

Quercus Message Link

Pack 1

Reference Guide

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Document History

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2.7.0.0	15-Mar-2010	Stephen Brennan, Jan Navratil	Internal circulation
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1 Introduction

1.1 Audience

This guide addresses the message driven integration between CampusIT QuercusPlus / QuercusLive product set and other corporate systems using event driven - service oriented architecture (SOA).

This guide is intended for integration architects, developers and IT managers.

1.2 Conventions Used in this Guide

- Menu options are shown in Italics with a leading capital e.g.
“Select the *File Open* menu option.”
- Field names are shown in bold with a leading capital e.g.
“Set the value of the **File Location** field to ...”
- Screen buttons are shown in bold sans-serif with a leading capital e.g.
“Click the **Next** button.”
- Keyboard keys are shown in bold italics with a leading capital e.g.
“Press **Return** to continue.”
- Notes and hints are shown in italics with an icon e.g.
“🕒 *You can save time by creating a desktop shortcut ...*”
- Warnings are shown in bold lettering, with a symbol to bring them to your attention e.g.
“🔥 **It is your responsibility to ensure that you do not violate your Oracle license agreement.**”
- References to other sources of information are shown in sans-serif with a book symbol e.g.
“For further details please refer to 📖 *Configuring Disk Storage for Oracle Data files and Recovery Files.*”

1.3 Documentation Overview

This guide forms part of a set of guides which includes the following:

- 📖 QuercusPlus Message Link Reference Guide (this document)
- 📖 QuercusPlus Installation Guide
- 📖 QuercusPlus System Administration Guide
- 📖 QuercusPlus User Guide
- 📖 QuercusPlus Reporting Guide
- 📖 QuercusPlus Business Area Reporting Guide

Further information (FAQ, Knowledge Base etc.) is available on the CampusIT web site at the following address:

📖 <http://connect.campusit.net>

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1.4 Introduction to Quercus integration capabilities

Quercus offers four approaches to integration with 3rd party systems. Each was specifically designed to meet specific demands of various types of systems.

1.4.1 Quercus Message Link

- SOA based, event driven on-line integration platform for Enterprise Corporate systems
- This interface is discussed in detail in this Reference guide.

1.4.2 Quercus Live Link

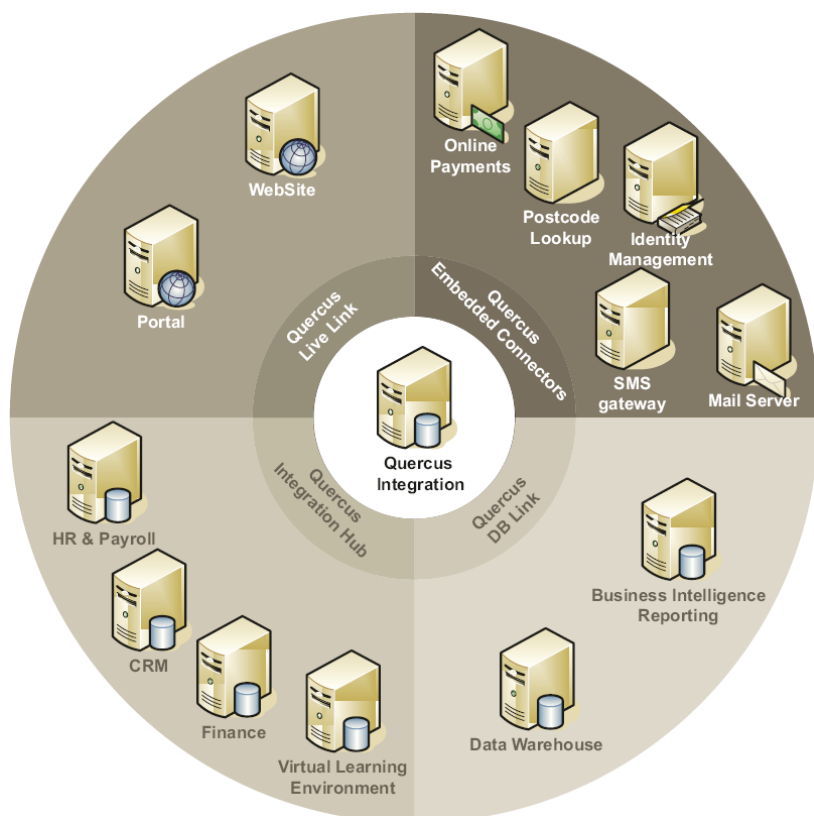
- Light interface specifically designed for interactive integration with website & portal technologies (REST/XML)
- This interface is not discussed in this Reference guide.

1.4.3 Quercus Embedded Connectors

- Out of the box connectors for all major industry infrastructure components
- This interface is not discussed in this Reference guide.

1.4.4 Quercus DB Link

- Specialized interface for data intensive integrations like data warehousing
- This interface is not discussed in this Reference guide.



