, the order of the set is not specified.		
Parameters	osid.type.Type	hierarchyGenusType	a hierarchy genus type
Return	osid.hierarchy.HierarchyList		the returned Hierarchy list
Errors	NULL_ARGUMENT		hierarchyGenusType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	getHierarchiesByParentGenusType		
Description	Gets a HierarchyList corresponding to the given hierarchy genus Type and include any additional hierarchies with types derived from the specified Type. In plenary mode, the returned list contains all known hierarchies or an error results. Otherwise, the returned list may contain only those hierarchies that are accessible through this session. In both cases, the order of the set is not specified.		
Parameters	osid.type.Type	hierarchyGenusType	a hierarchy genus type
Return	osid.hierarchy.HierarchyList		the returned Hierarchy list
Errors	NULL_ARGUMENT		hierarchyGenusType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.
Method	getHierarchiesByRecordType		
Description	Gets a HierarchyList corresponding to the given hierarchy record Type. The set of hierarchies implementing the given record type are returned. In plenary mode, the returned list contains all known hierarchies or an error results. Otherwise, the returned list may contain only those hierarchies that are accessible through this session. In both cases, the order of the set is not specified.		
Parameters	osid.type.Type	hierarchyRecordType	a hierarchy record type
Return	osid.hierarchy.HierarchyList		the returned Hierarchy list
Errors	NULL_ARGUMENT		hierarchyRecordType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Method	getHierarchies	
Description	Gets all Repositories. In plenary mode, the returned list contains all known hierarchies or an error results. Otherwise, the returned list may contain only those hierarchies that are accessible through this session. In both cases, the order of the set is not specified.	
Return	osid.hierarchy.HierarchyList	a list of Hierarchies
Errors	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchySearchSession		
Implements	osid.OsidSession		
Description	<p>This session provides methods for searching among Hierarchy objects. The search query is constructed using the HierarchyQuery interface. Multiple HierarchyQuery interfaces may be submitted into a search to perform a boolean OR. If more than one search element is specified within a single HierarchyQuery these elements form a boolean AND.</p> <p>getHierarchiesByQuery() is the basic search method and returns a list of Hierarchy objects.A more advanced search may be performed with getHierarchiesBySearch(). It accepts a HierarchySearch interface in addition to the query interface for the purpose of specifying additional options affecting the entire search, such as ordering. getHierarchiesBySearch() returns a HierarchySearchResults interface that can be used to access the resulting HierarchyList or be used to perform a search within the result set through HierarchySearch.</p> <p>Hierarchies may have a record query interface indicated by their respective record types. The record query interface is accessed via the HierarchuQuery.</p>		
Method	canSearchHierarchies		
Description	Tests if this user can perform Hierarchy searches. A return of true does not guarantee successful authorization. A return of false indicates that it is known all methods in this session will result in a PERMISSION_DENIED. This is intended as a hint to an application that may opt not to offer search operations to unauthorized users.		
Return	boolean	false if lookup methods are not authorized, true otherwise	
Compliance	mandatory	This method must be implemented.	
Method	getHierarchyQuery		
Description	Gets a hierarchy query interface.		
Return	osid.hierarchy.HierarchyQuery	the hierarchy query	
Compliance	mandatory	This method must be implemented.	
Method	getHierarchiesByQuery		
Description	Gets a list of Hierarchy objects matching the given search interface. Each element in the array is OR'd.		
Parameters	osid.hierarchy.HierarchyQuery[]	hierarchyQueries	the search query array
Return	osid.hierarchy.HierarchyList	the returned HierarchyList	
Errors	NULL_ARGUMENT		hierarchyQueries is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
	UNSUPPORTED		hierarchyQueries is not of this service
Compliance	mandatory	This method must be implemented.	
Method	getHierarchySearch		
Description	Gets a hierarchy search interface.		
Return	osid.hierarchy.HierarchySearch	the hierarchy search interface	
Compliance	mandatory	This method must be implemented.	
