

BesaHL7 Guide

<http://www.besasoftware.com>

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Introduction

BesaHL7 is Delphi components for handling HL7 (Health Level Seven) messages. BesaHL7 can generate and parse HL7 messages. You can develop easy your applications for communicate lab. devices or other healthcare systems.

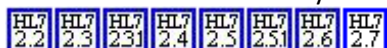
- Supports HL7 2.2, 2.3, 2.3.1, 2.4, 2.5, 2.5.1, 2.6, 2.7 versions.
- You can use with Delphi 7, 2005, 2006, 2007, 2009, 2010, XE, XE2, XE3, XE4, XE5, XE6, XE7, XE8, 10, 10.1.
- %100 Native delphi code. No DLL No OCX.
- Application development for Cross Platforms
- It's support message groups and nested groups.
- Support for all HL7 data types.
- Support custom message types .
- Support custom segment (Z Segment) types.
- Access to fields using a terse location specification syntax.
- You can get/set values **AsHL7/AsString** property.
- You can get XML document **AsXML** property.
- Licensed royalty-free per developer, per team, or per site.

Installation

Delphi versions

1. First install `bsbasedX.dpk` package. This package contains base common classes. (where X is your delphi version number).
2. Install your need `bsXXdZ.dpk` package.
(where XX is hl7 version, Z is delphi version : `bs22d15.dpk`)

if installation is succesfull you can see this images in "Besa" tab.



Quick Start

Creating Message

Before you create a message, you need to load the library of the message with `BShl7Library.LoadFromFile` method.

There are two ways to create a message:

1. Classical usage.

To create a new message you need only create a message and set required fields.

```
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
    BShl7Library.LoadFromFile('..\data\BShl722.BSL');
end;

procedure TForm1.bMessageCreateClick(Sender: TObject);
var
    msg : TbsADT_A01_22;
begin
    try
        msg := TbsADT_A01_22.Create;

        // Populate the MSH Segment
        msg.MSH.Sendingfacility.Value:='Sending';
        msg.MSH.Sequencenumber.Value:='123';

        // Populate the PID Segment
        msg.PID.PatientName.FamilyName.AsString:='Doe';
        msg.PID.PatientName.GivenName.AsString:='John';
        msg.PID.PatientIDInternalID[0].IDNumber.AsString:='123456';

        Mem1.Lines.Append(msg.AsHL7);
        // MSH|^~\&|||Sending|||||||123
        // PID|||123456||Doe^John
    finally
        msg.Free;
    end;
end;
```

2. Dynamically usage.

For use this way you need known segment name, group name and field name or their index.

```
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
    BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bCreateMessagePathClick(Sender: TObject);
var
    msg :TBSHL7Message;
begin
    try
        msg:=TBSHL7Message.Create('ADT_A01','22');

        // Populate the MSH Segment
        msg.S['MSH/Sendingfacility']:= 'Sending';
        msg.S['MSH/Sequencenumber']:= '123';

        // Populate the PID Segment
        msg.S['PID/PatientName/FamilyName']:= 'Doe';
        msg.S['PID/PatientName/GivenName']:= 'John';
        msg.S['PID/PatientIDInternalID(1)/IDNumber']:= '123456';

        Memol.Lines.Append(msg.AsHL7);

        // MSH|^~\&|||Sending|||||||123
        // PID|||123456||Doe^John
    finally
        msg.Free;
    end;
end;
```

Parsing Message

For parsing messages, create a message class set **AsString** property then ok. There are two ways to parsing a message

1. Classical usage.

To parse a message you need only create a message and set **AsString** property.

```
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bParseMessageClick(Sender: TObject);
var
  msg : TbsADT_A01_22;
  ASending : string;
  ASeq      : string;
  AFName    : string;
  AGName    : string;
  AIDNumber : string;
begin

  try
    msg := TbsADT_A01_22.Create;

    msg.AsHL7:='MSH|^~\&|||Sending|||||||123'+#13+
              'EVN|'+#13+
              'PID|||123456||Doe^John'+#13+
              'PV1|'+#13+#10;

    // Get the Sendingfacility value
    ASending := msg.MSH.Sendingfacility.Value; //Sending
    ASeq      := msg.MSH.Sequencenumber.Value; //123;

    // Access the PID Segment
    AFName := msg.PID.PatientName.FamilyName.AsString; //Doe
    AGName := msg.PID.PatientName.GivenName.AsString; //John
    AIDnumber:=msg.PID.PatientIDInternalID[0].IDNumber.AsString;
    //123456

  finally
    msg.Free;
  end;

end;
```

2. Dynamically usage

For use this way you need known segment name, group name and field name or their index.

```
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
    BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bParseMessagePathClick(Sender: TObject);
var
    msg :TBSHL7Message;
    ASending : string;
    ASeq : string;
    AFName : string;
    AGName : string;
    AIDNumber : string;

begin

    try
        msg:=TBSHL7Message.Create('ADT_A01','22');

        msg.AsHL7:='MSH|^~\&|||Sending|||||||123'+#13+
                'EVN|'+#13+
                'PID|||123456||Doe^John'+#13+
                'PV1|'+#13+#10;

        // Populate the MSH Segment
        ASending :=msg.S['MSH/Sendingfacility'];//Sending
        ASeq :=msg.S['MSH/Sequencenumber'];//123

        // Populate the PID Segment
        AFName:=msg.S['PID/PatientName/FamilyName'];//Doe
        AGName:=msg.S['PID/PatientName/GivenName'];//John;
        AIDNumber:=msg.S['PID/PatientIDInternalID(1)/IDNumber'];//'123456

    finally
        msg.Free;
    end;

end;
```

ADVANCED USAGE

Basically you can create/parse messages two ways.

1. Classical usage.

For create/parse a message you need only create a message object and set/get **AsString** property.

Advantages : You do not need know about name or Index. Editor helps with Invoke code completion

Disadvantages : You need add unit files and this increase file/memory size

```
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bMessageCreateClick(Sender: TObject);
var
  msg : TbsADT_A01_22;
begin
  try
    msg := TbsADT_A01_22.Create;
    ...
  finally
    msg.Free;
  end;
end;
```

Name	Description
AsString	Set/Get String value. The value is stored coded.
RawValue	Set/Get Value with raw value. adt_a01.MSH.FieldSeparator.RawValue:=' ';

2. Dynamically usage

For use this way you need known segment name, group name and field name or their index.

Advantages : Low memory footprint. You do not need know about name or Index.

Disadvantages : For use this way you need known segment name, group name and field name or their index. Index is 1 based.

