INTERNET POLLING DEVELOPMENT REPORT

LoanSTAR deliverable report

Final Report

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PREFACE

This is one of a series of final reports which document the development of the LoanSTAR and Technical Assistance Development Deliverables. The developments are broken down into two divisions, Task C and Task D. The following two tables itemize the deliverables for each Task.

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EXECUTIVE SUMMARY

The papers included in this report represent the LoanSTAR and Technical Assistance Development Deliverable Task C-Number 4, “Internet Data Logging and Display”. The paper included in this report represent the work of several individuals at Texas A&M University’s Energy Systems Lab: Peter Klima, Dan Lockhart and Jeff S. Haberl, Ph.D., P.E.
ABSTRACT

This is the final report which documents the development of Internet-based data logger polling. The project consists of two main tasks: the development of automated polling procedures that can be launched remotely with no operator input, and the development of a polling engine to launch the above procedures and pass the data on to the database server.

This final report describes the automated polling procedures that have been developed for Synergistic, Highland and ABB loggers. This report also describes the universal polling engine, which, in addition to launching polling and transferring data, is able to convert ABB data into Synergistic format (the format required to load the data into the LoanSTAR Informix database). The results of testing with Synergistic, Highland and ABB loggers are also described, as well as the real-world production use with ABB power meter loggers at West Texas A&M University.

This final report presents the system design, testing results and real-world production usage of the system. The copyrighted source code of all the programs is also included.
ACKNOWLEDGEMENTS

This project would not have been possible without the support that was provided by the following persons and/or the agencies or companies for which they work: Ms. Theresa Sifuentes and Mr. Dub Taylor at the Texas State Energy Conservation Office, Mr. Mike Thorpe at ABB USA, Mr. Ron Gumina at Synergistic Control Systems, Mr. John Larkin at Highland Technologies.

This project would not have been possible without the support that was provided by the following persons that work at the Energy Systems Lab: Mr. Carlos Ortiz, Ms. Kim Carlson, Mr. Kelly Milligan, Mr. John Bryant, and Mr. Stephen O’Neal.
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1.0 INTRODUCTION

The ESL has developed and tested an automated Internet polling capability for Synergistic (Synergistic 2001), Highland (Highland 2001) and ABB (ABB 2001) data loggers. These procedures can be used to eliminate phone lines at those facilities where Internet access is available at the data logger, as well as reduce the man-hours required for polling. Two ABB A1R+ power meters/loggers are currently being polled at West Texas A&M University using the system described below.

2.0 SYSTEM DESIGN

The entire polling system was designed to allow data from the loggers (which are only equipped with RS-232 serial or modem connections when supplied by the manufacturers) to be polled across and Internet connection.

2.1 Polling hardware

As none of the logger types supports a TCP/IP connection, the loggers cannot be connected directly to the Internet. These loggers only support RS-232 and telephone connections. Therefore, for Internet polling to avoid telephone costs, the logger must be connected to a PC by an RS-232 serial connection. That PC, in turn, can be connected to the Internet. This computer is henceforth referred to as the polling server. A second PC, located at the ESL, is required to
control the polling server, download data, and place it in the ESL database. That computer is henceforth referred to as the polling client. This configuration is shown in Figure 1.

Figure 1. Polling hardware configuration. This figure is a diagram of the equipment used in this demonstration project.
2.2 Polling software

Rather than develop new software for communicating with the loggers, the ESL chose to use the software provided by the data logger manufacturers. This was done for reasons of support and reliability. However, the manufacturers' software requires user input to read the data from the logger, and such input cannot be manually provided at the remote server side.

2.2.1 Software control method and scripts

As the software for all three logger types being tested is not true Microsoft Windows software and runs in a MS-DOS window, it cannot be remotely controlled using MS Windows API calls. This problem was solved by using a keystroke simulation program to automatically provide predetermined input sequences to the MS-DOS programs. After testing several freeware keystroke simulation programs, Scancode 5.90 (Johnson 2000) was selected for its reliability and its ability to react to text appearing on the screen. Waiting for specific text to appear on the screen to indicate when an action is finished is more reliable and faster than using simple delays to give the software time to finish an action before feeding more keystrokes. It also allows special keystroke sequences to be activated in the case of action failure, thus allowing the program to exit and place an error message in a log file. The Scancode sequences are activated by MS-DOS batch files. Different batch files are required for each logger. Examples for all logger types can be found in the Appendix.
2.2.2 Server-side polling engine software

The batch files are run by the polling server program (originally written by Dan Lockhart and included in the Appendix), which is started by Windows when the server PC boots. The server resides in a perpetual 'waiting to connect' state which is changed to 'connected' when a 'start polling' command is received from the client. The server is divided into two primary functions. One function communicates with the client. The other function activates the batch files that poll the loggers. When polling is completed for a logger, a 'polling result status message' is sent to the client. If all sites have been polled, the server 'disconnects' from the client and re-enters the 'waiting to connect' state. The server also records its activity in a status file. All polled data is placed in a repository file on the ESL network’s common share for reformatting (not needed for Synergistic logger files) and transfer to the ESL database loading routine.

2.2.3 Client-side polling engine software

The client (also written by Dan Lockhart and included in the Appendix) is started by the Windows NT Scheduler when polling is to commence. When started, the client verifies that the last polling activity was completed without errors. It then contacts the server program which runs on the Logger Polling PC (Fig. 1). After connection is established, the client sends a 'start polling' command, which include the sites to be polled, to the server(s) and waits for the arrival of a polling result message. This activity continues until all sites to be polled by the server have
been polled as directed by the client. All communication between client and server is written to a status file on the client PC for later analysis if necessary. The client is capable of providing realtime polling status information, though this capability is still being developed. When all sites have been polled the client activates a data reformatting program for any non-Synergistic loggers (the program for ABB loggers written by Dan Lockhart is included in the Appendix) and terminates. The reformatting program converts the polled data to Synergistic format, and the converted file is stored in a repository file on the network common share by the polling client, into the format required by the ESL database load routine. The data are then sent to the UNIX database system using the FTP feature of the Internet Transfer ActiveX Control. After the FTP process completes, the reformatting program invokes the MAPI ActiveX Controls to send an email message to the database administrator informing about the load data transfer. The program then terminates.

2.3 System overview

The programs, the computer on which they run and their relationship to each other are shown in Figure 2. Although the detailed relationships are quite complex, the entire system can be automated as long as the task scheduler is configured to run the polling client program at regular intervals, and the polling server is launched on the polling computer by default (i.e. it is placed in the startup program group). These programs will then launch and control the others.
Figure 2. Polling programs and their relationships
3.0 TESTING RESULTS

The above system has been successfully tested with various models of directly connected Synergistic loggers (with all versions of Parset in use at ESL), various models of Synergistic loggers connected via phone line, and two ABB A1R+ power meter/loggers connected via phone line (no ABB logger was locally available for testing, so the ESL’s loggers at remote sites were used). Automated keystroke feeding was also tested with one logger (a directly connected Highland logger), although the data format conversion program for those loggers has not yet been fully developed.

