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1 Introduction

1.1 Learning Information Service Profiles Overview

The Learning Information Services (LIS) specification is the definition of how systems manage the exchange of information that describes people, groups, memberships, courses and outcomes within the context of learning. The Learning Information Services specification is constructed following the recommendations documented in the IMS GLC Abstract Framework (IAF) [IAF, 03a], [IAF, 03b], [IAF, 03c]. This means that this specification is based upon the concepts of:

- **Interoperability** – Learning Information Services focuses on the exchange of information between Learning Information Services systems. There are no assumptions in the specification on how the data is managed within the Learning Information Services systems;
- **Service-oriented** – Learning Information Services defines the exchange of information in terms of the services being supplied by the collaboration of the systems;
- **Component-based** – the Learning Information Services are composed of the Person Management Service (PMS), Group Management Service (GMS), Membership Management Services (MMS), Course Management Service (CMS), Outcomes Management Service (OMS) and the Bulk Data Exchange Management Service (BDEMS);
- **Behaviors and Data Models** – the Learning Information Services are defined in terms of their behaviors and data models. The behaviors cause changes in the state of the data model and the state of the data model will only be altered as a result of a clearly defined behavior;
- **Multiple Bindings** – the Learning Information Services information model is to be defined using the Unified Modeling Language (UML). This enables reliable mapping of the information model into a range of different bindings. The binding of immediate importance is to the Web Services Description Language (WSDL);
- **Adoption** – whenever appropriate, the Learning Information Services specification makes use of other IMS GLC and non-IMS GLC standards and specifications.

The Profiles identify the minimal subset of the functionality of the IMS GLC LIS specification that must be supported by systems developed for deployment between a Student Information Systems and Learning Management Systems. These Profiles (there is a Core plus several Additions) define the set of operations and data models that must be supported by the systems supporting the set of services within the LIS. A system can support greater functionality but there is no guarantee of interoperability for those extra features. Interoperability is only guaranteed for the functionality described in the Profiles.

1.2 Scope and Context

This document is the IMS GLC Learning Information Services Profiles v1.0 document. It contains the minimum service and data functionality statements that must be supported by systems that are used to support the exchange of learning information between a Student Information System (SIS) and a Learning Management System (LMS). These statements define a subset of the service and data functionality in each of the services that comprise the LIS.

Other Profiles can be defined for LIS. There is no guarantee of interoperability between the Core and other profiles.

1.3 Structure of this Document

The structure of this document is:

- | | |
|--|---|
| 2. PROFILING THE LEARNING INFORMATION SERVICES | An overview of the Profiles defined for LIS; |
| 3. INFORMATION MODEL OF THE CORE PROFILE | Identifies the subset of the full Learning Information Services i.e., the services, their operations and the associated data models, that form the requirement of the core profile; |
| 4. INFORMATION MODELS OF THE | Identifies the subset of the full Learning Information Services i.e., the |

PROFILE ADDITIONS	services, their operations and the associated data models, that form the requirement of the three addition profiles. The three addition profiles are final grade, combined sections and full course hierarchy;
5. WSDL BINDINGS OF THE CORE PROFILES	Describes the mapping of the information model descriptions to the WSDL bindings;
6. BEST PRACTICES & IMPLEMENTATION GUIDANCE	Best practice recommendations for the use of the core and the addition profiles. This includes coverage of the use-cases addressed by the Core Profiles;
7. CONFORMANCE & COMPLIANCE TO THE PROFILES	A discussion of conformance and compliance to the individual Profiles and the various combinations of Core/Addition Profiles;
APPENDIX A SUMMARY OF THE SERVICES FOR THE PROFILES	A summary of the services and operations supported for each of the Profiles;
APPENDIX B THE PROFILES BINDING FILES	The set of WSDL and XSD binding files that should be used for the binding of the Profiles.

1.4 Nomenclature

a-API	Abstract Application Programming Interface
API	Application Programming Interface
BDEMS	Bulk Data Exchange Management Service
CMS	Course Management Service
GMS	Group Management Service
IAF	IMS GLC Abstract Framework
IMS GLC	IMS Global Learning Consortium, Inc.
LIS	Learning Information Services
LMS	Learning Management System
MMS	Membership Management Service
OMS	Outcomes Management Service
PIM	Platform Independent Model
PMS	Person Management Service
PSM	Platform Specific Model
RFC	Request For Comment
SDN	Specification Development Note
SIS	Student Information System
UML	Unified Modeling Language
URL	Uniform Resource Locator
WSDL	Web Services Description Language
XSD	XML Schema Definition

1.5 References

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2 Profiling the Learning Information Services

This is the Profiles of the IMS GLC LIS specification. The aim of the Profiles is to define the simplest subset of the full LIS specification that is required to support the exchange of information between a Student Information System and a Learning Management System.

The Profiles consists of the Core Profile and a set of Addition Profiles. All systems claiming compliance to the Profiles must conform to the Core Profile and may support none, some or all of the Addition Profiles. The Profiles are defined with respect to a 'Sync Agent' and 'Ref Agent'. Both the 'Sync Agent' and 'Ref Agent' will act as service provider and service consumer depending on the specific operation being supported (a 'Ref Agent' is the system of reference i.e., the source of the data to be exchanged and the 'Sync Agent' is the receiving system i.e., the system that is to be synchronized with the 'Ref Agent').

The Profiles have been produced by:

- a) Selecting which service(s) need to be supported;
- b) Selecting the minimal set of operations that must be supported for each service;
- c) Identifying the status codes that will be supported for each operation;
- d) Listing the data models so that a check-list reflecting the objects supported can be identified for an implementation;
- e) Defining the vocabularies that support the data models (these are reduced forms of the default vocabularies defined in the specification).

The content of this document is a result of the application of the above process to the full LIS specification.

2.1 The Core Profile

The LIS Core Profile is a subset of the IMS LIS 2.0 API. Conformance with this profile is designed to meet typical use cases where an Administrative System is interfaced with a Teaching and Learning Environment. In this profile the Administrative system is intended to act as an authoritative repository of user, course, group, section and membership information. The Administrative system is a consumer of outcomes information for purposes of maintaining final grades and other outcomes information. The LIS Core Profile supports both a near real time and event driven and batch / bulk data integrations. We anticipate that the administrative system will be the Ref agent and the teaching and learning system will be a Sync Agent. This profile is designed to support the following key integration cases between these systems:

- Provisioning and updating the teaching and learning environment through Bulk operations;
- Supporting near real time enrolment and, section and course provisioning;
- Allowing the posting of final grades to the administrative system using workflows with the teaching and learning environment or the administrative system;
- Supporting the data structures necessary to allow management of cross-listing and coordinated course sections.

2.2 The Addition Profiles

Currently there are three Addition Profiles, namely:

- Final Grades Addition Profile – to provide the capability to exchange detailed information about student grades. This is a profile of the Outcomes Management Service;
- Combined Sections Addition profile – to provide the capability to exchange detailed information about Course Sections and related Course Sections using Section Associations. This is a profile of the Course Management Service;
- Full Course Hierarchy Addition Profile – to provide the capability to exchange detailed information about courses. This is a profile of the Course Management Service.

An implementation may or may not support any of these Addition Profiles. A consequence of optional combinations of the Addition Profiles makes interoperability more complicated; full interoperability requires the systems to support the same range of Addition Profiles.

3 Information Model of the Core Profile

3.1 The Set of Services

The Core Profile¹ consists of:

- Person Management Service – with significantly reduced number of operations and unchanged data model;
- Group Management Service – with significantly reduced number of operations and unchanged data model;
- Membership Management Service – significantly reduced number of operations and unchanged data model;
- Course Management Service – with significantly reduced number of operations and with a significantly changed data model;
- Bulk Data Exchange Management Service – with unchanged service and data models².

The set of operations supported within each service are defined from the perspectives of the Sync Agent and Ref Agent. If either the Sync/Ref Agents ‘Calls’ the service then it is acting as a service consumer for that operation. If the Sync/Ref Agents ‘Implements’ the service then it is acting as a service provider for that operation.

3.2 The Person Management Service Statement

3.2.1 The Service Statement

The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the PMS are summarized in Table 3.1.

Table 3.1 PMS core profile operations conformance statement.

Operation	Sync Agent	Ref Agent
createPerson		
createByProxyPerson		
deletePerson	Implements	Calls
readPerson ³		
readPersonCore		
readAllPersonIds		
readPersonIdsFromSavePoint		
readPersons		
readPersonsFromSavePoint		
updatePerson		
replacePerson ⁴	Implements	Calls
discoverPersonIds		
changePersonIdentifier		

¹ The Outcomes Management Service is NOT supported as part of the Core Profile;

² Every implementation of the Profiles is expected to support the full BDEMS. The service status codes will reflect which parts of the data models are realized by the set of supported services.

³ This operation must be available to support the conformance testing. It can then be disabled for a released product.

⁴ The ‘replacePerson’ operation acts as a ‘createPerson’ in the case that the supplied ‘sourcedId’ is unknown at the Sync Agent.

In Table 3.1 (and all of the following similar tables) the implementation terms are used to mean:

- ‘Implements’ – the corresponding agent **must** implement the operation i.e., process service requests and not respond with the ‘unsupported’ status code;
- ‘Calls’ – the corresponding agent **may** make a service request using this operation. A system is not required to make use of this operation. Any such service call must be implemented correctly.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 3.2. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 3.2 Permitted status codes for the PMS core profile operations.

CodeMinor Status Code	deletePerson	replacePerson
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘overflowfail’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	Y
‘deletefailure’	Y	
‘unknownvocabulary’		Y
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘unauthorizedrequest’	Y	Y
‘linkfailure’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

3.2.2 The Data Model Statement

The profiled data model is given in Table 3.3. The nomenclature used in Table 3.3 (and in the later similar tables) is:

- The Class/Attribute column – the name of the Class and corresponding Attributes (as per the UML descriptions). The class name always starts with an uppercase character and each attribute starts with a lowercase character;
- The Baseline Constraints columns are composed of:-
 - Min – the minimum multiplicity (this is not applicable for the Class) as defined in the original Information Model
 - Max – the maximum multiplicity (this is not applicable for the Class) as defined in the original Information Model
 - SPMMax – the smallest permitted maximum that an implementation MUST support as defined in the original Information Model. An implementation may exceed his maximum but interoperability is not guaranteed for those exceeding the value of the SPMMax;
 - Type – the data type of the attribute (this is not applicable for the Class) as defined in the original Information Model. This type will either be a primitive data type or a Class described elsewhere in the tabular description. This description may also be accompanied by a note that adds further information e.g., to identify the associated vocabulary;
- The Profile Notes column – defines the changes that are imposed by the Profile.

