

# *Applied Methodologies, Inc.*



## *US Manufacture Inc.*

*Client/Server Performance & Impact analysis*

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## **1.0 Introduction**

This report will provide information regarding the network performance and impact analysis of the new Client/Server based applications currently being developed by US MANUFACTURE. Due to time and resource constraints, plus an aggressive project schedule, only the most popular Client/Server functions were analyzed. These application functions were deemed popular based on their comparative use in the System 80 system and forecasted transaction analysis. All applications functions were analyzed on the new tactical network infrastructure and Frame-Relay network, but not before the Client/Server FDDI backbone was integrated. The goal of the analysis was to determine bandwidth usage impact to the existing legacy and back office based applications as well as the application function response as well. This information was modeled to determine saturation points on the network if x number of transactions or users were active on the new system. The analysis also enabled us to decode and look into the packets of the application function to determine coding anomalies or bugs. The analysis covers only the TCP/IP based portion of traffic generation. We wanted to see the raw SQL transactions traversing the segments and understand the response time nuances. The application front-end itself is not covered for these will be loaded only once in most cases.

## **2.0 Executive Summary**

The application throughput and impact analysis provided much needed information for the initial rollout of the Client/Server applications in August. The modeling of the application functions analyzed against their estimated number of users and transactions per day showed us that the newly built tactical infrastructure can support them without impacting the existing systems residing over this new infrastructure.

The analysis in its entirety showed that the Client/Server applications analyzed performed reasonably well over the current campus network and traffic volumes. Our modeling suggests that with the increased user count and transaction volume, the application performance over the network will not suffer. A similar analysis was performed on selected WAN sites to determine circuit utilization. That analysis does not have the volume metric data and is limited in detail but still showed positive results.

Most of the applications queries sent over the network(campus and WAN) responded in an efficient and reasonable amount of time. However, some queries did execute longer. For example, list of items for the user to select and their initial login are two examples. The characteristics of most queries are **short and bursty**. Although superfluous queries were found and noted in the analysis, the response time was adequate. The most notable delay observed is when a user is accessing his application from their local Novell server or when the application is already loaded and another form is required but must be accessed from the file server. The user is at the mercy of their local file server's utilization.

We did discover that the Custom Application based applications create additional traffic from menu selection queries. The IMI applications performed well, but we could only look at them from the TCP/IP level, not from the Oracle level. IMI does not use Oracle's protocol to transport queries. We currently do not know of any IMI based network inefficiencies regarding Oracle table querying. The Oracle Financial applications were just recently analyzed and modeled and the results were adequate. Only the save function seems to generate many packets over the network and the user will wait over ten seconds for the result. Also, the loading and switching menus and forms does add a noticeable amount of traffic and delay. The Purchasing application was analyzed over the WAN and the response times were positive. The Oracle Financial network impact model is not complete for the transaction volume metrics are not currently available. Our modeling data of IMI and Custom Applications is dated from June/July. There has been changes made to these applications since then. However, the network related performance issues disclosed from that time period have not been addressed yet. The specific details and status of our analysis with recommendations on how to proceed are in the following sections.

### ***3.0 Performance Summary and Recommendations***

#### ***How the applications performed:***

#### ***3.1 IMI***

The IMI applications performed well considering the proprietary nature of their development. The traces showed us only the TCP/IP level of the application. We could not look at specific queries to determine if any Oracle based errors or extraneous unneeded data is being transmitted. The best we can model and tune is at the TCP protocol layer. We noticed the adverse window sizes for the session. The server will always communicate with a 65k window size but the client will run at 8k. The server tries to negotiate (set) the session window size for outstanding packets to 65k using a TCP WIN=65500 advertisement command, but it does not adjust.

The TCP protocol supports variable window sizes and flow control so this may be the normal operation. However, it may be prudent to check if the workstation IP stack or application can be tuned for a maximum window size all of the time. This is ideal due to the available bandwidth in the campus. A different approach may be required for the remote WAN users where the flow control must be left untouched due to the limited bandwidth available. A separate tuning document published for the August 1<sup>st</sup>. integration of ESS covers how to tune the network if response time suffers due to TCP issues.

Our traces also showed a user establishing a TCP session with the server, sending/receiving data, then notifying the server to close a session with a TCP FIN flag bit set and the connection closed confirmation ACKSs follow.