Two ABB loggers are currently being polled automatically on a weekly basis by the ESL using the above system. Although this connection currently uses a telephone line, the system is used to automate polling and save time. This demonstrates the dependability of the system in a real-world production setting. However, it has not been tested for polling large quantities of loggers with a single server, nor for using multiple servers with one client.

4.0 SUMMARY

Automated Internet polling capability has been developed for two logger types, and partially developed for a third. The basic principles may be applicable to several other logger types as well. It has also been demonstrated to be a reliable system for production use.
5.0 REFERENCES

ABB USA. (2001). P.O. Box 5308, 501 Merritt 7, Norwalk CT 06856-5308, USA


Synergistic Control Systems, Inc. (2001). 2700 Lake Villa Drive, Suite 180, Metairie, LA 70002, USA.
APPENDIX A: POLLING SCRIPT BATCH FILES

A.1 Scripts for Highland loggers (Ktools program)

Two batch files are required to complete polling. The first is the main polling sequence and must be altered appropriately for each individual logger. The second file only launches the first file and after that exist, updates the status file to indicate the main sequence is finished.

A.1.1 ktools.bat

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem this batch file causes kt to automatically poll whatever TSRs haven't
rem been polled yet
C:
cd \ktools
rem
rem uninstall any previous scan codes, just in case
scan code u
rem
rem change the status file to indicate that polling is now active
echo Status: Polling >status.txt
rem
rem here come the scan codes
rem
rem this one runs ktools2.bat which runs kt, then feeds kt keystrokes which
rem open a logger, connect to it, and go to read TSRs
rem this selects the second logger on the list (which our test logger happens
rem to be) - in order to select the first logger, remove one GDn (visible
rem below), or add as many GDNs as needed to select a logger further down
rem on the list
rem at the end, it presses the F1 and F2 keys, triggering the next scan codes
scan code "ktools2" 28,d 4, Alt-f Alt-24 GDn GDn GDn GDn 28, d 1, Alt-24, d 1, 1 Alt-c Alt-24, d 39, 1, d 1, 1 Alt-24 Alt-t f1 d2 f2
rem
rem this one just moves the mouse cursor down - a dumb workaround to get to
rem the button to read TSRs
rem it will not work correctly if NumLock isn't on, but it will not work
rem with the grey arrow keys, period
scancode k f1 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2
rem
rem this one is more of the same - the movement needed is so far that one
rem line isn't enough
scancode k f2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2 Sft-N2
rem
rem after waiting long enough to ensure the mouse cursor has been moved,
rem press shift-enter to simulate a mouse click, causing TSRs to begin
rem loading
scancode d 64 Sft-Enter
rem
rem scancode can't read kt's screen, because it's in graphics mode, so we
rem have to wait till the screen interrupt doesn't do anything for a while
rem another silly workaround
scancode waitforidle 72, Sft-N2 28
rem
rem two really dumb workarounds in one - wait for things to be done, then
rem start moving the mouse cursor to the right
rem
rem move the mouse cursor some more three seconds later
rem
rem after the mouse cursor is where it should be (over the Cancel button),
rem simulate a mouse click and exit the program
scancode waitforidle 80, Sft-Enter d 1, l alt-f alt-x
rem
rem this program doesn't have to change the status.txt file to say it's done,
rem uninstall all those scancodes or exit the DOS window, since ktools2.bat
rem takes care of those things

A.1.2 ktools2.bat

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem batch file called by ktools.bat as a kludge to get scancode to feed
rem keystrokes to kt but still have the batch file do stuff afterwards
kt
echo Status: Polling Complete >status.txt
rem exit
A.2 Scripts for Synergistic loggers (Parset program)

Three batch files are used. One runs the main polling sequence, and then (depending on whether polling succeeded or failed, as determined by Scancode reading information from the screen) one of the others is launched to update the status file accordingly. The main polling sequence file is slightly different for each version of Parset, and must be altered appropriately to work with each individual logger.

A.2.1 Main file for Parset 1.06

@echo off
rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem automatically poll using Scancode to feed Parset keystrokes
rem will poll fixed TSRs, so works best for polling the whole logger
c:
cd \sy\101
rem change the status file
echo polling >c:\sy\status.txt
rem
rem now, the big scancode keystroke feeder
rem it calls test2.bat, which runs Parset, to which all these keystrokes
rem are fed
rem when Parset exits (as instructed to by scancode at the end), test2 will
rem write DONE to the status file and close the DOS window
rem this part is run last, it exits Parset after polling
scancode k "x" w 0,0 "Any Key" " " 1 1 "q" d 1 "compl" 28
rem this is the backup exit strategy, if polling fails and "Any Key" never
rem shows up
scancode i 1900 " " 1 1 1 1 "q" d 1 "fail" 28
rem this is the polling sequence, run second
scancode w 0,0 "Any Key", " t" 56 56 "c", d 6, "0" 28 "12" 28 "f" 28 "temp.raw" 28 28 28 "x"
rem
rem last TSR filename
rem this part calls test2.bat (which calls parset) and feeds the keystrokes
rem to connect to the logger
scancode "test2" 28, s 1, i 4, 28 28 GDn GDn GDn 28 "cp" 28 28 28
echo DONE
rem
rem no GDn in this space - select fist logger
rem
rem the above parts will need to be changed for different loggers
rem
rem to select a different logger, add or remove down arrows (GDns) in the
rem last scancode
rem
rem the number of TSRs depends on how many the logger can hold (full test
rem logger is 14335)
rem
rem the filename is the logger serial number plus a .raw extension
rem
rem for the time being, only polling 12 TSRs and filename is bla.raw
rem
rem test2.bat will also change the status.txt file after Parset exits
rem and close the DOS window, thus unloading itself from memory as well
rem so, no need to have this batch file do any of that

A.2.2 Main file for Parset 1.48

@echo off
rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem automatically poll using Scancode to feed Parset keystrokes
rem will poll fixed TSRs, so works best for polling the whole logger
c:
cd \sy\491
del temp.raw
rem change the status file
echo polling >c:\syi\status.txt
rem
rem now, the big scancode keystroke feeder
rem it calls test2.bat, which runs Parset, to which all these keystrokes
rem are fed
rem when Parset exits (as instructed to by scancode at the end), test2 will
rem write DONE to the status file and close the DOS window
rem this part is run last, it exits Parset after polling
scancode k "x" w 0,0 "Any Key" " 1 1 "q" d 1 "compl" 28
rem this is the backup exit strategy, if polling fails and "Any Key" never
rem shows up
scancode i 1900 " 1 1 1 1 "q" d 1 "fail" 28
rem this is the polling sequence, run second
scancode w 0,0 "Any Key", " t", d 2, "c", d 6, "f" 28 "0" 28 "2660" 28 "temp.raw" 28 28 28 "x"
rem
rem last TSR filename
rem this part calls test2.bat (which calls parset) and feeds the keystrokes
rem to connect to the logger
scancode "test2" 28, s 1, i 4, 28 28 GDN GDN 28 "cp" 28 28 28
echo DONE
rem
rem
rem the above parts will need to be changed for different loggers
rem
rem to select a different logger, add or remove down arrows (GDNs) in the
rem last scancode
rem
rem the number of TSRs depends on how many the logger can hold (full test
rem logger is 14335)
rem
rem the filename is the logger serial number plus a .raw extension
rem
rem for the time being, only polling 12 TSRs and filename is bla.raw
rem
rem test2.bat will also change the status.txt file after Parset exits
rem and close the DOS window, thus unloading itself from memory as well
rem so, no need to have this batch file do any of that