Table 3.3 PMS data model profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
PersonRecordSet	–	–	–	–	
personRecord	0	*	100,000	PersonRecord	
PersonRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
person	1	1	1	Person	
Person	–	–	–	–	
formname	0	*	?	FormName	
name	1	*	?	Name	SPMax = 1.
Address	0	*	?	Address	
contactinfo	0	*	?	ContactInfo	
demographics	0	*	?	Demographics	
agent	0	*	?	Agent	
roles	0	*	?	EnterpriseRoles	
extension	0	1	1	IMSExtension	
PersonCore	–	–	–	–	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
sourcedId	1	1	1	GUID	
formname	1	1	1	FormName	
userId	1	1	1	UserId	
FormName	–	–	–	–	
formnameType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{As base type}	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary'. [1]	
formattedName	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
Name	–	–	–	–	
nameType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{As base type}	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [2]	Require: 'Full'
partName	1	*	5	BaseValueSingle	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{As base type}	
instanceVocabulary	1	1	1	AnyURI	
instanceName	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [3]	Require: 'First' and 'Last'. If ordinal then only the first value is returned.
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-127]	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
Address	–	–	–	–	
addressType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [4]	
addressPart	1	*	5	BaseValueSingle	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceName	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Entry in 'instanceVocabulary' [5]	
instanceValue	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-127]	
ContactInfo	–	–	–	–	
contactInfoType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [6]	
contactInfoValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-127]	
Demographics	–	–	–	–	
demographicsType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [7]	
Representation	0	*	1	Representation	
eventDate	0	*	1	BaseValueSingle	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceName	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [8]	
instanceValue	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Date in the form ISO8601: YYYY-MM-DD.	
Gender	0	1	1	Int Vocabulary. Default='unknown'. [9]	
demographicsInfo	0	*	5	BaseValueSingle	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceName	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [10]	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
Representation	–	–	–	–	
representationType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [11]	
date	1	1	1	Date in the form ISO8601: YYYY-MM-DD.	
Description	1	1	1	Description	
Agent	–	–	–	–	
agentType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [12]	
agentId	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-127]	
agentDomain	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
description	0	1	1	Description	
EnterpriseRoles	–	–	–	–	
enterpriserolesType	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [13]	
systemRole	0	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
textString	1	1	1	String [1-255]	
institutionRole	0	*	2	InstitutionRole	
userId	0	1	1	UserId	
InstitutionRole	–	–	–	–	
institutionroletype	1	1	1	BaseValueToken	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary' [15]	
primaryroletype	1	1	1	Boolean: {True=primary role; False=not primary role}	
UserId	–	–	–	–	
useridValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
userIdType	0	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-127]	
password	0	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
pwEncryptionType	0	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
authenticationType	0	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-255]	
BaseValueToken	–	–	–	–	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceValue	1	1	1	Text	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary'.	
BaseValueSingle	–	–	–	–	
instanceIdentifier	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	{ As base type }	
instanceVocabulary	1	1	1	AnyURI	
instanceName	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	Entry in 'instanceVocabulary'	
instanceValue	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-127]	
Description	–	–	–	–	
shortDescription	1	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-127]	
longDescription	0	1	1	Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-2095]	
fullDescription	0	1	1	FullDescription	
FulDescription	–	–	–	–	
mediamode	1	1	1	Int Vocab. [16]	
contentRefType	1	1	1	Int Vocab. [17]	
contentType	1	1	1	Normalized String: [1-63]	
descriptionText				Text	
language	1	1	1	Ext Vocab: Default='en-US' [19]	
textString	1	1	1	String [1-1024]	
GUID	–	–	–	Normalized String: [1-4095]	
GUIDSet	–	–	–	This is only used as a parameter.	
sourcedId	0	*	250,000	GUID	
IMSExtension	–	–	–	–	
extensionNameVocabulary	1	1	1	AnyURI	
extensionValueVocabulary	1	1	1	AnyURI	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
extensionField	1	*	5	ExtensionField	
ExtensionField	–	–	–	–	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in ‘extensionVocabulary’ [18]	
fieldValue	1	1	1	Normalized String: [1-1023]	
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN) This is only used as a parameter.	Not required.
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default=‘en-US’ [19]	
textString	1	1	1	String [1..4095]	

Data Model Notes:

- [1] External VDEX vocabulary: ‘formnameType’ – the set of permitted types of formatted names;
- [2] External VDEX vocabulary: ‘nameType’ – the set of permitted types of names;
- [3] External VDEX vocabulary: ‘partName’ – the set of permitted types of parts for a name;
- [4] External VDEX vocabulary: ‘addressType’ – the set of permitted types of addresses;
- [5] External VDEX vocabulary: ‘addressPart’ – the set of permitted types of parts for an addresses;
- [6] External VDEX vocabulary: ‘contactInfoType’ – the set of permitted types of contact information;
- [7] External VDEX vocabulary: ‘demographicsType’ – the set of permitted types of demographic information;
- [8] External VDEX vocabulary: ‘eventDate’ – the set of permitted types of event date;
- [9] Internal vocabulary: ‘gender’ – the permitted values for gender;
- [10] External VDEX vocabulary: ‘demographicsInfo’ – the set of permitted types of demographic content;
- [11] External VDEX vocabulary: ‘representationType’ – the set of permitted types of representation;
- [12] External VDEX vocabulary: ‘agentType’ – the set of permitted types of agent;
- [13] External VDEX vocabulary: ‘enterpriserolesType’ – the set of permitted types of Enterprise Role;
- [14] External VDEX vocabulary: ‘systemRole’ – the set of permitted types of System Role;
- [15] External VDEX vocabulary: ‘institutionRole’ – the set of permitted types of Institution Role;
- [16] Internal vocabulary: ‘mediaMode’ – set of permitted types of content reference;
- [17] Internal vocabulary: ‘contentRefType’ – set of permitted types of content;
- [18] External VDEX vocabulary: ‘fieldType’ – set of types permitted as extensions;
- [19] External vocabulary: ‘language’ – use ISO639 as the source.

3.3 The Group Management Service Statement

3.3.1 The Service Statement

The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the GMS are summarized in Table 3.4.

Table 3.4 GMS core profile operations conformance statement.

Operation	Sync Agent	Ref Agent
createGroup		
createByProxyGroup		
deleteGroup	Implements	Calls
addGroupRelationship		
removeGroupRelationship		
readGroup ⁵		
readAllGroupIds		
readGroupIdsForPerson		
readGroupIdsFromSavePoint		
readGroups		
readGroupsFromSavePoint		
updateGroup		
replaceGroup ⁶	Implements	Calls
discoverGroupIds		
changeGroupIdentifier		

⁵ This operation must be available to support the conformance testing. It can then be disabled for a released product.

⁶ The ‘replaceGroup’ operation acts as a ‘createGroup’ in the case that the supplied ‘sourcedId’ is unknown at the Sync Agent.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 3.5. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 3.5 Permitted status codes for the GMS core profile operations.

CodeMinor Status Code	deleteGroup	replaceGroup
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘overflowfail’		Y
‘idallocinusefail’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	Y
‘unknowngtvocabulary’		Y
‘unknownvocabulary’		Y
‘unknownmdvocabulary’		Y
‘deletefailure’	Y	
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

3.3.2 The Data Model Statement

The profiled data model is given in Table 3.6.

Table 3.6 GMS data model profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
GroupRecordSet	–	–	–	–	
groupRecord	0	*	100,000	GroupRecord	
GroupRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
group	1	1	1	Group	
Group	–	–	–	–	
groupType	1	1	1	GroupType	
email	0	1	1	Normalized String: [1-4095].	
url	0	1	1	URL	
timeFrame	0	1	1	Timeframe	
relationship	0	*	5	Relationship	
enrollControll	0	1	1	EnrollControll	
org	0	1	1	Org	
description	0	1	1	Description	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
GroupType	–	–	–	–	
scheme	1	1	1	Text	
language	1	1	1	{As base type}	
textString	1	1	1	String: [1-255]	
TypeValue	1	*	1	TypeValue	
TypeValue	–	–	–	–	
id	1	1	1	NormalizedString	
type	1	1	1	Text	
language	1	1	1	{As base type}	
textString	1	1	1	String: [1-63]	
level	1	1	1	Text	
language	1	1	1	{As base type}	
textString	1	1	1	String: [1-63]	Support for the value

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
					'TERM' is required.
Relationship	–	–	–	–	
relationId	1	1	1	GUID	
relation	1	1	1	Int Vocab [1]	
sourcedId	1	1	1	GUID	
label	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
EnrollControl	–	–	–	–	
enrollAccept	0	1	1	Boolean: {true=accept enrollment; false=do not accept enrollment}	
enrollAllowed	0	1	1	Boolean: {true=allow enrollment; false=do not allow enrollment}	
Org	–	–	–	–	
orgName	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
orgUnit	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
type	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
id	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
TimeFrame	–	–	–	–	
begin	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
end	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
restrict	0	1	1	Boolean: {true=restriction is active; false=restriction is not active}	
adminPeriod	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
Description	–	–	–	–	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
shortDescription	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-127]	
longDescription	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-2095]	
fullDescription	0	1	1	FullDescription	
FulDescription	–	–	–	–	
mediamode	1	1	1	Int Vocab. [2]	
contentRefType	1	1	1	Int Vocab. [3]	
mimeType	1	1	1	Normalized String: [1-63]	
descriptionText				Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-1024]	
Metadata	–	–	–	–	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
metadataField	1	*	?	ExtensionField	
IMSExtension	–	–	–	–	
extensionNameVocabulary	1	1	1	AnyURI	
extensionValueVocabulary	1	1	1	AnyURI	
extensionField	1	*	?	ExtensionField	
ExtensionField	–	–	–	–	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in 'extensionVocabulary' [4]	
fieldValue	1	1	1	Normalized String: [1-1023]	
GUID	–	–	–	Normalized String: [1-4095]	
GUIDSet	–	–	–	This is only used as a parameter.	
sourcedId	0	*	250,000	GUID	
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN)	Not required.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
				This is only used as a parameter.	
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default='en-US' [5]	
textString	1	1	1	String [1..4095]	
URL	–	–	–	Normalized String: [1-4095]	

Data Model Notes:

- [1] Internal vocabulary: 'relation' – set of permitted types of relationship
- [2] Internal vocabulary: 'mediaMode' – set of permitted types of content reference;
- [3] Internal vocabulary: 'contentRefType' – set of permitted types of content;
- [4] External VDEX vocabulary: 'fieldType' – set of types permitted as extensions;
- [5] External vocabulary: 'language' – use ISO639 as the source.

