Sending mails using Lazarus

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Abstract

There are various components to handle all kind of TCP/IP protocols in Lazarus. An example is sending E-Mail with the SMTP protocol. The Synapse package offers a particularly easy way to send e-mails in Lazarus.

1 Introduction

Sometimes, one needs to send an e-mail from a program or application: a website handling on-line subscriptions for an event will send a confirmation email, or a windows service which needs to communicate an error condition to the system administrator, for example when the hard-disk threatens to run out of disk space.

There are different class libraries that can be used to send e-mails: The Indy and Synapse libraries can be used to send email. Both class libraries can be used in Delphi as well as in Lazarus.

Synapse is a collection of classes that handle various TCP/IP tasks. It is not included in the default Lazarus distribution, but can be downloaded separately from the following URL:

`http://synapse.ararat.cz/`

The archive contains a laz_synapse.lpk package file, which can be opened with the Lazarus package manager. It is sufficient to compile the package once. There is no need to install the package in the IDE, because the package does not contain components that can be installed on the component palette: all classes must be instantiated and used in code.

For those that prefer it, there is a separate package available, called visualsynapse. It contains a series of components that can be installed on the component palette. However, this package is not officially supported by the creator of synapse.

Once compiled, the package laz_synapse can be chosen in the list of dependencies for a project.

2 E-mail through SMTP

E-mail programs use the SMTP protocol (Simple Mail Transfer Protocol) to send e-mails. This means that they deliver the mail message to a SMTP server (a MTA or Mail Transfer Agent) which will handle further delivery of the message to its final destination. Usually, a mail server listens on TCP/IP port 25.

The SMTP protocol is simple, and sending a mail is a simple matter. In synapse, the `smtpsend` unit contains a function that allows to send a mail:

```
function SendTo(const MailFrom, MailTo,
  Subject, SMTPHost: string;
  const MailData: TStrings): Boolean;
```

The 5 arguments speak for themselves:

MailFrom The sender's e-mail address.

MailTo The e-mail addresses of the recipients, separated by commas. This list can contain names, so things like

```
Michael Van Canneyt <michael@freepascal.org>
```

are allowed.

Subject The subject of the mail. This will be added to the mail headers.

SMTPHost The IP or DNS address of the SMTP server that will handle delivery of the mail. Usually, this is the outgoing mail server of the internet provider.

MailData The actual e-mail message.

The `SendTo` function creates an instance of the `TSMTPSend` class, and fills in the necessary properties, after which the `MailTo` method is used to send the mail to all provided e-mail addresses. If everything went without errors, the function will return `True`. If an error occurred, it will return `False`.

Some mailservers require a username/password combination before they allow sending mails. The function `SendToEx` operates identical to `SendTo`, but allows to specify a username/password in addition to the other arguments:

```
function SendToEx(const MailFrom, MailTo,
  Subject, SMTPHost: string;
  const MailData: TStrings;
  const Username, Password: string): Boolean;
```

These functions are all that is needed to construct a simple e-mail program.

This program needs some configuration variables to contain the sender e-mail, SMTP server and username/password. These can be declared as simple form variables:

```
  FSender,
  FSMTPHost,
  FSMTPUser,
  FSMTPPasswd : String;
```

A small configuration dialog allows the user to set their values, and they are saved in an .ini file and loaded when the program is started. The code for this is very simple, and will not be explained in detail.

To compose an e-mail, 2 `TEdit` controls for the recipients and e-mail subject are needed: (we'll call them `ETo` and `ESubject`). Additionally, a `TMemo` (`MMail`) control is needed to enter the message text. Adding a toolbar with a 'Send' button completes the program. The `BSend` button is coupled to an action `ASend`, which has the following `OnExecute` event handler:

```
procedure TMainForm.ASendExecute(Sender: TObject);
begin
  If not CheckSettings then
    Exit;
  DoSendMail(ETo.Text,ESubject.Text,MMail.Lines);
end;
```

The `CheckSettings` function checks whether the form variables contain a valid sender address and SMTP server. If not, a message is shown. If everything is configured correctly, the function `DoSendMail` is called. This function simply calls one of the `SendTo` or `SendToEx` functions:

```
procedure TMainForm.DoSendMail(Const ATo,ASubject : String;
                               Content : TStrings);

Var
  B : Boolean;

begin
  if (FSMTPUser<>'') then
    B:=SendToEx(FSender,ATo,ASubject,FSMTPHost,Content,
                FSMTPUser,FSMTPPasswd)
  else
    B:=SendTo(FSender,ATo,ASubject,FSMTPHost,Content);
  if not B then
    ShowMessage('Could not send the message!')
  else
    ShowMessage('Message sent successfully.');
end;
```

When everything is completed, a message reporting success of failure, is shown.

