

SAMPLE

**Sample Application
Network Review**

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TABLE OF CONTENTS

Explanation of this Profile 3
 Purpose..... 3
Application Review..... 3
 Test Environment..... 3
 Test Results and Analysis 5
 Recommendations..... 9
Appendix A -- Application Profile 11
 Application Profile Overview 12
 Operational Characteristics..... 13
 Technical Environment..... 14
Appendix B -- Application Packet Capture Data..... 16
 Sample Application Transaction Profile Summary 16
 Sample Application SLA Calculations 17

Explanation of this Profile

Purpose

The purpose of the Application Profile is to provide basic information about the application and the characteristics it exhibits when run on the network. This information can be used to predict application performance and impact to the network in various network environments.

This profile will also be useful in selecting or optimizing the network design, application development methodology, or application installation on the network.

Application Review

Test Environment

The application evaluation was conducted from the [Company] facility at two network locations. General campus background traffic was monitored in the computer room directly on the 3Com 3500 backbone switch. From this switch, monitoring was conducted on the Gigabit Ethernet uplink to the switch where the NT servers are connected. The results of the baseline captures were not used in the overall analysis of the application, but were used to get a general feel for the type of traffic on the network and to look for obvious network issues (congestion, transmission errors, etc.).

Three test scenarios were captured. First – from a local, LAN attached client; Second – from a remote client running Outlook in “connected” mode; Third – from the same remote client running Outlook in “off-line” mode. For each test scenario, the same basic transactions were executed. These were:

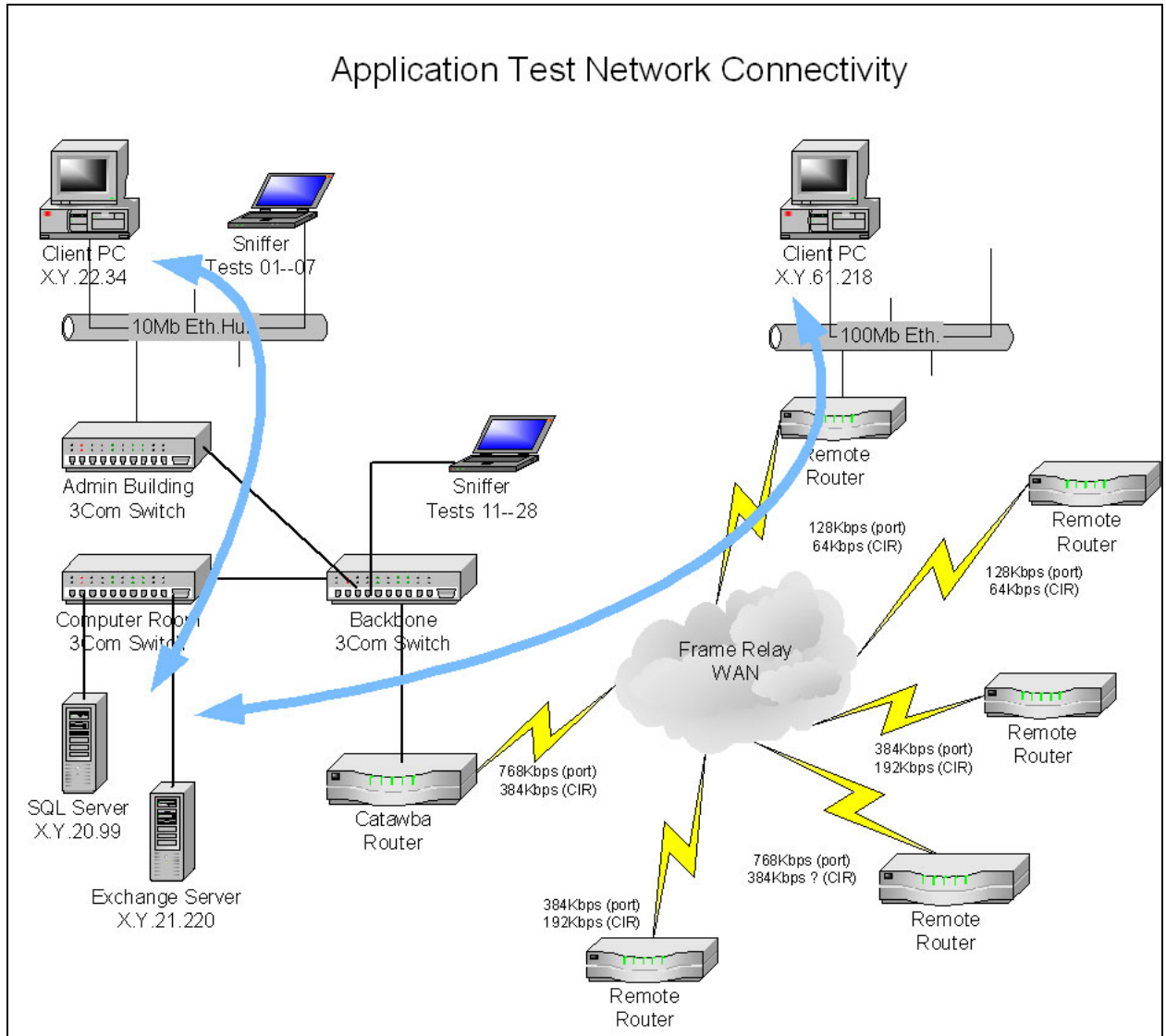
1. Start Outlook
2. Open the application address book (The first capture resulted in loading/updating a form.
3. Open the application address book (no new form)
4. Open a contact
5. Jump to view company Info
6. Reload Company info after change – LAN test only
7. Jump to Market Usage screen
8. Submit update to Market Usage – remote test only