3.4 The Membership Management Service Statement

3.4.1 The Service Statement

The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the MMS are summarized in Table 3.7.

Table 3.7 MMS core profile operations conformance statement.

Operation	Sync Agent	Ref Agent
createMembership		
createByProxyMembership		
deleteMembership	Implements	Calls
readMembership ⁷		
readMembershipIdsForPerson		
readMembershipIdsForPersonWithRole		
readMembershipIdsForCollection		
readAllMembershipIds		
readMembershipIdsFromSavePoint		
readMemberships		
readMembershipsFromSavePoint		
updateMembership		
replaceMembership ⁸	Implements	Calls
discoverMembershipIds		
changeMembershipIdentifier		

⁷ This operation must be available to support the conformance testing. It can then be disabled for a released product.

⁸ The ‘replaceMembership’ operation acts as a ‘createMembership’ in the case that the supplied ‘sourcedId’ is unknown at the Sync Agent.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 3.8. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 3.8 Permitted status codes for the MMS core profile operations.

CodeMinor Status Code	deleteMembership	replaceMembership
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘overflowfail’		Y
‘idallocinusefail’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	Y
‘deletefailure’	Y	
‘unknownvocabulary’		Y
‘unknownmdvocabulary’		Y
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘unauthorizedrequest’	Y	Y
‘linkfailure’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

3.4.2 The Data Model Statement

The profiled data model is given in Table 3.9.

Table 3.9 MMS data model profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
MembershipRecordSet	–	–	–	–	
membershipRecord	0	*	100,000	MembershipRecord	
MembershipRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
membership	1	1	1	Membership	
Membership	–	–	–	This is a required field.	
collectionSourcedId	1	1	1	GUID	
membershipIdType	1	1	1	Int Vocab. [1]	
member	1	1	1	Member	
dataSource	0	1	1	GUID	
Member	–	–	–	This is a required field.	
personSourcedid	1	1	1	GUID	
role	1	*	5	Role	
Role	–	–	–	This is a required field.	
roleType	1	1	1	Ext Vocab. [2]	
subRole	0	1	1	Ext Vocab. [3]	The Teaching Assistant subroles to be reduced to TeachingAssistant subrole only;
timeFrame	0	1	1	Timeframe	
status	0	1	1	Int Vocab. [4]	
dateTime	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS±TZ)	
creditHours	0	1	1	Integer: [1-9999]	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
TimeFrame	–	–	–	This is an optional field.	
begin	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
end	0	1	1	DateTime: ISO8601	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
				(YYYY-MM-DDTHH:MM:SS)	
restrict	0	1	1	Boolean: {true=restriction is active; false=restriction is not active}	
adminPeriod	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
Metadata	–	–	–	This is an optional field.	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
metadataField	1	*	?	ExtensionField	
IMSExtension	–	–	–	This is an optional field.	
extensionNameVocabulary	1	1	1	AnyURI	
extensionValueVocabulary	1	1	1	AnyURI	
extensionField	1	*	?	ExtensionField	
ExtensionField	–	–	–	This is a required field.	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in 'extensionVocabulary' [5]	
fieldValue	1	1	1	Normalized String: [1-1023]	
GUID	–	–	–	Normalized String: [1-4095]	
GUIDSet	–	–	–	This is only used as a parameter.	
sourcedId	0	*	250,000	GUID	
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN) This is only used as a parameter.	Not required.
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default='en-US' [6]	
textString	1	1	1	String [1..4095]	

Data Model Notes:

- [1] Internal vocabulary: 'membershipIdType' – set of permitted types of membership identifier;
- [2] External VDEX vocabulary: 'roleType' – set of types permitted roles;
- [3] External VDEX vocabulary: 'subRole' – set of permitted sub-roles. The Teaching Assistant subroles are to be reduced to the TeachingAssistant subrole only;

- [4] Internal vocabulary: ‘status’ – set of permitted values for the status;
- [5] External VDEX vocabulary: ‘fieldType’ – set of types permitted as extensions. NO changes for the Profile;
- [6] External vocabulary: ‘language’ – use ISO639 as the source. NO changes for the Profile.

3.5 The Course Management Service Statement

3.5.1 The Service Statement

The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the CMS are summarized in Table 3.10.

Table 3.10 CMS Course Section core profile operations conformance statement.

Operation	Sync Agent	Ref Agent
createCourseSection		
createByProxyCourseSection		
createCourseSectionFromCourseSection		
deleteCourseSection	Implements	Calls
readCourseSection ⁹		
readAllCourseSectionIds		
readCourseSectionIdsFromSavePoint		
readCourseSections		
readCourseSectionsFromSavePoint		
replaceCourseSection ¹⁰	Implements	Calls
updateCourseSection		
updateCourseSectionStatus		
discoverCourseSectionIds		
changeCourseSectionIdentifier		

⁹ This operation must be available to support the conformance testing. It can then be disabled for a released product.

¹⁰ The ‘replaceCourseSection’ operation acts as a ‘createCourseSection’ in the case that the supplied ‘sourcedId’ is unknown at the Sync Agent.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 3.11. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 3.11 Permitted status codes for the CMS core profile operations.

CodeMinor Status Code	deleteCourseSection	replaceCourseSection
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘overflowfail’		Y
‘idallocinusefail’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	Y
‘deletefailure’	Y	
‘unknownextension’		Y
‘unknownvocabulary’		Y
‘unknownmdvocabulary’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

3.5.2 The Data Model Statement

The profiled data model is given in Table 3.12.

Table 3.12 CMS data model profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
CourseTemplateRecordSet	–	–	–	–	Not required.
courseTemplateRecord	0	*	2,000	CourseTemplateRecord	Not required.
CourseOfferingRecordSet	–	–	–	–	Not required.
courseOfferingRecord	0	*	10,000	CourseOfferingRecord	Not required.
CourseSectionRecordSet	–	–	–	–	
courseSectionRecord	0	*	10,000	CourseSectionRecord	
SectionAssociationRecordSet	–	–	–	–	Not required.
sectionAssociationRecord	0	*	10,000	SectionAssociationRecord	Not required.
CourseSectionRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
courseSection	1	1	1	CourseSection	
CourseSection	–	–	–	–	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
parentOfferingId	0	1	1	GUID	
catalogDescription	0	1	1	Description	
status	0	1	1	Ext Vocab. [1]	
defaultCredits	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
category	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
academicSession	0	1	1	Text	academicSession
language	1	1	1	{ As base type }	language
textString	1	1	1	Ext Vocab. [2]	textString
maxNumberOfStudents	0	1	1	Integer: [1-999].	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
numberOfStudents	0	1	1	Integer: [1-999].	
org	0	1	1	Org	
timeFrame	0	1	1	TimeFrame	
enrollControl	0	1	1	EnrollControl	
location	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
notes	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
meeting	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
Org	–	–	–	–	
orgName	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
orgUnit	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
type	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
id	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
EnrollControl	–	–	–	–	
enrollAccept	0	1	1	Boolean: {true=accept enrollment; false=do not accept enrollment}	
enrollAllowed	0	1	1	Boolean: {true=allow enrollment; false=do not allow enrollment}	
TimeFrame	–	–	–	–	
begin	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
end	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
restrict	0	1	1	Boolean: {true=restriction is active; false=restriction is not active}	
adminPeriod	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
Description	–	–	–	–	
shortDescription	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-127]	
longDescription	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-2095]	
fullDescription	0	1	1	FullDescription	
FulDescription	–	–	–	–	
mediamode	1	1	1	Int Vocab. [3]	
contentRefType	1	1	1	Int Vocab. [4]	
mimeType	1	1	1	Normalized String: [1-63]	
descriptionText				Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-1024]	
Metadata	–	–	–	–	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
metadataField	1	*	?	ExtensionField	
IMSExtension	–	–	–	–	
extensionNameVocabulary	1	1	1	AnyURI	
extensionValueVocabulary	1	1	1	AnyURI	
extensionField	1	*	?	ExtensionField	
ExtensionField	–	–	–	–	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in 'extensionVocabulary' [5]	
fieldValue	1	1	1	Normalized String: [1-1023]	
GUID	–	–	–	Normalized String: [1-4095]	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
GUIDSet	–	–	–	This is only used as a parameter.	
sourcedId	0	*	250,000	GUID	
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN) This is only used as a parameter.	Not required.
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default='en-US' [6]	
textString	1	1	1	String [1..4095]	

Data Model Notes:

- [1] External VDEX vocabulary: 'status' – set of permitted values of the status field;
- [2] External VDEX vocabulary: 'academicSession' – the set of permitted values of the academic session;
- [3] Internal vocabulary: 'mediaMode' – set of permitted types of content reference;
- [4] Internal vocabulary: 'contentRefType' – set of permitted types of content;
- [5] External VDEX vocabulary: 'fieldType' – set of types permitted as extensions;
- [6] External vocabulary: 'language' – use ISO639 as the source.

3.6 The Bulk Data Exchange Management Service Statement

3.6.1 The Service Statement

The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the BDEMS are summarized in Table 3.13.

Table 3.13 BDEMS core profile operations conformance statement.

Operation	Synch Agent	Ref Agent
announceBulkDataExchange	Implements	Calls
announceBulkDataExchangeFailure		
reportBulkDataExchange	Calls	Implements
requestBulkDataExchange		
ignoreBulkDataExchange	Calls	Implements
cancelBulkDataExchange		
HTTPSget	Calls	Implements

NOTE: (a) The HTTPSget operation is a direct binding to HTTP;

(b) The data models supported by each implementation are reflected in the status codes returned by the BDEMS.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 3.14. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 3.14 Status codes for the BulkDataExchangeManager interface operations.

CodeMinor Status Code	announce	report	ignore
‘fullsuccess’	Y	Y	Y
‘invalidtransactionid’	Y	Y	Y
‘invaliddata’	Y	Y	
‘incompletedata’	Y	Y	
‘invalidurl’	Y		
‘savepointerror’			
‘savepointsyncerror’			
‘unsupportedservices’	Y		
‘unsupportedoperations’	Y		
‘expireddate’		Y	
‘targetisbusy’	Y	Y	Y
‘unauthorizedrequest’	Y	Y	Y
‘linkfailure’	Y	Y	Y
‘unsupportedLISservice’	Y	Y	Y
‘unsupportedLISoperation’	Y	Y	Y
‘unknownservice’	Y	Y	Y
‘unknownoperation’	Y	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

3.6.2 The Data Model Statement

The profiled data model is given in Table 3.15.