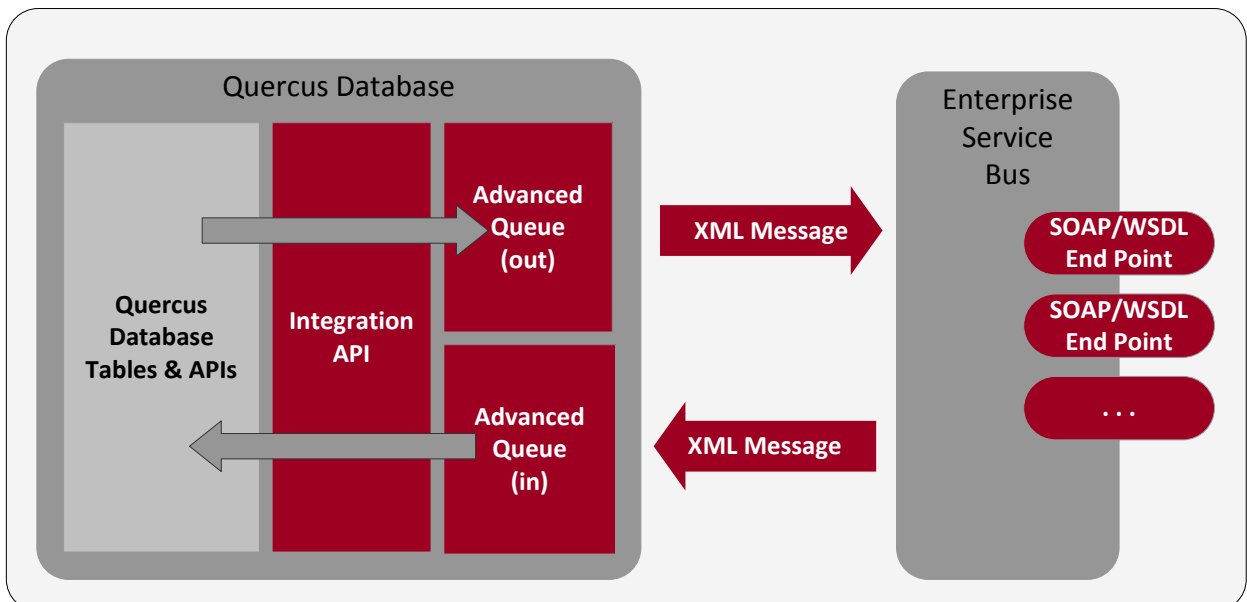
1.5 Quercus Message Link Architecture

1.5.1 Integration API

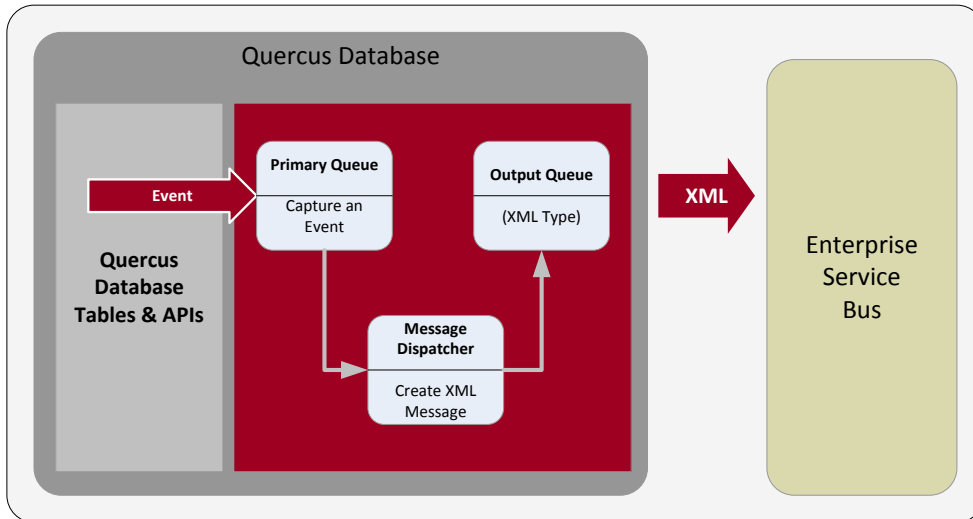
- API is monitoring changes in the Quercus database and creates a XML message and puts them into advanced queues.
- On other side incoming messages are constantly de-queued from the AQ and relevant database entities are updated in the Quercus database.
- Integration API guarantees that changes made via incoming message from ESB are not generating outgoing messages as it may cause infinite loops in the ESB.
- The API is configurable allowing enabling/disabling specific messages on as needed basis. This eliminates overhead generating XML messages that are not required for integration purposes.
- API itself resides in the Quercus database (PL/SQL code).

1.5.2 Advanced Queues

- Oracle Advanced Queuing mechanism is used to temporarily store messages in XML format before they are de-queued by ESB.
- Similar mechanism is used for incoming messages.
- This approach de-couples Quercus plus from ESB. Both Quercus and ESB can operate even when the other system is temporarily unavailable without loose of any data.
- Oracle AQ was specifically optimised for robust event driven messaging. Messages are stored securely in the Oracle database.
- Oracle AQ is an industry standard supported my majority of leading Enterprise Service Buses.