Local transaction packet captures were recorded from a shared 10 Megabit Ethernet hub. The transactions originated on the client’s PC. Connectivity

from the client PC to the Exchange and SQL servers was all LAN media running at a minimum of 10Mbps.

Remote transaction packet captures were recorded from the computer room monitoring the 3Com 3500 switch port connected to the Cisco 3640 router. This is the router which connects to the frame relay network

The following Diagram shows the placement and connectivity of the equipment.



In each test, the data collection was restricted to only the traffic to/from the client workstation. All other traffic was dropped (ignored).

Test Results and Analysis

Transaction capture summaries are presented in Appendix B.

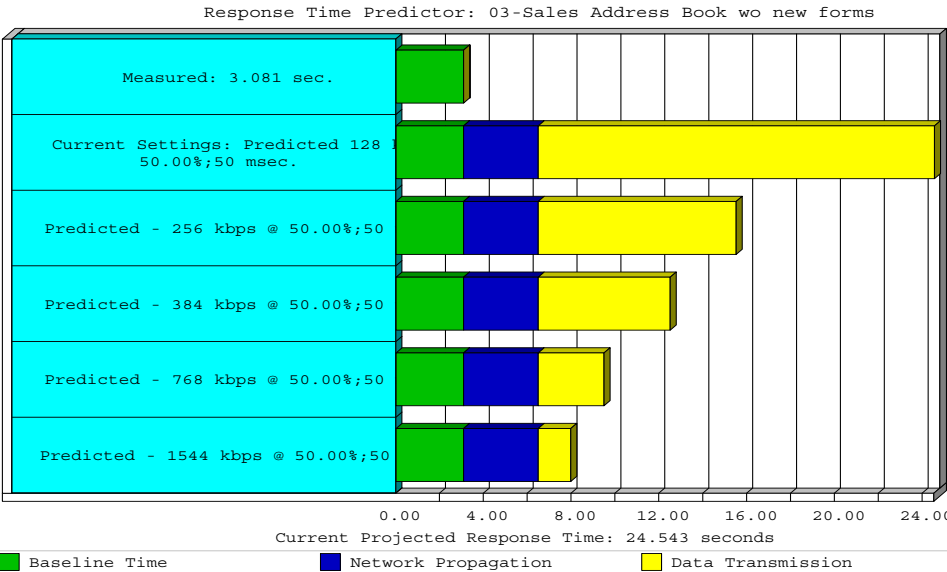
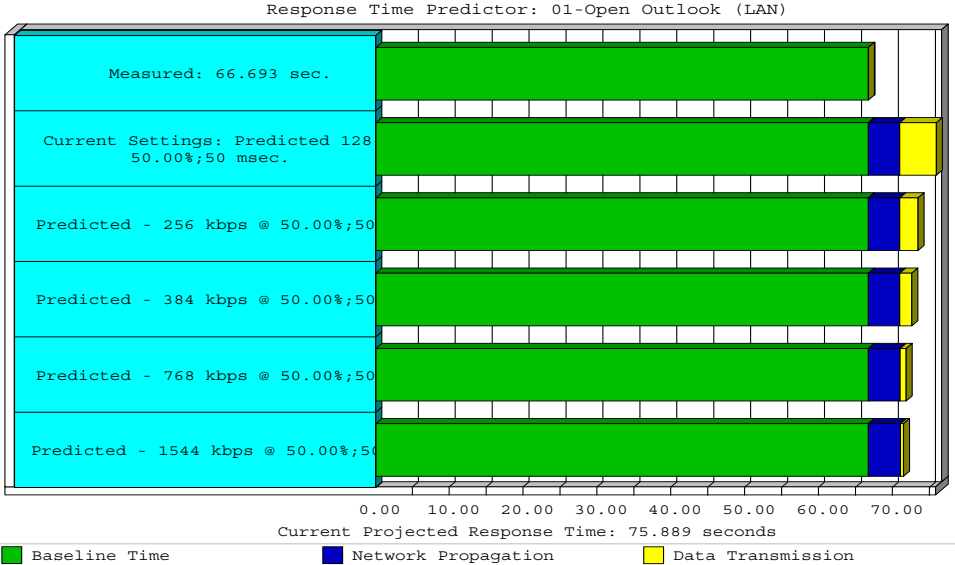
Application Transaction descriptions:

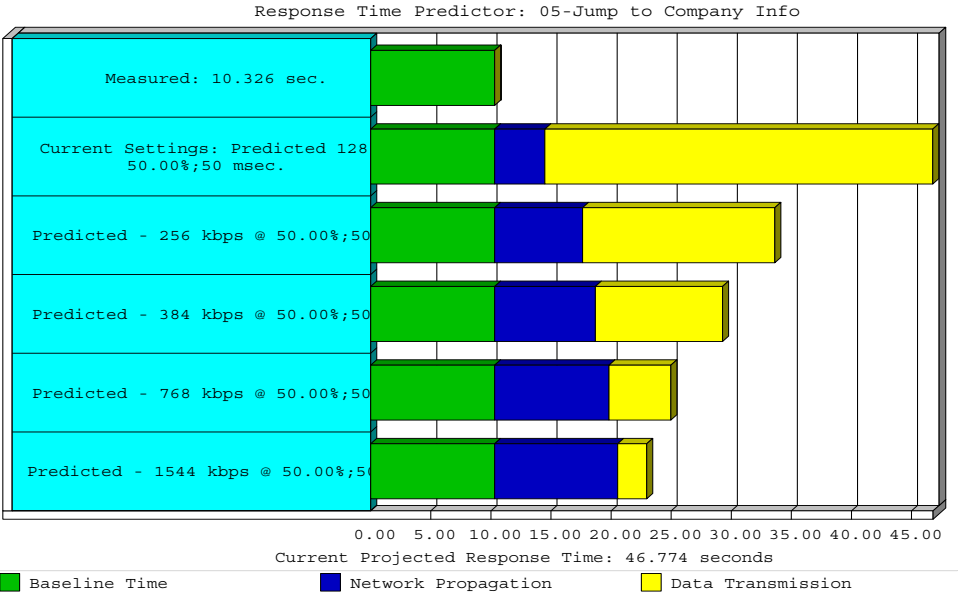
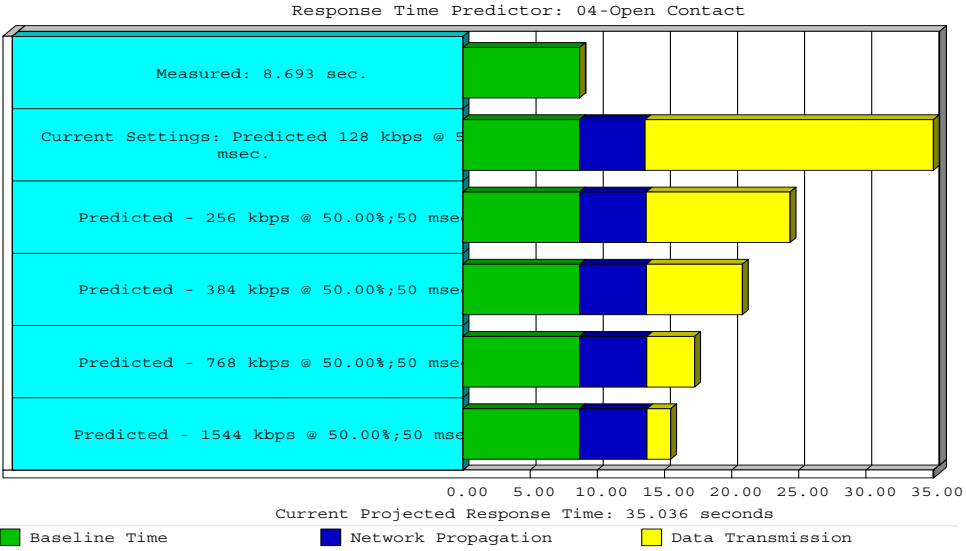
1. **Start Outlook-**
Transaction data size: 32Kbytes inbound; 20Kbytes outbound
The process to start Outlook involves many background activities. Primarily, Outlook will check for and begin downloading (or previewing) mail. In addition, if the client is running with “Offline access” enabled, Outlook will begin Synchronizing mail and folders specified in the users configuration.
2. **Open Sales Address Book -**
Transaction data size: 190Kbytes inbound; 22Kbytes outbound
The Sales Address Book is located in Outlook under Public Forms and is the client interface to the application. Users must open the Sales Address book in order to access the Contact and Company data in the SQL database. This trace was inconsistent between the local client and the remote client, however, after reviewing the trace files, we believe that the local client may not have received a form update, or received an update to a very small form.
3. **Open Sales Address Book (with no form update) –**
Transaction data size: 180Kbytes inbound; 12Kbytes outbound
The Address Book was closed and immediately re-opened opened to measure the difference when no forms updates were required. The results of this test were consistent between the local and remote client traces.
4. **Open Contact –**
Transaction data size: 313Kbytes inbound; 26Kbytes outbound
The client selected a contact (specific contact was not important) and opened the contact information.
5. **View Company Information –**
Transaction data size: 162Kbytes inbound; 33Kbytes outbound
Client selected the icon to jump to the Company Information Screen.
6. **Reload Company Info after Change –**
Transaction data size: 402Kbytes inbound; 26Kbytes outbound
The client made an update to the company information and submitted the change. This transaction was only recorded locally.
7. **Open Market Update Screen –**
Transaction data size: 734Kbytes inbound; 55Kbytes outbound
Client selected the Market Update icon. This selection opens the Market Usage for the current company selection and also populates six “pull-down” search fields for the user to change selection.
8. **Update Market Usage –**
Transaction data size: 10Kbytes inbound; 14Kbytes outbound
Client made a change to the Market Usage data and submitted the change. This trace was only performed for the remote client.