Accesing with name and Index:

```
msg.S['Name'] := 'Value';
msg.S['Index'] := 'Value';
```

```
msg.S['PID/PatientName/GivenName'] := 'John';
msg.S['PID/PatientName/2'] := 'John';
```

!!! Name parameter is case insensitive

Below codes generate same result:


```
msg.S['PID/PatientName/GivenName'] := 'John';
msg.S['PID/PatientName/GiveNnAmE'] := 'John';
```

Name	Description
S[IndexOrName]	Set/Get String value. The value is stored coded.
I[IndexOrName]	Set/Get Integer value
RawValue[IndexOrName]	Set/Get Value with raw value. adt_a01.MSH.FieldSeparator.RawValue := ' ';

```
msg.I[NameOrIndex] := 123; // Integer value
```

For accessing Array Index use Index specifier: Index is 1 based.

```
msg.S['ArrayTyped(1)'] := 'Value'
msg.S['PID/PatientIDInternalID(1)/IDNumber'] := '123456'
msg.S['PID/PatientIDInternalID(2)/IDNumber'] := '7890';
```

Getting Array Length:

```
ArrayLen := msg.ArrayLen[IndexOrName];
ArrayLen := msg.ArrayLen['PID/PatientIDInternalID'];
```

```
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bCreateMessagePathClick(Sender: TObject);
var
  msg : TBSHL7Message;
  ArrayLen: Integer;
begin
  try
    // Set Message parameters OnCreate
    msg := TBSHL7Message.Create('ADT_A01', '22');

    // Populate the MSH Segment
    msg.S['MSH/Sendingfacility'] := 'Sending';
    msg.S['MSH/Sequencenumber'] := '123';

    // Populate the PID Segment
    msg.S['PID/PatientName/FamilyName'] := 'Doe';
    msg.S['PID/PatientName/GivenName'] := 'John';

    msg.S['PID/PatientIDInternalID(1)/IDNumber'] := '123456';
    msg.S['PID/PatientIDInternalID(2)/IDNumber'] := '789';

    Memo1.Lines.Append(msg.AsString);

    // MSH|^~\&|||Sending|||||||123
    // PID|||123456~789||Doe^John
  finally
    msg.Free;
  end;
end;
```

SAMPES

Generate ORU_R01

Classical Classes Sample

```

//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
    BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bMessageCreateAdvClick(Sender: TObject);
var
    msg : TbsORU_R01_24;
    msh : TbsMSH_24;
    pid: TbsPID_24;
    obr: TbsOBR_24;
    obx: TbsOBX_24;
    sn : TbsSN_24;
begin
    msg:=TbsORU_R01_24.Create;

    //MSH
    msh:= msg.MSH;
    msh.SendingApplication.NamespaceID.AsString:='GHH LAB';
    msh.SendingFacility.NamespaceID.AsString:='ELAB-3';
    msh.ReceivingApplication.NamespaceID.AsString:='GHH OE';
    msh.ReceivingFacility.NamespaceID.AsString:='BLDG4';
    msh.DateTimeOfMessage.TimeOfAnEvent.AsString:='200202150930';
    msh.MessageControlID.AsString:='CNTRL-3456';

    //PID
    pid:=msg.PATIENT_RESULT[0].PATIENT.PID;
    pid.PatientIdentifierList[0].ID.AsString:='555-44-4444';
    pid.PatientName[0].Familyname.Surname.AsString:='EVERYWOMAN';
    pid.PatientName[0].Givenname.AsString:='EVE';
    pid.PatientName[0].Secondandfurthergivennamesorinitialsthereof.AsString:='E';
    pid.PatientName[0].Nametypecode.AsString:='L';
    pid.MothersMaidenName[0].Familyname.Surname.AsString:='JONES';
    pid.DateTimeOfBirth.TimeOfAnEvent.AsString:='196203520';
    pid.AdministrativeSex.AsString:='F';
    pid.PatientAddress[0].Streetaddress.Streetormailingaddress.AsString:='153
FERNWOOD DR.';
    pid.PatientAddress[0].City.AsString:='STATESVILLE';
    pid.PatientAddress[0].Stateorprovince.AsString:='OH';
    pid.PatientAddress[0].Ziporpostalcode.AsString:='35292';
    pid.PhoneNumberHome[0].Telephonenumber.AsString:='(206)3345232';
    pid.PhoneNumberBusiness[0].Telephonenumber.AsString:='(206)752-121';
    pid.PatientAccountNumber.ID.AsString:='AC555444444';
    pid.DriversLicenseNumberPatient.Driverslicensenummer.AsString:='67-A4335';
    pid.DriversLicenseNumberPatient.Issuingstate_province_country.AsString:='OH';
    pid.DriversLicenseNumberPatient.Expirationdate.AsString:='20030520';

    // OBR
    obr:=msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBR;
    obr.SetIDOBR.AsString:='1';
    obr.PlacerOrderNumber.Entityidentifier.AsString:='845439';
    obr.PlacerOrderNumber.NamespaceID.AsString:='GHH OE';
    obr.FillerOrderNumber.Entityidentifier.AsString:='1045813';
    obr.FillerOrderNumber.NamespaceID.AsString:='GHH LAB';
    obr.UniversalServiceIdentifier.Identifier.AsString:='1554-5';
    obr.UniversalServiceIdentifier.Text.AsString:='GLUCOSE';
    obr.UniversalServiceIdentifier.Nameofcodingsystem.AsString:='LN';
    obr.ObservationDateTime.TimeOfAnEvent.AsString:='200202150730';
    obr.OrderingProvider[0].IDnumber.AsString:='555-55-5555';