That's all there is to sending a mail in Object Pascal.

3 Attachments

Often, it is necessary to send a HTML mail message, or an attachment with a log file, PDF or even an image. The SMTP mail protocol only supports sending basic text. To be able to send a binary attachment such as an image, MIME encoding is necessary: MIME is an acronym for Multipurpose Internet Mail Extensions. MIME encoding allows to attach an arbitrary number of files to a mail message. Every e-mail client understands this encoding, and is able to recreate the attachments from the MIME encoded mail text.

A MIME message consists of several parts. There are differend kind of parts:

Text Contains regular text, in any character encoding.

Binary Contains binary data.

Message Contains another mail message.

Multipart Contains one or more other MIME parts.

To create an e-mail with an attachment, a multipart part must be created. To this multipart part, a text part is added (for the e-mail text), and one or more binary parts. This multipart is then sent as the mail text.

Synapse offers a class to facilitate the composing of a MIME email text: TMimeMess. This class collects some parts (one or more instances of TMimePart), and then composes the MIME content of the message. This class also takes care of constructing the necessary e-mail headers, which will tell the e-mail client to treat the e-mail as a MIME encoded message.

A part is added using the AddPart function:

```
function AddPart(const PartParent: TMimePart): TMimePart;
```

The TMimePart class has a multitude of properties that describe its content. Normally, all these properties must be given correct values, to enable the TMimeMess instance to correctly compose the MIME message.

Luckily, there are some methods that fill out the necessary properties automatically. Adding a multipart Part to the mime message can be done using the following function:

```
function AddPartMultipart(const MultipartType: String;
                          const PartParent: TMimePart): TMimePart;
```

Adding a text part can be done with:

```
function AddPartText(const Value: TStrings;
                     const PartParent: TMimePart): TMimepart;
function AddPartTextEx(const Value: TStrings;
                       const PartParent: TMimePart;
                       PartCharset: TMimeChar; Raw: Boolean;
                       PartEncoding: TMimeEncoding): TMimepart;
function AddPartTextFromFile(const FileName: String;
                       const PartParent: TMimePart): TMimepart;
```

And adding binary data can be done with:

```
function AddPartBinary(const Stream: TStream;
   const FileName: string;
   const PartParent: TMimePart): TMimepart;
function AddPartBinaryFromFile(const FileName: string;
                    const PartParent: TMimePart): TMimepart;
```

All functions have as the last argment PartParent. This is the 'multipart' part to which the new part must be added: only multipart parts can contain other parts. Attempting to add a binary part to another binary part will result in an error.

There are some auxiliary functions to add HTML data and complete mail messages to a MIME message.

Once all parts have been added to the message, the message must be encoded. This can be done using the EncodeMessage function.

The TMimeMess class can be demonstrated easily: The application keeps a list of file-names to attach to a message in a stringlist: (FAttachments).

The OnExecute handler of the ASend action now becomes more elaborate:

```
procedure TMainForm.ASendExecute(Sender: TObject);
begin
  If not CheckSettings then
    Exit;
```

```
  if (FAttachments.Count>0) then
    DoSendMailAndAttachments(ETo.Text,ESubject.Text,MMail.Lines)
  else
    DoSendMail(ETo.Text,ESubject.Text,MMail.Lines);
end;
```

If there are attachments, the functionDoSendMailAndAttachments is called. This function does the actual work:

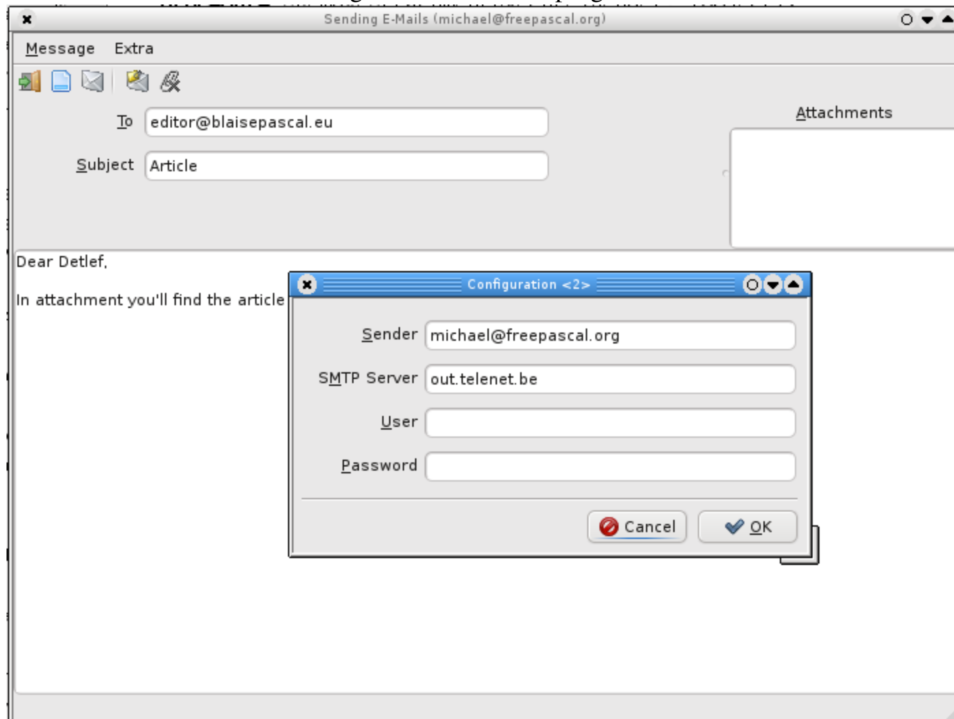
```
procedure TMainForm.DoSendMailAndAttachments(
   Const ATo,ASubject : String;
   Content : TStrings);

Var
  Mime : TMimeMess;
  P : TMimePart;
  I : Integer;
  B : Boolean;

begin
  Mime:=TMimeMess.Create;
  try
    // Set some headers
    Mime.Header.ToList.Text:=ATo;
    Mime.Header.Subject:=ASubject;
    Mime.Header.From:=FSender;
    // Create a MultiPart part
    P:=Mime.AddPartMultipart('mixed',Nil);
    // Add as first part the mail text
    Mime.AddPartText(Content,P);
    // Add all attachments:
    For I:=0 to FAttachments.Count-1 do
      Mime.AddPartBinaryFromFile(FAttachments[I],P);
```

After this code, the MIME message is ready. The message that will be sent through SMTP can now be composed using the EncodeMessage method. The resulting text can subsequently be sent using SendToRaw:

```
    // Compose message
    Mime.EncodeMessage;
    // Send using SendToRaw
    B:=SendToRaw(FSender,ATo,FSMTPHost,Mime.Lines,
                 FSMTPUser,FSMTPPasswd);
    if not B then
      ShowMessage('Could not send the message!')
    else
      ShowMessage('Message sent succesfully.');
  finally
    Mime.Free;
  end;
end;
```

After EncodeMessage has been called, the Lines property of the TMimeMess class contains the encoded message text, including mail headers. Because it contains the headers,

Figure 1: The e-mail program



this message must be sent using `SendToRaw`. The `SendToRaw` function is defined as follows:

```
function SendToRaw(const MailFrom, MailTo, SMTPHost: string;
  const MailData: TStrings;
  const Username, Password: string): Boolean;
```

The difference between the `SendToRaw` function and the `SendTo` or `SendToEx` functions is that it does not add e-mail headers to the message: the necessary e-mail headers must be present in `MailData`. The `TMimeMess` class creates the necessary headers when the `EncodeMessage` method is called.

The user can manage the attachments using a listbox (`LBAttachments`). A pop-up menu in the listbox shows 2 menu items: one to add an attachment, the other to remove the selected attachment. The same actions can be executed using buttons in the toolbar.

The finished program is shown (with the configuration dialog) in figure 1 on page 6.

4 Send status

Even in these times of fast internet connections, sending large attachments can still take a while. During that time, the program freezes, and the user has no indication of how far the sending of an email has progressed. To remedy this, the `TSMTPSend` class has an event that is called at regular intervals, and in which the current status is reported. The event handler has the following signature:

```
THookSocketStatus = procedure(Sender: TObject;
    Reason: THookSocketReason;
```

```
    const Value: string) of object;
```

`Sender` is the TCP/IP socket for which the status is being reported. `Reason` is a status indicator, which can have one of the following values for a client socket:

HR_ResolvingBegin The server hostname is converted to an IP address.