Table 3.15 BDEMS data model profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax		
BulkBlockManifest	–	–	–	–	
bulkBlockId	1	1	1	LUID	
expiryDate	1	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
bulkBlockDataFile	1	*	5	BulkBlockDataFile	
BulkBlockDataFile	–	–	–	–	
url	1	1	1	URL	
checksum	1	1	1	Hexadecimal (128bit): '0000...0000'-'FFFF....FFFF'	
totalSize	1	1	1	Integer: $[1-(2^{32}-1)]$	
savePoint	1	1	1	DateTime (YYYY-MM-DDTHH:MM:SS.NNN)	
serviceSet	1	1	1	ServiceSet	
ServiceSet	–	–	–	–	
serviceRecord	1	*	5	ServiceRecord	
ServiceRecord	–	–	–	–	
serviceName	1	1	1	Normalized String: [1-255]	
interfaceName	1	1	1	Normalized String: [1-255]	
operationSet	1	1	1	OperationSet	
OperationSet	–	–	–	–	
operationName	1	*	5000	Normalized String: [1-255]	
BulkBlockReport	–	–	–	–	
bulkBlockManifestIdRef	1	1	1	LUID	
transactionReport	0	*	1000	TransactionReport	
TransactionReport	–	–	–	–	
transactionOpIdentifierRef	1	1	1	GUID	
serviceName	1	1	1	Normalized String: [1-255]	
transactionFailStatus	1	1	1	Ext Vocab. [1]	
BulkDataRecord	–	–	–	–	
transactionRecord	1	*	100,000	TransactionRecord	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax		
TransactionRecord	–	–	–	–	
transactionOpIdentifier	1	1	1	LUID	
serviceName	1	1	1	Int Vocab. [2]	
interfaceName	1	1	1	Int Vocab. [3]	
operationName	1	1	1	Normalized String: [1-255]	
parameterSet	1	1	1	ParameterSet	
ParameterSet	–	–	–	–	
parameterRecord	1	*	5	ParameterRecord	
ParameterRecord	–	–	–	–	
parameterInvoc	1	1	1	Int Vocab. [4]	
parameterName	1	1	1	Normalized String: [1-255]	
parameterType	1	1	1	Ext Vocab. [5]	
parameterValue	1	1	1	ParameterValue	
ParameterValue	–	–	–	–	
guid [XOR1]	0	1	1	GUID	
guidSet [XOR1]	0	1	1	GUIDSet	
queryObject [XOR1]	0	1	1	QueryObject	
sequenceIdentifier [XOR1]	0	1	1	SequenceIdentifier	
text [XOR1]	0	1	1	Text	
url [XOR1]	0	1	1	URL	
personRecord [XOR1]	0	1	1	PersonRecord	
personCoreRecord [XOR1]	0	1	1	PersonCoreRecord	
personRecordSet [XOR1]	0	1	1	PersonRecordSet	
groupRecord [XOR1]	0	1	1	GroupRecord	
membershipRecord [XOR1]	0	1	1	MembershipRecord	
membershipRecordSet [XOR1]	0	1	1	MembershipRecordSet	
courseTemplate [XOR1]	0	1	1	CourseTemplate	
courseTemplateSet [XOR1]	0	1	1	CourseTemplateSet	
courseOffering [XOR1]	0	1	1	CourseOffering	
courseOfferingSet [XOR1]	0	1	1	CourseOfferingSet	
courseSection [XOR1]	0	1	1	CourseSection	
courseSectionSet [XOR1]	0	1	1	CourseSectionSet	
sectionAssociation [XOR1]	0	1	1	SectionAssociation	
sectionAssociationSet [XOR1]	0	1	1	SectionAssociationSet	
resultRecord [XOR1]	0	1	1	ResultRecord	
resultRecordSet [XOR1]	0	1	1	ResultRecordSet	

Class/Attribute		Baseline Constraints				Profile Notes
		Min	Max	SPMax		
resultValueRecord	[XOR1]	0	1	1	ResultValueRecord	
resultValueRecordSet	[XOR1]	0	1	1	ResultValueRecordSet	
lineItemRecord	[XOR1]	0	1	1	LineItemRecord	
lineItemRecordSet	[XOR1]	0	1	1	LineItemRecordSet	
lineItemType	[XOR1]	0	1	1	LineItemType	
membershipIdType	[XOR1]	0	1	1	MembershipIdType	
relationship	[XOR1]	0	1	1	relationship	
role	[XOR1]	0	1	1	Role	
resultStatus	[XOR1]	0	1	1	ResultStatus	
status	[XOR1]	0	1	1	Status	
FailureObject		–	–	–		
failureCode		1	1	1	Ext Vocab. [6]	
failureDescription		1	1	1	Normalized String: [1-255]	
FilterObject		–	–	–		
filterRule		1	*	2	FilterRule	
FilterRule		–	–	–		
filterType		1	1	1	Int Vocab. [7]	
filterValue		1	1	1	Normalized String: [1-31]	
LUID		–	–	–	Normalized String: [1-4095]	
URL		–	–	–	Normalized String: [1-4095]	

Data Model Notes:

- [1] External VDEX vocabulary: ‘transactionsFailStatus’ – set of permitted as failure status codes for a transaction request;
- [2] Internal vocabulary: ‘serviceName’ – set of permitted service names;
- [3] Internal vocabulary: ‘interfaceName’ – set of permitted interface names;
- [4] Internal vocabulary: ‘parameterInvoc’ – set of permitted set of parameter kinds;
- [5] External VDEX vocabulary: ‘parameterType’ – set of permitted types of parameter;
- [6] External VDEX vocabulary: ‘fileValue’ – the set of permitted values of data object to be supplied;
- [7] Internal vocabulary: ‘filterType’ – enumerated as { object | savepoint }.

4 Information Models of the Profile Additions

4.1 The Final Grade Addition Profile Statement

It should be noted that this Addition Profile can be used for to exchange a broad range of outcomes information i.e., than just 'final grade' information.

4.1.1 The Service Statements

The Final Grade Addition Profile is based the required functionality supplied through the OMS. The set of operations that must be supported by 'Sync Agent' and 'Ref Agent' implementations of the Final Grade Addition profile of the OMS are summarized in Tables 4.1 (for LineItem) and 4.3 (for Result). There is no requirement to support the ResultValue interface in the OMS.

Table 4.1 OMS LineItem grade addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createLineItem		
createByProxyLineItem		
deleteLineItem	Implements	Calls
readLineItem		
readAllLineItemIds		
readLineItemIdsWithLineItemType		
readLineItemIdsForPerson		
readLineItemIdsForCourseOffering		
readLineItemIdsForCourseSection		
readLineItemIdsForCourseSectionWithLineItemType		
readLineItemIdsWithLineItemType		
readLineItemIdsFromSavePoint		
readLineItems		
readLineItemsFromSavePoint		
updateLineItem		
replaceLineItem	Implements	Calls
discoverLineItemIds		
changeLineItemIdentifier		

See Appendix A2 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.2. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.2 Permitted status codes for the LineItem grade addition profile operations.

CodeMinor Status Code	deleteLineItem	replaceLineItem
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘overflowfail’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	
‘deletefailure’	Y	
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

Table 4.3 OMS Result grade addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createResult		
createByProxyResult		
deleteResult	Implements	Calls
readResult		
readAllResultIds		
readResultIdsForPerson		
readResultIdsForLineItem		
readResultIdsForCourseOffering		
readResultIdsForCourseSection		
readResultIdsForCourseSectionWithStatus		
readResultIdsForLineItemWithLineItemType	Implements	Calls
readResultIdsFromSavePoint		
readResults		
readResultsFromSavePoint		
updateResult		
replaceResult	Implements	Calls
replaceResultsForLineItem		
discoverResultIds		
changeResultIdentifier		

See Appendix A2 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.4. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.4 Permitted status codes for the Result grade addition profile operations.

CodeMinor Status Code	deleteResult	readResultIdsForLineItemWithLineItemType	replaceResult
‘fullsuccess’	Y		Y
‘createsuccess’			Y
‘nosourcedids’		Y	
‘overflowfail’			Y
‘invaliddata’		Y	Y
‘targetreadfailure’		Y	
‘invalidlineitemtype’		Y	
‘incompletedata’			Y
‘partialdatastorage’			Y
‘unknownobject’	Y	Y	
‘deletefailure’	Y		
‘unknownextension’			Y
‘targetisbusy’	Y		Y
‘linkfailure’	Y		Y
‘unauthorizedrequest’	Y		Y
‘unsupportedLISoperation’	Y		Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

4.1.2 The Data Model Statements

The profiled data model is given in Table 4.5.

Table 4.5 OMS data model grade addition profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
LineItemRecordSet	–	–	–	–	
lineItemRecord	0	*	1,000	LineItemRecord	
ResultRecordSet	–	–	–	–	
resultRecord	0	*	1,000	ResultRecord	
ResultValeRecordSet	–	–	–	–	
resultValueRecord	0	*	1,000	ResultValueRecord	
LineItemRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
lineItem	1	1	1	LineItem	
ResultRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
result	1	1	1	Result	
ResultValueRecord	–	–	–	–	Prohibited.
sourcedGUID	1	1	0	SourcedGUID	
refAgentInstance	0	1	0	Normalized String [1-4095]	
sourcedId	1	1	0	GUID	
resultValue	1	1	0	ResultValue	
LineItem	–	–	–	–	
context	0	1	1	Context	
lineItemType	0	1	1	LineItemType	
label	0	1	1	NormalizedString	
resultValueSourcedId	0	1	0	GUID	Prohibited.
resultValue	0	1	1	ResultValue	
lineItemSettings	0	1	1	PropertySet	Not required.
outcomesHandlerSourcedId	0	1	1	AnyURI	Not required.
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
Context					
contextIdentifier	1	1	1	GUID	
contextType	1	1	1	AnyURI	
LineItemType					
lineItemTypeVocabulary	1	1	1	AnyURI	
lineItemTypeValue	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Ext Vocab. [1]	
resourceHandlerId	0	1	1	AnyURI	Not required.
localeKey	0	1	1	NormalizedString	Not required.
defaultDisplayName	0	1	1	NormalizedString	Not required.
Result	–	–	–	–	
statusofResult	0	1	1	ResultStatus	
lineItemSourcedId	1	1	1	GUID	
personSourcedId	0	1	1	GUID	
date	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS±TZ)	
resultValueSourcedId	0	1	0	GUID	Prohibited.
resultValue	0	1	1	ResultValue	
resultScore	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-127]	
resultMessageSettings	0	1	1	PropertySet	Not required.
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
ResultStatus	–	–	–	–	
resultStatusVocabulary	1	1	1	AnyURI	
statusofResult	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Ext Vocab. [2]	Only the entry 'Final' is required.
localeKey	0	1	1	NormalizedString	Not required.
defaultDisplayName	0	1	1	NormalizedString	Not required.
ResultValue	–	–	–	–	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-63]	
valueList [XOR1]	0	1	1	ValueList	
valueRange [XOR1]	0	1	1	ValueRange	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
ValueList	–	–	–	–	
orderValue	1	*	5	OrderedValue	
ValueRange	–	–	–	–	
min	0	1	1	Decimal: ± 32676.00	
max	0	1	1	Decimal: ± 32676.00	
OrderedValue	–	–	–	–	
ordinal	0	1	1	Integer: $\pm 2^{16}-1$	
grade	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-15]	
valueRange	0	1	1	ValueRange	
Metadata	–	–	–	–	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
metadataField	1	*	?	ExtensionField	
IMSExtension	–	–	–	–	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
extensionField	1	*	?	ExtensionField	
ExtensionField	–	–	–	–	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in 'extensionVocabulary' [3]	
fieldValue	1	1	1	Normalized String: [1-1023]	
GUID	–	–	–	Normalized String: [1-4095]	
GUIDSet	–	–	–	This is only used as a parameter.	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
sourcedId	0	*	250,000	GUID	
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN) This is only used as a parameter.	Not required.
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default='en-US' [4]	
textString	1	1	1	String [1..4095]	