```

```

obr.OrderingProvider[0].Familyname.Surname.AsString='PRIMARY';
obr.OrderingProvider[0].Givenname.AsString='PATRICIA P';
obr.OrderingProvider[0].Degree.AsString='MD';
obr.OrderingProvider[0].Assigningauthority.NamespaceID.AsString='LEVEL SEVEN
HEALTHCARE, INC.';
obr.ResultStatus.AsString='F';
obr.PrincipalResultInterpreter.OPName.IDNumber.AsString='444-44-4444';
obr.PrincipalResultInterpreter.OPName.FamilyName.AsString='HIPPOCRATES';
obr.PrincipalResultInterpreter.OPName.GivenName.AsString='HOWARD H';
obr.PrincipalResultInterpreter.OPName.Degree.AsString='MD';

// OBX
obx:=msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBSERVATION[0].OBX;
obx.SetIDOBX.AsString='1';
obx.ValueType.AsString='SN';
obx.ObservationIdentifier.Identifier.AsString='1554-5';
obx.ObservationIdentifier.Text.AsString='GLUCOSE POST 12H CFST';
obx.ObservationIdentifier.Nameofcodingsystem.AsString='LN';

sn:=TbsSN_24.Create;
sn.Num1.AsString='182';
obx.ObservationValue[0]:= sn;
obx.Units.Identifier.AsString='mg/dl';
obx.ReferencesRange.AsString='70-105';
obx.AbnormalFlags.AsString='H';
obx.ObservationResultStatus.AsString='F';

// PDF
obx:=msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBSERVATION[1].OBX;
obx.SetIDOBX.AsString='2';
obx.ValueType.AsString='ED';

ed:=TbsED_24.Create;
ed.TypeOfdata.AsString='TEXT';
ed.Datasubtype.AsString='PDF';
ed.Encoding.AsString='Base64';
ed.Data.Value:='PDF_BASE64_STR'; //EncodeBase64String(PDF Content String)

obx.ObservationValue[0]:= ed;

// HL7 format
Memol.Lines.Append('Message Create (Advanced)');
Memol.Lines.Text:=msg.AsHL7;

FreeAndNil(msg);
end;

```

```

MSH|^~\&|GHH LAB|ELAB-3|GHH OE|BLDG4|200202150930||ORU^R01|CNTRL-3456|P|2.4<cr>
PID|||555-44-4444|EVERYWOMAN^EVE^E^^^L|JONES|196203520|F|||153 FERNWOOD
DR.^^STATESVILLE^OH^35292|| (206) 3345232| (206) 752-121|||AC555444444|67-A4335^OH^20030520<cr>
OBR|1|845439^GHH OE|1045813^GHH LAB|1554-5^GLUCOSE^LN|||200202150730|||555-55-
5555^PRIMARY^PATRICIA P^^^MD^^LEVEL SEVEN HEALTHCARE, INC.|||||F|||||444-44-
4444&HIPPOCRATES&HOWARD H&&&MD<cr>
OBX|1|SN|1554-5^GLUCOSE POST 12H CFST^LN||^182|mg/dl|70-105|H|||F<cr>
OBX|2|ED|||^TEXT^PDF^Base64^PDF_BASE64_STR<cr>

```

Dynamically Usage Path Sample

```

//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL724.BSL');
end;

procedure TForm1.bCreateMessagePathAdvClick(Sender: TObject);
var
  msg : TBSHL7Message;
  msh : TBSHL7Object;
  pid : TBSHL7Object;
  obr : TBSHL7Object;
  obx : TBSHL7Object;
  sn : TBSHL7Object;
begin
  msg:=TBSHL7Message.Create('ORU_R01','24');

  //MSH
  msh:= msg.O['MSH'];
  msh.S['SendingApplication/namespaceID']:= 'GHH LAB';
  msh.S['SendingFacility/namespaceID']:= 'ELAB-3';
  msh.S['ReceivingApplication/namespaceID']:= 'GHH OE';
  msh.S['ReceivingFacility/namespaceID']:= 'BLDG4';
  msh.S['DateTimeOfMessage/TimeOfAnEvent']:= '200202150930';
  msh.S['MessageControlID']:= 'CNTRL-3456';

  //PID
  pid:=msg.O['PATIENT_RESULT(1)/PATIENT/PID'];
  pid.S['PatientIdentifierList(1)/ID']:= '555-44-4444';
  pid.S['PatientName(1)/Familyname/Surname']:= 'EVERYWOMAN';
  pid.S['PatientName(1)/Givenname']:= 'EVE';
  pid.S['PatientName(1)/Secondandfurthergiventnamesorinitialsthereof']:= 'E';
  pid.S['PatientName(1)/Nametypecode']:= 'L';
  pid.S['MothersMaidenName(1)/Familyname/Surname']:= 'JONES';
  pid.S['DateTimeOfBirth/TimeOfAnEvent']:= '196203520';
  pid.S['AdministrativeSex']:= 'F';
  pid.S['PatientAddress(1)/Streetaddress/Streetormailingaddress']:= '153 FERNWOOD
DR.';
  pid.S['PatientAddress(1)/City']:= 'STATESVILLE';
  pid.S['PatientAddress(1)/Stateorprovince']:= 'OH';
  pid.S['PatientAddress(1)/Ziporpostalcode']:= '35292';
  pid.S['PhoneNumberHome(1)/Telephonenumber']:= '(206) 3345232';
  pid.S['PhoneNumberBusiness(1)/Telephonenumber']:= '(206) 752-121';
  pid.S['PatientAccountNumber/ID']:= 'AC555444444';
  pid.S['DriversLicenseNumberPatient/Driverslicensenummer']:= '67-A4335';
  pid.S['DriversLicenseNumberPatient/Issuingstate_province_country']:= 'OH';
  pid.S['DriversLicenseNumberPatient/Expirationdate']:= '20030520';

  // OBR
  obr:=msg.O['PATIENT_RESULT(1)/ORDER_OBSERVATION(1)/OBR'];
  obr.S['SetIDOBR']:= '1';
  obr.S['PlacerOrderNumber/Entityidentifier']:= '845439';
  obr.S['PlacerOrderNumber/namespaceID']:= 'GHH OE';
  obr.S['FillerOrderNumber/Entityidentifier']:= '1045813';
  obr.S['FillerOrderNumber/namespaceID']:= 'GHH LAB';
  obr.S['UniversalServiceIdentifier/Identifier']:= '1554-5';
  obr.S['UniversalServiceIdentifier/Text']:= 'GLUCOSE';
  obr.S['UniversalServiceIdentifier/Nameofcodingsystem']:= 'LN';
  obr.S['ObservationDateTime/TimeOfAnEvent']:= '200202150730';
  obr.S['OrderingProvider(1)/IDnumber']:= '555-55-5555';
  obr.S['OrderingProvider(1)/Familyname/Surname']:= 'PRIMARY';
  obr.S['OrderingProvider(1)/Givenname']:= 'PATRICIA P';
  obr.S['OrderingProvider(1)/Degree']:= 'MD';