A.2.3 Main file for Parset 1.5

@echo off
rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem automatically poll using Scancode to feed Parset keystrokes
rem will poll fixed TSRs, so works best for polling the whole logger
c:
cd \sy\h
rem change the status file
echo polling >:\sy\status.txt
rem delete old raw file to make sure Parset won't complain about wanting to
rem overwrite it - in the final version, should probably not just destroy it
rem
rem now, the big scancode keystroke feeder
rem it calls test2.bat, which runs Parset, to which all these keystrokes
rem are fed
rem when Parset exits (as instructed to by scancode at the end), test2 will
rem write DONE to the status file and close the DOS window
rem this part is run last, it exits Parset after polling
scancode k "x" w 0,0 "Any Key" " " 1 1 "q" d 1 "compl" 28
rem this is the backup exit strategy, if polling fails and "Any Key" never
rem shows up
scancode i 1900 " " 1 1 1 1 "q" d 1 "fail" 28
rem this is the polling sequence, run second
scancode w 0,0 "Any Key", "t" d 6 "c", d 6, "f" 28 "0" 28 "12" 28 "temp.raw" 28 28 28 "x"
rem ^^^^^^^
rem last TSR filename
rem this part calls test2.bat (which calls parset) and feeds the keystrokes
rem to connect to the logger
scancode "test2" 28, s 1, i 4, 28 28 28 "cp" 28 28 28
echo DONE
rem ^^^
rem no GDn - select first logger
rem
rem the above parts will need to be changed for different loggers
rem
rem to select a different logger, add down arrows (GDn) before the third 28
rem (the fourth 28, if you count the one right after "parset", too...)
rem
rem the number of TSRs depends on how many the logger can hold (full test
rem logger is 14335)
rem
rem the filename is the logger serial number plus a .raw extension
rem
rem test2.bat will also change the status.txt file after Parset exits
rem and close the DOS window, thus unloading itself from memory as well
rem so, no need to have this batch file do any of that

A.2.4 Script launched in case of success

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
echo Complete > c:sy\status.txt
exit

A.2.5 Script launched in case of failure

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
echo Failed > c:sy\status.txt
exit

A.3 Scripts for ABB loggers (AlphaPlus program)

Four batch files are used. The first is the main polling sequence, which must be altered
appropriately for each logger. If polling fails (as determined by Scancode reading the
information on the screen), the failure program (which must also be altered appropriately for
each logger – although not strictly necessary for the system to run appropriately, it is useful if the
status file contains specific information as to which logger failed) is launched. In case of
success, the report-generating program is launched, and it in turn launches the finishing program,
which updates the status file.

A.3.1 Main polling sequence

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem automated polling script for ABB meter
rem this version will select the first meter in the second phone list
rem which ends up being the WTAMU phone list and the Activity Center meter
rem the script calls rpt.bat which generates a report file and in turn calls
rem finish.bat which backs up the data
rem
rem first, make sure there's no files called billread.rp3 or a.rp3 to get
rem in the way of the later parts of the script
rem
rem clear out any previously loaded scancodes
rem
rem these keystrokes are actually run at the end, after the data is polled
rem (after the scancode sequence below is executed)
rem the 56s (Alt key) are a kludge to delay the 1s (Esc key)
rem the rpt launches the next batch file
rem
rem this is the sequence for polling
rem in order to select a different meter, GDns below need to be removed
rem or added
rem the first GDn is to select the second phone list
rem in order to select another meter on the list, add GDns after the "c"
rem no GDNs means the first meter gets selected
rem other than that, everything remains constant for all meters
scancode "aplus" 28 "alpha" 28 28 88 GDn 28 "c" 28 w 0,0 "CONN" 28 w 3,19 "Register R"
GryRight GDn 28 28 28

A.3.2 Script launched in case of polling failure

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem This is run when AUTOA.BAT fails to poll and times out
echo failed Activity Center > c:\aplus\status.txt
scancode "exit" 28

A.3.3 Report generation script

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem automated billing data report generation script for ABB meters
rem this is run by the auto.bat polling script, and at the end launches the
rem finish.bat script, which backs up the data
rem
rem first, make sure the newly collected data will be at the beginning of
rem the list of data that can be reported on
rem as the list is in alphabetical order by file, we copy the data to a
rem file called a,rp3
rem
C:
cd \aplus
ren billing\billread,rp3 billing\a,rp3
rem
rem unload old leftover scanmodes and key in the report-generating sequence
rem then call finish.bat
rem the file will be called temp.rpt - obviously, change the "temp" part
rem to generate a file with a different name
scancode u
scancode "aplus" 28 "alpha" 28 28 GryRight 28 GryRight GryRight 28 GDn GDn 28 28 Gdn 28
"temp" 28 28 f10 1 1 1 1 1 "y" "finish" 28

A.3.4 Backup and cleanup script launched after report generation

rem Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
rem this script is called by rpt.bat (which is called by auto_.bat) and backs
rem up the freshly polled data
rem
C:
cd \aplus\billing
copy a,rp3 /b + old,rp3 /b temp,rp3 /b
copy temp,rp3 old,rp3 /b
del a rp3
del temp rp3
echo Complete > c:\aplus\status.txt
exit
APPENDIX B: Server-side polling engine software

Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
Option Explicit
Dim timerctr As Integer
Dim sent As Integer
Dim activ As Boolean
Dim connected As Boolean
Dim subst As Boolean
Dim toact As Boolean
Dim map As Boolean

Private Sub Command1_Click()
If Not (tcpServer.State = sckClosed) Then
tcpServer.Close
Do Until tcpServer.State = sckClosed
Loop
End If
statusck
DoEvents
tcpServer.Listen
statusck
DoEvents
End Sub

Private Sub Form_Load()
On Error GoTo errend
map = True
Open "c:\map.txt" For Output As #8
Print #8, "start"
Close #8

statusck
DoEvents

Open "c:\check.txt" For Output As #4
Print #4, "init"
Close #4
If map Then
  mapper ("Closing Port 1011.")
End If
If Not (tcpServer.State = sckClosed) Then
tcpServer.Close
Do Until tcpServer.State = sckClosed
Loop
statusck
DoEvents
End If
If map Then
  mapper ("Port 1011 closed.")
End If
tcpServer.LocalPort = 1011
tcpServer.Listen
statusck
DoEvents
If map Then
  mapper ("listen #1")
End If
Exit Sub
On Error GoTo 0
errend:
If map Then
  mapper ("Form_Load Error")
End If
Close
End
End Sub