Method	getHierarchySearchOrder		
Description	Gets a hierarchy search order interface. The HierarchySearchOrder is supplied to a HierarchySearch to specify the ordering of results.		
Return	osid.hierarchy.HierarchySearchOrder	the hierarchy search order interface	
Compliance	mandatory	This method must be implemented.	

Method	getHierarchiesBySearch		
Description	Gets the search results matching the given search query using the given search. Each element in the query array is OR'd.		
Parameters	osid.hierarchy.HierarchyQuery[]	hierarchyQueries	the search query array
	osid.hierarchy.HierarchySearch	hierarchySearch	the search interface
Return	osid.hierarchy.HierarchySearchResults		the search results
Errors	NULL_ARGUMENT		hierarchyQueries or hierarchySearch is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
	UNSUPPORTED		a query or hierarchySearch is not of this service
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyAdminSession	
Implements	osid.OsidSession	
Description	This session creates and removes hierarchies. The data for create and update is provided by the consumer via the form object.	
Method	canCreateHierarchies	
Description	Tests if this user can create Hierarchy objects. A return of true does not guarantee successful authorization. A return of false indicates that it is known creating a Hierarchy will result in a PERMISSION_DENIED. This is intended as a hint to an application that may not wish to offer create operations to unauthorized users.	
Return	boolean	false if Hierarchy creation is not authorized, true otherwise
Compliance	mandatory	This method must be implemented.
Method	canCreateHierarchyWithRecordTypes	
Description	Tests if this user can create a single Hierarchy using the desired record types. While HierarchyManager.getHierarchyRecordTypes() can be used to examine which record interfaces are supported, this method tests which record(s) are required for creating a specific Hierarchy. Providing an empty array tests if a Hierarchy can be created with no records.	
Parameters	osid.type.Type[] hierarchyRecordTypes	array of types
Return	boolean	true if Hierarchy creation using the specified Types is supported, false otherwise
Errors	NULL_ARGUMENT	hierarchyRecordTypes is null
Compliance	mandatory	This method must be implemented.
Method	getHierarchyFormForCreate	
Description	Gets the hierarchy form for creating new hierarchies. A new form should be requested for each create transaction. This method is used for creating new hierarchies, where only the Hierarchy Type is known.	
Return	osid.hierarchy.HierarchyForm	the hierarchy form
Compliance	mandatory	This method must be implemented.
Method	createHierarchy	
Description	Creates a new Hierarchy.	
Parameters	osid.hierarchy.HierarchyForm hierarchyForm	the form for this Hierarchy
Return	osid.hierarchy.Hierarchy	the new Hierarchy
Errors	ALREADY_EXISTS	attempt at duplicating a property the underlying system is enforcing to be unique
	INVALID_ARGUMENT	one or more of the form elements is invalid
	NULL_ARGUMENT	hierarchyForm is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure
Compliance	UNSUPPORTED	a hierarchyForm is not of this service
	mandatory	This method must be implemented.
Method	canUpdateHierarchies	
Description	Tests if this user can update Hierarchy objects. A return of true does not guarantee successful authorization. A return of false indicates that it is known updating a Hierarchy will result in a PERMISSION_DENIED. This is intended as a hint to an application that may not wish to offer update operations to unauthorized users.	
Return	boolean	false if Hierarchy modification is not authorized, true otherwise
Compliance	mandatory	This method must be implemented.

Method	canUpdateHierarchy		
Description	Tests if this user can update a specified Hierarchy. A return of true does not guarantee successful authorization. A return of false indicates that it is known updating the Hierarchy will result in a PERMISSION_DENIED. This is intended as a hint to an application that may not wish to offer update operations to unauthorized users.		
Parameters	osid.id.Id	hierarchyId	the Id of the Hierarchy
Return	boolean		false if hierarchy modification is not authorized, true otherwise
Errors	NULL_ARGUMENT		hierarchyId is null
Compliance	mandatory		This method must be implemented.
Provider Notes	If the hierarchyId is not found, then it is acceptable to return false to indicate the lack of an update available.		