```

```

obr.S['OrderingProvider(1)/Assigningauthority/namespaceID'] := 'LEVEL SEVEN
HEALTHCARE, INC.';
obr.S['ResultStatus'] := 'F';
obr.S['PrincipalResultInterpreter/OPName/IDNumber'] := '444-44-4444';
obr.S['PrincipalResultInterpreter/OPName/FamilyName'] := 'HIPPOCRATES';
obr.S['PrincipalResultInterpreter/OPName/GivenName'] := 'HOWARD H';
obr.S['PrincipalResultInterpreter/OPName/Degree'] := 'MD';

// OBX
obx:=msg.O['PATIENT_RESULT(1)/ORDER_OBSERVATION(1)/OBSERVATION(1)/OBX'];
obx.S['SetIDOBX'] := '1';
obx.S['ValueType'] := 'SN';
obx.S['ObservationIdentifier/Identifier'] := '1554-5';
obx.S['ObservationIdentifier/Text'] := 'GLUCOSE POST 12H CFST';
obx.S['ObservationIdentifier/Nameofcodingsystem'] := 'LN';
obx.S['Units/Identifier'] := 'mg/dl';
obx.S['ReferencesRange'] := '70-105';
obx.S['AbnormalFlags'] := 'H';
obx.S['ObservationResultStatus'] := 'F';

sn:=TBSHL7Object.Create('SN', '24');
sn.S['Num1'] := '182';
obx.O['ObservationValue(1)'] := sn;

// HL7 format
Mem1.Lines.Append('Create Message with Path (Advanced)');
Mem1.Lines.Text:=msg.AsHL7;

FreeAndNil(msg);
end;

```

```

MSH|^~\&|GHH LAB|ELAB-3|GHH OE|BLDG4|200202150930||ORU^R01|CNTRL-3456|P|2.4<cr>
PID|||555-44-4444|EVERYWOMAN^EVE^E^^^L|JONES|196203520|F|||153 FERNWOOD
DR.^STATEVILLE^OH^35292|| (206) 3345232| (206) 752-121|||AC555444444||67-A4335^OH^20030520<cr>
OBR|1|845439^GHH OE|1045813^GHH LAB|1554-5^GLUCOSE^LN|||200202150730|||555-55-
5555^PRIMARY^PATRICIA P^^^MD^^LEVEL SEVEN HEALTHCARE, INC.|||||F|||||444-44-
4444&HIPPOCRATES&HOWARD H&&&MD<cr>
OBX|1|SN|1554-5^GLUCOSE POST 12H CFST^LN||^182|mg/dl|70-105|H|||F<cr>

```

Parse ORU_R01

Classical Classes Sample

```

const
  MsgORU_R01_22 =
    'MSH|^~\&|ABL735^ABL735 Operating Theatres|ABL735^ABL735 Operating Theatres|||'+
    '20010516135518||ORU^R01|20010516135518|P^not present|2.2' + #13 +
    'PID|1|||F87248654|Doe^John|||U' + #13 +
    'OBR|1||6^Sample #|||O|||Arterial^' + #13 +
    'NTE|1|L|443' + #13 +
    'OBX|1|ST|^pH^M||7.600||N|||F|||20010503151400||' + #13 +
    'OBX|2|ST|^pO2^M||127|mmHg||N|||F|||'| + #13 +
    'OBX|3|ST|^pCO2^M||20.4|mmHg||N|||F|||'| + #13 +
    'OBX|4|ST|^Cl^-M||73|mmol/L||N|||F|||'| + #13 +
    'OBX|5|ST|^K+^M||5.5|mmol/L||N|||F|||'| + #13 +
    'OBX|6|ST|^Na+^M||125|mmol/L||N|||F|||'| + #13 +
    'OBX|7|ST|^Glu^M||11.3|mmol/L||N|||F|||'| + #13 +
    'OBX|8|ST|^Lac^M||10.0|mmol/L||N|||F|||'| + #13 +
    'OBX|9|ST|^Ca+^M||0.36|mmol/L||N|||F|||'| + #13 +
    'OBX|10|ST|^tHb^M||17.3|g/dL||N|||F|||'| + #13 +
    'NTE|1|L|314' + #13 +
    'OBX|11|ST|^sO2^M||....%||N|||F|||'| + #13 +
    'NTE|1|L|314' + #13 +
    'OBX|12|ST|^O2Hb^M||-58.4%||<|||F|||'| + #13 +
    'NTE|1|L|314^94' + #13 +
    'OBX|13|ST|^COHb^M||110.4%||>|||F|||'| + #13 +
    'NTE|1|L|314^93' + #13 +
    'OBX|14|ST|^MetHb^M||-6.5%||<|||F|||'| + #13 +
    'NTE|1|L|314^94' + #13 +
    'OBX|15|ST|^tBil^M||....|micromol/L||<|||F|||'| + #13 +
    'NTE|1|L|314^94' + #13 +
    'OBX|16|ST|^T^I||37.0|Cel|||F|||'| + #13 +
    'OBX|17|ST|^FIO2^D||21.0%|||F|||'| + #13 +
    'OBX|18|ST|^pH(T)^M||7.600||N|||F|||'| + #13 +
    'OBX|19|ST|^pCO2(T)^M||20.4|mmHg||N|||F|||'| + #13 +
    'OBX|20|ST|^SBE^C||-1.5|mmol/L|||F|||'| + #13 +
    'OBX|21|ST|^pO2(T)^M||127|mmHg||N|||F|||'| + #13#10;

//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bParseMessageAdvClick(Sender: TObject);
var
  msg : TbsORU_R01_22;
  Patient : TbsPN_22;
  observation : TbsORU_R01_PATIENT_RESULT_ORDER_OBSERVATION_OBSERVATION_22;
  i : integer;
begin
  Memo1.Lines.Append('Message Parse (Advanced)');

  msg := TbsORU_R01_22.Create;
  //Parse message
  msg.AsString := MsgORU_R01_22;

  Patient:=msg.PATIENT_RESULT[0].PATIENT.PID.PatientName;

  // Shows John
  Memo1.Lines.Append('Patient Name : '+Patient.GivenName.AsString);

  Memo1.Lines.Add( 'OBSERVATIONRepCount : ' + IntToStr(
    msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBSERVATIONRepCount)
  );

```

```
for i:=0 to msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBSERVATIONRepCount-1

do begin
  observation := msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBSERVATION[i];
  Memo1.Lines.Append(
    observation.OBX.ObservationIdentifier.Text.AsString+#9#9+
    observation.OBX.ObservationValue.AsString);
end;

{
OBSERVATIONRepCount : 21

pH 7.600
pO2 127
pCO2 20.4
Cl- 73
K+ 5.5
Na+ 125
Glu 11.3
Lac 10.0
Ca++ 0.36
tHb 17.3
sO2 .....
O2Hb -58.4
COHb 110.4
MetHb -6.5
tBil .....
T 37.0
FIO2 21.0
pH(T) 7.600
pCO2(T) 20.4
SBE -1.5
pO2(T) 127
}
FreeAndNil(msg);
end;
```