Private Sub tcpServer_Close()
On Error GoTo errend
If Not (tcpServer.State = sckClosed) Then
tcpServer.Close
  Do Until tcpServer.State = sckClosed
    Loop
  statusck
  DoEvents
End If
Open "c:\check.txt" For Output As #4
Print #4, "init"
Close #4
tcpServer.LocalPort = 1011
tcpServer.Listen
statusck
DoEvents
If map Then
  mapper ("listen #2")
End If
Exit Sub
On Error GoTo 0
errend:
If map Then
    mapper ("tcpServer_Close Error")
End If
Close
End
End Sub

Private Sub tcpServer_Connect()
On Error GoTo errend
    connected = True
    If map Then
        mapper ("connected")
    End If
    statusck
    DoEvents
    Exit Sub
On Error GoTo 0
errend:
    If map Then
        mapper ("tcpServer_Connect Error")
    End If
Close
End
End Sub

Private Sub tcpServer_ConnectionRequest _( ByVal requestID As Long )
    'Check if the control's State is closed. If not,
    'close the connection before accepting the new
    'connection.
On Error GoTo errend
    statusck
    DoEvents
    If Not (tcpServer.State = sckClosed) Then
        tcpServer.Close
        Do Until tcpServer.State = sckClosed
            Loop
            statusck
            DoEvents
        End If
    'Accept the request with the requestID
    'parameter.
    tcpServer.Accept requestID
    statusck
    DoEvents
    If map Then
mapper ("connection accepted")
End If
   Exit Sub
On Error GoTo 0
errend:
   If map Then
      mapper ("tcpServer_ConnectionRequest Error")
   End If
   Close
End
End Sub

Private Sub tcpServer_Error(ByVal Number As Integer, Description As String, ByVal Scode As Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long, CancelDisplay As Boolean)
   On Error GoTo errend
   mapper Str(Number) + " " + Description

   If Not (tcpServer.State = sckClosed) Then
      tcpServer.Close
      Do Until tcpServer.State = sckClosed
         Loop
      statusck
      DoEvents
      End If
   connected = False
   If map Then
      mapper ("error occurred")
   End If
      Exit Sub
   On Error GoTo 0
errend:
   If map Then
      mapper ("tcpServer_Error Error")
   End If
   Close
   End
End Sub

Private Sub tcpServer_DataArrival _
(ByVal bytesTotal As Long)
   ' Declare a variable for the incoming data.
   ' Invoke the GetData method and set the Text
   ' property of a TextBox named txtOutput to
   ' the data.
   Dim strData As String
Dim h As Long

On Error GoTo errEnd
tcpServer.GetData strData

If Trim(strData) = "close" Then
    If map Then
        mapper ("Received Close - Closing.")
    End If
    Command1_Click
Else

    If Trim(strData) = "abb" Then
        If Shell("C:\command.com /k c:\aplus\ipserver.exe", vbMaximizedFocus) = 0 Then
            If map Then
                mapper ("ABB Server didn't launch.")
            End If
        Else
            If map Then
                mapper ("ABB Server launched.")
            End If
        End If
    tcpServer.SendData "abb"
    Timer1.Enabled = True
    Timer1.Interval = 60000
    End If
    Exit Sub
End If

If Trim(strData) = "syn" Then
    Open "c:\check.txt" For Output As #4
    Print #4, "init"
    Close #4
    If Shell("C:\command.com /k c:\sy\syner_server.exe", vbMaximizedFocus) = 0 Then
        If map Then
            mapper ("Synergistic Server didn't launch.")
        End If
    Else
        If map Then
            mapper ("Synergistic Server launched.")
        End If
    End If
    tcpServer.SendData "syn"
    Timer2.Enabled = True
    Timer2.Interval = 60000
    End If
    Exit Sub
End If
mapper "unknown command: " + Trim(strData)
End If

Exit Sub
OnError GoTo 0
errend:
If map Then
 mapper ("tcpServer_DataArrival Error")
End If
Close
End
End Sub
Private Sub Timer1_Timer()
Dim str1 As String

OnError GoTo errend
Timer1.Enabled = False
End
Open "c:\check.txt" For Input As #4
Line Input #4, str1
Close #4
If Mid(LCase(Trim(str1)), 1, 4) = "abbe" Then
tcpServer.SendData "abbe"
If map Then
 mapper ("ABB Server ended.")
End If
Open "c:\check.txt" For Output As #4
Print #4, "init"
Close #4
Else
 Timer1.Enabled = True
 Timer1.Interval = 60000
End If
Exit Sub
OnError GoTo 0
errend:
If map Then
 mapper ("Timer1_Timer Error")
End If
Close
End
End Sub

Private Sub Timer2_Timer()
Dim str1 As String
On Error GoTo errend
Timer2.Enabled = False

Open "c:\check.txt" For Input As #4
Line Input #4, str1
Close #4
If Mid(LCase(Trim(str1)), 1, 4) = "syne" Then
tcpServer.SendData "syne"
If map Then
mappar ("Synergistic Logger ended.")
End If
Open "c:\check.txt" For Output As #4
Print #4, "init"
Close #4
tcpServer.Close
statusck
DoEvents
Else
Timer2.Enabled = True
Timer2.Interval = 60000
End If
Exit Sub
On Error GoTo 0
errend:
If map Then
mappar ("Timer2_Timer Error")
End If
Close
End
End Sub
Private Sub mapper(tag As String)
Open "c:\map.txt" For Append As #8
Print #8, tag
Close #8
End Sub
Sub statusck()
Select Case tcpServer.State  ' Evaluate state.
Case 0
Text1.Text = "Current State: Closed"
Case 1
Text1.Text = "Current State: Open"
Case 2
Text1.Text = "Current State: Listening"
Case 3
Text1.Text = "Current State: Connection pending"
Case 4
    Text1.Text = "Current State: Resolving host"
Case 5
    Text1.Text = "Current State: Host resolved"
Case 6
    Text1.Text = "Current State: Connecting"
Case 7
    Text1.Text = "Current State: Connected"
Case 8
    Text1.Text = "Current State: Peer is closing the connection"
Case 9
    Text1.Text = "Current State: Error"
Case Else
    Text1.Text = "Unknown State"
End Select
End Sub
APPENDIX C: Client-side polling engine software

C.1 The polling client

' Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
Option Explicit
Public errcnt As Integer
Public gocnt As Integer

Private Sub Command1_Click()
    Timer5.Enabled = False
    tcpClient.SendData "close"
    status ("waiting to close")
End Sub