HR_ResolvingEnd The server hostname has been converted to an IP address.

HR_SocketCreate The TCP/IP socket for communication with the server has been created.

HR_SocketClose The TCP/IP socket for communication with the server has been closed.

HR_Connect Connection has been made with the SMTP server.

HR_WriteCount A data packet was sent to the server. This event is reported multiple times; `Value` contains the number of sent bytes in the package.

HR_Error when an error has occurred.

The `Value` parameter contains extra information on the status, in textual form.

To be able to use this event, the functions `SendTo`,`SendToEx` and `SendToRaw` cannot be used. It is necessary to create an instance of the `TSMTPSend` class, and to call the necessary methods manually. This is not a lot of effort, and the implementation of the `SendToRaw` function shows how to use the class:

```
Function TMainForm.DoSendMailAndAttachmentsProgress
  (Const ATo,ASubject : String; Content : TStrings) : Boolean;

var
  SMTP: TSMTPSend;
  s, t: string;
  L : Integer;

begin
  Result := False;
  SMTP:=TSMTPSend.Create;
  try
    SMTP.TargetHost := Trim(FSMTPHost);
    SMTP.Username := FSMTPUser;
    SMTP.Password := FSMTPPasswd;
    // Set status callback:
    SMTP.Sock.OnStatus:=@ShowStatus;
    CurrentSent:=0;
    SendSize:=Length(Content.Text);
```

At this point, all properties that the `TSMTPSend` class needs to do its work, have been set. The `CurrentSent` and `SendSize` variables are 2 form variables which keep the amount of sent bytes, and the total amount of bytes to be sent.

Now, the actual sending of the SMTP message can start:

```
  // Log in to SMTP server
  if SMTP.Login then
    begin
```

```
    // Set sender address and total send size
    if SMTP.MailFrom(GetEmailAddr(FSender), SendSize) then
      begin
      s:=ATo;
      // Add all recipient addresses
      repeat
        t:=GetEmailAddr(Trim(FetchEx(s, ',', '"')));
        if (t<>'') then
          Result := SMTP.MailTo(t);
        if not Result then
          Break;
      until s = '';
      // Now send e-mail content
      if Result then
        Result := SMTP.MailData(Content);
      end;
   // And log out...
   SMTP.Logout;
   end;
 finally
    SMTP.Free;
  end;
end;
```

The `GetEmailAddr` function of the synautil unit extracts the e-mail address from an address/name pair like

```
Michael Van Canneyt <michael@freepascal.org>
```

The event handler that was assigned to the `TSMTPSend` class still needs to be implemented. A large case statement in the event handler is used to handle all possible values of the socket status. To indicate the status, a progress bar and a status panel are added to the form. The progress bar is shown only when the connection with the server has been established, and is hidden when the connection is closed.

```
procedure TMainForm.ShowStatus(Sender: TObject;
   Reason: THookSocketReason;
   const Value: string);

Var
  S : String;
  d : double;

begin
  Case reason of
    HR_ResolvingBegin :
       SBMain.SimpleText:='Resolving SMTP server IP';
    HR_ResolvingEnd :
       SBMain.SimpleText:='';
    HR_SocketCreate :
       begin
       PBStatus.Visible:=True;
       PBStatus.Position:=0;
       end;
```

```
    HR_Connect :
       SBMain.SimpleText:='Connected to SMTP server';
    HR_SocketClose :
       PBStatus.Visible:=False;
```

The HR_WriteCount status is reported after each sent data packet. The following code keeps a running total, and shows some statistics in the status panel:

```
    HR_WriteCount :
       begin
       CurrentSent:=CurrentSent+StrToInt(Value);
       D:=CurrentSent/SendSize;
       PBStatus.Position:=Round(D*PBStatus.Max);
       S:=Format('%d/%d bytes sent (%5.2f %%)',
                 [CurrentSent,SendSize,D*100]);
       SBMain.SimpleText:=S;
       end;
  end;
  Application.ProcessMessages;
end;
```

The last statement is a call to Application.ProcessMessages: this will allow the form to redraw itself.

5 Conclusion

In todays on-line world, tasks such as sending an email is part of the standard functionality of many programs. This article has attempted to demonstrate that, using the Synapse package, Lazarus offers a simple way to send emails.