However, after that initial transaction many "CLOSED CONNECTION" frames follow from the server. This does not look normal for during the first TCP session there was only one source and destination socket pair recorded. We could understand if the application opened multiple sessions but by the amount of closed connection frames recorded it would lead us to believe that the application opened 20+ sessions!

The queries all provided quick response times, one to three seconds in most cases, from their respective screens. The only reduction in response from the users display noted was loading the application from a Novell server or if the application is switching between menus and screens and these new screen forms are coming from a Novell server. Most of the transactions are bursty in nature. What this means is that the transaction requires the user to select data from lists and input information into various fields during the course of the transaction. So, small bursts of queries are transmitted. The traces and summary report in the previous section may show 1 minute response time for the traces. This is mostly due to the time between the user's mouse clicks and screen navigation.

***IMI Exceptions & caveats***

- Since we cannot see the Oracle transactions we cannot determine what type of Oracle based tuning is required.
- The TCP/IP “closed connections” was brought to the development team’s attention in July. There is currently no status regarding this issue.
- IMI does not use Oracle’s TNS protocol so IMI transactions may not be managed by Oracle Enterprise manager.

***IMI Recommendations:***

1. Pursue IMI to resolve the “closed connections” issue.
2. Pursue IMI to review our traces and possible help us determine Oracle based issues if possible.
3. Check with IMI on Oracle Enterprise Manager or recommendation of a transaction monitor for IMI transactions.
4. If the application has been upgraded since August analyze the application in the latest pre October incarnation and compare results from July.

## **3.2 Custom Applications**

The Custom Applications performed equally as well as IMI's. The response times for queries were quick. The response times listed in the previous section summary shows only the query response time only. These times do not include the user pauses and clicks of the mouse when he is filling in the screen fields. There have been some times recorded in the forty second area and this is due to either a user pause or a list of values was returned. Also, the initial Oracle login connection may be slow, especially in the morning. The WAN response was just a little shorter than the LAN and that is to be expected based on the bandwidth of the circuit. The recorded response times of one to three minutes are mostly related from the user pauses and clicks of the mouse to fill in the filed and list of values queries. The overall performance of the Custom Applications is expected to be efficient since most of the transactions will be small bursts of data from queries at different times.

The Custom Applications utilizes Oracle's TNS protocol so our traces can see the actual queries, returned data and any error messages from the Oracle Server.

### **ISSUE #1 ORA-1403 messages**

It was noted that there were superfluous packets from application usage.

This was brought to Rob Salvaggio's and team's attention and this was the cause:

Issue #1 - The majority of the "no data found" messages being carried over the network are a result of the team using the Developer 2000 tool as it was designed to be used. Mainly, this is the use of the Master Control Block with "Post Query" triggers to select data from other associated tables in order to populate a screen of data. However, in doing this, Oracle does not do a full screen validation on the server side. Instead, it fires the triggers column-by-column and row-by-row. Therefore, with the current design there is no way to avoid the message when there is no hit on the associated table.

What can be done? Nothing immediately as it would require redesign. For the future, we need to look at using views and stored procedures to help minimize the number of server requests. Basically, every time you make a request, you get a response (i.e. the data or the not found message).

We looked into the possibility of suppressing none critical errors on the server side, but that cannot be done. Suppression of messages can only occur on the client side so the user does not see them on the form. However, it's too late at that point; the message has already traveled over the network.

### **ISSUE#2 ORA 1445 and 1446.**

This was determined to be a possible application error and Rob's team is reviewing this.

This was brought to Rob Salvaggio's and his team's attention and this was the cause:

Issue #2 - ORA-1445 and 1446 and the "TNS Marker/ATTN" message are occurring whenever you use the ROWID column in a join with a view (1445) or when you use ROWID with DISTINCT in a view. However, ROWID is NOT a column on any table use. This must be used internally by Oracle Developer 2000 and is put there automatically. We have determined that we might be able to eliminate these

messages by using the "Key Mode" property in Forms to turn-off the use of ROWID. However, there is no guarantee since the property is intended to be used when you are accessing non-Oracle databases.