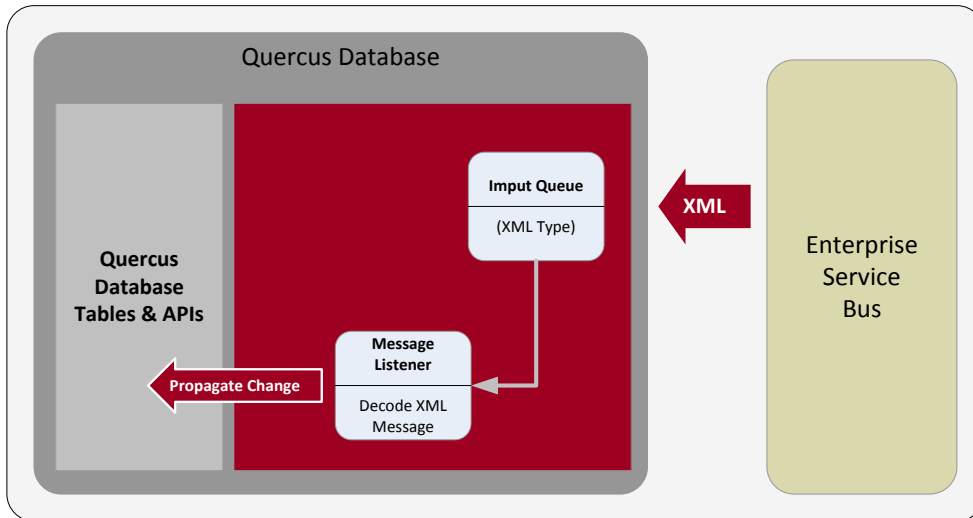


1.5.3 Outbound Message Generation Process



- An Event in QuercusPlus triggers an internal message that is enqueued in a primary queue. The message contains a link to the object that has changed and the type of message it is.
- A Message Dispatcher polls the primary queue checking if any messages have been queued. If messages are queued then the primary queue is dequeued into the message dispatcher.
- The message dispatcher gathers all information for any given object and creates a single XML message for that object.
- The single object XML message is then enqueued to a general purpose queue where it can be dequeued by the Enterprise Service Bus and dispatched to the appropriate external systems.

1.5.4 Inbound Message Process



- An ESB enqueues a message into inbound queue.
- A Message Listener polls the inbound queue checking if any messages have been queued.
- The message listener identifies what type of message it is and if the message type is enabled for inbound processing.
- According to message type relevant changes are propagated to the QuercusPlus database.
- Note: Incoming message never generate outbound message.

2 Messages

2.1 Summary

- This section lists all current and future Quercus Message Link messages.
- Messages are grouped and prioritized into “Packs”.
- Direction identifies direction of messages from the Quercus perspective
 - Out → Quercus is pushing information about a change made in the Quercus
 - In → Quercus is accepting information about a change made by other system

2.2 List of messages

	Message	Direction	Description (Event)	Pack / Priority
A1	Course data	Out	To provide course data when new records are created or existing records are updated.	2
A2	Course data	In	Updates or creates course data from external systems.	
B1	Biographic data	Out	To provide biographic data when new records are created or existing records are updated.	1
B2	Biographic data	In	Updates QuercusPlus biographic from external systems.	1
C1	Module data	Out	To provide module data to external systems when a new module is created or an existing module is updated.	2
C2	Module data	In	To receive details of modules from external systems. Modules can be created in QuercusPlus provided the module code does not already exist.	
D1	Applicant	Out	To provide applicant data when new records are created or existing records are updated.	
D1	Applicant	In	To create or update applicant record from external system.	
E1	Student Enrolment	Out	Provides details of student enrolments to external systems	1
E2	Student Enrolment	In	Enrols student (existing person) on a course instance.	
F1	Fee Transaction	Out	Provides details of financial transaction generated in Quercus to external systems.	2
F2	Fee Transaction	In	Updates student account with transaction generated in an external finance system.	2
G1	Student Curriculum	Out	Provides details of changes in the student curriculum to external systems.	2
G2	Student Curriculum	In	Update student’s curriculum in QuercusPlus from external system.	
H1	Marks & Standards	Out	Provides details of assessment results to external systems.	

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H2	Marks & Standards	In	Updates student's assessment results from external systems.	
I1	Attendance	Out	Provides details of student attendance to external systems.	
I2	Attendance	In	Update student's attendance from external systems.	
J1	Student sponsorship	Out	Provides details of student sponsorship to external systems.	
J2	Student sponsorship	In	Update student's sponsorship from external systems.	
K1	Bio data de-duplication	Out	Validates bio data against external system to identify possible duplicates or exact matches.	
K2	Bio data de-duplication	In	Provides list of possible duplicates matching passed bio data from the external system.	