Data Model Notes:

- [1] External VDEX vocabulary: 'lineItemType' – set of permitted as lineItem types;
- [2] External VDEX vocabulary: 'statusofResult' – set of permitted value for the status of a result. Only the entry 'Final' is required;
- [3] External VDEX vocabulary: 'fieldType' – set of types permitted as extensions;
- [4] External vocabulary: 'language' – use ISO639 as the source.

4.2 The Combined Sections Addition Profile Statement

4.2.1 The Service Statements

The Combined Sections Addition Profile is based upon more detailed functionality supplied through the CMS. The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the Combined Sections Addition Profile of the CMS are summarized in Tables 4.6 (for CourseSection) and 4.8 for (SectionAssociation).

Table 4.6 CMS Section combined sections addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createCourseSection		
createByProxyCourseSection		
createCourseSectionFromCourseSection		
deleteCourseSection	Implements	Calls
readCourseSection		
readAllCourseSectionIds		
readCourseSectionIdsFromSavePoint		
readCourseSections		
readCourseSectionsFromSavePoint		
replaceCourseSection	Implements	Calls
updateCourseSection		
updateCourseSectionStatus		
discoverCourseSectionIds		
changeCourseSectionIdentifier		

See Appendix A3 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 47. The key to the entries is: 'Y' denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.7 Permitted status codes for the Section combined section addition profile operations.

CodeMinor Status Code	deleteCourseSection	replaceCourseSection
'fullsuccess'	Y	Y
'createsuccess'		Y
'overflowfail'		Y
'invaliddata'		Y
'incompletedata'		Y
'partialdatastorage'		Y
'unknownobject'	Y	
'deletefailure'	Y	
'unknownextension'		Y
'targetisbusy'	Y	Y
'linkfailure'	Y	Y
'unauthorizedrequest'	Y	Y
'unsupportedLISoperation'	Y	Y

NOTE: Both 'Sync Agent' and 'Ref Agent' implementations **must** respond with the 'unsupportedLISoperation' for **all and any** of the operations under the LIS which are **not** implemented.

Table 4.8 CMS Association combined sections addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createSectionAssociation		
createByProxySectionAssociation		
deleteSectionAssociation	Implements	Calls
readSectionAssociation		
readAllSectionAssociationIds		
readSectionAssociationIdsFromSavePoint		
readSectionAssociations		
readSectionAssociationsFromSavePoint		
addCourseSectionId		
removeCourseSectionId		
replaceSectionAssociation	Implements	Calls
updateSectionAssociation		
discoverSectionAssociationIds		
changeSectionAssociationIdentifier		

See Appendix A3 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.9. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.9 Permitted status codes for the Association combined section addition profile operations.

CodeMinor Status Code	deleteSectionAssociation	replaceSectionAssociations
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘overflowfail’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	
‘deletefailure’	Y	
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

4.2.2 The Data Model Statements

The profiled data model is given in Table 4.10.

Table 4.10 CMS combined sections data model addition profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
CourseTemplateRecordSet	–	–	–	–	Not required.
courseTemplateRecord	0	*	2,000	CourseTemplateRecord	Not required.
CourseOfferingRecordSet	–	–	–	–	Not required.
courseOfferingRecord	0	*	10,000	CourseOfferingRecord	Not required.
CourseSectionRecordSet	–	–	–	–	
courseSectionRecord	0	*	10,000	CourseSectionRecord	
SectionAssociationRecordSet	–	–	–	–	
sectionAssociationRecord	0	*	10,000	SectionAssociationRecord	
CourseSectionRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
courseSection	1	1	1	CourseSection	
SectionAssociationRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
sectionAssociation	1	1	1	SectionAssociation	
CourseSection	–	–	–	–	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
parentOfferingId	0	1	1	GUID	
catalogDescription	0	1	1	Description	
status	0	1	1	Ext Vocab. [1]	
defaultCredits	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
category	0	1	1	Text	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
academicSession	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Ext Vocab. [2]	
maxNumberOfStudents	0	1	1	Integer: [1-999].	
numberOfStudents	0	1	1	Integer: [1-999].	
org	0	1	1	Org	
timeFrame	0	1	1	TimeFrame	
enrollControl	0	1	1	EnrollControl	
location	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
notes	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
meeting	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSEExtension	
SectionAssociation	—	—	—	—	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
status	0	1	1	Ext Vocab. [1]	
courseSectionIdList	0	1	1	ListofCourseSectionIds	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSEExtension	
ListofCourseSectionIds	—	—	—	—	
courseSectionId	1	*	100	GUID	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
Org	–	–	–	–	
orgName	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
orgUnit	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
type	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
id	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
EnrollControl	–	–	–	–	
enrollAccept	0	1	1	Boolean: {true=accept enrollment; false=do not accept enrollment}	
enrollAllowed	0	1	1	Boolean: {true=allow enrollment; false=do not allow enrollment}	
TimeFrame	–	–	–	–	
begin	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
end	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
restrict	0	1	1	Boolean: {true=restriction is active; false=restriction is not active}	
adminPeriod	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
Description	–	–	–	–	
shortDescription	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-127]	
longDescription	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-2095]	
fullDescription	0	1	1	FullDescription	
FulDescription	–	–	–	–	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
mediamode	1	1	1	Int Vocab. [3]	
contentRefType	1	1	1	Int Vocab. [4]	
contentType	1	1	1	Normalized String: [1-63]	
descriptionText				Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-1024]	
Metadata	–	–	–	–	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
metadataField	1	*	?	ExtensionField	
IMSExtension	–	–	–	–	
extensionNameVocabulary	1	1	1	AnyURI	
extensionValueVocabulary	1	1	1	AnyURI	
extensionField	1	*	?	ExtensionField	
ExtensionField	–	–	–	–	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in ‘extensionVocabulary’ [6]	
fieldValue	1	1	1	Normalized String: [1-1023]	
GUID	–	–	–	Normalized String: [1-4095]	
GUIDSet	–	–	–	This is only used as a parameter.	Not required.
sourcedId	0	*	250,000	GUID	Not required.
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN) This is only used as a parameter.	Not required.
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default=‘en-US’ [8]	
textString	1	1	1	String [1..4095]	

Data Model Notes:

- [1] External VDEX vocabulary: ‘status’ – set of permitted values of the status field;
- [2] External VDEX vocabulary: ‘academicSession’ – the set of permitted values of the academic session;
- [3] Internal vocabulary: ‘mediaMode’ – set of permitted types of content reference;

- [4] Internal vocabulary: ‘contentRefType’ – set of permitted types of content;
- [5] External VDEX vocabulary: ‘fieldType’ – set of types permitted as extensions;
- [6] External vocabulary: ‘language’ – use ISO639 as the source.

4.3 The Full Course Hierarchy Addition Profile Statement

4.3.1 The Service Statements

The Full Course Hierarchy Addition Profile is based upon more detailed functionality supplied through the CMS. The set of operations that must be supported by ‘Sync Agent’ and ‘Ref Agent’ implementations of the Full Course Hierarchy Profile of the CMS are summarized in Tables 4.11 (for CourseTemplate), 4.13 (for CourseOffering), 4.15 (for CourseSection) and 4.17 for (SectionAssociation).

Table 4.11 CMS Template full course hierarchy addition profile operations conformance statement.

Operation	Sync Agent	Ref Agent
createCourseTemplate		
createByProxyCourseTemplate		
deleteCourseTemplate	Implements	Calls
readCourseTemplate		
readAllCourseTemplateIds		
readCourseOfferingIdsForCourseTemplate		
readCourseTemplateIdsFromSavePoint		
readCourseTemplates		
readCourseTemplatesFromSavePoint		
updateCourseTemplate		
replaceCourseTemplate	Implements	Calls
discoverCourseTemplateIds		
changeCourseTemplateIdentifier		

See Appendix A4 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.12. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.12 Permitted status codes for the Template full course hierarchy addition profile operations.

CodeMinor Status Code	deleteCourseTemplate	replaceCourseTemplate
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	
‘deletefailure’	Y	
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

Table 4.13 CMS Offering full course hierarchy addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createCourseOffering		
createByProxyCourseOffering		
createCourseOfferingFromCourseOffering		
deleteCourseOffering	Implements	Calls
readCourseOffering		
readAllCourseOfferingIds		
readAllActiveCourseOfferingIdsForAcademicSession		
readCourseSectionIdsForCourseOffering		
readCourseOfferingIdsFromSavePoint		
readCourseOfferings		
readCourseOfferingsFromSavePoint		
replaceCourseOffering	Implements	Calls
updateCourseOffering		
updateCourseOfferingStatus		
discoverCourseOfferingIds		
changeCourseOfferingIdentifier		

See Appendix A4 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.14. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.14 Permitted status codes for the Offering full course hierarchy addition profile operations.