Dynamically Usage Path Sample

```

const
MsgORU_R01_22 =
'MSH|^~\&|ABL735^ABL735 Operating Theatres|ABL735^ABL735 Operating Theatres|||'+
'20010516135518|ORU^R01|20010516135518|P^not present|2.2' + #13 +
'PID|1|||F87248654|Doe^John|||U' + #13 +
'OBR|1||6^Sample #|||O|||Arterial^' + #13 +
'NTE|1|L|443' + #13 +
'OBX|1|ST|^pH^M||7.600||N||F|||20010503151400||' + #13 +
'OBX|2|ST|^pO2^M||127|mmHg||N||F|||'| + #13 +
'OBX|3|ST|^pCO2^M||20.4|mmHg||N||F|||'| + #13 +
'OBX|4|ST|^Cl^-M||73|mmol/L||N||F|||'| + #13 +
'OBX|5|ST|^K+^M||5.5|mmol/L||N||F|||'| + #13 +
'OBX|6|ST|^Na+^M||125|mmol/L||N||F|||'| + #13 +
'OBX|7|ST|^Glu^M||11.3|mmol/L||N||F|||'| + #13 +
'OBX|8|ST|^Lac^M||10.0|mmol/L||N||F|||'| + #13 +
'OBX|9|ST|^Ca+^M||0.36|mmol/L||N||F|||'| + #13 +
'OBX|10|ST|^tHb^M||17.3|g/dL||N||F|||'| + #13 +
'NTE|1|L|314' + #13 +
'OBX|11|ST|^sO2^M||.....|N||F|||'| + #13 +
'NTE|1|L|314' + #13 +
'OBX|12|ST|^O2Hb^M||-58.4|N||F|||'| + #13 +
'NTE|1|L|314^94' + #13 +
'OBX|13|ST|^COHb^M||110.4|N||F|||'| + #13 +
'NTE|1|L|314^93' + #13 +
'OBX|14|ST|^MetHb^M||-6.5|N||F|||'| + #13 +
'NTE|1|L|314^94' + #13 +
'OBX|15|ST|^tBil^M||.....|micromol/L||N||F|||'| + #13 +
'NTE|1|L|314^94' + #13 +
'OBX|16|ST|^T^I||37.0|Cel||N||F|||'| + #13 +
'OBX|17|ST|^FIO2^D||21.0|N||F|||'| + #13 +
'OBX|18|ST|^pH(T)^M||7.600||N||F|||'| + #13 +
'OBX|19|ST|^pCO2(T)^M||20.4|mmHg||N||F|||'| + #13 +
'OBX|20|ST|^SBE^C||-1.5|mmol/L||N||F|||'| + #13 +
'OBX|21|ST|^pO2(T)^M||127|mmHg||N||F|||'| + #13#10;

//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.bParseMessagePathAdvClick(Sender: TObject);
var
  msg :TBSHL7Message;
  I, LArrayLen : Integer;
  LPatientName : String;
begin
  Mem01.Lines.Append('Message Parse with Path (Advanced)');
  try
    msg:=TBSHL7Message.Create('ORU_R01','22');
    msg.AsHL7:=MsgORU_R01_22;

    LPatientName := msg.S['PATIENT_RESULT/PATIENT/PID/PatientName/FamilyName'];
    Mem01.Lines.Append('Patient Name :'+ LPatientName);
    Mem01.Lines.Append('');

    LArrayLen :=msg.ArrayLen['PATIENT_RESULT/ORDER_OBSERVATION/OBSERVATION'];
    Mem01.Lines.Append(
      'PATIENT_RESULT/ORDER_OBSERVATION/OBSERVATION : '+IntToStr(LArrayLen)
    );

    for I := 1 to LArrayLen do
      begin
        Mem01.Lines.Append(

```



```
msg.S[Format('PATIENT_RESULT/ORDER_OBSERVATION(%d)/OBX/ObservationIdentifier/Text',[I])]
      +#9#9+

msg.S[Format('PATIENT_RESULT/ORDER_OBSERVATION(%d)/OBX/ObservationValue',[I])]
      );
      end;

      finally
        msg.Free;
      end;
    end;
```

Find message's version:

```

uses bsHL7Object;
{
  TBSHL7MessageInfo=record
    FieldSeparator      : BSChar;
    ComponentSeparator  : BSChar;
    RepetitionSeparator : BSChar;
    SubcomponentSeparator : BSChar;
    EscapeCharacter     : BSChar;
    EncodingCharacters  : BSString;
    ProcessingID        : BSString;
    MessageControlID    : BSString;
    MessageType         : BSString;
    Version              : BSString;
  end;
}
//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.Button1Click(Sender: TObject);
var
  mi : TBSHL7MessageInfo;
  msg: String;
begin
  msg:='MSH|^~\&|TestSendingSystem|||200701011539||ADT^A01||P|2.2|123'+#13+
    'PID|||123456||Doe^John';

  mi := GetMessageInfo(msg);
  ShowMessage(mi.Version);
  // Shows : 2.2
end;

```

Generate XML message

```

//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
  BSHL7Library.LoadFromFile('..\data\BSHL724.BSL');
end;

procedure TForm1.bGenerateXMLMsg(Sender: TObject);
var
  msg : TbsORU_R01_24;
  msh : TbsMSH_24;
  pid: TbsPID_24;
  obr: TbsOBR_24;
  obx: TbsOBX_24;
  sn : TbsSN_24;
begin
  msg:=TbsORU_R01_24.Create;

  //MSH
  msh:= msg.MSH;
  msh.SendingApplication.NamespaceID.AsString:='GHH LAB';
  msh.SendingFacility.NamespaceID.AsString:='ELAB-3';
  msh.ReceivingApplication.NamespaceID.AsString:='GHH OE';
  msh.ReceivingFacility.NamespaceID.AsString:='BLDG4';
  msh.DateTimeOfMessage.TimeOfAnEvent.AsString:='200202150930';