Method	getHierarchyFormForUpdate		
Description	Gets the hierarchy form for updating an existing hierarchy. A new hierarchy form should be requested for each update transaction.		
Parameters	osid.id.Id	hierarchyId	the Id of the Hierarchy
Return	osid.hierarchy.HierarchyForm		the hierarchy form
Errors	NOT_FOUND		hierarchyId is not found
	NULL_ARGUMENT		hierarchyId is null
	OPERATION_FAILED		unable to complete request
Compliance	mandatory		This method must be implemented.
Method	updateHierarchy		
Description	Updates an existing hierarchy.		
Parameters	osid.id.Id	hierarchyId	the Id of the Hierarchy
	osid.hierarchy.HierarchyForm	hierarchyForm	the form containing the elements to be updated
Errors	INVALID_ARGUMENT		the form contains an invalid value
	NOT_FOUND		hierarchyId is not found
	NULL_ARGUMENT		hierarchyId or hierarchyForm is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	UNSUPPORTED		hierarchyForm is not supported
	mandatory		This method must be implemented.
Method	canDeleteHierarchies		
Description	Tests if this user can delete Hierarchy objects. A return of true does not guarantee successful authorization. A return of false indicates that it is known deleting a Hierarchy will result in a PERMISSION_DENIED. This is intended as a hint to an application that may not wish to offer delete operations to unauthorized users.		
Return	boolean		false if Hierarchy deletion is not authorized, true otherwise
Compliance	mandatory		This method must be implemented.
Method	canDeleteHierarchy		
Description	Tests if this user can delete a specified Hierarchy. A return of true does not guarantee successful authorization. A return of false indicates that it is known deleting the Hierarchy will result in a PERMISSION_DENIED. This is intended as a hint to an application that may not wish to offer delete operations to unauthorized users.		
Parameters	osid.id.Id	hierarchyId	the Id of the Hierarchy
Return	boolean		false if deletion of this Hierarchy is not authorized, true otherwise
Errors	NULL_ARGUMENT		hierarchyId is null
Compliance	mandatory		This method must be implemented.
Provider Notes	If the hierarchyId is not found, then it is acceptable to return false to indicate the lack of an delete available.		

Method	deleteHierarchy		
Description	Deletes a Hierarchy.		
Parameters	osid.id.Id	hierarchyId	the Id of the Hierarchy to remove
Errors	NOT_FOUND		hierarchyId not found
	NULL_ARGUMENT		hierarchyId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Method	addIdToHierarchy		
Description	Adds an Id to a Hierarchy for the purpose of creating compatibility. The primary Id of the Hierarchy is determined by the provider. The new Id performs as an alias to the primary Id.		
Parameters	osid.id.Id	hierarchyId	the Id of an Hierarchy
	osid.id.Id	aliasId	the alias Id
Errors	ALREADY_EXISTS		aliasId is already assigned
	NOT_FOUND		hierarchyId not found
	NULL_ARGUMENT		hierarchyId or aliasId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyNotificationSession		
Implements	osid.OsidSession		
Description	This session defines methods to receive notifications on adds/changes to Hierarchy objects. This session is intended for consumers needing to synchronize their state with this service without the use of polling. Notifications are cancelled when this session is closed.		
	Notifications are triggered with changes to the Hierarchy object itself. Adding and removing Ids result in notifications available from the HierarchyNodeNotificationSession.		
Method	canRegisterForHierarchyNotifications		
Description	Tests if this user can register for Hierarchy notifications. A return of true does not guarantee successful authorization. A return of false indicates that it is known all methods in this session will result in a PERMISSION_DENIED. This is intended as a hint to an application that may opt not to offer notification operations.		
Return	boolean	false if notification methods are not authorized, true otherwise	
Compliance	mandatory	This method must be implemented.	
Method	registerForNewHierarchies		
Description	Register for notifications of new hierarchies. HierarchyReceiver.newHierarchy() is invoked when a new Hierarchy is created.		
Errors	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	
Method	registerForChangedHierarchies		
Description	Registers for notification of updated hierarchies. HierarchyReceiver.changedHierarchy() is invoked when a hierarchy is changed.		