CodeMinor Status Code	deleteCourseOffering	replaceCourseOffering
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	
‘deletefailure’	Y	
‘targetreadfailure’		
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

Table 4.15 CMS Section full course hierarchy addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createCourseSection	Implements	Calls
createByProxyCourseSection		
createCourseSectionFromCourseSection		
deleteCourseSection	Implements	Calls
readCourseSection	Calls	Implements
readAllCourseSectionIds		
readCourseSectionIdsFromSavePoint		
readCourseSections		Implements
readCourseSectionsFromSavePoint		
replaceCourseSection	Implements	Calls
updateCourseSection		
updateCourseSectionStatus		
discoverCourseSectionIds		
changeCourseSectionIdentifier		

See Appendix A4 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.16. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.16 Permitted status codes for the Section full course hierarchy addition profile operations.

CodeMinor Status Code	deleteCourseSection	replaceCourseSection
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘partialreadfail’		
‘unknownobject’	Y	
‘deletefailure’	Y	
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

Table 4.17 CMS Association full course hierarchy addition profile operations conformance statement.

Operation	Synch Agent	Ref Agent
createSectionAssociation		
createByProxySectionAssociation		
deleteSectionAssociation	Implements	Calls
readSectionAssociation		
readAllSectionAssociationIds		
readSectionAssociationIdsFromSavePoint		
readSectionAssociations		
readSectionAssociationsFromSavePoint		
addCourseSection		
removeCourseSection		
replaceSectionAssociation	Implements	Calls
updateSectionAssociation		
discoverSectionAssociationIds		
changeSectionAssociationIdentifier		

See Appendix A4 below for the associated implementation notes.

The summary list of status codes that can be returned by the different operations through the StatusInfo object is given in Table 4.18. The key to the entries is: ‘Y’ denotes the code may be returned by that operation. A blank entry means that the code cannot be returned by that operation.

Table 4.18 Permitted status codes for the Association full course hierarchy addition profile operations.

CodeMinor Status Code	deleteSectionAssociation	replaceSectionAssociations
‘fullsuccess’	Y	Y
‘createsuccess’		Y
‘invaliddata’		Y
‘incompletedata’		Y
‘partialdatastorage’		Y
‘unknownobject’	Y	
‘deletefailure’	Y	
‘unknownextension’		Y
‘targetisbusy’	Y	Y
‘linkfailure’	Y	Y
‘unauthorizedrequest’	Y	Y
‘unsupportedLISoperation’	Y	Y

NOTE: Both ‘Sync Agent’ and ‘Ref Agent’ implementations **must** respond with the ‘unsupportedLISoperation’ for **all and any** of the operations under the LIS which are **not** implemented.

4.3.2 The Data Model Statements

The profiled data model is given in Table 4.19.

Table 4.19 CMS data model profile changes.

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
CourseTemplateRecordSet	–	–	–	–	
courseTemplateRecord	0	*	2,000	CourseTemplateRecord	
CourseOfferingRecordSet	–	–	–	–	
courseOfferingRecord	0	*	10,000	CourseOfferingRecord	
CourseSectionRecordSet	–	–	–	–	
courseSectionRecord	0	*	10,000	CourseSectionRecord	
SectionAssociationRecordSet	–	–	–	–	
sectionAssociationRecord	0	*	10,000	SectionAssociationRecord	
CourseTemplateRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
courseTemplate	1	1	1	CourseTemplate	
CourseOfferingRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
courseOffering	1	1	1	CourseOffering	
CourseSectionRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
courseSection	1	1	1	CourseSection	
SectionAssociationRecord	–	–	–	–	
sourcedGUID	1	1	1	SourcedGUID	
refAgentInstance	0	1	1	Normalized String [1-4095]	
sourcedId	1	1	1	GUID	
sectionAssociation	1	1	1	SectionAssociation	
CourseTemplate	–	–	–	–	
label	0	1	1	Text	
language	1	1	1	{ As base type }	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
catalogDescription	0	1	1	Description	
courseNumber	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
status	0	1	1	Ext Vocab. [1]	
defaultCredits	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
org	0	1	1	Org	
listofTopics	0	1	1	ListofTopics	
listofPrerequisites	0	1	1	ListofPrerequisites	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
ListofTopics	–	–	–	–	
topic	1	*	63	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
ListofPrerequisites	–	–	–	–	
prerequisite	1	*	63	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
CourseOffering	–	–	–	–	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
parentTemplateId	0	1	1	GUID	
catalogDescription	0	1	1	Description	
status	0	1	1	Ext Vocab. [1]	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
defaultCredits	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
academicSession	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Ext Vocab. [2]	
org	0	1	1	Org	
timeFrame	0	1	1	TimeFrame	
enrollControl	0	1	1	EnrollControl	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
CourseSection	–	–	–	–	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
parentOfferingId	0	1	1	GUID	
catalogDescription	0	1	1	Description	
status	0	1	1	Ext Vocab. [1]	
defaultCredits	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
category	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Ext Vocab. [3]	
academicSession	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	Ext Vocab. [2]	
maxNumberOfStudents	0	1	1	Integer: [1-999].	
numberOfStudents	0	1	1	Integer: [1-999].	
org	0	1	1	Org	
timeFrame	0	1	1	TimeFrame	
enrollControl	0	1	1	EnrollControl	
location	0	1	1	Text	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
notes	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-2047]	
meeting	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
SectionAssociation	–	–	–	–	
label	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
title	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
status	0	1	1	Ext Vocab. [1]	
courseSectionIdList	0	1	1	ListofCourseSectionIds	
dataSource	0	1	1	GUID	
recordInfo	0	1	1	Metadata	
extension	0	1	1	IMSExtension	
ListofCourseSectionIds	–	–	–	–	
courseSectionId	1	*	100	GUID	
Org	–	–	–	–	
orgName	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
orgUnit	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
type	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
id	0	1	1	Text	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
language	1	1	1	{ As base type }	
textString	1	1	1	String: [1-255]	
EnrollControl	–	–	–	–	
enrollAccept	0	1	1	Boolean: {true=accept enrollment; false=do not accept enrollment}	
enrollAllowed	0	1	1	Boolean: {true=allow enrollment; false=do not allow enrollment}	
TimeFrame	–	–	–	–	
begin	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
end	0	1	1	DateTime: ISO8601 (YYYY-MM-DDTHH:MM:SS)	
restrict	0	1	1	Boolean: {true=restriction is active; false=restriction is not active}	
adminPeriod	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	{ As base type }	
Description	–	–	–	–	
shortDescription	1	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-127]	
longDescription	0	1	1	Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-2095]	
fullDescription	0	1	1	FullDescription	
FulDescription	–	–	–	–	
mediamode	1	1	1	Int Vocab. [5]	
contentRefType	1	1	1	Int Vocab. [6]	
mimeType	1	1	1	Normalized String: [1-63]	
descriptionText				Text	
language	1	1	1	{ As base type }	
textString	1	1	1	String [1-1024]	
Metadata	–	–	–	–	
metadataNameVocabulary	1	1	1	AnyURI	
metadataValueVocabulary	1	1	1	AnyURI	
metadataField	1	*	?	ExtensionField	

Class/Attribute	Baseline Constraints				Profile Notes
	Min	Max	SPMax	Type	
IMSExtension	–	–	–	–	
extensionNameVocabulary	1	1	1	AnyURI	
extensionValueVocabulary	1	1	1	AnyURI	
extensionField	1	*	?	ExtensionField	
ExtensionField	–	–	–	–	
fieldName	1	1	1	Normalized String: [1-127]	
fieldType	1	1	1	Entry in ‘extensionVocabulary’ [7]	
fieldValue	1	1	1	Normalized String: [1-1023]	
GUID	–	–	–	Normalized String: [1-4095]	
GUIDSet	–	–	–	This is only used as a parameter.	Not required.
sourcedId	0	*	250,000	GUID	Not required.
QueryObject	–	–	–	Normalized String: [1-1023] This is only used as a parameter.	Not required.
SequenceIdentifier	–	–	–	DateTime (YYYY-MM-DDTHH:MM:SS.NNN) This is only used as a parameter.	Not required.
Text	–	–	–	–	
language	1	1	1	Ext Vocab: Default=‘en-US’ [8]	
textString	1	1	1	String [1..4095]	
URL	–	–	–	Normalized String: [1-4095]	

Data Model Notes:

- [1] External VDEX vocabulary: ‘status’ – set of permitted values of the status field;
- [2] External VDEX vocabulary: ‘academicSession’ – the set of permitted values of the session field;
- [3] External VDEX vocabulary: ‘category’ – set of permitted values of the category field;
- [4] Internal vocabulary: ‘day’ – the set of permitted values for the day field;
- [5] Internal vocabulary: ‘mediaMode’ – set of permitted types of content reference;
- [6] Internal vocabulary: ‘contentRefType’ – set of permitted types of content;
- [7] External VDEX vocabulary: ‘fieldType’ – set of types permitted as extensions;
- [8] External vocabulary: ‘language’ – use ISO639 as the source.

5 WSDL Bindings of the Core Profiles

The detailed list of files used in the Core Profiles are summarized in Appendix B below. The key points are:

- Core Profile – the same WSDL/XSD files are used for the BDEMS, PMS, GMS and MMS. New WSDSL/XSD files are created for the CMS in which the Course Template, Course Offering and Section Association data structures and service interfaces are removed. The OMS is not supported;
- Final Grade Addition Profile – new WSDSL/XSD files are created for the OMS in which the ResultValue data service interface is removed;
- Combined Sections Addition Profile – new WSDSL/XSD files are created for the CMS in which the Course Template and Course Offering data structures and service interfaces are removed;
- Full Course Hierarchy Addition Profile – the same set of WSDL/XSD files as per the full CMS specification.

6 Best Practices and Implementation Guidance

6.1 Using the Core Profile

Some keep points to be addressed in an implementation of the Core Profile are:

- The ‘unsupported’ status code must be returned for ALL of the operation not supported in an available service. Therefore, when an operation is not ‘implemented’ the service provider must still return the ‘unsupported’ code for any request on that operation;
- The PMS, GMS, MMS and CMS are synchronous services whereas the BDEMS is asynchronous. In the case of the synchronous services an implementation must respond in a synchronous manner even if the implementation itself cannot behave as required i.e., changes may only be permitted at scheduled times. An implementation must provide an accurate status response i.e., a promise of success should not be assumed;
- The PMS requires that ALL ‘replacePerson’ requests provide the ‘First’ and ‘Given’ name parts. This is considered the minimum information that is required for a person object;
- Further details are available in the Section 4.6.6 of the LIS Best Practices [LIS, 11b] on the support of ‘Terms’ in the GMS;
- The recommended authentication mechanisms are as per the full LIS. Further details are available in the Section 4.2.5 of the LIS Best Practices [LIS, 11b].