Private Sub Command2_Click()
    If Not (tcpClient.state = sckClosed) Then
        MsgBox "Closing Connection"
        tcpClient.Close
        Do Until tcpClient.state = sckClosed
            Loop
        End If
    End
End Sub

Private Sub Command3_Click()
    tcpClient.SendData "syn"
    Timer5.Enabled = False
End Sub

Private Sub Command4_Click()
    Timer5.Enabled = False
    engine.Hide
    display.Show
End Sub

Private Sub Command5_Click()
    tcpClient.SendData "abb"
    Timer5.Enabled = False
End Sub

Private Sub Form_Load()
    ' The name of the Winsock control is tcpClient.
    ' Note: to specify a remote host, you can use
    ' either the IP address (ex: "121.111.1.1") or
' the computer's "friendly" name, as shown here.
Timer3.Enabled = True
Timer3.Interval = 3000
Timer5.Enabled = False
Timer5.Interval = 60000
display.Timer1.Interval = 20000
Open "\esint\common\dialog\loggers\polling_results.txt" For Output As #1
Print #1, Trimmer("start")
Close #1
errcnt = 0
If LCase(InputBox("Connect?", "Connect or Check Status", "y")) = "y" Then
    tcpClient.LocalPort = 1011
    tcpClient.RemoteHost = "PRINTSVR"
    tcpClient.RemotePort = 1011
    If Not (tcpClient.state = sckClosed) Then
        tcpClient.Close
        Do Until tcpClient.state = sckClosed
            Loop
        End If
        MsgBox "connect"
    On Error Resume Next
    tcpClient.Connect
    On Error GoTo 0
    End If
End Sub

Private Sub tcpClient_error(ByVal Number As Integer, Description As String, ByVal Scode As Long, ByVal source As String, ByVal HelpFile As String, ByVal HelpContext As Long, CancelDisplay As Boolean)
    errcnt = errcnt + 1
    MsgBox "ERROR: " + CStr(Number) + vbCrLf + vbCrLf + _
        "DESCRIPTION: " + Description
    If Not (tcpClient.state = sckClosed) Then
        tcpClient.Close
        status ("waiting to close - error")
        Do Until tcpClient.state = sckClosed
            Loop
        End If
        status ("closed - error")
    End If
    If errcnt > 3 Then
        End
    Else
        try_again
    End If
End Sub
Private Sub tcpClient_Connect()
    status ("connected")
    gcnt = 0
    Timer5.Enabled = True
End Sub
Private Sub tcpClient_Close()
    status ("entered the close exit")
    If Not (tcpClient.state = sckClosed) Then
        tcpClient.Close
        Do Until tcpClient.state = sckClosed
            Loop
        End If
    status ("connection closed - reconnecting")
    tcpClient.Connect
End Sub

Private Sub tcpClient_DataArrival _
(ByVal bytesTotal As Long)
Dim strData As String
Dim str1 As String
Dim i As Integer

tcpClient.GetData strData
str1 = Trim(strData)
If LCase(Trim(str1)) = "abb" Then
    status ("ABB Logging Process started on " + str(Date) + " at " + str(Time))
    Timer1.Enabled = True
    Timer1.Interval = 60000
Else
    If LCase(Trim(str1)) = "syn" Then
        status ("Synergistic Logging Process started on " + str(Date) + " at " + str(Time))
        Timer2.Enabled = True
        Timer2.Interval = 60000
    Else
        If LCase(Trim(str1)) = "abbe" Then
            status ("ABB Logging Process ended on " + str(Date) + " at " + str(Time))
            tcpClient.SendData "abb"
        Else
            If LCase(Trim(str1)) = "syne" Then
                status ("Synergistic Logging Process ended on " + str(Date) + " at " + str(Time))
                If Not (tcpClient.state = sckClosed) Then
                    tcpClient.Close
                    Do Until tcpClient.state = sckClosed
                        Loop
                    End If
Else
    status ("spurious message: " + str1 + ", ignoring.")
End If
End If
End If

End Sub

Private Sub status(state As String)
    Open "\eslnt\common\dlockhar\loggers\polling_results.txt" For Append As #1
    Print #1, Trim(state)
    Close #1
End Sub

Private Sub Timer1_Timer()
    Dim h As Integer
    Timer1.Enabled = False
    If Shell("C:\vbtestdev\Poll ABB\connect_to_polling_PC.exe", vbMaximizedFocus) = 0 Then
        status ("ABB Client Crated.")
    Else
        status ("ABB Client Started.")
    End If
End Sub

Private Sub Timer2_Timer()
    Dim h As Integer
    Timer2.Enabled = False
    If Shell("C:\vbtestdev\Poll Synergistic\Syner.Client.exe", vbMaximizedFocus) = 0 Then
        status ("Synergistic Client Crated.")
    Else
        status ("Synergistic Client Started.")
    End If
End Sub

Private Sub try_again()
tcpClient.LocalPort = 1011
tcpClient.RemoteHost = "PRINTSVR"
tcpClient.RemotePort = 1011
If Not (tcpClient.state = sckClosed) Then
    tcpClient.Close
    Do Until tcpClient.state = sckClosed
        Loop
End If
"MsgBox "connect"
On Error Resume Next
tcpClient.Connect
On Error GoTo 0
End Sub
Private Sub Timer3_Timer()
    statusck
    DoEvents
End Sub
Sub statusck()
    Select Case tcpClient.state    ' Evaluate state.
        Case 0
            Text1.Text = "Current State: Closed"
        Case 1
            Text1.Text = "Current State: Open"
        Case 2
            Text1.Text = "Current State: Listening"
        Case 3
            Text1.Text = "Current State: Connection pending"
        Case 4
            Text1.Text = "Current State: Resolving host"
        Case 5
            Text1.Text = "Current State: Host resolved"
        Case 6
            Text1.Text = "Current State: Connecting"
        Case 7
            Text1.Text = "Current State: Connected"
        Case 8
            Text1.Text = "Current State: Peer is closing the connection"
        Case 9
            Text1.Text = "Current State: Error"
    Case Else
        Text1.Text = "Unknown State"
    End Select
End Sub

Private Sub Timer5_Timer()
    If gocnt = 2 Then
        Timer5.Enabled = False
tcpClient.SendData "abb"
    End If
    gocnt = gocnt + 1
End Sub

C.2 ABB report file format conversion program

' Copyright 2001 Texas Engineering Experiment Station, Energy Systems Laboratory
Public Sub abb()
    Dim rstsiteinfo1 As ADO.DB.Recordset
    Dim cnn As ADO.DB.Connection