```

```

msh.MessageControlID.AsString:='CNTRL-3456';

//PID
pid:=msg.PATIENT_RESULT[0].PATIENT.PID;
pid.PatientIdentifierList[0].ID.AsString:='555-44-4444';
pid.PatientName[0].Familyname.Surname.AsString:='EVERYWOMAN';
pid.PatientName[0].Givenname.AsString:='EVE';
pid.PatientName[0].Secondandfurthergivennamesorinitialsthereof.AsString:='E';
pid.PatientName[0].Nametypecode.AsString:='L';
pid.MothersMaidenName[0].Familyname.Surname.AsString:='JONES';
pid.DateTimeOfBirth.TimeOfAnEvent.AsString:='196203520';
pid.AdministrativeSex.AsString:='F';
pid.PatientAddress[0].Streetaddress.Streetormailingaddress.AsString:='153
FERNWOOD DR.';
pid.PatientAddress[0].City.AsString:='STATESVILLE';
pid.PatientAddress[0].Stateorprovince.AsString:='OH';
pid.PatientAddress[0].Ziporpostalcode.AsString:='35292';
pid.PhoneNumberHome[0].Telephonenumber.AsString:='(206)3345232';
pid.PhoneNumberBusiness[0].Telephonenumber.AsString:='(206)752-121';
pid.PatientAccountNumber.ID.AsString:='AC555444444';
pid.DriversLicenseNumberPatient.Driverslicensenummer.AsString:='67-A4335';
pid.DriversLicenseNumberPatient.Issuingstate_province_country.AsString:='OH';
pid.DriversLicenseNumberPatient.Expirationdate.AsString:='20030520';

// OBR
obr:=msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBR;
obr.SetIDOBR.AsString:='1';
obr.PlacerOrderNumber.Entityidentifier.AsString:='845439';
obr.PlacerOrderNumber.NamespaceID.AsString:='GHH OE';
obr.FillerOrderNumber.Entityidentifier.AsString:='1045813';
obr.FillerOrderNumber.NamespaceID.AsString:='GHH LAB';
obr.UniversalServiceIdentifier.Identifier.AsString:='1554-5';
obr.UniversalServiceIdentifier.Text.AsString:='GLUCOSE';
obr.UniversalServiceIdentifier.Nameofcodingsystem.AsString:='LN';
obr.ObservationDateTime.TimeOfAnEvent.AsString:='200202150730';
obr.OrderingProvider[0].IDnumber.AsString:='555-55-5555';
obr.OrderingProvider[0].Familyname.Surname.AsString:='PRIMARY';
obr.OrderingProvider[0].Givenname.AsString:='PATRICIA P';
obr.OrderingProvider[0].Degree.AsString:='MD';
obr.OrderingProvider[0].Assigningauthority.NamespaceID.AsString:='LEVEL SEVEN
HEALTHCARE, INC.';
obr.ResultStatus.AsString:='F';
obr.PrincipalResultInterpreter.OPName.IDNumber.AsString:='444-44-4444';
obr.PrincipalResultInterpreter.OPName.FamilyName.AsString:='HIPPOCRATES';
obr.PrincipalResultInterpreter.OPName.GivenName.AsString:='HOWARD H';
obr.PrincipalResultInterpreter.OPName.Degree.AsString:='MD';

// OBX
obx:=msg.PATIENT_RESULT[0].ORDER_OBSERVATION[0].OBSERVATION[0].OBX;
obx.SetIDOBX.AsString:='1';
obx.ValueType.AsString:='SN';
obx.ObservationIdentifier.Identifier.AsString:='1554-5';
obx.ObservationIdentifier.Text.AsString:='GLUCOSE POST 12H CFST';
obx.ObservationIdentifier.Nameofcodingsystem.AsString:='LN';

sn:=TbsSN_24.Create;
sn.Num1.AsString:='182';
obx.ObservationValue[0]:= sn;
obx.Units.Identifier.AsString:='mg/dl';
obx.ReferencesRange.AsString:='70-105';
obx.AbnormalFlags.AsString:='H';
obx.ObservationResultStatus.AsString:='F';

// XML format
Mem1.Lines.Append('Message Create (Advanced)');
Mem1.Lines.Text:=msg.AsXML;

```

```
FreeAndNil(msg);
end;
```

Outputs

Standart format

```
MSH|^~\&|GHH LAB|ELAB-3|GHH OE|BLDG4|200202150930||ORU^R01|CNTRL-3456|P|2.4
PID|||555-44-4444||EVERYWOMAN^EVE^E^^^L|JONES|196203520|F|||153 FERNWOOD
DR.^STATESVILLE^OH^35292|| (206) 3345232 | (206) 752-121 |||AC555444444||67-
A4335^OH^20030520
OBR|1|845439^GHH OE|1045813^GHH LAB|1554-5^GLUCOSE^LN|||200202150730|||555-55-5555^PRIMARY^PATRICIA P^^^MD^^LEVEL SEVEN HEALTHCARE, INC.|||||F|||||
444-44-4444&HIPPOCRATES&HOWARD H&&&&MD
OBX|1|SN|1554-5^GLUCOSE POST 12H CFST^LN||^182|mg/dl|70-105|H|||F
```

XML Format

```
<ORU_R01 xmlns="urn:hl7-org:v2xml">
  <MSH>
    <MSH.1>|</MSH.1>
    <MSH.2>^~\&amp;</MSH.2>
    <MSH.3>
      <HD.1>GHH LAB</HD.1>
    </MSH.3>
    <MSH.4>
      <HD.1>ELAB-3</HD.1>
    </MSH.4>
    <MSH.5>
      <HD.1>GHH OE</HD.1>
    </MSH.5>
    <MSH.6>
      <HD.1>BLDG4</HD.1>
    </MSH.6>
    <MSH.7>
      <TS.1>200202150930</TS.1>
    </MSH.7>
    <MSH.9>
      <MSG.1>ORU</MSG.1>
      <MSG.2>R01</MSG.2>
    </MSH.9>
    <MSH.10>CNTRL-3456</MSH.10>
    <MSH.11>
      <PT.1>P</PT.1>
    </MSH.11>
    <MSH.12>
      <VID.1>2.4</VID.1>
    </MSH.12>
  </MSH>
  <ORU_R01.PATIENT_RESULT>
  <ORU_R01.PATIENT>
    <PID>
      <PID.3>
        <CX.1>555-44-4444</CX.1>
      </PID.3>
      <PID.5>
        <XPN.1>
          <FN.1>EVERYWOMAN</FN.1>
        </XPN.1>
        <XPN.2>EVE</XPN.2>
        <XPN.3>E</XPN.3>
        <XPN.7>L</XPN.7>
```

```

</PID.5>
<PID.6>
  <XPN.1>
    <FN.1>JONES</FN.1>
  </XPN.1>
</PID.6>
<PID.7>
  <TS.1>196203520</TS.1>
</PID.7>
<PID.8>F</PID.8>
<PID.11>
  <XAD.1>
    <SAD.1>153 FERNWOOD DR.</SAD.1>
  </XAD.1>
  <XAD.3>STATESVILLE</XAD.3>
  <XAD.4>OH</XAD.4>
  <XAD.5>35292</XAD.5>
</PID.11>
<PID.13>
  <XTN.1>(206) 3345232</XTN.1>
</PID.13>
<PID.14>
  <XTN.1>(206) 752-121</XTN.1>
</PID.14>
<PID.18>
  <CX.1>AC555444444</CX.1>
</PID.18>
<PID.20>
  <DLN.1>67-A4335</DLN.1>
  <DLN.2>OH</DLN.2>
  <DLN.3>20030520</DLN.3>
</PID.20>
</PID>
</ORU_R01.PATIENT>
<ORU_R01.ORDER_OBSERVATION>
  <OBR>
    <OBR.1>1</OBR.1>
    <OBR.2>
      <EI.1>845439</EI.1>
      <EI.2>GHH OE</EI.2>
    </OBR.2>
    <OBR.3>
      <EI.1>1045813</EI.1>
      <EI.2>GHH LAB</EI.2>
    </OBR.3>
    <OBR.4>
      <CE.1>1554-5</CE.1>
      <CE.2>GLUCOSE</CE.2>
      <CE.3>LN</CE.3>
    </OBR.4>
    <OBR.7>
      <TS.1>200202150730</TS.1>
    </OBR.7>
    <OBR.16>
      <XCN.1>555-55-5555</XCN.1>
      <XCN.2>
        <FN.1>PRIMARY</FN.1>
      </XCN.2>
      <XCN.3>PATRICIA P</XCN.3>
      <XCN.7>MD</XCN.7>
      <XCN.9>
        <HD.1>LEVEL SEVEN HEALTHCARE, INC.</HD.1>
      </XCN.9>
    </OBR.16>
    <OBR.25>F</OBR.25>
    <OBR.32>
      <NDL.1>