Rob's team suggested the following:

What can be done now to minimize network traffic? Clearly, reviewing the analysis we did on all the LOVs used in our forms should be done. Two form properties must be reviewed for each LOV(List Of Values). They are:

1. "Refresh" property - All selects to populate an LOV occur the first time the user executes the LOV in the form session. If it is not necessary to go back to the server and refresh the list, we shouldn't.
2. "Long List" - For those LOVs that return large amounts of rows, we should turn this property on since it gives the user the ability to limit what is returned from the server. This will speed up response-time in the screen, as well as reduce unnecessary network traffic.

### **Issue# 3 Menu selection traffic generation**

This is not a Rob issue but one for Walter Ruzek the Custom Applications menu developers.

The traces show that when a Custom Applications application module is selected the menu application will reset the users session with an ALTER SESSION and then set their ROLE. This does add unnecessary traffic if during the course of a day users are moving in and out of different modules. Their session and role attributes should be set just once. In our campus this may not be an issue for August 1<sup>st</sup>., but for the WAN and campus on October 1<sup>st</sup>. the sheer number of users could contribute to a possible response issue.

It is understood that this is done, for different users will have access to different applications and tables and it is easier to set their attributes each time from a server than to change the workstation's configuration.

These traces of the menu occurred on 7/17 when we traced the Custom Applications applications from the WAN. This issue was noticed since we wanted to capture the session starting from the menu item and not the actual working user screen itself.

This was brought to Walter's attention in late July and the traces were reviewed.

The latest status from the menu developers was that the last enhancements to the menu was made 7/15.

Our traces were performed after the 7/15 enhancements so there still may be a requirement to review this issue again.

The status of these issues to date are as follows:

Below is the original list of things that can be looked at.

Issue 1: No action to-date.

Issue 2: No action to-date.

Issue 3: No action to date

LOVs: some have been tweaked to minimize the refreshes and to limit what is returned. I suspect more can be done.

Since these items have been identified, they have taken a lower priority to other things like supporting production and developing new requirements for 10/1. These are not scheduled activities at this point.

### ***Custom Applications, Exceptions &, caveats***

- There may be intermittent performance issues for users if additional Forms are required and are not brought down initially at application execution. The run time interpreter will request additional forms from the Novell server between queries and the user is now subjected to the response time of the Novell server and not the Oracle server.
- A separate tuning document published for the August 1<sup>st</sup>. integration of ESS covers what to look for in terms of Custom Applications related symptoms.

### ***Custom Applications Recommendations:***

1. Pursue Issues 1,2 and 3 with the appropriate parties for resolution and re-analyze to determine improvement
2. Upgrade Novell servers to 100 Mbs Ethernet adapters(if not already done) in the campus and add to server segment.
3. Determine if remote Novell servers are sized properly to perform adequately to serve Forms and IMI based applications
4. Pursue status of Oracle Enterprise manager integration



### **3.3 Oracle Financials**

Oracle Financials utilizes Oracle Forms so the applications analyzed may have some similar issues to that of the Custom Applications.

Due to the time constraints of creating this report only the raw performance and utilization statistics of the Oracle financial applications will be presented. There was no time to sift through the traces to determine Oracle SQL based errors and protocol issues. Also, the model in section two does not reflect volume metrics for transaction volume, for this data was unavailable at the time. When such data is present the model will be updated. As of this writing we cannot determine the overall impact of Financials to the Campus and the remote sites.

The areas analyzed in Oracle financials for the Campus were Purchasing and Accounts Payable. For the remote sites only the Purchasing was analyzed.

The overall results of the financial applications were positive, again the queries are short bursts with a quick response time of three to ten seconds. The Save function in all modules does seem to transmit many frames and the response time is noticeably longer. Also, the building of the distribution line, approval and waiting for a returned in Auto PO are slow. Many frames were transmitted and some processing pauses on the Oracle server were noticed as well. The response times listed in section two take into account the user pauses and mouse clicks to navigate the form. Some functions that require the user to select an item from a list requires a query to bring down an entire list of items can be slow at times, but the cause is not yet determined.

The loading of the Oracle Financial application is noticeably slow from the Novell file server. In one case the user was looking at an Oracle logo for over one minute before the login box appeared. The Oracle Financial login is not as quick as that of the ESS applications. Switching through the Financial applications was noticeably slow as well. Again, this is due to the Novell server response capabilities. After review the protocol traces there were some Oracle based error messages and Novell messages discovered. It is unknown if these messages are normal application results or issues. The details of these messages will be outlined at the end of this section.