Errors	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	
Method	registerForChangedHierarchy		
Description	Registers for notification of an updated hierarchy. HierarchyReceiver.changedHierarchy() is invoked when the specified hierarchy is changed.		
Parameters	osid.id.Id	hierarchyId	the Id of the hierarchy to monitor
Errors	NOT_FOUND	a hierarchy was not found identified by the given Id	
	NULL_ARGUMENT	hierarchyId is null	
	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	
Method	registerForDeletedHierarchies		
Description	Registers for notification of deleted hierarchies. HierarchyReceiver.deletedHierarchy() is invoked when a hierarchy is deleted.		
Errors	OPERATION_FAILED	unable to complete request	
	PERMISSION_DENIED	authorization failure	
Compliance	mandatory	This method must be implemented.	

Method	registerForDeletedHierarchy		
Description	Registers for notification of a deleted hierarchy. HierarchyReceiver.deletedHierarchy() is invoked when the specified hierarchy is deleted.		
Parameters	osid.id.Id	hierarchyId	the Id of the Hierarchy to monitor
Errors	NOT_FOUND		a hierarchy was not found identified by the given Id
	NULL_ARGUMENT		hierarchyId is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure
Compliance	mandatory		This method must be implemented.

Interface	osid.repository.HierarchyStructureReceiver		
Implements	osid.OsidReceiver		
Description	The hierarchy receiver is the consumer supplied interface for receiving notifications pertaining to new, updated or deleted hierarchy nodes.		
Method	newNode		
Description	The callback for notifications of new hierarchy nodes.		
Parameters	osid.id.Id	nodeId	the Id of the new node
Compliance	mandatory		This method must be implemented.
Method	newAncestor		
Description	The callback for notification of a change to the node's ancestry.		
Parameters	osid.id.Id	nodeId	the Id of the registered node
	osid.id.Id	ancestorId	the Id of the new ancestor
Compliance	mandatory		This method must be implemented.
Method	deletedAncestor		
Description	The callback for notification of a change to the node's ancestry.		
Parameters	osid.id.Id	nodeId	the Id of the registered node
	osid.id.Id	ancestorId	the Id of the deleted ancestor
Compliance	mandatory		This method must be implemented.
Method	newDescendant		
Description	The callback for notification of a change to the node's descendants.		
Parameters	osid.id.Id	nodeId	the Id of the registered node
	osid.id.Id	ancestorId	the Id of the new descendant
Compliance	mandatory		This method must be implemented.
Method	deletedDescendant		
Description	The callback for notification of a change to the node's descendants.		
Parameters	osid.id.Id	nodeId	the Id of the registered node
	osid.id.Id	ancestorId	the Id of the deleted descendant
Compliance	mandatory		This method must be implemented.
Method	deletedNode		
Description	the callback for notification of deleted hierarchy nodes.		
Parameters	osid.id.Id	nodeId	the Id of the deleted node
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.Hierarchy	
Implements	osid.OsidCatalog	
Description	A Hierarchy represents an authenticatable identity. Like all OSID objects, a Hierarchy is identified by its Id and any persisted references should use the Id.	
	getHierarchyRecord	
Description	Gets the record corresponding to the given Hierarchy record Type. This method must be used to retrieve an object implementing the requested record interface along with all of its ancestor interfaces. The hierarchyRecordType may be the Type returned in getRecordTypes() or any of its parents in a Type hierarchy where hasRecordType(hierarchyRecordType) is true.	
Parameters	osid.type.Type	hierarchyRecordType the type of the record to retrieve
Return	osid.hierarchy.HierarchyRecord	the agent with the specified record
Errors	NULL_ARGUMENT	hierarchyRecordType is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure occurred
	UNSUPPORTED	hasRecordType(hierarchyRecordType) is false
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchyRecord	
Implements	osid.OsidRecord	
Description	A record for a Hierarchy. The methods specified by the record type are available through the underlying object.	
	getHierarchy	
Description	Gets the Hierarchy from which this record originated.	