Dim strcnn As String
Dim server As String
Dim cnn1 As ADODB.Connection
Dim strcnn1 As String
Dim infile As String
Dim outfile As String
Dim thefile As String
Dim buffer1 As String
Dim unit1 As String
Dim unit2 As String
Dim outbuf As String
Dim holdbuf As String
Dim fso, MyFile, f
Dim i As Integer
Dim j As Integer
Dim k As Integer
Dim ctr As Integer
Dim first As Boolean
Dim therest As Boolean
Dim startdate As String
Dim starttime As String
Dim startdatetime As String
Dim resumedatetime As String
Dim realdatetime As Date
Dim FileDateTime As Date
Dim cntrdatetime As Date
Dim time1 As Date
Dim time2 As Date
Dim time3 As Date
Dim time4 As Date
Dim dorf As Long
Dim valx(4) As String
Dim SENDFILES(20) As String
Dim val3 As String
Dim State As String
Dim logger As String
Dim chan As String
Dim val4 As String
Dim msg As String
Dim db As String
Dim place As String
Dim fs, a, f2, f1, s, fc, fd

Set cnn = New ADODB.Connection
Set cnn1 = New ADODB.Connection
strcnn = "DSN=informix online connect;" & _

"UID=lvk4173;PWD=lvk412;DATABASE=lsd;HOST=lstaraxp.tamu.edu;SERVER=lsol;SER
VICE=sqlexec;PROTOCOL=olsoctcp"
cnn.Open strcnn
Set rstsiteinfo1 = New ADODB.Recordset

Call ftp_thing_on(" ", " ", "lstaraxp.tamu.edu", " ")

Set fs = CreateObject("Scripting.FileSystemObject")
Open "\esInt\common\dlockhar\loggers\abb\polling_status.txt" For Input As #1
Line Input #1, val3
Close #1

If LCase(Trim(val3)) = "polling complete" Then
   fs.deletefile "\esInt\common\dlockhar\loggers\abb\polling_status.txt", True
Else
   status ("there was an error polling the ABB loggers.")
End
End If
On Error Resume Next
fs.deletefolder "\esInt\common\dlockhar\loggers\abb\data", True
Set fd = fs.createfolder("\esInt\common\dlockhar\loggers\abb\data")
On Error GoTo 0

Set f = fs.GetFolder("\esInt\common\dlockhar\loggers\abb\")
Set fc = f.Files

'---------- START OF MAIN PROCESSING LOOP ---------------'

For Each f1 In fc

   If LCase(Mid(Trim(f1.Name), 1, 3)) = "sub" Then
      logger = "436"
      chan = "4470"
      infile = "\esInt\common\dlockhar\loggers\abb\" + Trim(f1.Name)
      GoTo ext1
   End If
   If LCase(Mid(Trim(f1.Name), 1, 3)) = "act" Then
      logger = "437"
      chan = "4472"
      infile = "\esInt\common\dlockhar\loggers\abb\" + Trim(f1.Name)
      GoTo ext1
   End If
   GoTo ext2

--- End of document ---
ext1:

logit ("processed " + Trim(f1.Name) + " on " + Str(Date) + " at " + Str(Time) + ".")

scratch1 = \"lesInt\common\dlockhar\scratch1.txt\"
scratch2 = \"lesInt\common\dlockhar\scratch2.txt\"
thefile = logger + Trim(julian(Str(Date) + " " + Str(Time))) + ".txt"
outfile = \"lesInt\common\dlockhar\loggers\abb\" + thefile
resumefile = \"lesInt\common\dlockhar\loggers\abb\resumetime\" + logger + ".txt"
Open infile For Input As #1
Open scratch1 For Output As #3

Do Until EOF(1)
  Line Input #1, buffer1
  If (Mid(Trim(buffer1), 15, 5) = "Total") Then
    startdate = Mid(Trim(buffer1), 5, 8)
    starttime = Mid(Trim(buffer1), 1, 5)
    Line Input #1, buffer1
    starttime = Mid(Trim(buffer1), 1, 5)
    startdatetime = startdate + " " + starttime
    realdatetime = DateAdd("n", -15, startdatetime)
    Exit Do
  End If
Loop
Close #1

"Debug.Print "know start date"
Open infile For Input As #1
first = False
therest = True
Do Until EOF(1)
  Line Input #1, buffer1
  If (Mid(Trim(buffer1), 1, 21) = "------- LOAD PROFILE") And (therest) Then
    first = True
    therest = False
    buffer1 = StrReverse(Trim(buffer1))
    i = InStr(1, buffer1, " ")
    i = InStr(i + 1, buffer1, ".")
    buffer1 = Mid(buffer1, i + 1, 3)
    unit1 = StrReverse(buffer1)
    Print #3, "CHANNEL units= " + unit1 + " STARTING DATE= " + startdate
  Else
    If first Then
      If (Mid(Trim(buffer1), 1, 12) = "------- LOAD") Then
        Exit Do
      Else
        Print #3, "LOAD DATA= " + Trim(buffer1)
      End If
    End If
  End If
End Do
Else
  If IsNumeric(Mid(Trim(buffer1), 1, 2)) And Mid(Trim(buffer1), 3, 1) = ":" Then
    Print #3, buffer1
  Else
    End If
  End If
Else
  End If
End If
Loop
'End
'Debug.Print "1 channel"
buffer1 = StrReverse(Trim(buffer1))
i = InStr(1, buffer1, " ")
i = InStr(i + 1, buffer1, "")
buffer1 = Mid(buffer1, i + 1, 5)
unit2 = StrReverse(buffer1)
Print #3, "CHANNEL units= " + buffer1 + " STARTING DATE= " +startdate

Do Until EOF(1)
  Line Input #1, buffer1
  If first Then
    If (Mid(Trim(buffer1), 1, 12) = "------- LOAD") Then
      Exit Do
    Else
      If IsNumeric(Mid(Trim(buffer1), 1, 2)) And Mid(Trim(buffer1), 3, 1) = ":" Then
        Print #3, buffer1
      Else
        End If
      End If
    Else
      End If
  End If
Loop
Close

Open scratch1 For Input As #3
Open scratch2 For Output As #4
crt = 0
cntrdatetime = DateAdd("n", 15, realdatetime)
Line Input #3, buffer1
Do Until EOF(3)
  Line Input #3, buffer1
  If (Mid(Trim(buffer1), 1, 7) = "CHANNEL") Then
    Exit Do
Else
  buffer1 = Trim(buffer1)
  buffer1 = Trim(Mid(buffer1, 6))
  i = InStr(1, buffer1, "")
  valx(1) = Trim(Mid(buffer1, 1, i))
  buffer1 = Trim(Mid(buffer1, i))
  i = InStr(1, buffer1, "")
  valx(2) = Trim(Mid(buffer1, 1, i))
  buffer1 = Trim(Mid(buffer1, i))
  i = InStr(1, buffer1, "")
  valx(3) = Trim(Mid(buffer1, 1, i))
  buffer1 = Trim(Mid(buffer1, i))
  valx(4) = Trim(buffer1)
  For i = 1 To 4
    ctr = ctr + 1
    valx(i) = Replace(valx(i), "*", "")
    valx(i) = Replace(valx(i), "-", "")
    If Len(Trim(valx(i))) = 0 Then
      valx(i) = "0"
    End If
    Debug.Print Str(DateValue(cntrdatetime)) + "+" + Str(TimeValue(cntrdatetime)) + "+" + Str(ctr) + "" + valx(i)
    dorf = CLng(valx(i))
    valx(i) = Trim(21 * dorf)
    Debug.Print Str(DateValue(cntrdatetime)) + "+" + Str(TimeValue(cntrdatetime)) + "+" + Str(ctr) + "" + valx(i)
  Next i
End If
Loop
Close #4