Further details are available in the Section 4 of the LIS Best Practices [LIS, 11b].

6.2 Using the Final Grade Addition Profile

The functional goal of the Final Grade Import is to remove the need for the common current business practice of calculating final grades in an external system e.g., an LMS, then retyping those grades into an SIS as the system of record. The IMS LIS specification allows for two different models of Outcomes integration: a “pull” methodology in which one system (usually the final system of record, such as the student information system) requests the grades from the system in grades have initially been entered (such as a learning management system); and a “push” methodology in which the system, in which the grades have initially been entered, sends the grades to the final system of record based on an action within that initial system.

Further details are available in the Section 4.8 of the LIS Best Practices [LIS, 11b].

6.3 Using the Combined Sections Addition Profile

The two most common use cases for Section Association are combined sections and multi-section courses. With combined sections, a course section is offered for credit in two or more departments or as two or more course listings within the same department. For example, Statistics for Psychology might be listed for credit in both the Mathematics and the Psychology departments.

Further details are available in the Section 4.5.4 of the LIS Best Practices [LIS, 11b].

6.4 Using the Full Course Hierarchy Addition Profile

This Addition Profile is in effect a minimal version of the full CMS. As such, further details are available in the Section 4.5 of the LIS Best Practices [LIS, 11b].

7 Conformance and Compliance to the Core Profiles

7.1 Compliance to the Core Profile

Compliance to the Core Profile for a *Sync Agent* means:

- a) Support the Person Management Service such that:-
 - Be a *service provider* for the 'deletePerson' and 'replacePerson' operations
 - Be a *service provider* for the 'readPerson' operation during the conformance testing activity (this may then be disabled)
 - Support the SOAPv1.1 messages for the operations
 - Support the set of status codes returned in the response messages (see Table 3.2)
 - As a service provider reject the unsupported operations with the status code 'unsupported'
 - Support the Person data model for the operations (either the full data model or a proper subset)
 - Support the external VDEX vocabularies specific to this service;
- b) Support the Group Management Service such that:-
 - Be a *service provider* for the 'deleteGroup' and 'replaceGroup' operations
 - Be a *service provider* for the 'readGroup' operation during the conformance testing activity (this may then be disabled)
 - Support the SOAPv1.1 messages for the operations
 - Support the set of status codes returned in the response messages (see Table 3.5)
 - As a service provider reject the unsupported operations with the status code 'unsupported'
 - Support the Group data model for the operations (either the full data model or a proper subset)
 - Support the external VDEX vocabularies specific to this service;
- c) Support the Membership Management Service such that:-
 - Be a *service provider* for the 'deleteMembership' and 'replaceMembership' operations
 - Be a *service provider* for the 'readMembership' operation during the conformance testing activity (this may then be disabled)
 - Support the SOAPv1.1 messages for the operations
 - Support the set of status codes returned in the response messages (see Table 3.8)
 - As a service provider reject the unsupported operations with the status code 'unsupported'
 - Support the Membership data model for the operations (either the full data model or a proper subset)
 - Support the external VDEX vocabularies specific to this service;
- d) Support the Course Management Service such that:-
 - Be a *service provider* for the 'deleteCourseSection' and 'replaceCourseSection' operations
 - Be a *service provider* for the 'readCourseSection' operation during the conformance testing activity (this may then be disabled)
 - Support the SOAPv1.1 messages for the operations
 - Support the set of status codes returned in the response messages (see Table 3.11)
 - As a service provider reject the unsupported operations with the status code 'unsupported'
 - Support the CourseSection data model for the operations (either the full data model or a proper subset)
 - Support the external VDEX vocabularies specific to this service;
- e) Support the Bulk Data Exchange Management Service such that:-
 - When functionally appropriate, be a *service consumer* for the 'reportBulkDataExchange', 'cancelBulkDataExchange', 'ignoreBulkDataExchange' and 'HTTPSget' operations
 - Be a *service provider* for the 'announceBulkDataExchange' operation
 - Support the SOAPv1.1 messages for the operations
 - Support the set of status codes returned in the response messages (see Table 3.17)
 - As a service provider reject the unsupported operations with the status code 'unsupported'

- Support the full bulk data models for the operations (either the full data model or a proper subset)
- Get and process the set of received bulk data files;
- Support the external VDEX vocabularies specific to this service.

Compliance to the Core Profile for a *Ref Agent* means:

a) Support the Person Management Service such that:-

- When functionally appropriate, be a *service consumer* for the ‘deletePerson’ and ‘replacePerson’ operations
- Support the SOAPv1.1 messages for the operations
- Support the set of status codes returned in the response messages (see Table 3.2)
- As a service provider reject the unsupported operations with the status code ‘unsupported’
- Support the Person data model for the operations (either the full data model or a proper subset)
- Support the external VDEX vocabularies specific to this service;

b) Support the Group Management Service such that:-

- When functionally appropriate, be a *service consumer* for the ‘deleteGroup’ and ‘replaceGroup’ operations
- Support the SOAPv1.1 messages for the operations
- Support the set of status codes returned in the response messages (see Table 3.5)
- As a service provider reject the unsupported operations with the status code ‘unsupported’
- Support the Group data model for the operations (either the full data model or a proper subset)
- Support the external VDEX vocabularies specific to this service;

c) Support the Membership Management Service such that:-

- When functionally appropriate, be a *service consumer* for the ‘deleteMembership’ and ‘replaceMembership’ operations
- Support the SOAPv1.1 messages for the operations
- Support the set of status codes returned in the response messages (see Table 3.8)
- As a service provider reject the unsupported operations with the status code ‘unsupported’
- Support the Membership data model for the operations (either the full data model or a proper subset)
- Support the external VDEX vocabularies specific to this service;

d) Support the Course Management Service such that:-

- When functionally appropriate, be a *service consumer* for the ‘deleteCourseSection’ and ‘replaceCourseSection’ operations
- Support the SOAPv1.1 messages for the operations
- Support the set of status codes returned in the response messages (see Table 3.11)
- As a service provider reject the unsupported operations with the status code ‘unsupported’
- Support the CourseSection data model for the operations (either the full data model or a proper subset)
- Support the external VDEX vocabularies specific to this service;

e) Support the Bulk Data Exchange Management Service such that:-

- When functionally appropriate, be a *service consumer* for the ‘announceBulkDataExchange’ operation
- Be a *service provider* for the ‘reportBulkDataExchange’, ‘cancelBulkDataExchange’, ‘ignoreBulkDataExchange’ and ‘HTTPSget’ operations
- Support the SOAPv1.1 messages for the operations
- Support the set of status codes returned in the response messages (see Table 3.17)
- As a service provider reject the unsupported operations with the status code ‘unsupported’
- Support the full bulk data model for the operations (either the full data model or a proper subset)
- Create the bulk data files and make them available for HTTPS download
- Support the four external VDEX vocabularies specific to this service.

7.2 Compliance to the Addition Profiles

When a system claims compliance to the Core profiles then any implementation must support the Core Profile. A system may support some or all of the Addition Profiles. Support of Addition Profiles reduces guaranteed

interoperability. When Addition profiles are supported the set of possible combinations of Core and Addition profiles are:

- Core + Final Grade (X+G);
- Core + Combined Sections (X+C);
- Core + Full Hierarchical Course (X+F);
- Core + Final Grade + Combined Sections (X+G+C);
- Core + Final Grade + Full Hierarchical Course (X+G+F);
- Core + Combined Sections + Full Hierarchical Course (X+C+F);
- Core + Final Grade + Combined Sections + Full Hierarchical Course (All);

Interoperability between these combinations is summarized in Table 7.1.

Table 7.1 Interoperability provided by different combinations of the core profiles.

Profile	X+G	X+C	X+F	X+G+C	X+G+F	X+C+F	All
X+G	X+G	X only	X only	X+G	X+G	X only	X+G
X+C	X only	X+G	X only	X+C	X only	X+C	X+C
X+F	X only	X only	X+F	X only	X+F	X+F	X+F
X+G+C	X+G	X+C	X only	X+G+C	X+G	X+C	X+G+C
X+G+F	X+G	X only	X+F	X+G	X+G+F	X+F	X+G+F
X+C+F	X only	X+C	X+F	X+C	X+F	X+C+F	X+C+F
All	X+G	X+C	X+F	X+G+C	X+G+F	X+C+F	All

The key points to note in Table 7.1 are:

- The green shaded cells (the diagonals) denote full interoperability (assuming the either both systems support the full data model or they support a common subset);
- The red shaded cells denote NO interoperability **except** for that defined in the Core Profile plus the common subset of the data models in the Core Profile;
- The orange shaded cells denote limited extra interoperability exceeding that defined in the Core Profile (the cell is marked with the common Addition profiles that provide the added interoperability). Once again the common subset of the data models defines the exact form of the interoperability.

7.2.1 Final Grade Addition Profile Conformance

Compliance to the Grade Addition Profile for a *Sync Agent* means:

- Be a *service provider* for the 'deleteLineItem', 'replaceLineItem', 'deleteResult', 'readResultIdsForLineItemWithLineItemType' and 'replaceResult' operations;
- Be a *service provider* for the 'readLineItem' and 'readResult' operations during the conformance testing activity (this may then be disabled);
- Support the SOAPv1.1 messages for the operations;

- Support the set of status codes returned in the response messages (see Tables 4.2, 4.4 and 4.6);
- As a service provider reject the unsupported operations with the status code 'unsupported';
- Support the LineItem, Result and ResultValue data models for the operations (either the full data model or a proper subset);
- Support the external VDEX vocabularies specific to this service.

Compliance to the Final Grade Addition Profile for a *Ref Agent* means:

- Be a *service consumer* for the 'deleteLineItem', 'replaceLineItem', 'deleteResult', 'readResultIdsForLineItemWithLineItemType' and 'replaceResult' operations;
- Support the SOAPv1.1 messages for the operations;
- Support the set of status codes returned in the response messages (see Tables 4.2, 4.4 and 4.6);
- As a service provider reject the unsupported operations with the status code 'unsupported';
- Support the LineItem, Result and ResultValue data models for the operations (either the full data model or a proper subset);
- Support the three external VDEX vocabularies specific to this service.

