Title: **Creating GUI Front-End Applications for the HPe3000 Using Visual Studio**
Presentation: 250

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Outline

- Introduction
- Types of Data Processing
- Technology Diagrams
- Benefits and Advantages
- Socket Communications
- Setting up the HP e3000
- PC Access to the HP e3000
- Examples
- Questions

Introduction

- Why the HP e3000?

  Stability, current data and applications

- Why GUI?

  Nicer interface, user demands

- Goal: Develop robust applications using the data stored on the HP e3000 and giving users the GUI environment they desire

Types of Data Processing

Online Transaction Processing (OLTP)

- High transaction throughput
- Add/change/delete data
- Predefined transactions
- Response times critical

Types of Data Processing (Cont.)

Information on Demand - Ad Hoc Reporting

- Inquire and Report data only
- Undefined transactions - different each time
- Response times not as critical

ODBC Defined

- Open Database Connectivity (ODBC)
- Used for standard access to multiple types of databases (Image, Oracle, etc)
- Allows PC access from applications like Excel to HP e3000 TurboImage data
- Converts SQL/ODBC calls to TurboImage calls
- Good for Ad Hoc Reporting and extracting data to other applications

Sockets Defined

- Sockets are a method of establishing a connection between different machines and/or operating systems
- Socket ports are similar to phone numbers for a machine
- Uses low level TurboImage native database access routines that are already developed
- Good for high volume OLTP performance

HP e3000 Benchmarks

ODBC Benchmarks

- Higher HP e3000 CPU usage
- Low concurrency of users, slower response times under load
- Database locking problems with other applications, not controlled by the application

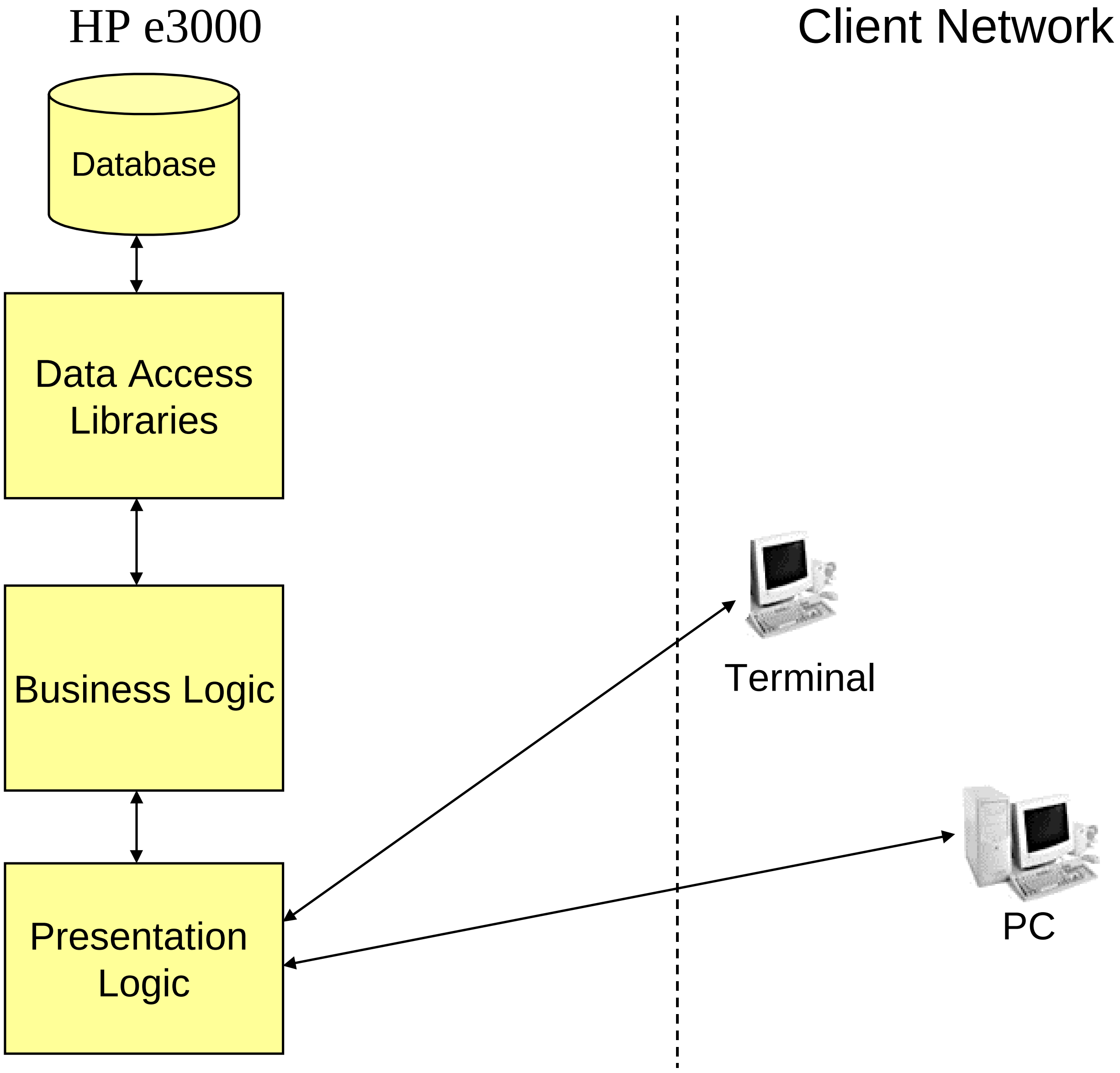
Socket Technology Benchmarks

- Low HP e3000 CPU usage (similar to current native HP e3000 applications)
- High concurrency of users
- Database locking controlled by the server program on the HP e3000