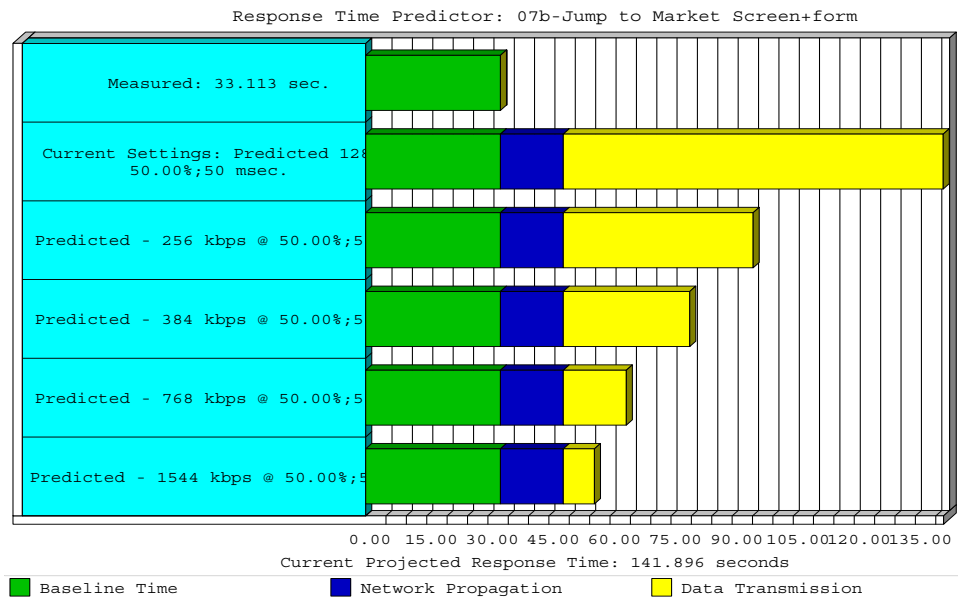
Several systems are required (or accessed) to use this application. The Client, the Exchange Server, the SQL Database, and the DNS server. The application runs from Microsoft Outlook with "Offline access" enabled. The application forms are located in the public forms folder. These forms are maintained on the Exchange server and automatically updated as needed whenever the client "synchronizes" with the server. The actual application data (company and contact information) is stored on the SQL server. All SQL calls are made from the client (i.e. Exchange does not call the data for the client). In general, the SQL data calls appear to be concise and efficient. The exception to this is on the Market Usage screen where six pull-down fields must be pre-populated. This screen alone generated over 800 KBytes of network traffic each time it was loaded. Short of that screen, the primary performance issues noted were the result of updates to forms (or forms being downloaded / synchronized over the network).

To keep the client from dynamically synchronizing forms (i.e. adding to application delay) the client can run outlook off-line (non-connected mode). This could improve the application performance somewhat. Over the course of a normal business day, we estimate a data transmission savings of between 30% and 40%. A caveat to this, however, is that the client will still need to periodically update their public forms folder. During this update process the client will experience degraded network performance. Also, while off-line, the client cannot send or receive email until the inbox folder synchronizes.

The following five charts show the key transaction types with actual response time as recorded on the local traces and the predicted remote user response time based on various circuit speeds (including the current speed). In each case, the green bar represents the "best case" response time on a 10 Mbps Ethernet segment. The blue bar represents the time to propagate the data onto the WAN (i.e. time in and out of the routers). The yellow bar represents the time to transmit across the WAN based on the specified circuit speed and utilization.







Recommendations

1. Based on the response time charts, upgrade the remote site Frame Relay port speed from 128Kbps to 384Kbps. Due to the bursty nature of the traffic, the PVC speed (CIR) of 64Kbps can remain as is. Port speed at the Charlotte site should be increase to 768Kbps with a CIR of 256Kbps. To accommodate these changes, the (central site) Frame Relay interface will require upgrade to full T1 port (1536Kbps) and a minimum CIR of 640Kbps.
2. Network review and server configuration analysis to distribute Exchange servers to remote offices. Prior to implementing in the other remote offices a network review and server configuration analysis to identify areas to optimize connectivity and performance between exchange servers. Issues to consider prior to implementing remote exchange servers are:
 - o Outlook implementation
 - o Background exchange synchronization
 - o Network bandwidth requirements to support background activities as well as improved client performance.
 - o Remote Access Server (RAS) client access
 - o Tech Support and maintenance issues at remote locations