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k = 4
buffer1 = Trim(buffer1)
buffer1 = Trim(Mid(buffer1, 6))
i = InStr(1, buffer1, " ")
valx(1) = Trim(Mid(buffer1, 1, i))
buffer1 = Trim(Mid(buffer1, i))
i = InStr(1, buffer1, " ")
valx(2) = Trim(Mid(buffer1, 1, i))
If Not IsNumeric(valx(2)) Then
    k = 1
    GoTo calc
End If
buffer1 = Trim(Mid(buffer1, i))
i = InStr(1, buffer1, " ")
valx(3) = Trim(Mid(buffer1, 1, i))
If Not IsNumeric(valx(3)) Then
    k = 2
    GoTo calc
End If
buffer1 = Trim(Mid(buffer1, i))
valx(4) = Trim(buffer1)
If Not IsNumeric(valx(4)) Then
    k = 3
End If
calc: For i = 1 To k
    Line Input #4, outfbuf
    Print #2, Trim(outbuf) + " " + valx(i)
Next i
End If
Loop

On Error GoTo 0
GoTo here
quit1: Close
    Resume here

here:

    Close
    Open outfile For Input As #2
    Open scratch2 For Output As #3
    Line Input #2, buffer1
    startdatetime = Mid(Trim(buffer1), 1, 17)
    time1 = startdatetime
Close #2
Open outfile For Input As #2
Do Until EOF(2)
  Line Input #2, outbuf
  time2 = Mid(Trim(outbuf), 1, 17)
  If time1 <= time2 Then
    Print #3, outbuf
  End If
Loop
Close

'adjust for daylight savings time
time3 = "4/2/00 01:00:00"
time4 = "10/29/00 00:00:00"
Open scratch1 For Output As #3
Open scratch2 For Input As #2
Do Until EOF(2)
  Line Input #2, buffer1
  startdatetime = Mid(Trim(buffer1), 1, 17)
  Startdate = Mid(Trim(buffer1), 18)
  TIMESTAMP <= 2000-10-29 00:00 then
    time1 = startdatetime
    If time1 >= time3 And time1 <= time4 Then
      time1 = DateAdd("h", 1, time1)
      startdatetime = Trim(Str(time1))
      If InStr(1, Trim(startdatetime), ":") = 0 Then
        startdatetime = startdatetime + " 00:00:00"
      End If
    End If
  End If
  buffer1 = startdatetime + ":" + buffer1
  Print #3, buffer1
Loop
Close

sqlquery = "select * from chids where site=" + Trim(logger)
On Error GoTo notgot
  rsstsiteinfo1.Open sqlquery, cnn, , adCmdText
On Error GoTo 0
db = Trim(rsstsiteinfo1!server)
rsstsiteinfo1.Close
cnn.Close

If Trim(db) = "1" Then
  place = "Istar"
  strcnn1 = "DSN=informix online connect;" & _
"UID=lvk4173;PWD=lvk4142;DATABASE=lsd;HOST=lsstaraxp.tamu.edu;SERVER=lsol;SERVICE=sqlexec;PROTOCOL=olsocctp;"
cnn1.Open strcnn1
Set rsstsiteinfo1 = New ADODBObject.Recordset
Else
  place = "esl"
  strcnn1 = "DSN=ESLSQL;" & _

"UID=lvk4173;PWD=lvk4142;DATABASE=esld;HOST=esl.tamu.edu;SERVER=eslol;SERVICE=sqlexec;PROTOCOL=olsocctp;"
cnn1.Open strcnn1
Set rsstsiteinfo1 = New ADODBObject.Recordset
End If
sqlquery1 = "select max(timestamp) from ch" + Trim(channel)
rsstsiteinfo1.Open sqlquery1, strcnn1, , cmdtext
time1 = rsstsiteinfo1(0)

Call ftp_thing_dir(" ", " ", " ", LCase(Trim(place)))

Open scratch2 For Output As #3
Open scratch1 For Input As #2
Do Until EOF(2)
  Line Input #2, outbuf
  i = InStr(1, Trim(outbuf), " ")
  If InStr(i + 1, Trim(outbuf), ":") = 0 Then
    time2 = Mid(Trim(outbuf), 1, i) + ":00:00:00"
  Else
    time2 = Mid(outbuf, 1, i)
    i = InStr(i + 1, Trim(outbuf), ":")
    unit2 = Mid(outbuf, i + 1, j - i + 1)
    time2 = Trim(unit1) + " " + Trim(unit2)
    MsgBox Trim(time2)
  End If
End If

If time2 > time1 Then
  Print #3, outbuf
End If
Loop
Close

Open scratch1 For Output As #3
Open scratch2 For Input As #2
Do Until EOF(2)
Line Input #2, outbuf
  Debug.Print "max time = " + Str(time1) + " first record time = " + Trim(outbuf)
End
Print #3, outbuf
Loop
Close

Open scratch1 For Input As #3
Line Input #3, buffer1
FileNotFoundException = Trim(Mid(Trim(buffer1), 1, InStr(1, Trim(buffer1), " ")))

j = 0
Do Until EOF(3)
  i = i + 1
  If i <= 999 Then
    Line Input #3, buffer1
    Print #2, buffer1
  Else
    Close #2
    Call ftp_thing_send(outfile, Trim(thefile), "lstaraxp.tamu.edu", Trim(db))
    SENDFILES(j) = thefile
    MsgBox "j= " + Str(j) + " " + SENDFILES(j)
    j = j + 1
    i = 0
  End If
  FileDateTime = Trim(Mid(Trim(buffer1), 1, InStr(1, Trim(buffer1), " "))) + Trim(julian(FileDateTime)) + ".raw"
  thefile = logger + Replace(Str(Date), ",", ":") + Replace(Str(Time), ",", ":") + ".raw"
  outfile = "\esln\common\lockhar\loggers\" + abbn + "\data" + thefile
  Open outfile For Output As #2
  Debug.Print "OPEN: " + outfile
End If
Loop
Close
If i > 1 Then
  Call ftp_thing_send(outfile, Trim(thefile), "lstaraxp.tamu.edu", Trim(db))
End If
SENDFILES(j) = thefile

msg = "Raw load file(s) for site " + logger + " have been FTPd to lstaraxp " + Trim(db) + " directory on " + Trim(Str(Date)) + " at " + Trim(Str(Time)) + "."
logit (msg)

log_in
  Call send_em(SENDFILES, logger, j, msg)
log_off
  fs.movefile infile, "\esln\common\dlochkar\loggers\abb\processed\"
  ext2:
'
  ------------------------END OF MAIN PROCESSING LOOP ------------------------