2.3 Common rules / practices

2.3.1 Inbound messages will not generate outbound messages to other systems

- Messages into QuercusPlus will create/update the relevant records with the payload in the message but will not spawn new messages out of QuercusPlus.
- It is expected that the inbound messages will be dispersed to all targets from the source of the message.

2.3.2 Enterprise Service Bus compatibility requirements

- Quercus Message Link is designed to operate with open standard based Enterprise Service Buses from various vendors (Oracle, IBM, Microsoft, Apache...).
- The only requirement is that ESB can interact with Oracle database and de-queue/en-queue XML messages from/into Oracle Advanced Queue.

2.3.3 WSDL definitions

- The exact format of the WSDL file depends on the specific Enterprise Service Bus (ESB).
- Quercus Message Link can operate with various ESB and therefore WSDL definitions are not provided in this document.
- Additional resources will be made available detailing examples of WSDL files for the Oracle Service Bus 11g.

2.3.4 Naming Conventions

- All database objects associated with the QuercusPlus Message Link system have a common prefix so they can be easily identified.
- For the database tables and packages the prefix is “APIWS_” which is short for API Web Service
- For the database queue types the prefix is “AQ_” which is short for Advanced Queue

3 Message Controls

3.1 The Message Table

The message table registers the different types of message available in QuercusPlus, e.g. BioData(In), BioData(Out), Enrolment(Out).

It also is used to record:

- the direction of the message, IN or OUT
- whether or not the message is enabled
- whether or not the message is a system message, that is, a baseline message.

The message table name is APIWS_MESSAGE.

Below is a brief description of the APIWS_MESSAGE table columns.

Column Name	Format	Description
Object_Id	Number	Internal QuercusPlus record identifier
Timestamp	Date	Timestamp when the record was created
Message_Type	Character(30)	The code name for the message – e.g. 'PERSON_BIO_OUT'
Direction	Character(3)	The direction of the message. It can be either 'IN' or 'OUT'
Root_Element_Name	Character(30)	The core table that initiates the message, for example a PERSON_BIO_OUT message will contain information about the person including addresses and reference numbers but the root element is PERSON therefore the root element name is set to 'PersonBioData'.
Package_Name	Character(30)	The name of the database package that is used to handle the creation or processing of the message. Example: 'APIWS_DOM_PERSON' deals with all messages for BioData.
Method_Name	Character(30)	What method is being used for the message? If the message is being generated from QuercusPlus then the method is usually 'Create_Message' however if the message is being received into the QuercusPlus database then the method is usually 'Process_Message'
Enabled	Character(1)	Is the message enabled (Y) or disabled (N). By Default all messages are enabled.

System	Character(1)	Is the message a system message (Y) or not (N). Administrators can create their own custom messages and register them with QuercusPlus Messaging. By default custom messaging are not system.
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3.2 The Message Link Queues

Three queue tables are used to handle all messages into and out of QuercusPlus, one inbound queue and two outbound queues. See section 1.5.3 and 1.5.4 for message processing details.

Queue Name	Description
MESSAGE_IN	This queue processes all inbound messages. The message listener polls this queue at intervals checking if any new messages are available. If a new message is found than it is dequeued and propagated to the appropriate database tables.
TRANSACTION_OUT	This queue acts as the primary queue for all outbound messages. Any events that trigger the creation of a new message are first recorded in this queue. A message dispatcher polls this queue at regular intervals checking for new transactions.
MESSAGE_OUT	This queue processes all outbound messages. The message dispatcher collects all available information from the TRANSACTION_OUT queue for a given object and then creates one message for that object. The message is then enqueued in this queue awaiting the ESB to dequeue it.

3.3 The Message Link Controller

A purpose built package to allow an administrator to control the behaviour of the message link system is supplied as part of Message Link. The package name is APIWS_CONTROLLER

The package has a number of easy to use procedures that allow an administrator control how messages handled in the system. A brief description of each public procedure in the package is described below:

Function	Description	Example Usage
Enable_Message	Allows the administrator to enable a given message. The message type is passed as a parameter to this procedure.	<code>apiws_controller.enable_message('PERSON_BIO_OUT')</code>
Disable_Message	Allows the administrator to disable	<code>apiws_controller.disable_message('PERSON_BIO_IN')</code>