3. [Company] has explored the idea of installing the SQL data on the client PC. This would nearly eliminate the network overhead required to access the Sales data. It does not eliminate the need to maintain current forms. Optimal performance could be achieved by running SQL local and running Outlook off-line, **however**, this option could be fraught with synchronization issues due to the dynamic nature of both the SQL data and Sales forms. While running SQL local, the client would still need to replicate and synchronize updates to/from the master database. This could result in replication conflicts when multiple users try to update the same record. Additionally, while running off-line, there is no way to lock records on the master database.

This option is **not recommend**.

4. While capturing data for this deliverable, sufficient time was not available to capture and thoroughly analyze all of the applications and data running on the [Company] network. The final recommendation is to perform a comprehensive network performance analysis to discover and document applications, overall network transmission requirements, opportunities for enhancing network efficiency and reliability, and provide a baseline for evaluating the implementation of future applications and technologies.

Appendix A -- Application Profile

Purpose

The purpose of the Application Profile is to provide basic information about the application and the characteristics it exhibits when run on the network. This information can be used to predict application performance and impact to the network in various network environments.

This profile will also be useful in selecting or optimizing a design, development methodology, for installation on the network. Developers may use this Application Profile as a checklist to assist them in following LAN/WAN guidelines for their application's operational requirements.

Type of Application

Three Levels of Application Profiles are defined. These levels correspond, roughly, to the intended use of LAN/WAN resources for access to the application and its data.

Level I applications are evaluated for standalone workstations. These are single-user applications which would not normally be used in support of critical operations or for sensitive information.

Level I applications do not require a network review, but the user should be apprised that any critical application is still subject to a poor audit review unless adequate backup, contingency, and support practices are maintained as recommended or mandated by corporate policy.

Level II applications are evaluated for local server (same LAN or switched environment), or to run on a standalone workstation. A procedure or policy statement for the application must assure that the application will not access any data across the Corporate WAN. Level II applications are typically database type applications, thin client, or Web applications. Any application which loads from a network server (e.g. NT application, exchange) or which accesses data across the network, must be evaluated at least as Level II.

Level III applications are evaluated for access across the corporate WAN, from a user's local server, or to run on a standalone workstation. Level III applications will generally require access to a common set of data by multiple users at multiple locations, including multiple cities. The data may reside in a single, central location, or may be distributed to multiple locations but with provisions for user access or replication to all locations or for record locking and automatic updates between locations.

Application Profile Overview

This first page is intended to describe only the "big picture" aspects of the application. Where appropriate, additional details will be furnished in later sections.

Name and ID

Please give the full name of the application and any acronyms by which it is known.

Application

Description

Give a brief description of the application. Include its purpose, the business unit(s) who will use the application, and a general idea of the scope of anticipated deployment. Is this a purchased commercial package; a custom application contracted for by [Company]; or an internally developed product?

- **Description or purpose :**

Application used for Sales and Admin information warehousing. Sales staff use it to track customers and their use of product.

- **Business Unit:**

Coated Paper Division

- **General Scope of deployment:**

Cities, number of servers, number of users. We are looking here for general magnitude, not exact numbers.

Exchange and SQL servers centrally located in [Company] data center. Primary Admin users, developers and support staff are located in... . Remote users located in Charlotte, Sales offices and regional facilities. Sales staff also use dial-up (PPP).

- **Vendor, Outside Contractor, In House:** Identify publisher or developer.

Developed in-house using Microsoft Exchange (public forms) and Microsoft SQL.

Contact Information

Developer:	Name: Company: Address:	Phone: Fax: Pager:
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Operational Characteristics

Environment

If the application requires a specific version or minimum level of operating system, please list the version or level.

- **Server Operating System(s)** (ie. MS-DOS, OS/2, etc.)

Microsoft Windows NT Server, Version 4.0, Service Pack 6a

- **Client Interface** (ie. Text, Windows, PM, etc.)