The results on the WAN for purchasing applications were positive. The queries returned quick responses and the user mentioned that this was acceptable and "better than expected". The save function though still appears to be slow in execution and the user waits for over ten seconds. With all of these small bursts of queries from 200+estimated users scattered across the WAN and what was observed, the impact to the WAN and performance after October 1<sup>st</sup> may be minimal. Again, there are no transaction volume numbers to complete the model to verify this outcome.

Also noted that moving between the menu items and drilling down to sub application menus resulted in traffic generated on the network.

The LOV and Item search also responded in an adequate response time based on observation not modeling.

There was an error with the WAN installation of the Oracle Financials. At various times, when entering or searching for an Item in the purchasing application in any module, the following was displayed on the users screen:

**“UNABLE TO DYNAMICALLY LOAD ORACLE PURCHASING PROGRAM LIBRARY  
CAUSED A USER EXIT WAS REQUESTED BY A DLL THAT WAS NOT FOUND PRESENT OR  
COULD NOT BE FOUND IN THE ORACLE DIRECTORY. “**

The Oracle Financials applications in one case after the initial load and login caused a general error and the program abended.

From a brief review of the traces it seems that the Oracle financials is subjected to the same issues listed in the Custom Applications summary earlier in this section.

### **Oracle Financial issues discovered from protocol/traffic analysis packet traces**

This particular message shows up in the following application functions of Oracle Financial:

- **Requisition Approval**
- **Approval of a Requisition**
- **Creation of a Purchase Order**
- **Creation of Purchase Order Request**
- **Accounts Payable**
- **Credit Payments**

```
Oracle TNS
Frame Length          63
Frame Chksum         00-00
Type                  6           Data
Reserved              0
Header Chksum        00-00
Data Flags            00000000
                    .....0.           NT Trailer not requested
                    .....0           Not a request to send
Data Flags            00000000
                    0.....           Immediate Confirm not reqd.
                    .0.....           Not End of File
                    ..0.....           No more data to come
                    ...0...           Reserved for HDX flag
                    ....0..           Not a confirmation
                    .....0.           No request for confirmation
                    .....0           Not HDX (send) token
Basic Operation Code  4           Error return status
Data
   ___é *           " _____ORA-01001: invalid cursor
```

The Applications listed above also reviled the following messages during operation

1. **ORA-00942 Table or View does not Exist:** This will show up from time to time in all traces
2. **ORA-12578 Conn Refuse Undefined system error:** This only showed up in the Create a Purchase Order function
3. **ORA-1445-6 and 1403s** see previous section Custom Applications

4. **Ora-01012 Not Logged in:** This sometimes shows up repeatedly at the end of a trace. Is one or many messages required?
5. These following appears randomly throughout the traces:

TNS sends a large query result back to the client in one packet then sends individual words in separate TNS packets instead of another large frame.

We also noted that in the middles of a Client/Server conversation different IP addresses are suddenly used for the conversation pair and different queries are sent. This does not make any sense. One of the addresses is our DNS and UNX server. Examples are below:

266	58:40.489	ARNIE	EDPSP006	TNS	Data Len=154	
267	58:40.485	EDPSP006	ARNIE	TNS	Data Len=24	<b>Normal</b>
268	58:40.484	ARNIE	EDPSP006	TNS	Data Len=42	
269	58:40.466	EDPSP006	ARNIE	TNS	Data Len=51	
270	58:40.411	ARNIE	EDPSP006	TNS	Data Len=474	
271	58:40.387	EDPSP006	ARNIE	TNS	Data Len=242	
276	58:39.027	146.184.100.100	146.184.100.226	TNS	Data Len=43	
277	58:39.026	146.184.100.226	146.184.100.100	TNS	Data Len=42	<b>What or Who?</b>
278	58:39.021	146.184.100.100	146.184.100.226	TNS	Data Len=36	
279	58:39.005	146.184.100.226	146.184.100.100	TNS	Data Len=71	
281	58:38.007	ARNIE	EDPSP006	TNS	Data Len=684	
282	58:38.000	EDPSP006	ARNIE	TNS	Data Len=166	<b>Normal</b>
283	58:37.962	ARNIE	EDPSP006	TNS	Data Len=766	
285	58:37.876	EDPSP006	ARNIE	TNS	Data Len=2048	
286	58:37.875	EDPSP006	ARNIE	TNS		

In the Accounts Payable module the Server will send the following at the start of it's use:

25	00:00.000	ARNIE	EDPSP006	TNS	Data Len=220
26	00:00.004	EDPSP006	ARNIE	TNS	Data Len=107
32	00:00.557	ARNIE	EDPSP006	TNS	Conn Request
34	00:00.672	ARNIE	EDPSP006	TNS	Data Len=297
35	00:00.723	EDPSP006	ARNIE	TNS	Resend
36	00:00.723	ARNIE	EDPSP006	TNS	Conn Request
38	00:00.882	ARNIE	EDPSP006	TNS	Data Len=297
39	00:00.883	EDPSP006	ARNIE	TNS	Conn Accept
40	00:00.885	ARNIE	EDPSP006	TNS	Data Len=117 SNS
41	00:00.887	EDPSP006	ARNIE	TNS	Data Len=87 SNS
43	00:01.131	ARNIE	EDPSP006	TNS	Data Len=176
44	00:01.135	EDPSP006	ARNIE	TNS	Data Len=58
45	00:01.145	ARNIE	EDPSP006	TNS	Data Len=220
46	00:01.148	EDPSP006	ARNIE	TNS	Data Len=107
47	00:01.162	ARNIE	EDPSP006	TNS	Data Len=154
48	00:01.167	EDPSP006	ARNIE	TNS	Data Len=2048
49	00:01.169	EDPSP006	ARNIE	TNS	
51	00:01.169	EDPSP006	ARNIE	TNS	Data Len=2048
52	00:01.171	EDPSP006	ARNIE	TNS	
53	00:01.172	EDPSP006	ARNIE	TNS	
54	00:01.173	EDPSP006	ARNIE	TNS	
55	00:01.174	EDPSP006	ARNIE	TNS	<b>What is this?</b>
56	00:01.176	EDPSP006	ARNIE	TNS	
60	00:01.180	EDPSP006	ARNIE	TNS	<b>These packets are 1518</b>
61	00:01.181	EDPSP006	ARNIE	TNS	<b>in size but no data???</b>
62	00:01.182	EDPSP006	ARNIE	TNS	
64	00:01.184	EDPSP006	ARNIE	TNS	
65	00:01.185	EDPSP006	ARNIE	TNS	
67	00:01.186	EDPSP006	ARNIE	TNS	
71	00:01.597	EDPSP006	ARNIE	TNS	
72	00:01.598	EDPSP006	ARNIE	TNS	
73	00:01.599	EDPSP006	ARNIE	TNS	
74	00:01.601	EDPSP006	ARNIE	TNS	
75	00:01.602	EDPSP006	ARNIE	TNS	
76	00:01.603	EDPSP006	ARNIE	TNS	
81	00:01.883	EDPSP006	ARNIE	TNS	
84	00:02.440	EDPSP006	ARNIE	TNS	
85	00:02.441	EDPSP006	ARNIE	TNS	
86	00:02.442	EDPSP006	ARNIE	TNS	
88	00:02.444	EDPSP006	ARNIE	TNS	
89	00:02.445	EDPSP006	ARNIE	TNS	
92	00:02.582	EDPSP006	ARNIE	TNS	
97	00:02.999	EDPSP006	ARNIE	TNS	
98	00:03.001	EDPSP006	ARNIE	TNS	
99	00:03.002	EDPSP006	ARNIE	TNS	
101	00:03.003	EDPSP006	ARNIE	TNS	
102	00:03.005	EDPSP006	ARNIE	TNS	
105	00:03.142	EDPSP006	ARNIE	TNS	
108	00:03.696	EDPSP006	ARNIE	TNS	
109	00:03.698	EDPSP006	ARNIE	TNS	
110	00:03.699	EDPSP006	ARNIE	TNS	
112	00:03.700	EDPSP006	ARNIE	TNS	
113	00:03.702	EDPSP006	ARNIE	TNS	
114	00:03.703	EDPSP006	ARNIE	TNS	
120	00:04.256	EDPSP006	ARNIE	TNS	
121	00:04.257	EDPSP006	ARNIE	TNS	
122	00:04.259	EDPSP006	ARNIE	TNS	
124	00:04.260	EDPSP006	ARNIE	TNS	
125	00:04.261	EDPSP006	ARNIE	TNS	
127	00:04.263	EDPSP006	ARNIE	TNS	
130	00:04.400	EDPSP006	ARNIE	TNS	
133	00:04.955	EDPSP006	ARNIE	TNS	
134	00:04.956	EDPSP006	ARNIE	TNS	
135	00:04.957	EDPSP006	ARNIE	TNS	
136	00:04.959	EDPSP006	ARNIE	TNS	
137	00:04.960	EDPSP006	ARNIE	TNS	
141	00:05.099	EDPSP006	ARNIE	TNS	