7.2.2 Combined Sections Addition Profile

Compliance to the Combined Sections Addition Profile for a *Sync Agent* means:

- Be a *service provider* for the 'deleteCourseSection', 'replaceCourseSection', 'deleteSectionAssociation', 'addCourseSectionId', 'removeCourseSectionId' and 'replaceSectionAssociation' operations;
- Be a *service provider* for the 'readCourseSection' and 'readSectionAssociation' operations during the conformance testing activity (this may then be disabled);
- Support the SOAPv1.1 messages for the operations;
- Support the set of status codes returned in the response messages (see Tables 4.11 and 4.13);
- As a service provider reject the unsupported operations with the status code 'unsupported';
- Support the CourseSection and SectionAssociation data models for the operations (either the full data model or a proper subset);
- Support the external VDEX vocabularies specific to this service.

Compliance to the Combined Sections Addition Profile for a *Ref Agent* means:

- Be a *service consumer* for the 'deleteCourseSection', 'replaceCourseSection', 'deleteSectionAssociation', 'addCourseSectionId', 'removeCourseSectionId' and 'replaceSectionAssociation' operations;
- Support the SOAPv1.1 messages for the operations;
- Support the set of status codes returned in the response messages (see Tables 4.11 and 4.13);
- As a service provider reject the unsupported operations with the status code 'unsupported';
- Support the CourseSection and SectionAssociation data models for the operations (either the full data model or a proper subset);
- Support the external VDEX vocabularies specific to this service.

7.2.3 Fill Course Hierarchy Addition Profile

Compliance to the Full Course Hierarchy Addition Profile for a *Sync Agent* means:

- Be a *service provider* for the 'deleteCourseTemplate', 'replaceCourseTemplate', 'deleteCourseOffering', 'replaceCourseOffering', 'deleteCourseSection', 'replaceCourseSection', 'deleteSectionAssociation', 'addCourseSectionId', 'removeCourseSectionId' and 'replaceSectionAssociation' operations;
- Be a *service provider* for the 'readCourseTemplate', 'readCourseOffering', 'readCourseSection' and 'readSectionAssociation' operations during the conformance testing activity (this may then be disabled);
- Support the SOAPv1.1 messages for the operations;
- Support the set of status codes returned in the response messages (see Tables 4.18, 4.20, 4.22 and 4.24);
- As a service provider reject the unsupported operations with the status code 'unsupported';
- Support the CourseTemplate, CourseOffering, CourseSection and SectionAssociation data models for the operations (either the full data model or a proper subset);
- Support the external VDEX vocabularies specific to this service;.

Compliance to the Full Course Hierarchy Profile for a *Ref Agent* means:

- Be a *service consumer* for the deleteCourseTemplate', 'replaceCourseTemplate', 'deleteCourseOffering', 'replaceCourseOffering', 'deleteCourseSection', 'replaceCourseSection', 'deleteSectionAssociation', 'addCourseSectionId', 'removeCourseSectionId' and 'replaceSectionAssociation' operations;
- Support the SOAPv1.1 messages for the operations;
- Support the set of status codes returned in the response messages (see Tables 4.18, 4.20, 4.22 and 4.24);
- As a service provider reject the unsupported operations with the status code 'unsupported';
- Support the CourseTemplate, CourseOffering, CourseSection and SectionAssociation data models for the operations (either the full data model or a proper subset);
- Support the external VDEX vocabularies specific to this service.

7.3 Mixed Compliance

In many cases an implementation will support more of the original features in the base LIS specification than required by the profiles. In such cases the system is expected to correctly realize those features. Conformance testing of those extra features may or may not be undertaken (the conformance test system will indicate which extra features have or have not been tested). Any compliance mark obtained will not imply interoperability with other systems that support the same extra features i.e., interoperability may be expected but no guarantees are made.

Appendix A Summary of the Services for the Profiles

A1 Core Profile Summary

Table A1.1 Summary of the service behaviors required in the core profile.

Service/Interface	Operation	Synch Agent	Ref Agent
Person Management Service • PersonManager	deletePerson	Implements	Calls
	replacePerson	Implements	Calls
Group Management Service • GroupManager	deleteGroup	Implements	Calls
	replaceGroup	Implements	Calls
Membership Management Service • MembershipManager	deleteMembership	Implements	Calls
	replaceMembership	Implements	Calls
Course Management Service • CourseSectionManager	deleteCourseSection	Implements	Calls
	replaceCourseSection	Implements	Calls
Bulk Data Exchange Management Service • BulkDataExchangeManager	announceBulkDataExchange	Implements	Calls
	reportBulkDataExchange	Calls	Implements
	ignoreBulkDataExchange	Implements	Calls
	HTTPSget	Calls	Implements

- NOTE: (a) A Synch Agent/Ref Agent must implement all of the operations denoted as 'Implements'. A Sync Agent/Ref Agent may or may not invoke the operations denoted as 'Calls' and if such a call is made then the service provider is obligated to support the request;
- (b) Support for the Outcomes Management Service is not required as part of the Core Profile. Instead, this is addressed in the Final Grade Addition Profile;
- (c) The 'replace*' operations act as implied 'create*' operations when the supplied 'sourcedId' is unknown in the service provider;
- (d) The 'read*' operations are required to support conformance testing but these operations are not then required to be made operationally available.

A2 Final Grade Addition Profile Summary

Table A2.1 Summary of the service behaviors required in the grade addition profile.

Service/Interface	Operation	Synch Agent	Ref Agent
Outcomes Management Service	deleteLineItem	Implements	Calls
• LineItemManager	replaceLineItem	Implements	Calls
Outcomes Management Service	deleteResult	Implements	Calls
• ResultManager	readResultIdsForLineItemWithLineItemType	Implements	Calls
	replaceResult	Implements	Calls

- NOTE: (a) A Synch Agent/Ref Agent must implement all of the operations denoted as 'Implements'. A Sync Agent/Ref Agent may or may not invoke the operations denoted as 'Calls' and if such a call is made then the service provider is obligated to support the request;
- (b) The 'replace*' operations act as implied 'create*' operations when the supplied 'sourcedId' is unknown in the service provider;
- (c) The 'read*' operations are required to support conformance testing but these operations are not then required to be made operationally available.

A3 Combined Sections Addition Profile Summary

Table A3.1 Summary of the service behaviors required in the combined sections addition profile.

Service/Interface	Operation	Synch Agent	Ref Agent
Course Management Service	deleteCourseSection	Implements	Calls
• CourseSectionManager	replaceCourseSection	Implements	Calls
Course Management Service	deleteSectionAssociation	Implements	Calls
• CourseSectionAssociationManager	replaceSectionAssociation	Implements	Calls

- NOTE: (a) A Synch Agent/Ref Agent must implement all of the operations denoted as 'Implements'. A Sync Agent/Ref Agent may or may not invoke the operations denoted as 'Calls' and if such a call is made then the service provider is obligated to support the request;
- (b) The 'replace*' operations act as implied 'create*' operations when the supplied 'sourcedId' is unknown in the service provider;
- (c) The 'read*' operations are required to support conformance testing but these operations are not then required to be made operationally available.

A4 Full Course Hierarchy Addition Profile Summary

Table A4.1 Summary of the service behaviors required in the full course hierarchy addition profile.

Service/Interface	Operation	Synch Agent	Ref Agent
Course Management Service • CourseTemplateManager	deleteCourseTemplate	Implements	Calls
	replaceCourseTemplate	Implements	Calls
Course Management Service • CourseOfferingManager	deleteCourseOffering	Implements	Calls
	replaceCourseOffering	Implements	Calls
Course Management Service • CourseSectionManager	deleteCourseSection	Implements	Calls
	replaceCourseSection	Implements	Calls
Course Management Service • CourseSectionAssociationManager	deleteSectionAssociation	Implements	Calls
	replaceSectionAssociation	Implements	Calls

- NOTE: (a) A Synch Agent/Ref Agent must implement all of the operations denoted as 'Implements'. A Sync Agent/Ref Agent may or may not invoke the operations denoted as 'Calls' and if such a call is made then the service provider is obligated to support the request;
- (b) The 'replace*' operations act as implied 'create*' operations when the supplied 'sourcedId' is unknown in the service provider;
- (c) The 'read*' operations are required to support conformance testing but these operations are not then required to be made operationally available.

Appendix B The Core Profiles Binding Files

B1 Core Profile Binding Files

The set of files for the Core Profile binding are:

B1.1 Bulk Data Exchange Data Management Service (BDEMS)

As per the full specification.

B1.2 Course Management Service (CMS)

a) UML

- PSM_CMSv1p0_ServiceModel_Corev1.zuml
- PSM_CMSv1p0_ServiceModel_Corev1.xmi

b) WSDL

- CourseManagementServicev1p0_CoreSyncSingle_v1p0.wsdl
- CourseManagementServicev1p0_CoreSyncWSDL_v1p0.wsdl

c) XSD

- CourseManagementServiceSyncXSD.xsd

d) VDEX

- extensionvocabularyv1p0.xml
- statusvocabularyv1p0.xml

B1.3 Group Management Service (GMS)

As per the full specification.

B1.4 Membership Management Service (MMS)

As per the full specification.

B1.5 Person Management Service (PMS)

As per the full specification.

B2 Final Grade Addition Profile Binding Files

The set of files for the Final Grade Addition Profile binding are:

- a) UML
 - PSM_OMSv1p0_ServiceModel_FinalGradeAddv1.zuml
 - PSM_OMSv1p0_ServiceModel_FinalGradeAddv1.xmi
- b) WSDL
 - OutcomesManagementServicev1p0_FGAddSyncSingle_v1p0.wsdl
 - OutcomesManagementServicev1p0_FGAddSyncWSDL_v1p0.wsdl
- c) XSD
 - OutcomesManagementServiceSyncXSD.xsd
- d) VDEX
 - extensionvocabularyv1p0.xml
 - lineitemtypevocabularyv1p0.xml
 - statusofresultvocabularyv1p0.xml

B3 Combined Section Addition Profile Binding Files

The set of files for the Combined Section Addition Profile binding are:

- a) UML
 - PSM_CMSv1p0_ServiceModel_CmbSectionsAdv1.zuml
 - PSM_CMSv1p0_ServiceModel_CmbSectionsAdv1.xmi
- b) WSDL
 - CourseManagementServicev1p0_CSAddSyncSingle_v1p0.wsdl
 - CourseManagementServicev1p0_CSAddSyncWSDL_v1p0.wsdl
- c) XSD
 - CourseManagementServiceSyncXSD.xsd
- d) VDEX
 - extensionvocabularyv1p0.xml
 - statusvocabularyv1p0.xml

B4 Full Course Hierarchy Addition Profile Binding Files

The set of files for the Full Course Hierarchy Addition Profile binding are as per the full CMS specification.

About This Document

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Purpose:	This document is made available for adoption by the public community at large.
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