Microsoft Windows Client (NT 4, 2000, 98?)
Microsoft Outlook 2000 (Public Forms)

- **Network**

Primarily Ethernet (10/100 Client, 100bTX Server) Campus environment.
Also extended to sales offices via Frame Relay WAN at a variety of circuit speeds from 64K to 768K.

Evaluation Level

What is the level of evaluation performed / requested for this application?
(Levels are described on the first page of this document.)

Level III

Operational

- Is this application **mission-critical**? (Would down-time seriously affect the user's ability to perform their normal work, or impact the quality or timeliness of their output?)

YES

- Does this application contain **internally sensitive or confidential data**?

YES

- Does this application contain **customer data**?

YES

Technical Environment

- Memory. How much does this application require on the workstation? Does it require access to Expanded memory. If a DOS application, how much available memory does it require?

Not available

- Can this application be installed in a normal "Program Files" directory structure? (ie. No additional drive mappings required. Program and any configuration tables maintained in a read-only directory separate from the data.) Please attach a listing of the application's directory structure and drive mapping requirements.

YES

- How much disk space is the application expected to require? (estimates are fine, if details are not available.)

Software ==>MS Outlook – Public Forms
Data ==>Off-Line Forms require xxx MBytes

- What basic type of data storage technology does this application use? (xBase, Paradox, Sybase, etc.)

Forms stored on Exchange Server (or local for off-line mode)
Data stored in SQL database

- Does this application use any FAX input/output technology? Please describe.

NO

- Does this application use any multimedia technology? (voice, video, animation, etc.) Please describe.

NO

- Does this application use any remote access technology? Please describe.

Some clients connect via Remote Access to the local data center.

- Does this application require access to the mainframe? If so, how?

NO

- Does this application require any specific network protocol other than TCP/IP? If so, which one(s)?

NO

- Does this application require any special TSRs, device drivers, or Windows drivers? If so, please list and describe.

None

- Does this application require any additional software, such as a word processor, Web Browser, report writer, or communication program? If so, please list or describe.

- Does this application require any special changes to globally maintained configuration files such as the Windows Registry, CONFIG.SYS, AUTOEXEC.BAT, SYSTEM.INI, WIN.INI? If so, please name affected files here and attach a copy of the proposed changes to this questionnaire.

- Does this application require any other special software or hardware not covered above? If yes, please describe below or in a more detailed attachment.