```

```

                                <CNN.1>444-44-4444</CNN.1>
                                <CNN.2>HIPPOCRATES</CNN.2>
                                <CNN.3>HOWARD H</CNN.3>
                                <CNN.7>MD</CNN.7>
                                </NDL.1>
                                </OBR.32>
                                </OBR>
                                <ORU_R01.OBSERVATION>
                                <OBX>
                                    <OBX.1>1</OBX.1>
                                    <OBX.2>SN</OBX.2>
                                    <OBX.3>
                                        <CE.1>1554-5</CE.1>
                                        <CE.2>GLUCOSE POST 12H CFST</CE.2>
                                        <CE.3>LN</CE.3>
                                    </OBX.3>
                                    <OBX.5>
                                        <SN.2>182</SN.2>
                                    </OBX.5>
                                    <OBX.6>
                                        <CE.1>mg/dl</CE.1>
                                    </OBX.6>
                                    <OBX.7>70-105</OBX.7>
                                    <OBX.8>H</OBX.8>
                                    <OBX.11>F</OBX.11>
                                </OBX>
                                </ORU_R01.OBSERVATION>
                                </ORU_R01.ORDER_OBSERVATION>
                                </ORU_R01.PATIENT_RESULT>
                                </ORU_R01>

```

Send Message with Indy (v.10)

```

const
    START_BLOCK = #0B;
    END_BLOCK = #1C#0D;

//Load library...
procedure TForm1.FormCreate(Sender: TObject);
begin
    BSHL7Library.LoadFromFile('..\data\BSHL722.BSL');
end;

procedure TForm1.Button1Click(Sender: TObject);
var
    MsgOut : String;
    MsgIn : String;
begin
    MsgOut:=
    'MSH|^~\&|TestSendingSystem|||200701011539||ADT^A01||P|2.2|123'+#13
    'PID|||123456||Doe^John'+#13;

    IdTcpClient1.Port := 100;
    IdTcpClient1.Host := '192.168.1.1';
    IdTcpClient1.Connect;

    // Send Message
    IdTCPClient1.IOHandler.Write(START_BLOCK+MsgOut+END_BLOCK);

    // Wait ACK Message
    MsgIn := IdTCPClient1.IOHandler.ReadLn(END_BLOCK);
    // Parse message...

```

end;

For more socket information see indy's idHL7.pas









[Download Indy Project](#)

Files

BSHL7Object	Base class for all data types, groups and messages.
BSHL7XX	Defines HL7 XX messages (ADT_A01 : TbsADT_A01_22)
BSHL7DTXX	Defines Data Types for HL7 XX (Segments:MSH,Fields:ST...)
BSHL7GrpXX	Defines Message Groups for HL7 XX (TbsADT_A01_INSURANCE_22)

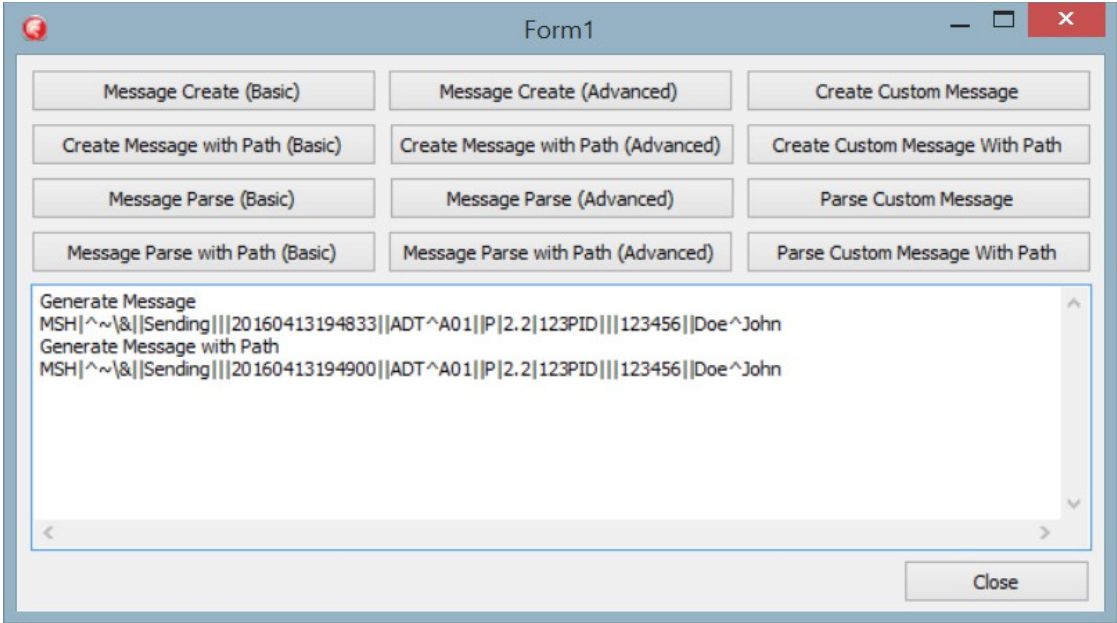
Where XX HL7 version.