Return	osid.hierarchy.Hierarchy	the hierarchy
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchyQuery		
Implements	osid.OsidCatalogQuery		
Description	This is the query interface for searching hierarchies. Results are returned if all the specified elements match. Each method match request produces an AND term while multiple invocations of a method produces a nested OR, except for accessing the HierarchyQuery record.		
Method	matchId		
Description	Matches an Id of a node in this hierarchy. Multiple nodes can be added to this query which behave as a boolean AND.		
Parameters	osid.id.Id	id	Id to match
	boolean	match	true if a positive match, false for negative match
Errors	NULL_ARGUMENT		id is null
Compliance	mandatory		This method must be implemented.
Method	getHierarchyQueryRecord		
Description	Gets the record query interface corresponding to the given Hierarchy record Type. Multiple record retrievals of the same type may return the same underlying object and do not result in adding terms to the query. Multiple record retrievals of different types add AND terms to the other elements set in this form.		
Parameters	osid.type.Type	hierarchyRecordType	a hierarchy record type
Return	osid.hierarchy.HierarchyQueryRecord		the hierarchy query record
Errors	NULL_ARGUMENT		hierarchyRecordType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure occurred
	UNSUPPORTED		hasRecordType(hierarchyRecordType) is false
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyQueryRecord	
Implements	osid.OsidRecord	
Description	A record for a HierarchyQuery. The methods specified by the record type are available through the underlying object.	
	getHierarchyQuery	
Description	Gets the HierarchyQuery from which this record originated.	
Return	osid.hierarchy.HierarchyQuery	the hierarchy query
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchyForm		
Implements	osid.OsidCatalogForm		
Description	This is the form for creating and updating Hierarchy objects. Like all OsidForm objects, various data elements may be set here for use in the create and update methods in the HierarchyAdminSession. For each data element that may be set, metadata may be examined to provide display hints or data constraints.		
Method	getHierarchyFormRecord		
Description	Gets the HierarchyFormRecord interface corresponding to the given hierarchy record interface Type.		
Parameters	osid.type.Type	hierarchyRecordType	the hierarchy record type
Return	osid.hierarchy.HierarchyFormRecord		the record
Errors	NULL_ARGUMENT		hierarchyRecordType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure occurred
	UNSUPPORTED		hasRecordType(hierarchyRecordType) is false
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyFormRecord	
Implements	osid.OsidRecord	
Description	A record for a HierarchyForm. The methods specified by the record type are available through the underlying object.	
	getHierarchyForm	
Description	Gets the HierarchyForm from which this record originated.	
Return	osid.hierarchy.HierarchyForm	the hierarchy form
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchySearchOrder	
Implements	osid.OsidCatalogSearchOrder	
Description	An interface for specifying the ordering of search results.	
Method	getHierarchySearchOrderRecord	
Description	Gets the hierarchy search record interface corresponding to the given repository record Type. Multiple retrievals return the same underlying object.	
Parameters	osid.type.Type	hierarchyRecordType a hierarchy record type
Return	osid.hierarchy.HierarchySearchOrderRecord	the hierarchy search order record interface
Errors	NULL_ARGUMENT	hierarchyRecordType is null
	OPERATION_FAILED	unable to complete request
	PERMISSION_DENIED	authorization failure occurred
	UNSUPPORTED	hasRecordType(hierarchyRecordType) is false
Compliance	mandatory	This method must be implemented.

<i>Interface</i>	osid.hierarchy.HierarchySearchOrderRecord	
Implements	osid.OsidRecord	
Description	A record for a HierarchySearchOrder. The methods specified by the record type are available through the underlying object.	
	getHierarchySearchOrder	
Description	Gets the HierarchySearchOrder from which this record originated.	
Return	osid.hierarchy.HierarchySearchOrder	the hierarchy search order
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchySearch		
Implements	osid.OsidSearch		
Description	HierarchySearch defines the interface for specifying hierarchy search options.		