Appendix B -- Application Packet Capture Data

Sample Application Transaction Profile Summary

Application Network Review		Application Name		Sample Application		Review Date (Start)		1/19/01																															
Version 2.0		Reviewer Name		Jim Hudson		Review Date (End)		1/19/01																															
Data in blue text is manual entry																																							
Available Network Transmissions Unit (MTU = 1 Second) Per Pa.		MTU		24,300		Business Hours																																	
CALCULATED FIELDS																																							
Transaction Details		Per Transaction Demand				Usage Information				Environment				Extended Demand				Extended MTU				Instance Demand				Z and Environment													
Trace Ref.	Trace	Actual Duration (Seconds)	Instance Size (Kbytes)	Inbound	Outbound	Transmit Protocol	Trans. Freq. Per User/Per Period	Number of User (each Env.)	Bandwidth (Kbps)	Shared	Duplex	Instance Size (Kbytes)	Inbound	Outbound	Instance Demand (MTU Per Instance)	Inbound	Outbound	Extended Demand	Inbound	Outbound	Extended MTU	Inbound	Outbound	Instance Demand	Inbound	Outbound	Z and Environment	Inbound	Outbound										
18	Make update to Market Usage	24.079	10.425	13.668		TCP	2.00	15.00	128	shared	fdx	312.750	410.04		0.65	0.85		122,688,480	11,133.33		7,686.16	695.83	26.42Z	14.52Z	0.99Z	0.99Z	0.99Z	0.99Z											
Totals		312.286	1,666,575	171,762											104.16	10.74																							
Remote User, Local Exchange (not connected)																																							
21	Start Outlook																																						
22	Open Sales address book (update from																																						
23	Open Sales Address Book (update)	18.365	176.313	11,209		TCP	5.00	15.00	128	shared	fdx	13,223.475	840.68		11.02	0.70					826.47	52.54	2.87Z	0.18Z	1.53Z	0.18Z	1.53Z	0.18Z											
24	Open Contact	24.000	207.152	15,208		TCP	5.00	15.00	128	shared	fdx	15,536.400	1,140.60		12.95	0.95					971.03	71.29	3.37Z	0.25Z	1.81Z	0.25Z	1.81Z	0.25Z											
25	*Jump* to Visu Company Info	13.522	7,574	4,722		TCP	5.00	15.00	128	shared	fdx	588,050	354.15		0.47	0.30					35.50	22.13	0.12Z	0.08Z	0.10Z	0.08Z	0.10Z	0.08Z											
26	Reload Company info after change																																						
27	Open Market Usage Screen	96.156	743.881	50,994		TCP	5.00	15.00	128	shared	fdx	95,788.575	3,824.55		46.50	3.19					3,487.41	239.03	12.11Z	0.33Z	6.47Z	0.33Z	6.47Z	0.33Z											
28	Make update to Market Usage	24.752	15,810	16,326		TCP	2.00	15.00	128	shared	fdx	474.300	489.78		0.99	1.02					29.64	30.61	0.10Z	0.11Z	0.10Z	0.11Z	0.10Z	0.11Z											
Totals		181.296	1,150,830	98,459								85,600,800	6,448.76		71.93	6.15					5,350.05	415.61	18.58Z	1.44Z	10.01Z	1.44Z	10.01Z	1.44Z											
										Difference Between Connected / non-connected transactions										37,057,680										4,493,575									
										Percent of data										30Z										40Z									
Transaction Size Averages		Connected Made				non-Connected Made				Difference Between																													
		Inbound	Outbound			Inbound	Outbound			Inbound	Outbound			Inbound	Outbound																								
1	Start Outlook	32	20			0	0	32	20																														
2	Open Sales Address Book (update)	190	22			0	0	190	22																														
3	Open Sales Address Book (update)	180	12			176	11	4	0																														
4	Open Contact	313	26			207	15	106	11																														
5	*Jump* to Visu Company Info	162	33			8	5	154	28																														
6	Reload Company after change	402	26			n/a	n/a	n/a	n/a																														
7	Open Market Usage Screen	734	55			744	51	-10	4																														
8	Make update to Market Usage	10	14			16	16	-5	-3																														

Sample Application SLA Calculations

Application Network Review		Application Name	Sample Application	Review Date (Start)	1/19/01					
Version 2.0		Reviewer Name	Jim Hudson	Review Date (End)	1/19/01					
Data in blue text is manual entry										
Transaction Details		Per Transaction Demand		Environmental		SLA		Estimated Bandwidth Requirement (Kbps)		
Function Name	Trace Ref.	Actual Duration (Seconds)	Instance Size (Kbytes)	Bandwidth (Kbps)	Info only Shared or Switched	Duplex (fdx/hdx)	Response Time (seconds)	Simultaneous Transaction Volume	Inbound	Outbound
Catawba - Local Switched LAN										
Start Outlook	01	66.693	32.398	20.414	10,000	shared	hdx	3	17.279	10.887
Open Sales address book (update form)	02							n/a		
Open Sales Address Book (no update)	03	3.081	179.873	12.952	10,000	shared	hdx	5	239.831	17.269
Open Contract	04	8.693	225.563	23.810	10,000	shared	hdx	5	300.751	31.747
"Jump" to View Company Info	05	10.326	295.966	51.224	10,000	shared	hdx	3	236.773	40.979
Re-load Company info after change	06							n/a		
Open Market Usage Screen	07	12.387	750.682	50.534	10,000	shared	hdx	3	400.364	26.951
Make update to Market Usage	08	no trace data								
Totals		101.180	1,484.482	158.934				180	329.885	35.319
CALCULATED FIELDS										