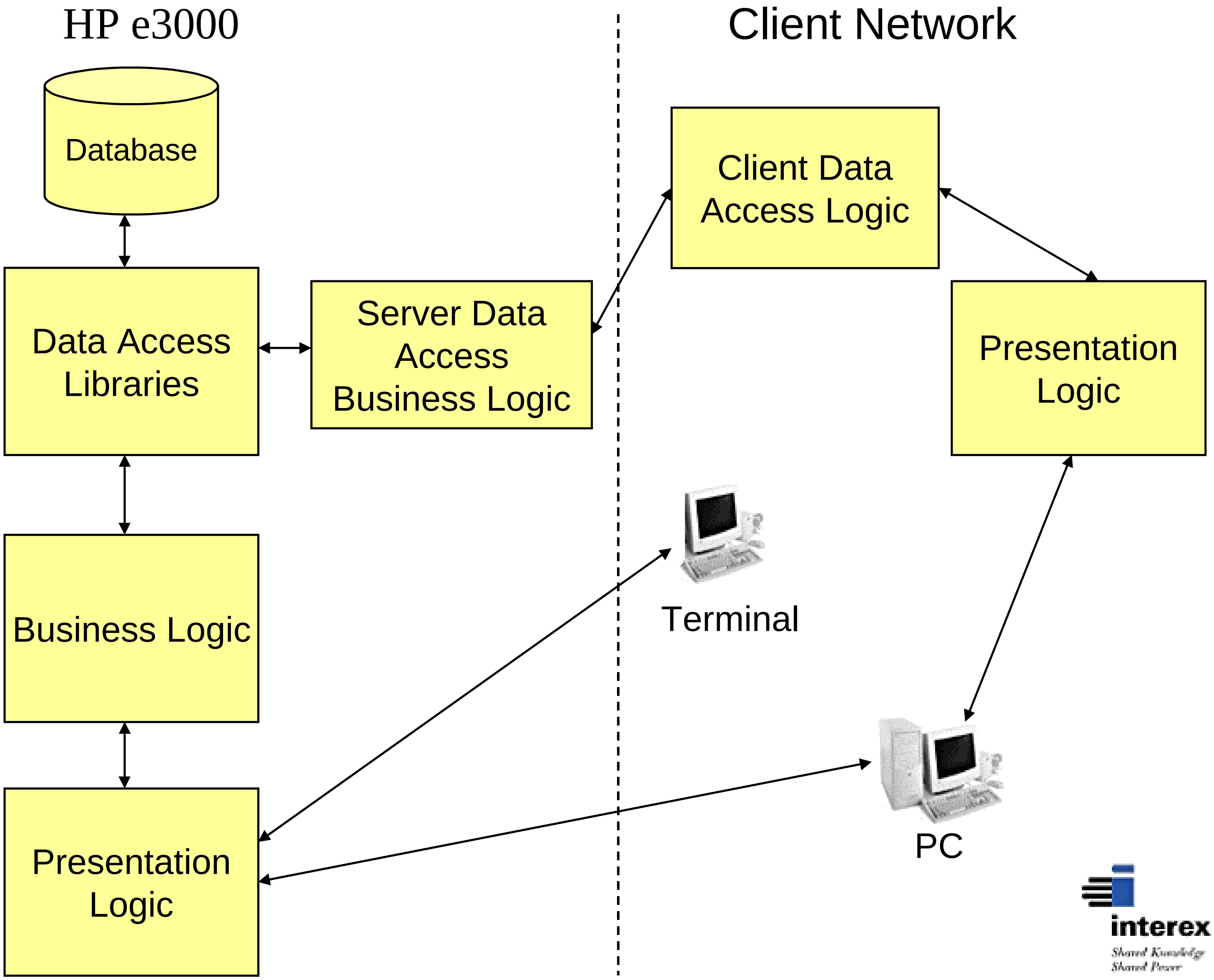
Socket Technology Application Goals

- Fastest response on HP3000-based data
- Read and Update ability from the PC application to the HP e3000
- No performance hit to the production HP e3000 environment

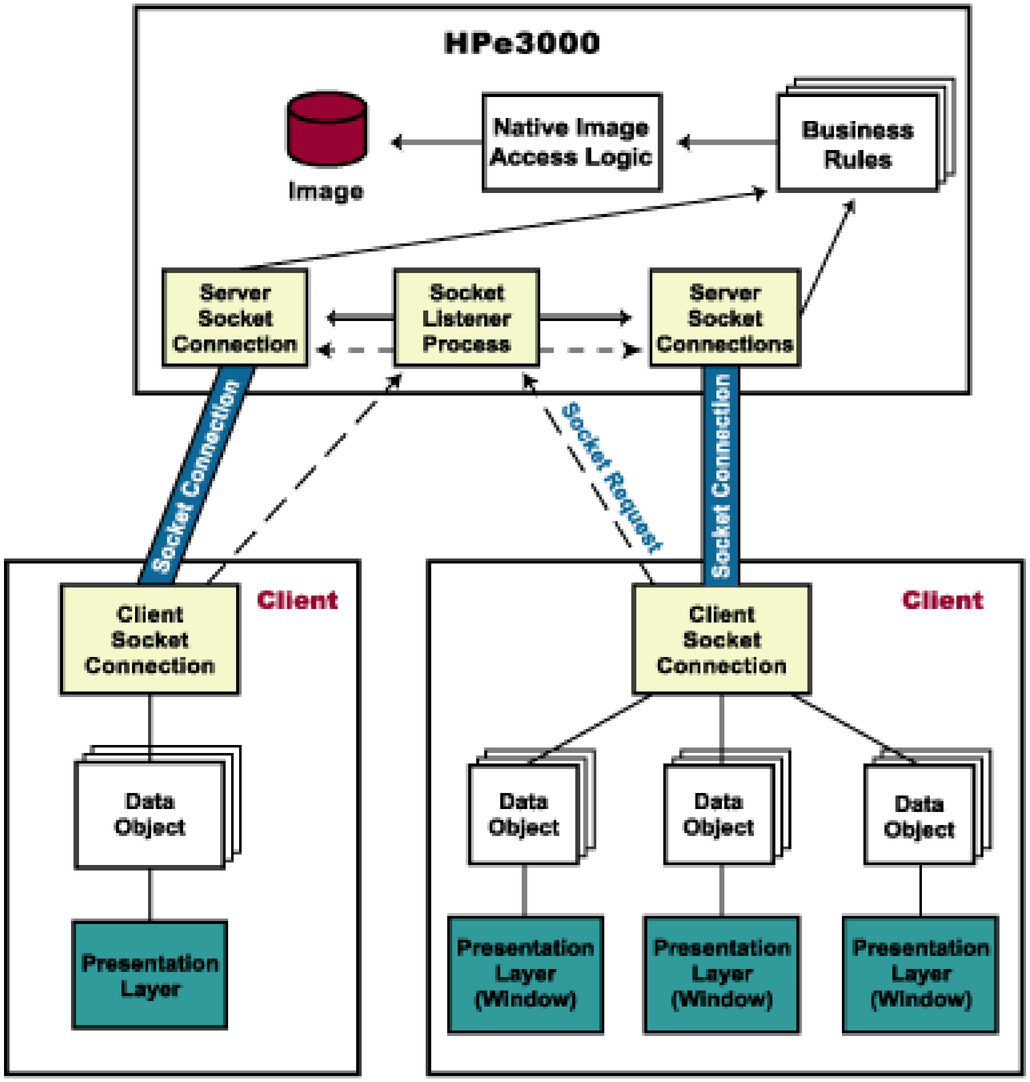
Current HP e3000 Technology



Adding Socket Technology

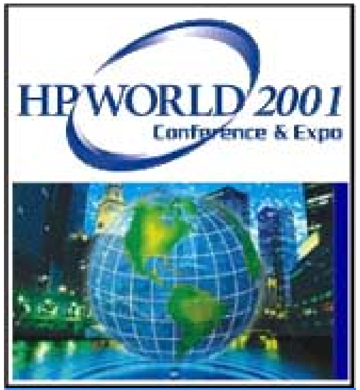


Socket Technology Architecture



Architecture Advantages

- Fast OLTP performance
- Reliable, non-invasive data processing on the production HP e3000
- No changes to current programs
- Take advantage of the native strengths of the HP e3000 and Image databases



Company Benefits

- PC GUI screens relieve V-Plus limitations
- Popup windows available for notes, searches, valid values, help, etc.
- Can see all error/validations at one time
- Can have multiple windows open, doesn’t add sessions to the HP e3000
- Ease of use / less user training
- New user interface but same data, report processes, nightly processing, etc.
- Tie into PC tools and applications

Setting Up the HP e3000

HP e3000 Database - Customer

```
SET NAME:
   CUSTOMER,MANUAL

      ITEMS:
         CUSTOMER,                X8              <<KEY ITEM>>
         NAME,                    X30
         ADDRESS-1,               X30
         ADDRESS-2,               X30
         ADDRESS-3,               X30
         CITY,                    X30
         STATE,                   X2
         ZIP,                     X10
         CREDIT-LIMIT,            I2
         DATE-ENTERED,            X8
         DATE-MODIFIED,           X8

      CAPACITY: 100                ENTRIES: 3
```

HP e3000 Customer #6

```
CUSTOMER         =6
NAME             =Test Customer 1
ADDRESS-1        =ADDRESS LINE 1................
ADDRESS-2        =ADDRESS LINE 2................
ADDRESS-3        =ADDRESS LINE 3................
CITY             =CITY..........................
STATE            =IN
ZIP              =12345-1234
CREDIT-LIMIT     =1000
DATE-ENTERED     =
DATE-MODIFIED    =
```

Socket Communications

- Socket communications are a way to connect different machines without understanding the different network protocols
- All connectivity between machines uses sockets at the low level
- Berkley Software Distribution Interprocess Communications (BSD IPC) is a standard available on almost all machines

Socket Communications (Cont.)

- Network Interprocess Communications (NetIPC) is similar and compatible to BSD IPC, but has additional functionality on the HP e3000
- Perform system calls to establish connections and transfer data between machines

Socket Communications (Cont.)