144	00:05.517	EDPSP006	ARNIE	TNS	
145	00:05.518	EDPSP006	ARNIE	TNS	
146	00:05.520	EDPSP006	ARNIE	TNS	
148	00:05.521	EDPSP006	ARNIE	TNS	
149	00:05.522	EDPSP006	ARNIE	TNS	
152	00:05.659	EDPSP006	ARNIE	TNS	
174	00:27.482	ARNIE	EDPSP006	TNS	Data Len=221
175	00:27.487	EDPSP006	ARNIE	TNS	Data Len=104
176	00:27.512	ARNIE	EDPSP006	TNS	Data Len=151
177	00:27.517	EDPSP006	ARNIE	TNS	Data Len=2048
178	00:27.518	EDPSP006	ARNIE	TNS	
180	00:27.521	EDPSP006	ARNIE	TNS	Data Len=1049
213	00:33.302	146.184.100.116	146.184.100.188	TNS	Unkn type
218	00:33.475	146.184.100.116	146.184.100.188	TNS	
220	00:33.483	146.184.100.116	146.184.100.188	TNS	
222	00:33.526	146.184.100.116	146.184.100.188	TNS	<b>What are these addresses?</b>
223	00:33.527	146.184.100.116	146.184.100.188	TNS	
226	00:37.826	146.184.100.116	146.184.100.188	TNS	
227	00:37.827	146.184.100.116	146.184.100.188	TNS	
261	00:51.596	ARNIE	EDPSP006	TNS	Data Len=15
262	00:51.598	EDPSP006	ARNIE	TNS	Data Len=14
263	00:51.605	ARNIE	EDPSP006	TNS	Data Len=650
265	00:51.671	EDPSP006	ARNIE	TNS	Marker/Attn
266	00:51.671	ARNIE	EDPSP006	TNS	Marker/Attn
267	00:51.672	EDPSP006	ARNIE	TNS	Marker/Attn
269	00:51.786	EDPSP006	ARNIE	TNS	Data Len=107
270	00:51.793	ARNIE	EDPSP006	TNS	Data Len=642
272	00:51.908	EDPSP006	ARNIE	TNS	Data Len=230
273	00:51.912	ARNIE	EDPSP006	TNS	Data Len=17
274	00:51.914	EDPSP006	ARNIE	TNS	Data Len=67
283	01:01.704	ARNIE	EDPSP006	TNS	Data Len=220
284	01:01.709	EDPSP006	ARNIE	TNS	Data Len=107
285	01:01.718	ARNIE	EDPSP006	TNS	Data Len=150
286	01:01.721	EDPSP006	ARNIE	TNS	Data Len=30
287	01:01.731	ARNIE	EDPSP006	TNS	Data Len=220
288	01:01.734	EDPSP006	ARNIE	TNS	Data Len=107
289	01:01.747	ARNIE	EDPSP006	TNS	Data Len=154
290	01:01.751	EDPSP006	ARNIE	TNS	Data Len=778

**Of those stranges addresses noted 100.226, 100.116 and 100.141 some of their queries show the following:**

```

Oracle TNS
Frame Length          319
Frame Chksum          00-00
Type                  6                               Data
Reserved              0
Header Chksum         00-00
Data Flags            00000000
                      .....0.
                      .....0
Data Flags            00000000
                      0.....
                      .0.....
                      ..0.....
                      ....0...
                      .....0..
                      .....0.
                      .....0
Basic Operation Code  6                               Row transfer header
Data
__ __ __ __ __
__CAN_OEE_SURVEY__CAR_ALLOCUK_SEC__CAR_DATACAN_SEC__CAR
__DATAUK_SEC__CAR_DATAUS_SEC__CM_CLUSTER_TABLE__COMPANY_TABLE2
__COMPANY_TABLE2__CAN__COMP_TBL2CAN_SEC__COMP_TBL2FRA_SEC__CO
MP_TBL2GER_SEC__COMP_TBL2USA_SEC__COURSE_DESCRIPTION CRSE_EN
RL_WL__CURRENT_POSN_DATA__-__

```

## Novell/Oracle Financial issues discovered

Our traces shoed the following during a purchasing session of Oracle Forms sent to the client. We do not understand these messages and do not know if the are background messages for Oracle Forms or an error. These are messages are repeated often to add to the overall response and throughput of the applications performance over the network.