Method	searchWithinHierarchyResults		
Description	Execute this search using a previous search result.		
Parameters	osid.hierarchy.HierarchySearchResults	results	results from a query
Errors	INVALID_ARGUMENT	results is not valid	
	NULL_ARGUMENT	results is null	
Compliance	mandatory		This method must be implemented.
Method	searchAmongHierarchies		
Description	Execute this search using a given list of hierarchies.		
Parameters	osid.id.IdList	hierarchyIds	list of hierarchies
Errors	NULL_ARGUMENT		hierarchyIds is null
Compliance	mandatory		This method must be implemented.
Method	orderHierarchyResults		
Description	Specify an ordering to the search results.		
Parameters	osid.hierarchy.HierarchySearchOrder	hierarchySearchOrder	hierarchy search order
Errors	NULL_ARGUMENT	hierarchySearchOrder is null	
	UNSUPPORTED	hierarchySearchOrder is not of this service	
Compliance	mandatory		This method must be implemented.
Method	getHierarchySearchRecord		
Description	Gets the record corresponding to the given hierarchy search record Type. This method must be used to retrieve an object implementing the requested record interface along with all of its ancestor interfaces.		
Parameters	osid.type.Type	hierarchySearchRecordType	a hierarchy search record type
Return	osid.hierarchy.HierarchySearchRecord		the hierarchy search interface
Errors	NULL_ARGUMENT		hierarchySearchRecordType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure occurred
	UNSUPPORTED		hasSearchRecordType(hierarchyRecordType) is false
Compliance	mandatory		This method must be implemented.

<i>Interface</i>	osid.hierarchy.HierarchySearchRecord	
Implements	osid.OsidSearchRecord	
Description	A record for a HierarchySearch. The methods specified by the record type are available through the underlying object.	
	getHierarchySearch	
Description	Gets the HierarchySearch from which this record originated.	
Return	osid.hierarchy.HierarchySearch	the hierarchy search
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchySearchResults		
Implements	osid.OsidSearchResults		
Description	This interface provides a means to capture results of a search and is used as a vehicle to perform a search within a previous result set.		
Method	getHierarchies		
Description	Gets the hierarchy list resulting from the search.		
Return	osid.hierarchy.HierarchyList	the hierarchy list	
Compliance	mandatory	This method must be implemented.	
Method	getHierarchySearchResultsRecord		
Description	Gets the record corresponding to the given hierarchy search record Type. This method must be used to retrieve an object implementing the requested record interface along with all of its ancestor interfaces.		
Parameters	osid.type.Type	hierarchySearchRecordType	a hierarchy search record type
Return	osid.hierarchy.HierarchySearchResultsRecord		the hierarchy search interface
Errors	NULL_ARGUMENT		hierarchySearchRecordType is null
	OPERATION_FAILED		unable to complete request
	PERMISSION_DENIED		authorization failure occurred
	UNSUPPORTED		hasSearchRecordType(hierarchySearchRecordType) is false
Compliance	mandatory		This method must be implemented.

<i>Interface</i>	osid.hierarchy.HierarchySearchResultsRecord	
Implements	osid.OsidSearchRecord	
Description	A record for a HierarchySearchResults. The methods specified by the record type are available through the underlying object.	
	getHierarchySearchResults	
Description	Gets the HierarchySearchResults from which this record originated.	
Return	osid.hierarchy.HierarchySearchResults	the hierarchy search results
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.HierarchyReceiver		
Implements	osid.OsidReceiver		
Description	The hierarchy receiver is the consumer supplied interface for receiving notifications pertaining to new, updated or deleted Hierarchy objects.		
Method	newHierarchy		
Description	The callback for notifications of new hierarchies.		
Parameters	osid.id.Id	hierarchyId	the Id of the new Hierarchy
Compliance	mandatory		This method must be implemented.
Method	changedHierarchy		
Description	The callback for notification of updated hierarchies.		
Parameters	osid.id.Id	hierarchyId	the Id of the updated Hierarchy
Compliance	mandatory		This method must be implemented.