Processes required for socket connections:

- Listener Process (Waits for new connection requests)
- Server Process (Handles requests once connected)
- Client Process (Asks for connection, sends requests, accepts returned data)

Listener Process

- A background job on the HP e3000 waits for “calls” on a specified port from clients
- Define the port in the services.net.sys file with a port over 20,000
- Once a request is received, create a separate socket connection for the client to use when sending and receiving information across the socket and start an individual server process

Listener Process Example

```
MAIN.
  PERFORM OPEN-LISTENER.
  PERFORM LISTEN-FOR-CONNECTION UNTIL DONE.

OPEN-LISTENER.
  CALL INTRINSIC "IPCCREATE" USING SOCKETKIND,
       PROTOCOL, FLAGS, OPT, CALLDESC, RESULT.

LISTEN-FOR-CONNECTION.
  CALL INTRINSIC "IPCRECVCN" USING CALLDESC,
       VCDESC, FLAGS, \\, RESULT.
  CALL “SERVER”.
```

Server Process

- A unique child process is started for each client connection
- All socket communications are handled by the server process
- The server process handles transaction requests and enforces business rules
- Calls sub-routines to handle individual transaction requests

Server Process Example

```
MAIN.
  CALL INTRINSIC "IPCRECV" USING
       IPC-VCDESC, WS-SOCKET-IN,
       IPC-DLEN, IPC-FLAGS, \\,
       IPC-RESULT.
  CALL “CUSTOMER”.
  CALL INTRINSIC "IPCSEND" USING
       IPC-VCDESC, LS-SOCKET-OUT,
       IPC-DLEN, IPC-FLAGS, \\,
       IPC-RESULT.
```

Customer Transaction Example

```
CUSTOMER.
    MOVE CUST-KEY-IN TO SEARCH-KEY.
    PERFORM READ-CUSTOMER.
    IF NOT CUSTOMER-FOUND
       PERFORM SET-READ-ERROR
    ELSE
       PERFORM LOAD-SOCKET-BUFFER.
```

PC Access the HP e3000

PC Applications

- Socket Tester (Freeware)
- Microsoft Excel & Microsoft Visual Basic
- Microsoft Visual FoxPro
- Web Access

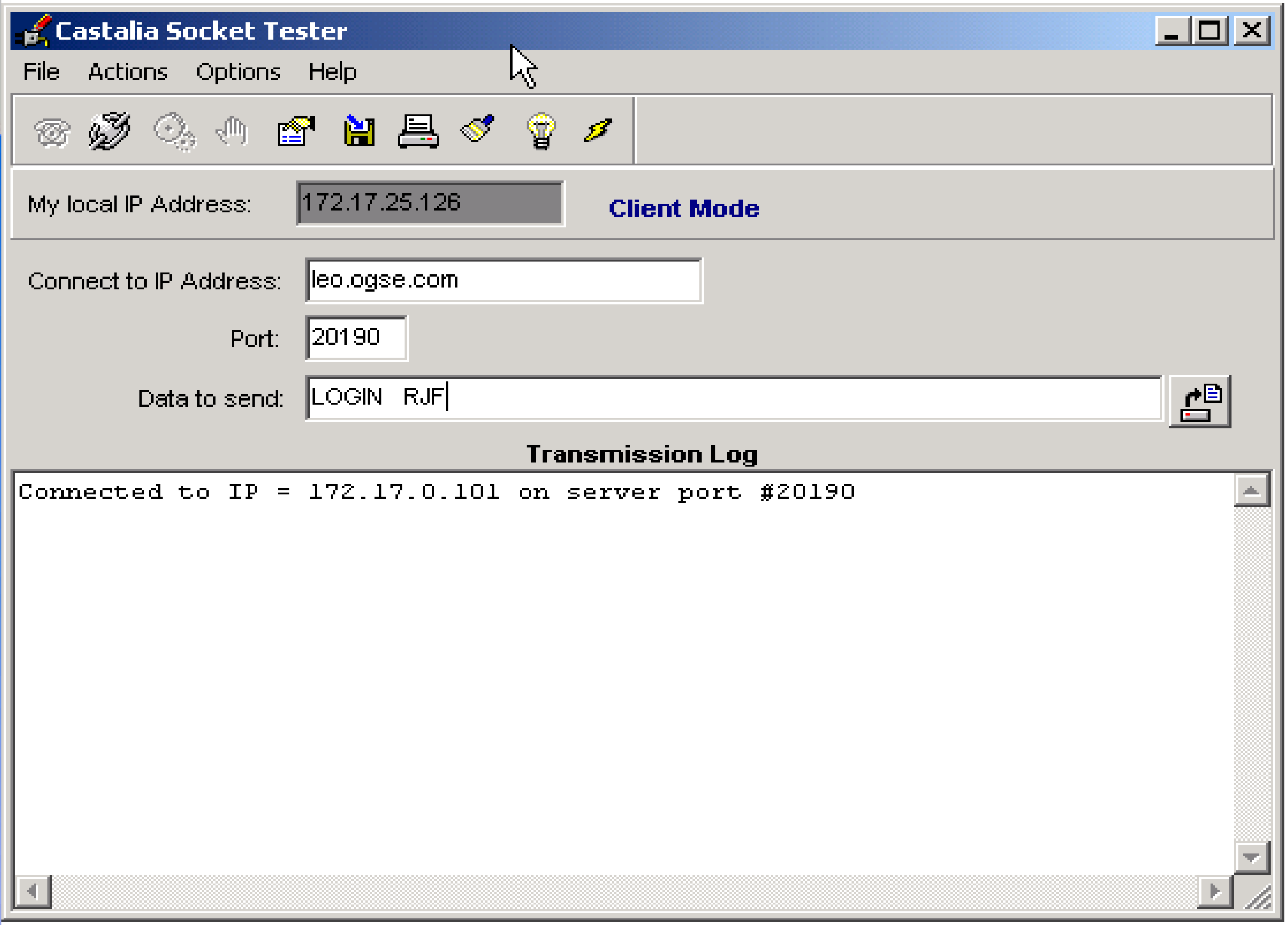
Client Process

- Use BSD IPC to connect to the HP e3000 on the predefined socket port
- Client initiates connection, then is moved to a separate unique socket connection for further transactions
- Each window on a client can have a unique socket connection or share one for the machine

Socket Tester (Freeware)

- Simple PC program from Castalia (www.castalia.com) that establishes a socket connection and allows data to be sent back and forth
- Used to show and test the data being sent back and forth from the HP e3000