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	<p>a given message.</p> <p>The message type is passed as a parameter to this procedure.</p>	
Enable_Queue	<p>Allows the administrator to enable the queue.</p> <p>The queue name is passed as a parameter to this procedure.</p>	<pre>apiws_controller.enable_queue('MESSAGE_IN')</pre>
Disable_Queue	<p>Allows the administrator to disable the queue.</p> <p>The queue name is passed as a parameter to this procedure.</p>	<pre>apiws_controlloer.disable_queue('MESSAGE_OUT')</pre>
Enable_Outbound_Propagation	<p>Allows the administrator to enable the propagation of all outbound messages.</p>	<pre>apiws_controller.enable_outbound_propagation</pre>
Disable_Outbound_Propagation	<p>Allows the administrator to disable the propagation of all outbound messages.</p> <p>This is useful during periods of high activity where you may not want messages to be propagated from the system.</p>	<pre>apiws_controller.disable_outbound_propagation</pre>
Reschedule_Propagation	<p>Allows the administrator to schedule the time interval in seconds at which outbound messages are propagated.</p> <p>The default is 30 seconds.</p> <p>The time in seconds is passed as a parameter. Values between 1 and 999 are accepted otherwise the default value is used.</p>	<pre>apiws_controller.reschedule_propagation(60)</pre>
Enable_Inbound_Listener	<p>Allows the</p>	<pre>apiws_controller.enable_inbound_listener</pre>

	<p>administrator to enable the message listener to accept all inbound messages.</p>	
Disable_Inbound_Listener	<p>Allows the administrator to disable the message listener from accepting all inbound messages.</p>	<p>apiws_controller.disable_inbound_listener</p>
Reschedule_Listener	<p>Allows the administrator to schedule the time interval in seconds at which the message listener checks for inbound messages.</p> <p>The default is 30 seconds.</p> <p>The time in seconds is passed as a parameter. Values between 1 and 999 are accepted otherwise the default value is used.</p>	<p>apiws_controller.reschedule_listener(60)</p>

By default all messages are installed disabled. This is to prevent the database queues being populated immediately after installation so as to allow a controlled switch to the propagation of messages.

4 Reference - Messages

4.1 B1 - Biographic data (out)

4.1.1 Purpose

- To provide biographic data when new records are created or existing records are updated.

4.1.2 Triggering Events

	Event	Table	Operation(s)
1	Change of person bio data	PERSON	I/U
2	Change of person address	ADDRESS	I/U
3	Change of reference number	PERSON_REFERENCE_TYPE	I/U/D
4	Change of person type	PERSON_TYPE	I/U/D

4.1.3 Fields

In/Out	Field	Mandatory (Y/N)	Type	Length	Description
Out	Message ID	Y	Varchar		Message Identifier (transaction id)
Out	Message Type	Y	Varchar		PERSON_BIO_OUT
Out	GUID	Y	Varchar		Global Unique Identifier – LDAP ID
Out	ID Number	Y	Number		QuercusPlus Person ID Number
Out	First Name	Y	Varchar	30	Person First Name
Out	Surname	Y	Varchar	30	Person Surname
Out	Middle Name	N	Varchar	30	Person Middle Name
Out	Preferred Name	N	Varchar	30	Person Preferred Name
Out	Title	N	Varchar	16	Person Honorific
Out	Gender	Y	Varchar	6	Person Gender (M or F)
Out	Social Insurance Number	N	Varchar	16	Person Social Insurance Number
Out	Date of Birth	N	Date		Person Date of Birth
Out	Home Address	N	Address Type		Person Home Address – Type: Address
Out	Term Address	N	Address Type		Person Term Address – Type: Address
Out	Work Address	N	Address Type		Person Work Address – Type: Address
Out	Mailing Label	N	Address type		Person Mailing Label – Type: Address
Repeated List of Person Roles (e.g. Student, Tutor, Director etc.)					
Out	Person Type	N	Varchar	16	Person Type Code
Out	Description	N	Varchar	80	Person Type Description
Repeated List of Person Reference Numbers (e.g. ULN, UCAS)					
Out	Reference Number Type	N	Varchar	16	Reference Number Type Code
Out	Description	N	Varchar	80	Reference Number Type Description
Out	Reference Number	N	Varchar		Reference Number value
Out	Start Date	N	Date		Reference Number Start date

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Out	End Date	N	Date	Reference Number	End date
-----	----------	---	------	------------------	----------

Notes

1. All Reference numbers will be listed regardless of start and end dates.

4.1.4 XSD schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="http://xmlns.oracle.com/xdb/campusit/messaging"
  targetNamespace="http://xmlns.oracle.com/xdb/campusit/messaging"
  elementFormDefault="qualified">

  <xsd:include schemaLocation="QuercusIntegraMetaData.xsd"/>

  <xsd:element name="PersonBioData">
    <xsd:annotation>
      <xsd:documentation>Biographical data about a person</xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element ref="QuercusMessageMeta" minOccurs="1" maxOccurs="1"/>
        <xsd:element name="personRecord" type="PersonRecordType" minOccurs="1" maxOccurs="1"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="Address" type="AddressType"/>