Method	deletedHierarchy		
Description	the callback for notification of deleted hierarchies.		
Parameters	osid.id.Id	hierarchyId	the Id of the deleted Hierarchy
Compliance	mandatory		This method must be implemented.

Interface	osid.hierarchy.HierarchyList	
Implements	osid.OsidList	
Description	<p>Like all OsidLists, HierarchyList provides a means for accessing Id elements sequentially either one at a time or many at a time. Examples:</p> <pre>while (hl.hasNext()) { Hierarchy hierarchy = hl.getNextHierarchy(); }</pre> <p>or</p> <pre>while (hl.hasNext()) { Hierarchy[] hierarchies = gl.getNextHierarchies(hl.available()); }</pre>	
Method	getNextHierarchy	
Description	Gets the next Hierarchy in this list.	
Return	osid.hierarchy.Hierarchy	the next Hierarchy in this list. The hasNext() method should be used to test that a next Hierarchy is available before calling this method.
Errors	ILLEGAL_STATE	no more elements available in this list
	OPERATION_FAILED	unable to complete request
Compliance	mandatory	This method must be implemented.
Method	getNextHierarchies	
Description	Gets the next set of Hierarchy objects in this list. The specified amount must be less than or equal to the return from available().	
Parameters	cardinal	n the number of Hierarchy elements requested which must be less than or equal to available()
Return	osid.hierarchy.Hierarchy[]	an array of Hierarchy elements. The length of the array is less than or equal to the number specified.
Errors	ILLEGAL_STATE	no more elements available in this list
	OPERATION_FAILED	unable to complete request
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.Position	
Implements		
Description	This interface is a container for the node Id and level for use with the hierarchy traversal methods.	
Method	getNodeId	
Description	Gets the node Id.	
Return	osid.id.Id	the Id of this node
Compliance	mandatory	This method must be implemented.
Method	getLevel	
Description	Gets the level of this node in relation to the starting node as specified in the traversal method. Descendants are assigned increasingly positive levels. Ancestors are assigned increasingly negative levels.	
Return	integer	the node level
Compliance	mandatory	This method must be implemented.
Method	hasParents	
Description	Tests if this node has any parents.	
Return	boolean	true if this Id has parents, false otherwise
Compliance	mandatory	This method must be implemented.
Method	getParents	
Description	Gets the parents of this node.	
Return	osid.id.IdList	the parents of the id
Compliance	mandatory	This method must be implemented.
Method	hasChildren	
Description	Tests if this node has any children.	
Return	boolean	true if this Id has children, false otherwise
Compliance	mandatory	This method must be implemented.
Method	getChildren	
Description	Gets the children of the given Id.	
Return	osid.id.IdList	the children of the id
Compliance	mandatory	This method must be implemented.

Interface	osid.hierarchy.PositionList		
Implements	osid.OsidList		
Description	Like all OsidLists, PositionList provides a means for accessing Id elements sequentially either one at a time or many at a time. Examples:		
	<pre>while (pl.hasNext()) { Position position = pl.getNextPosition(); }</pre>		
	or		
	<pre>while (pl.hasNext()) { Position[] positions = pl.getNextPositions(pl.available()); }</pre>		
Method	getNextPosition		
Description	Gets the next Position in this list.		
Return	osid.hierarchy.Position	the next Position in this list. The hasNext() method should be used to test that a next Position is available before calling this method.	
Errors	ILLEGAL_STATE	no more elements available in this list	
	OPERATION_FAILED	unable to complete request	
Compliance	mandatory	This method must be implemented.	
Method	getNextPositions		
Description	Gets the next set of Position objects in this list. The specified amount must be less than or equal to the return from available().		
Parameters	cardinal	n	the number of Position elements requested which must be less than or equal to available()
Return	osid.hierarchy.Position[]		an array of Position elements. The length of the array is less than or equal to the number specified.
Errors	ILLEGAL_STATE	no more elements available in this list	
	OPERATION_FAILED	unable to complete request	
Compliance	mandatory	This method must be implemented.	