Socket Tester Example



My local IP Address: 172.17.25.126

Client Mode

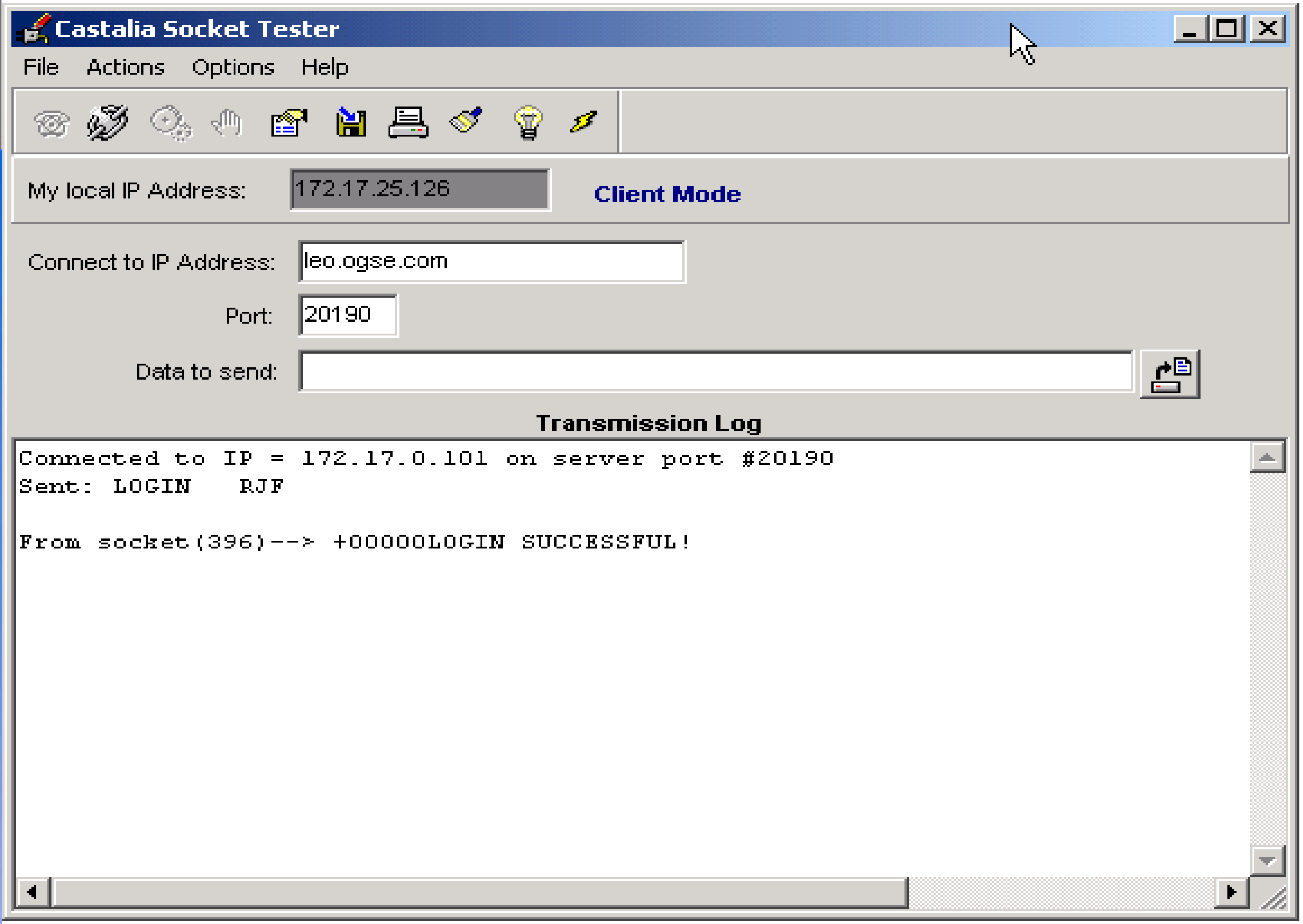
Connect to IP Address: leo.ogse.com

Port: 20190

Data to send: LOGIN RJF

```
Connected to IP = 172.17.0.101 on server port #20190
```

Socket Tester Example (Cont.)



My local IP Address: 172.17.25.126

Client Mode

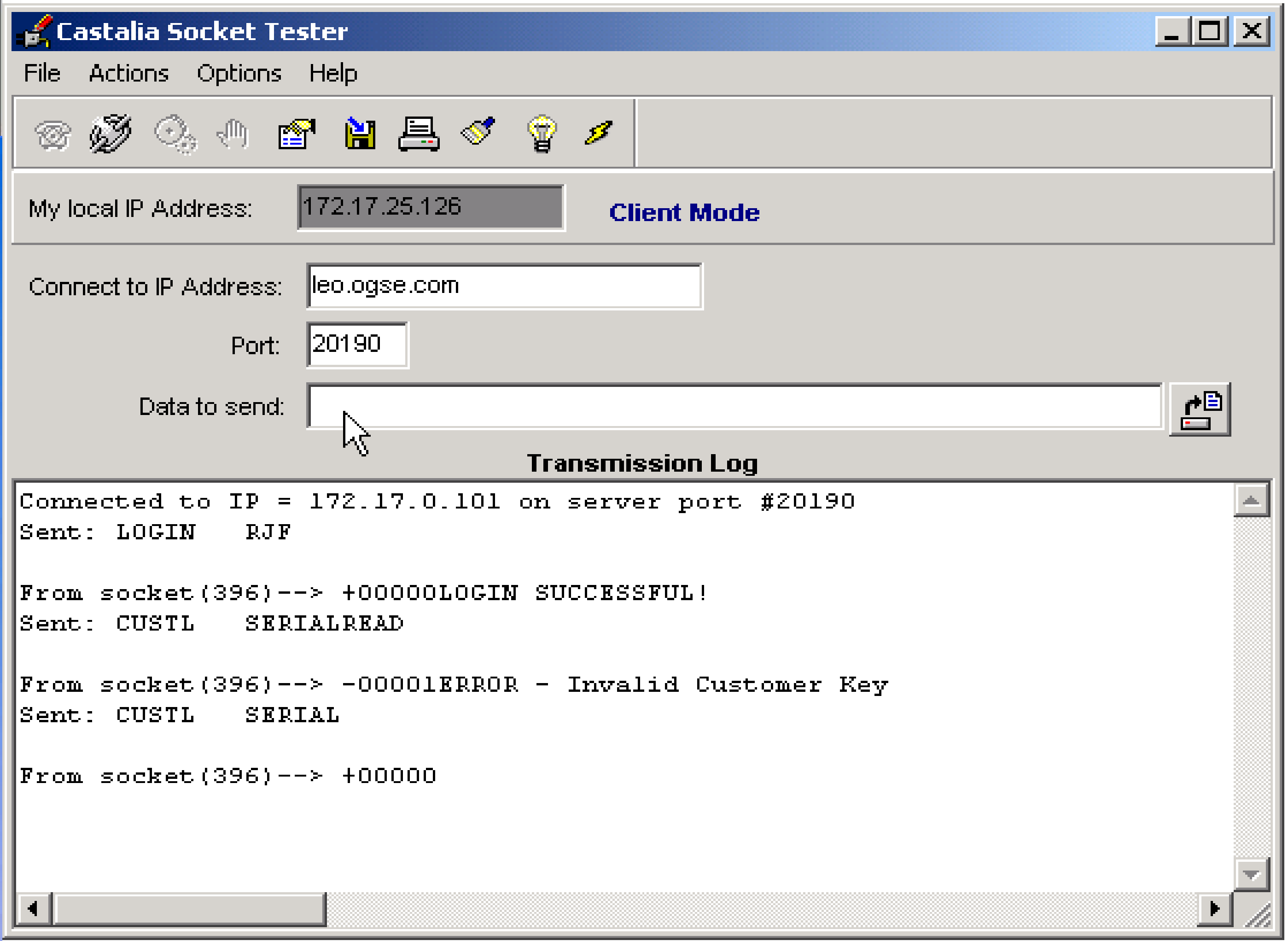
Connect to IP Address: leo.ogse.com

Port: 20190

Data to send:

```
Connected to IP = 172.17.0.101 on server port #20190
Sent: LOGIN   RJF

From socket(396)--> +00000LOGIN SUCCESSFUL!
```

Socket Tester Example (Cont.)