  <xsd:complexType name="PersonRecordType">
    <xsd:sequence>
      <xsd:element name="GUID" minOccurs="1" maxOccurs="1" nillable="false">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="idNumber" type="xsd:long" minOccurs="1" maxOccurs="1" nillable="true">
      </xsd:element>
      <xsd:element name="firstName" minOccurs="1" maxOccurs="1" nillable="false">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="middleName" minOccurs="0" maxOccurs="1" nillable="true">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="surname" minOccurs="1" maxOccurs="1" nillable="false">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="preferredName" minOccurs="0" maxOccurs="1" nillable="true">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">

```

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```

        <xsd:maxLength value="30"/>
    </xsd:restriction>
</xsd:simpleType>
</xsd:element>
<xsd:element name="title" minOccurs="0" maxOccurs="1" nillable="true">
    <xsd:simpleType>
        <xsd:restriction base="xsd:string">
            <xsd:maxLength value="16"/>
        </xsd:restriction>
    </xsd:simpleType>
</xsd:element>
<xsd:element name="gender" minOccurs="0" maxOccurs="1" nillable="true">
    <xsd:simpleType>
        <xsd:restriction base="xsd:string">
            <xsd:maxLength value="1"/>
        </xsd:restriction>
    </xsd:simpleType>
</xsd:element>
<xsd:element name="socialInsuranceNumber" minOccurs="0" maxOccurs="1" nillable="true">
    <xsd:simpleType>
        <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
        </xsd:restriction>
    </xsd:simpleType>
</xsd:element>
<xsd:element name="dataOfBirth" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="homeAddress" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="termAddress" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="workAddress" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="mailingLabel" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="roles" type="PersonRoles" minOccurs="0"/>
<xsd:element name="referenceNumbers" type="PersonReferenceNumbers" minOccurs="0"/>
</xsd:sequence>
<xsd:attribute name="personObjectId" type="xsd:long"/>
<xsd:attribute name="timestamp" type="xsd:dateTime"/>
</xsd:complexType>

<xsd:complexType name="PersonRoleType">
    <xsd:sequence>
        <xsd:element name="personType" minOccurs="1" maxOccurs="1" nillable="false">
            <xsd:simpleType>
                <xsd:restriction base="xsd:string">
                    <xsd:maxLength value="16"/>
                </xsd:restriction>
            </xsd:simpleType>
        </xsd:element>
        <xsd:element name="description" minOccurs="0" maxOccurs="1" nillable="true">
            <xsd:simpleType>
                <xsd:restriction base="xsd:string">
                    <xsd:maxLength value="80"/>
                </xsd:restriction>
            </xsd:simpleType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="PersonRoles">
    <xsd:sequence>
        <xsd:element name="role" type="PersonRoleType" minOccurs="1" maxOccurs="unbounded" nillable="false"/>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="PersonReferenceNumberType">
    <xsd:sequence>
        <xsd:element name="referenceNumber" minOccurs="1" maxOccurs="1" nillable="false">
            <xsd:simpleType>

```

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```

    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="16"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="referenceNumberType" minOccurs="1" maxOccurs="1" nillable="false">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="16"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="desription" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="80"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="startDate" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="endDate" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="PersonReferenceNumbers">
  <xsd:sequence>
    <xsd:element name="referenceNumber" type="PersonReferenceNumberType" minOccurs="1" maxOccurs="unbounded" nillable="false"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="AddressLinesType">
  <xsd:sequence>
    <xsd:element name="addressLine1" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine2" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine3" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine4" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine5" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

```

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```

</xsd:element>
<xsd:element name="postcode" minOccurs="1" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="30"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="AddressType">
  <xsd:sequence>
    <xsd:element name="address" type="AddressLinesType" minOccurs="0" maxOccurs="1" nillable="true"/>
    <xsd:element name="email" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="100"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="phone" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="20"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="mobilePhone" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="20"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="fax" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="20"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="contactInfo" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
  </xsd:sequence>
  <xsd:attribute name="addressObjectId" type="xsd:long"/>
  <xsd:attribute name="timestamp" type="xsd:dateTime"/>
</xsd:complexType>
</xsd:schema>

```

4.2 B2 - Biographic data (in)

4.2.1 Purpose

- Updates QuercusPlus biographic data from external systems.

4.2.2 Triggering Events

Event	Table	Operation(s)

4.2.3 Fields

In/Out	Field	Mandatory (Y/N)	Type	Length	Description
Out	Message ID	Y	Varchar		Message Identifier (transaction id)
Out	Message Type	Y	Varchar		PERSON_BIO_IN
Out	GUID	Y	Varchar		Global Unique Identifier – LDAP ID
Out	ID Number	Y	Number		QuercusPlus Person ID Number
Out	First Name	Y	Varchar	30	Person First Name
Out	Surname	Y	Varchar	30	Person Surname
Out	Middle Name	N	Varchar	30	Person Middle Name
Out	Preferred Name	N	Varchar	30	Person Preferred Name
Out	Title	N	Varchar	16	Person Honorific
Out	Gender	Y	Varchar	6	Person Gender (M or F)
Out	Social Insurance Number	N	Varchar	16	Person Social Insurance Number
Out	Date of Birth	N	Date		Person Date of Birth
Out	Home Address	N	Address Type		Person Home Address – Type: Address
Out	Term Address	N	Address Type		Person Term Address – Type: Address
Out	Work Address	N	Address Type		Person Work Address – Type: Address
Out	Mailing Label	N	Address type		Person Mailing Label – Type: Address
Repeated List of Person Roles (e.g. Student, Tutor, Director etc.)					
Out	Person Type	N	Varchar	16	Person Type Code
Out	Description	N	Varchar	80	Person Type Description
Repeated List of Person Reference Numbers (e.g. ULN, UCAS)					
Out	Reference Number Type	N	Varchar	16	Reference Number Type Code
Out	Description	N	Varchar	80	Reference Number Type Description
Out	Reference Number	N	Varchar		Reference Number value
Out	Start Date	N	Date		Reference Number Start date
Out	End Date	N	Date		Reference Number End date