Next

  fs.deletefile "\esln\common\dlochkar\loggers\abb\polling_status.txt", True
  status ("inactive")
  Close
  cnn.Close
  Call ftp_thing_close(outfile, thefile, "lstaraxp.tamu.edu", Trim(db))
  End

notgot:
  log_in
  MessageBox sqlquery1
  msg = "Site " + logger + " does not exist on either lstar or esl databases. abbpoll polling" 
  terminated."
  Call send_em(SENDFILES, logger, j, msg)
log_off
  End
  Resume Next
End Sub
Private Sub status(State As String)
  Open "\esln\common\dlochkar\loggers\abb\polling_status.txt" For Append As #1
  Print #1, Trim(State)
  Close
End Sub

Public Sub log_in()
  abbpoll.MAPISession1.SignOn
  abbpoll.MAPIMessages1.SessionID = abbpoll.MAPISession1.SessionID
End Sub

Public Sub log_off()
  abbpoll.MAPISession1.SignOff
End Sub
Public Sub send_em(SENDFILES() As String, logger As String, j As Integer, msg As String)
  Dim i As Integer
  Dim str1, str2 As String
  Dim hnd1 As Integer
Open "\lesInt\common\dlockhar\loggers\abb\mail_people.txt" For Input As #2
Do Until EOF(2)
  DoEvents
  Line Input #2, str1
  str1 = Trim(str1)
  abbpoll.MAPIMessages1.
  abbpoll.MAPIMessages1.MsgIndex = -1
  abbpoll.MAPIMessages1.Compose
  abbpoll.MAPIMessages1.RecipDisplayName = str1
  abbpoll.MAPIMessages1.MsgSubject = "Database Load Files"
  str2 = "File(s) Sent: "
  For i = 0 To j
    If i <> j Then
      str2 = str2 + SENDFILES(i) + ", "
    Else
      str2 = str2 + SENDFILES(i)
    End If
  Next i
  abbpoll.MAPIMessages1.MsgNoteText = Trim(msg) + vbCrLf + str2
  abbpoll.MAPIMessages1.ResolveName
  abbpoll.MAPIMessages1.Send
Loop
Close #2
End Sub
Public Function julian(dater As Date) As String
  Select Case Month(dater)
    Case 1
      If Len(Trim(Str(Day(dater)))) = 1 Then
        julian = Mid(Trim(Str(Year(dater))), 3, 2) + "00" + Trim(Str(Day(dater)))
      Else
        julian = Mid(Trim(Str(Year(dater))), 3, 2) + "0" + Trim(Str(Day(dater)))
      End If
    Case 2
      julian = Mid(Trim(Str(Year(dater))), 3, 2) + "0" + Trim(Str(31 + Day(dater)))
    Case 3
      julian = Mid(Trim(Str(Year(dater))), 3, 2) + "0" + Trim(Str(59 + Day(dater)))
    Case 4
      If Len(Trim(Str(90 + Day(dater)))) = 2 Then
        julian = Mid(Trim(Str(Year(dater))), 3, 2) + "0" + Trim(Str(90 + Day(dater)))
      Else
        julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(90 + Day(dater)))
      End If
    Case 5
      julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(120 + Day(dater)))
  End Select
End Function
Case 6
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(151 + Day(dater)))
Case 7
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(181 + Day(dater)))
Case 8
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(212 + Day(dater)))
Case 9
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(243 + Day(dater)))
Case 10
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(273 + Day(dater)))
Case 11
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(304 + Day(dater)))
Case 12
    julian = Mid(Trim(Str(Year(dater))), 3, 2) + Trim(Str(334 + Day(dater)))
Case Else
End Select
End Function

Sub logit(msg As string)
    Open \eslnt\common\dlkochhar\loggers\abb\abb_logfile.txt For Append As #1
    Print #1, msg
    Close
End Sub

Public Sub ftp_thing_on(sendfile As String, rcvfile As String, site As String, dir As String)
    With abbpoll.Inet1
        .URL = Trim(site)
        .UserName = "dataloader"
        .Password = "upl0ad"
        .Protocol = icFTP
    End With
    abbpoll.Inet1.Execute abbpoll.Inet1.URL
    Wait
End Sub

Public Sub ftp_thing_dir(sendfile As String, rcvfile As String, site As String, dir As String)
    Debug.Print "dir: " + Trim(abbpoll.Inet1.URL) + " cd " + LCase(Trim(dir))
    abbpoll.Inet1.Execute abbpoll.Inet1.URL, "cd " + LCase(Trim(dir))
    Wait
End Sub

Public Sub ftp_thing_send(sendfile As String, rcvfile As String, site As String, dir As String)
    Debug.Print "send: " + Trim(abbpoll.Inet1.URL) + " put " + LCase(Trim(sendfile)) + " " + LCase(Trim(rcvfile))
    abbpoll.Inet1.Execute abbpoll.Inet1.URL, "put " + LCase(Trim(sendfile)) + " " + LCase(Trim(rcvfile))
    Wait
End Sub
Public Sub ftp_thing_close(sendfile As String, rcvfile As String, site As String, dir As String)
  "Debug.Print "close: " + Trim(abbpoll.Inet1.URL) + " close"
  wait
End Sub

Private Sub Inet1_StateChanged(ByVal State As Integer)

  Select Case State
    Case icNone 0 No state to report.
      'Debug.Print "State 0"
    Case icHostResolvingHost 1 The control is looking up the IP address of the specified host computer.
      'Debug.Print "State 1"
    Case icHostResolved 2 The control successfully found the IP address of the specified host computer.
      'Debug.Print "State 2"
    Case icConnecting 3 The control is connecting to the host computer.
      'Debug.Print "State 3"
    Case icConnected 4 The control successfully connected to the host computer.
      'Debug.Print "State 4"
    Case icRequesting 5 The control is sending a request to the host computer.
      'Debug.Print "State 5"
    Case icRequestSent 6 The control successfully sent the request.
      'Debug.Print "State 6"
    Case icReceivingResponse 7 The control is receiving a response from the host computer.
      'Debug.Print "State 7"
    Case icResponseReceived 8 The control successfully received a response from the host computer.
      'Debug.Print "State 8"
    Case icDisconnecting 9 The control is disconnecting from the host computer.
      'Debug.Print "State 9"
    Case icDisconnected 10 The control successfully disconnected from the host computer.
      'Debug.Print "State 10"
    Case icError 11 An error occurred in communicating with the host computer.
      'Debug.Print "State 11"
    Case icResponseCompleted 12 The request has completed and all data has been received.
      'Debug.Print "State 12"
  End Select
End Sub

Public Sub wait()
  Do While abbpoll.Inet1.StillExecuting
    DoEvents
  Loop
End Sub