My local IP Address: 172.17.25.126

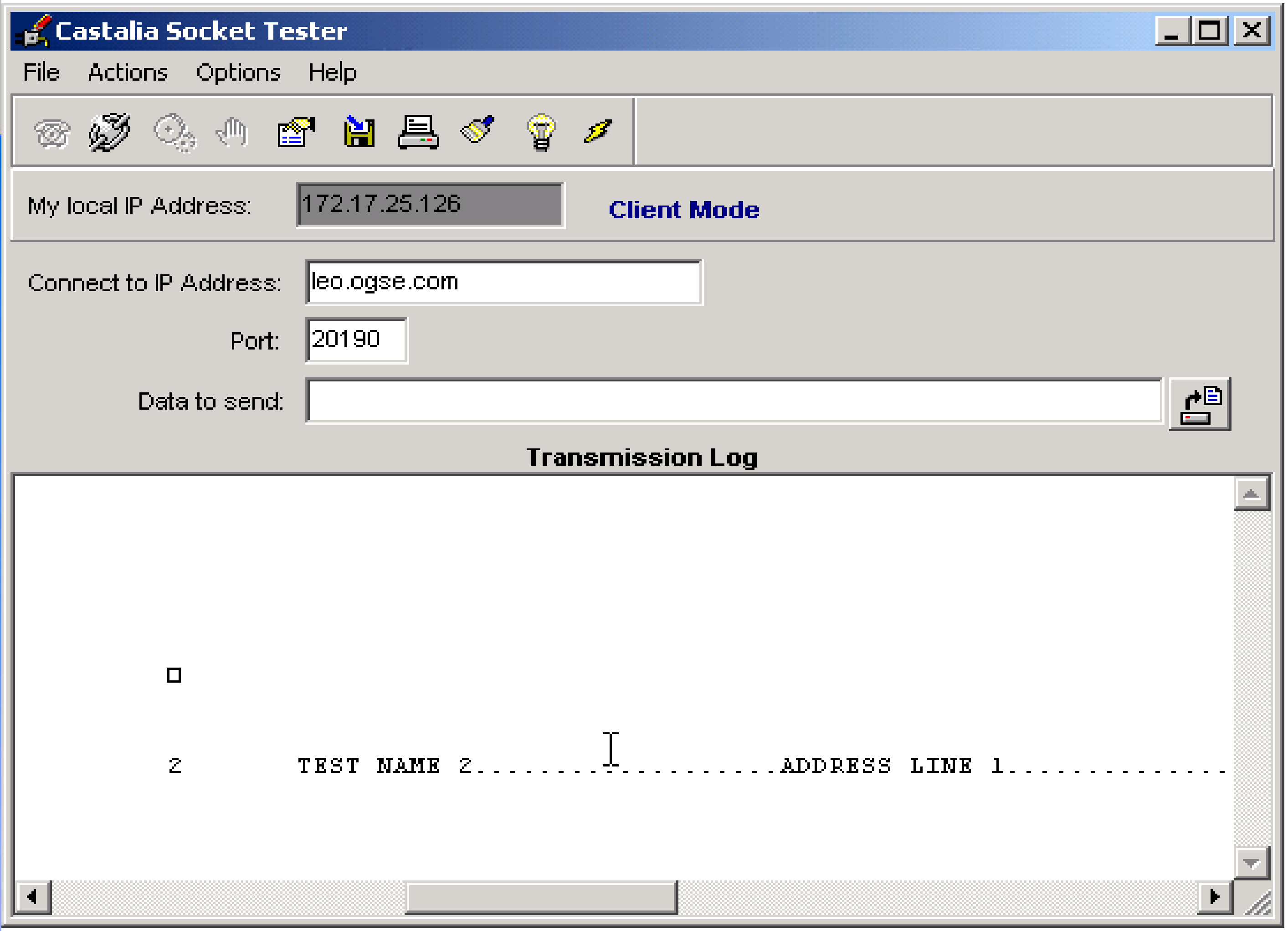
Connect to IP Address: leo.ogse.com

Port: 20190

Data to send:

```
Connected to IP = 172.17.0.101 on server port #20190
Sent: LOGIN   RJF

From socket(396)--> +00000LOGIN SUCCESSFUL!
Sent: CUSTL   SERIALREAD

From socket(396)--> -00001ERROR - Invalid Customer Key
Sent: CUSTL   SERIAL

From socket(396)--> +00000
```

Socket Tester Example (Cont.)



My local IP Address: 172.17.25.126

Client Mode

Connect to IP Address: leo.ogse.com

Port: 20190

Data to send:

```
   □

   2       TEST NAME 2...................ADDRESS LINE 1.............
```

Microsoft Excel & Visual Basic

- Using Excel to display values and Visual Basic code to access the data on the HP e3000 through the socket
- Can add Visual Basic graphical components to “pretty up” the interface
- Uses DLL to handle the socket connection and parse the data fields

Excel & VB Example

```
Sub cust()

Worksheets("display").Select
Worksheets("display").Cells(1, 1).Select
ClearFields

Set loSock = CreateObject("OgScar.Socket")

If loSock.Connect("leo.ogse.com", 20190) = 0 Then
    Set loCust = CreateObject("OgScar.Transaction")
    loCust.SetSocket (loSock)

    lnOK = loCust.SendTransaction("LOGIN   ")

    If lnOK <> 0 Then
        MsgBox (loCust.GetError())
        Exit Sub
    End If

    llRet = addfields(loCust, "customer")
```

Excel & VB Example (Cont.)

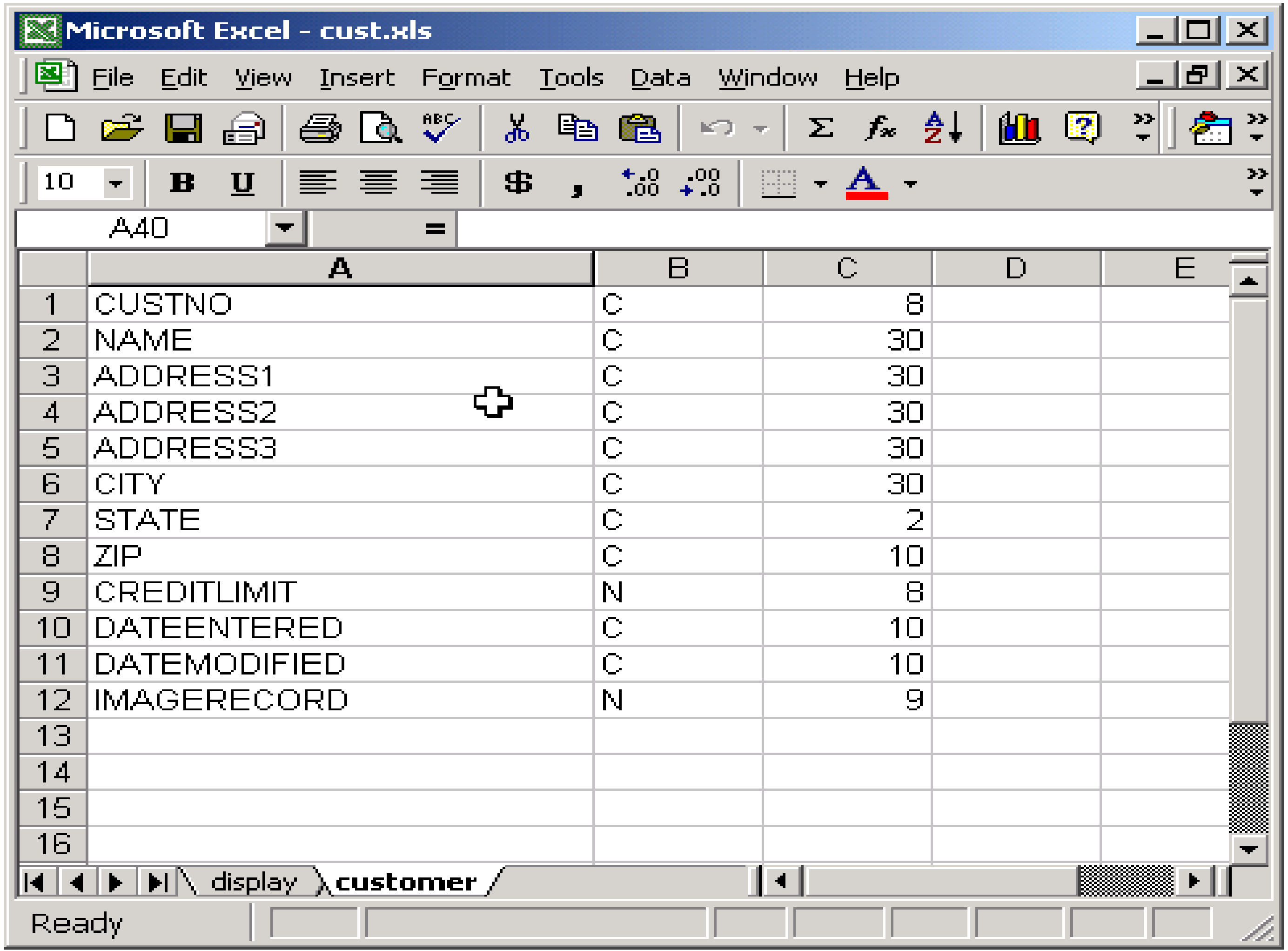
```
' RETRIEVE AN INDIVIDUAL CUSTOMER

MsgBox ("We're going to get customer #6 and display it.")

loCust.ClearParameters

llRet = loCust.AddParameterValue("KEY", "C", 16, 0, "CUSTOMERNO")
llRet = loCust.AddParameterValue("RECORD", "N", 9, 0, 0)
llRet = loCust.AddParameterValue("VALUE", "C", 8, 0, "6       ")

If loCust.SendTransaction("CUSTI   ") <> 0 Then
   MsgBox (loCust.GetError())
   Exit Sub
End If

llRet = readfields(loCust, "customer", 1)
```

Excel & VB Example (Cont.)