4.2.4 XSD schema

```

<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="http://xmlns.oracle.com/xdb/campusit/messaging"
  targetNamespace="http://xmlns.oracle.com/xdb/campusit/messaging"
  elementFormDefault="qualified">

  <xsd:include schemaLocation="QuercusIntegraMetaData.xsd"/>

  <xsd:element name="PersonBioData">
    <xsd:annotation>
      <xsd:documentation>Biographical data about a person</xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element ref="QuercusMessageMeta" minOccurs="1" maxOccurs="1"/>
        <xsd:element name="personRecord" type="PersonRecordType" minOccurs="1" maxOccurs="1"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="Address" type="AddressType"/>

  <xsd:complexType name="PersonRecordType">
    <xsd:sequence>
      <xsd:element name="GUID" minOccurs="1" maxOccurs="1" nillable="false">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="idNumber" type="xsd:long" minOccurs="1" maxOccurs="1" nillable="true">
      </xsd:element>
      <xsd:element name="firstName" minOccurs="1" maxOccurs="1" nillable="false">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="middleName" minOccurs="0" maxOccurs="1" nillable="true">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="surname" minOccurs="1" maxOccurs="1" nillable="false">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element name="preferredName" minOccurs="0" maxOccurs="1" nillable="true">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:maxLength value="30"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>

```

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```

<xsd:element name="title" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="16"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="gender" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="1"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="socialInsuranceNumber" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="30"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="dataOfBirth" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="homeAddress" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="termAddress" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="workAddress" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="mailingLabel" type="AddressType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="roles" type="PersonRoles" minOccurs="0"/>
<xsd:element name="referenceNumbers" type="PersonReferenceNumbers" minOccurs="0"/>
</xsd:sequence>
<xsd:attribute name="personObjectId" type="xsd:long"/>
<xsd:attribute name="timestamp" type="xsd:dateTime"/>
</xsd:complexType>

<xsd:complexType name="PersonRoleType">
  <xsd:sequence>
    <xsd:element name="personType" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="16"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="description" minOccurs="0" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="80"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="PersonRoles">
  <xsd:sequence>
    <xsd:element name="role" type="PersonRoleType" minOccurs="1" maxOccurs="unbounded" nillable="false"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="PersonReferenceNumberType">
  <xsd:sequence>
    <xsd:element name="referenceNumber" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="16"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

```

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```

</xsd:element>
<xsd:element name="referenceNumberType" minOccurs="1" maxOccurs="1" nillable="false">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="16"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="desription" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="80"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="startDate" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="endDate" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="PersonReferenceNumbers">
  <xsd:sequence>
    <xsd:element name="referenceNumber" type="PersonReferenceNumberType" minOccurs="1" maxOccurs="unbounded" nillable="false"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="AddressLinesType">
  <xsd:sequence>
    <xsd:element name="addressLine1" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine2" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine3" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine4" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="addressLine5" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="postcode" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">