**Frame: 14409      Time: Sep 11@11:57:42.0830349      Length: 708**

Data

```
0      20-61-20-66-6C-65-78-66-69-65-6C-64-20-70-72-65-      a flexfield pre
16     2D-70-72-6F-63-65-73-73-6F-72-20-66-69-6C-65-0A-      -processor file
32     0A-43-61-75-73-65-3A-09-46-6C-65-78-66-69-65-6C-      Cause: Flexfiel
48     64-20-6D-6F-64-75-6C-65-20-26-4D-4F-44-55-4C-45-      d module &MODULE
64     20-63-61-6E-6E-6F-74-20-66-69-6E-64-20-61-20-63-      cannot find a c
80     6C-6F-73-69-6E-67-20-70-61-72-65-6E-74-68-65-73-      losing parenthes
96     69-73-2E-20-20-59-6F-75-72-20-66-6C-65-78-66-69-      is. Your flexfi
112    65-6C-64-20-70-72-65-2D-70-72-6F-63-65-73-73-6F-      eld pre-processo
128    72-20-66-69-6C-65-20-73-70-65-63-69-66-69-65-73-      r file specifies
144    20-61-20-73-65-67-6D-65-6E-74-20-74-6F-6B-65-6E-      a segment token
160    20-77-69-74-68-20-61-20-66-6C-65-78-66-69-65-6C-      with a flexfiel
176    64-20-63-6F-64-65-20-73-70-65-63-69-66-69-65-72-      d code specifier
192    2C-20-62-75-74-20-79-6F-75-20-64-6F-20-6E-6F-74-      , but you do not
208    20-68-61-76-65-20-61-20-63-6C-6F-73-69-6E-67-20-      have a closing
224    70-61-72-65-6E-74-68-65-73-69-73-2E-0A-0A-41-63-      parenthesis. Ac
240    74-69-6F-6E-3A-09-55-73-65-20-76-61-6C-69-64-20-      tion: Use valid
256    70-61-72-61-6D-65-74-65-72-73-20-69-6E-20-79-6F-      parameters in yo
272    75-72-20-66-6C-65-78-66-69-65-6C-64-20-70-72-65-      ur flexfield pre
288    2D-70-72-6F-63-65-73-73-6F-72-20-66-69-6C-65-2E-      -processor file.
304    20-20-4D-61-6B-65-20-73-75-72-65-20-79-6F-75-20-      Make sure you
320    63-6C-6F-73-65-20-79-6F-75-72-20-70-61-72-65-6E-      close your paren
336    74-68-65-73-65-73-20-70-72-6F-70-65-72-6C-79-2E-      theses properly.
352    0A-00-26-52-4F-55-54-49-4E-45-3A-20-26-54-59-50-      &ROUTINE: &TYP
368    45-20-63-6F-6E-73-74-72-61-69-6E-74-20-73-70-65-      E constraint spe
384    63-69-66-69-65-64-20-66-6F-72-20-74-68-65-20-26-      cified for the &
400    51-55-41-4C-49-46-49-45-52-20-71-75-61-6C-69-66-      QUALIFIER qualif
416    69-65-72-20-69-73-20-6E-6F-74-20-73-61-74-69-73-      ier is not satis
432    66-69-65-64-00-50-6C-65-61-73-65-20-65-6E-74-65-      fied Please ente
448    72-20-64-65-70-65-6E-64-65-6E-74-20-69-6E-66-6F-      r dependent info
464    72-6D-61-74-69-6F-6E-20-66-6F-72-20-74-68-69-73-      rmation for this
480    20-76-61-6C-75-65-20-73-65-74-00-43-6C-61-73-73      value set Class
496    8B-46-6D-BF                                           Fm
NCP
0      77-77 10 02 01-00-96-01 66-3E-00-00 00-00-30-D3      ww      f>      0
16     00-00-00-00 06-08 06-09 00-00-08-08 00-00-05-98
32     02-70 00-00 4C-44-20-70-61-72-61-6D-65-74-65-72-      p LD parameter
48     2E-20-20-0A-0A-41-63-74-69-6F-6E-3A-20-20-50-61-      . Action: Pa
64     73-73-20-74-68-65-20-44-41-54-41-5F-46-49-45-4C-      ss the DATA_FIEL
80     44-20-70-61-72-61-6D-65-74-65-72-20-69-6E-20-74-      D parameter in t
96     68-65-20-66-6F-72-6D-3A-20-44-41-54-41-5F-46-49-      he form: DATA_FI
112    45-4C-44-3D-22-3A-62-6C-6F-63-6B-2E-66-69-65-6C-      ELD=":block.fiel
128    64-22-2E-3A-00-49-6E-76-61-6C-69-64-20-70-61-72-      d".: Invalid par
144    61-6D-65-74-65-72-73-20-73-70-65-63-69-66-69-65-      ameters specifie
160    64-20-69-6E                                           d in
IPX
0      FF-FF 02-B2 00 11 00-00-01-01 00-60-97-5C-C9-6A      ` \ j
16     40-0A 00-10-0E-EE 00-00-00-00-00-01 04-51           @      Q
Ethernet
0      00-60-97-5C-C9-6A 00-00-1B-16-71-C4 02-B2           ` \ j      q
```