Read fields function:

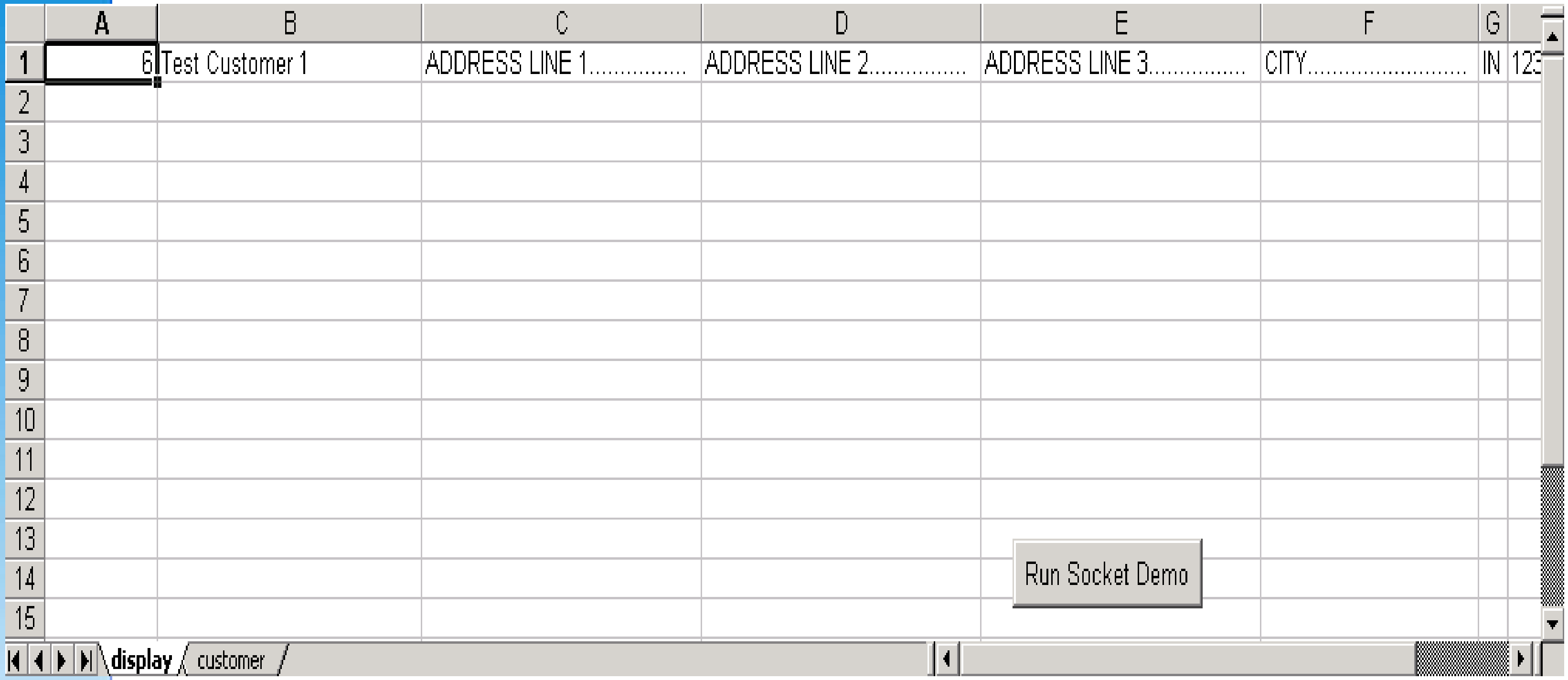
```
Function readfields(toCust, tcSheet, tnRow)
Dim i
With toCust
   For i = 1 To 12
      Worksheets("display").Cells(tnRow, i).Select
      ActiveCell.FormulaR1C1 = .GetFieldValue(Worksheets(tcSheet).Cells(i, 1).Value)
   Next
   Worksheets("display").Cells(1, 1).Select
End With
End Function
```

Excel & VB Example (Cont.)


Microsoft Excel - cust.xls
File Edit View Insert Format Tools Data Window Help
10
A40
=
display
customer
Ready

	A	B	C	D	E
1	CUSTNO	C	8		
2	NAME	C	30		
3	ADDRESS1	C	30		
4	ADDRESS2	C	30		
5	ADDRESS3	C	30		
6	CITY	C	30		
7	STATE	C	2		
8	ZIP	C	10		
9	CREDITLIMIT	N	8		
10	DATEENTERED	C	10		
11	DATEMODIFIED	C	10		
12	IMAGERECORD	N	9		
13					
14					
15					
16					

Excel & VB Example (Cont.)