```


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```

    <xsd:maxLength value="30"/>
  </xsd:restriction>
</xsd:simpleType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="AddressType">
  <xsd:sequence>
    <xsd:element name="address" type="AddressLinesType" minOccurs="0" maxOccurs="1" nillable="true"/>
    <xsd:element name="email" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="100"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="phone" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="20"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="mobilePhone" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="20"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="fax" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="20"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="contactInfo" minOccurs="1" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
  </xsd:sequence>
  <xsd:attribute name="addressObjectId" type="xsd:long"/>
  <xsd:attribute name="timestamp" type="xsd:dateTime"/>
</xsd:complexType>
</xsd:schema>

```

4.2.5 Rules for Biographic Data Inbound Messages

As a general rule for Bio_Data_In messages if a field value has changed then it will be updated in QuercusPlus with the changed value with the exception of the fields IDnumber and GUID

4.2.5.1 Address Field Rules

The address fields are:

- Addressline1
- Addressline2

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- Addressline3
- Addressline4
- Addressline5
- Postcode
- Email
- Phone
- MobilePhone
- Fax
- Contact

For the purposes of update the address is split between the first 6 lines of address (Addressline1 to Postcode) and the rest of the address. Updates to address are processed as follows:

- If the first 6 lines of address in the message are empty (null) then the address lines 1 to postcode are not updated in QuercusPlus.
- If the first 6 lines of address in the message are not empty then the address lines 1 to postcode are updated in QuercusPlus.
- The remaining address fields in the message are used to update the database address fields whether or not they are null.

4.2.5.2 Person Role Rules

If a person role is included in the Bio_Data_In message then the system checks if the role already exists for the person and if it doesn't then the role is added to the persons record.

4.2.5.3 Person Reference Number Rules

If a reference number is included in the Bio_Data_In message then the following rules apply.

- The system checks for an existing record using the reference number and the reference number type.
- If there is an existing reference number record for the person then it is updated (start and end dates)
- If a record does not exist then a new record is created.

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4.3 E1 – Student Enrolment (Out)

4.3.1 Purpose

- Provides details of student enrolments to external systems

4.3.2 Triggering Events

	Event	Table	Operation(s)
1	New or change to existing Student Enrolment	Student Course Detail	I/U

4.3.3 Fields

In/Out	Field	Mandatory (Y/N)	Type	Length	Description
Out	Message ID	Y	Varchar		Message Identifier (transaction id)
Out	Message Type	Y	Varchar		
Out	GUID	Y	Varchar		Global Unique Identifier – LDAP ID
Out	ID Number	Y	Number		QuercusPlus Person ID Number
Out	Course Instance Code	Y	Varchar	40	Unique code for a course instance. It is a concatenation of course code, instance code and academic session separated with a hyphen (“-”)
Out	Student Status Code	Y	Varchar	16	Status of enrolment (e.g. P, R, WD)
Out	Student Status Description	Y	Varchar	80	Status Description (e.g. pre-registered, registered)
Out	Student Category Code	N	Varchar	16	Category Code
Out	Student Category Description	N	Varchar	80	Category Description
Out	Fee Category Code	N	Varchar	16	Fee Category Code
Out	Fee Category Description	N	Varchar	80	Fee Category Description
Out	Fee Level Code	N	Varchar	16	Fee Level Code (M or CI)
Out	Fee Level Description	N	Varchar	80	Fee Level Description (Module or Course Instance)
Out	Enrolment Date	N	Date		Date student enrolls on course instance
Out	Withdrawal Date	N	Date		Date student withdraws from course instance

4.3.4 XSD schema

```

<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="http://xmlns.oracle.com/xdb/campusit/messaging"
  targetNamespace="http://xmlns.oracle.com/xdb/campusit/messaging"
  elementFormDefault="qualified">

  <xsd:include schemaLocation="QuercusIntegraMetaData.xsd"/>

  <xsd:element name="StudentEnrolmentData">
    <xsd:annotation>
      <xsd:documentation>Student Enrolment element</xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>

```

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```

<xsd:sequence>
  <xsd:element ref="QuercusMessageMeta" minOccurs="1" maxOccurs="1"/>
  <xsd:element name="enrolment" type="EnrolmentType"/>
</xsd:sequence>
</xsd:complexType>
</xsd:element>

<xsd:complexType name="EnrolmentType">
  <xsd:sequence>
    <xsd:element name="GUID" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="idNumber" type="xsd:long" minOccurs="1" maxOccurs="1" nillable="false"/>
    <xsd:element name="courseInstanceCode" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="30"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="studentStatusCode" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="16"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="studentStatusDescription" minOccurs="1" maxOccurs="1" nillable="false">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="80"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="studentCategoryCode" minOccurs="0" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="16"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="studentCategoryDescription" minOccurs="0" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="80"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="feeCategoryCode" minOccurs="0" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="16"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element name="feeCategoryDescription" minOccurs="0" maxOccurs="1" nillable="true">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="80"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

```

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```
<xsd:element name="feeLevelCode" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="16"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="feeLevelDescription" minOccurs="0" maxOccurs="1" nillable="true">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:maxLength value="80"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
<xsd:element name="enrolmentDate" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
<xsd:element name="withdrawalDate" type="xsd:date" minOccurs="0" maxOccurs="1" nillable="true"/>
</xsd:sequence>
<xsd:attribute name="personObjectId" type="xsd:string"/>
<xsd:attribute name="courseInstanceObjectId" type="xsd:long"/>
<xsd:attribute name="timestamp" type="xsd:dateTime"/>
</xsd:complexType>
</xsd:schema>
```

5 Types

5.1 AddressLines Type

5.1.1 Fields

Field	Mandatory (Y/N)	Type	Length	Description
Address Line1	N	Varchar	30	
Address Line2	N	Varchar	30	
Address Line3	N	Varchar	30	
Address Line4	N	Varchar	30	
Address Line5	N	Varchar	30	
Postcode	N	Varchar	30	

5.2 Address Type

5.2.1 Fields

Field	Mandatory (Y/N)	Type	Length	Description
Address Lines	N	AddressLines Type		
Phone	N	Varchar	20	
Fax	N	Varchar	20	
Email	N	Varchar	100	
Contact	N	Varchar	30	Contact Name
Mobile Phone	N	Varchar	20	