Components

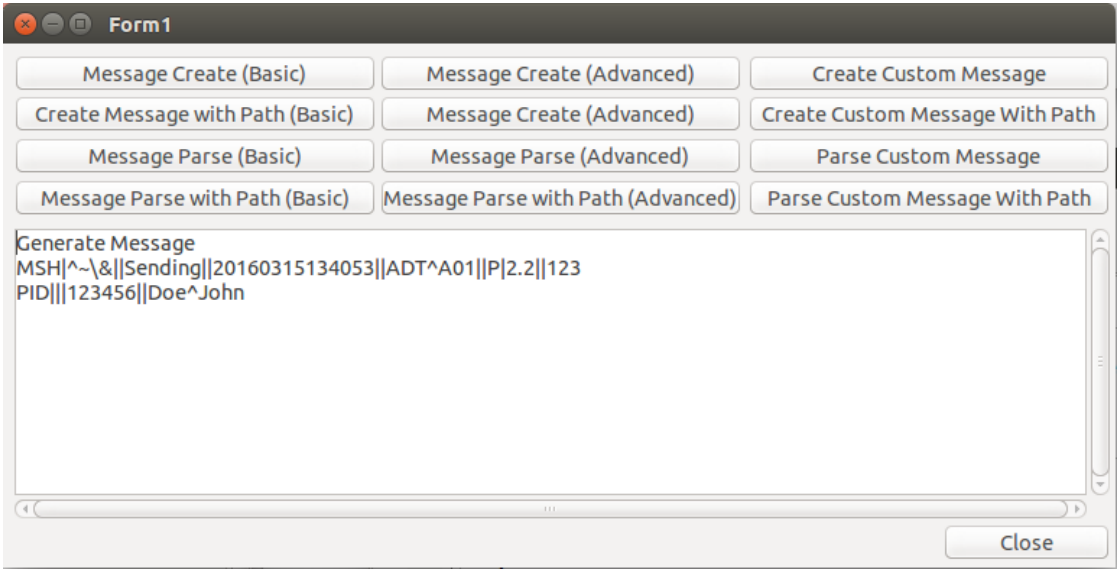
	Contains HL7 v 2.2 definition.
	Contains HL7 v 2.3 definition.
	Contains HL7 v 2.3.1 definition.
	Contains HL7 v 2.4 definition.
	Contains HL7 v 2.5 definition.
	Contains HL7 v 2.5.1 definition.
	Contains HL7 v 2.6 definition.
	Contains HL7 v 2.7 definition.

ScreenShots

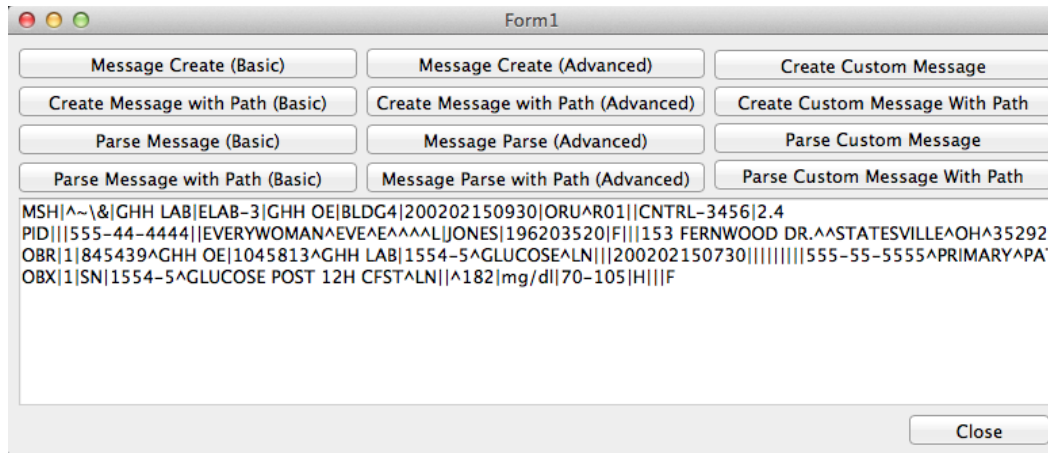
Delphi VCL



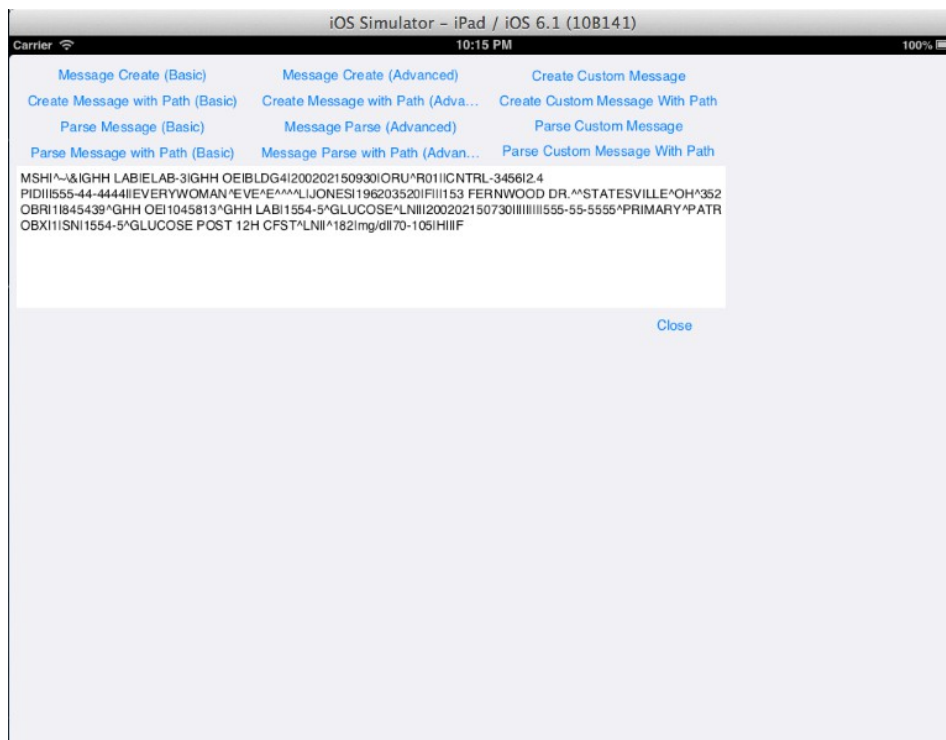
Free Pascal on Ubuntu



Delphi FMX – MacOS



Delphi FMX – iOS Simulator



Delphi FMX – iPhone