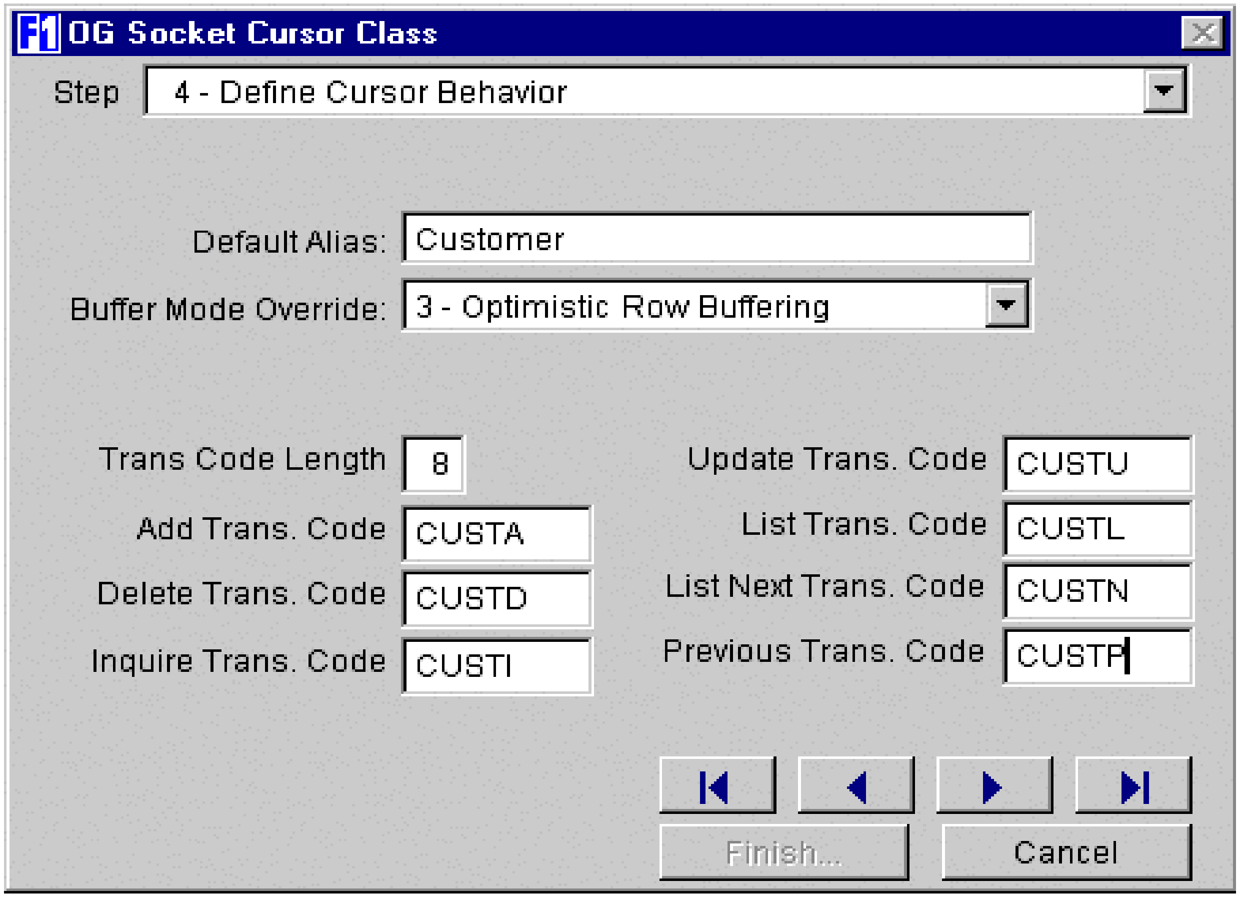


	A	B	C	D	E	F	G	
1	6	Test Customer 1	ADDRESS LINE 1...............	ADDRESS LINE 2...............	ADDRESS LINE 3...............	CITY.........................	IN	123
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Microsoft Visual FoxPro

- True Object Oriented Programming
- Using F1 Technologies' Visual Fox Express framework
- Uses C++ DLL for low level socket control

Visual FoxPro Example



OG Socket Cursor Class

Step: 4 - Define Cursor Behavior

Default Alias: Customer

Buffer Mode Override: 3 - Optimistic Row Buffering

Trans Code Length: 8

Add Trans. Code: CUSTA

Delete Trans. Code: CUSTD

Inquire Trans. Code: CUSTI

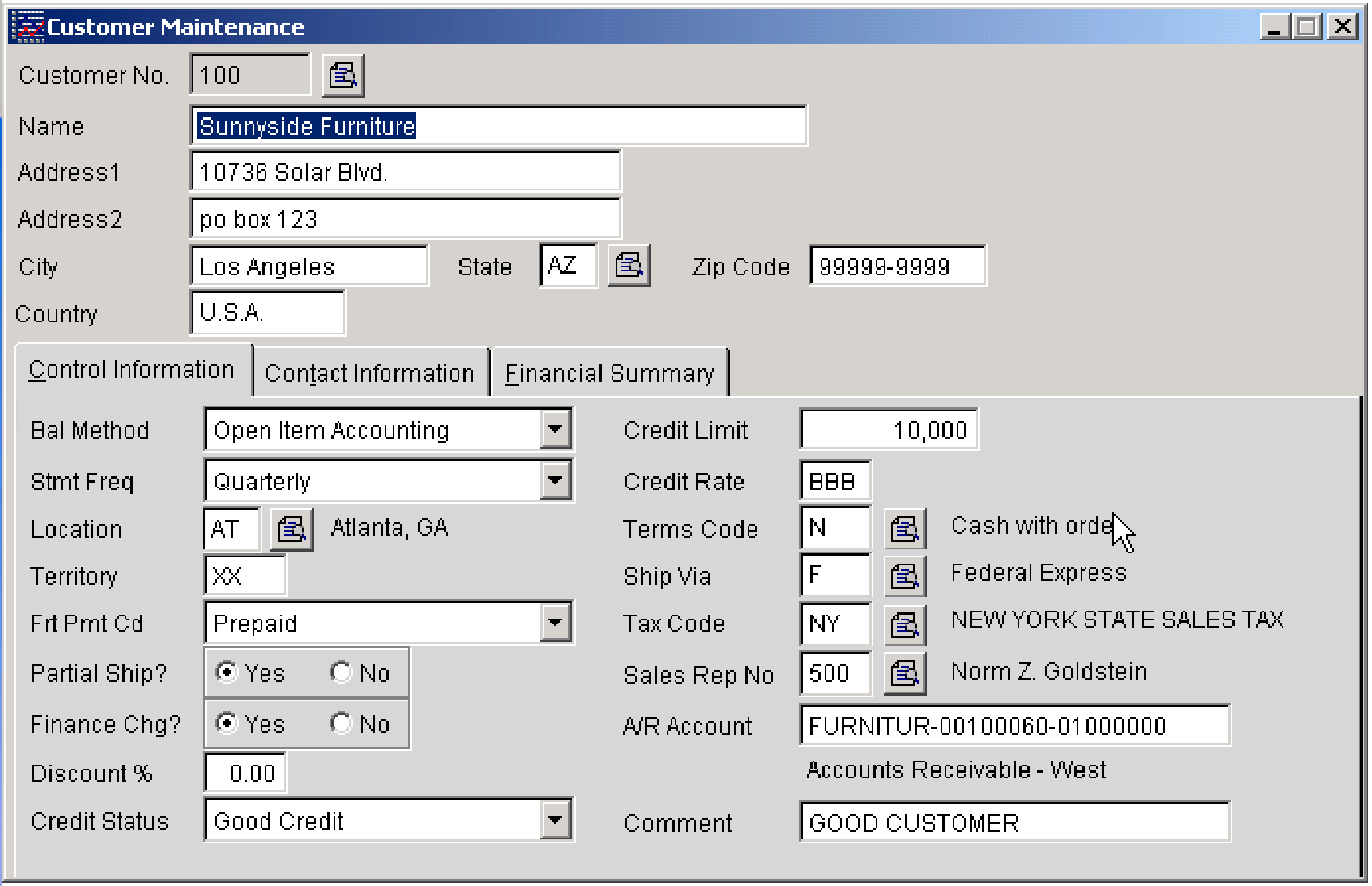
Update Trans. Code: CUSTU

List Trans. Code: CUSTL

List Next Trans. Code: CUSTN

Previous Trans. Code: CUSTP

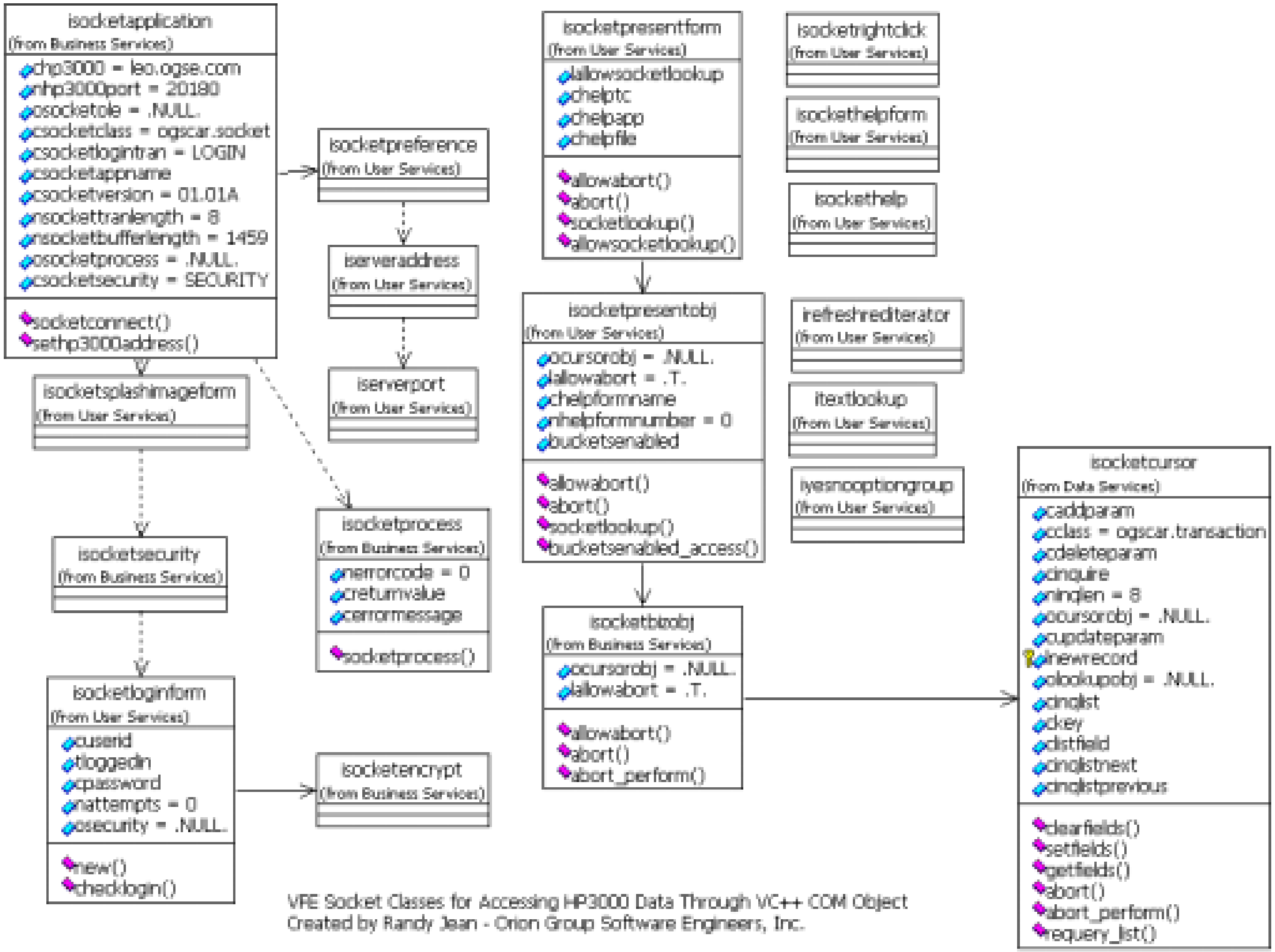
Visual FoxPro Example (Cont.)



Customer No.	100				
Name	Sunnyside Furniture				
Address1	10736 Solar Blvd.				
Address2	po box 123				
City	Los Angeles	State	AZ	Zip Code	99999-9999
Country	U.S.A.				

Bal Method	Open Item Accounting		Credit Limit	10,000	
Stmt Freq	Quarterly		Credit Rate	BBB	
Location	AT	Atlanta, GA	Terms Code	N	Cash with orde
Territory	XX		Ship Via	F	Federal Express
Frt Pmt Cd	Prepaid		Tax Code	NY	NEW YORK STATE SALES TAX
Partial Ship?	● Yes ○ No		Sales Rep No	500	Norm Z. Goldstein
Finance Chg?	● Yes ○ No		A/R Account	FURNITUR-00100060-01000000	
				Accounts Receivable - West	
Discount %	0.00				
Credit Status	Good Credit		Comment	GOOD CUSTOMER	

Visual FoxPro Example (Cont.)

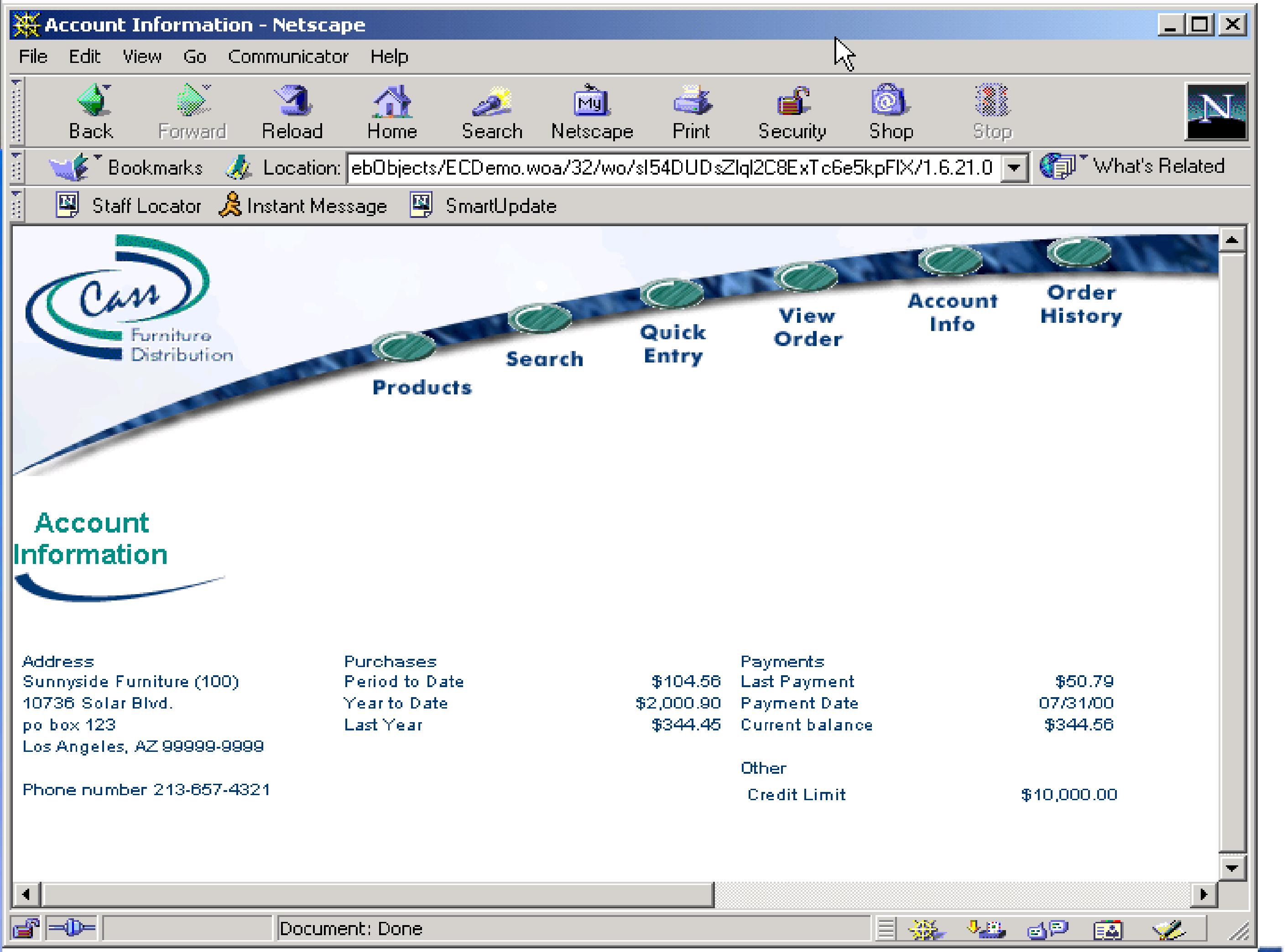


VRE Socket Classes for Accessing HP3000 Data Through VC++ COM Object
Created by Randy Jean - Orion Group Software Engineers, Inc.

Web Access

- The transactions created on the HP e3000 can also be used to create web applications
- Works with HTML, Active Server Pages, Web Objects, etc.
- Orion Group has created socket frameworks in Java and C++ to aide in application development

Web Access Example



Location: ebObjects/ECDemo.woa/32/wo/sI54DUDsZlql2C8ExTc6e5kpFIX/1.6.21.0

Account Information

Address	Purchases		Payments	
Sunnyside Furniture (100)	Period to Date	$104.56	Last Payment	$50.79
10736 Solar Blvd.	Year to Date	$2,000.90	Payment Date	07/31/00
po box 123	Last Year	$344.45	Current balance	$344.56
Los Angeles, AZ 99999-9999				
			Other	
Phone number 213-657-4321			Credit Limit	$10,000.00

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Questions?

HP WORLD 2001
Conference & Expo

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