Another frame showed the following:

Frame: 14408 Time: Sep 11@11:57:42.0816664 Length: 1516

Data

```
0 52-4F-55-54-49-4E-45-20-77-61-73-20-75-6E-61-62-
16 6C-65-20-74-6F-20-66-69-6E-64-20-74-68-65-20-73-
32 65-67-6D-65-6E-74-20-71-75-61-6C-69-66-69-65-72-
48 2E-20-20-54-68-65-20-66-6C-65-78-66-69-65-6C-64-
64 20-75-73-65-72-20-65-78-69-74-73-20-23-46-4E-44-
80 20-4C-4F-41-44-49-44-2C-20-23-46-4E-44-20-50-4F-
96 50-49-44-2C-20-6F-72-20-23-46-4E-44-20-56-41-4C-
112 49-44-20-68-61-76-65-20-62-65-65-6E-20-63-61-6C-
128 6C-65-64-20-69-6E-63-6F-72-72-65-63-74-6C-79-2E-
144 0A-0A-4D-61-6B-65-20-73-75-72-65-20-74-68-65-20-
160 73-65-67-6D-65-6E-74-20-71-75-61-6C-69-66-69-65-
176 72-73-20-73-70-65-63-69-66-69-66-65-64-20-6D-61-74-
192 63-68-20-74-68-6F-73-65-20-64-65-66-69-6E-65-64-
208 20-69-6E-20-74-68-65-20-44-65-66-69-6E-65-20-51-
224 75-61-6C-69-66-69-65-72-73-20-66-6F-72-6D-2E-00-
240 45-6E-74-65-72-20-61-20-70-61-72-74-69-61-6C-20-
256 76-61-6C-75-65-20-74-6F-20-6C-69-6D-69-74-20-74-
272 68-65-20-6C-69-73-74-2C-20-25-20-74-6F-20-73-65-
288 65-20-61-6C-6C-20-76-61-6C-75-65-73-00-50-6C-65-
304 61-73-65-20-63-68-6F-6F-73-65-20-61-20-6C-6F-77-
320 20-76-61-6C-75-65-20-74-68-61-74-20-69-73-20-6C-
336 6F-77-65-72-20-74-68-61-6E-20-74-68-65-20-68-69-
352 67-68-20-76-61-6C-75-65-00-59-6F-75-20-6D-75-73-
368 74-20-65-6E-74-65-72-20-61-20-6D-61-78-69-6D-75-
384 6D-20-73-69-7A-65-20-74-68-61-74-20-69-73-20-6C-
400 65-73-73-20-74-68-61-6E-20-74-68-65-20-63-6F-6C-
416 75-6D-6E-20-73-69-7A-65-00-59-6F-75-20-6D-75-73-
432 74-20-65-6E-74-65-72-20-61-20-6D-61-78-69-6D-75-
448 6D-20-73-69-7A-65-20-74-68-61-74-20-69-73-20-67-
464 72-65-61-74-65-72-20-74-68-61-6E-20-7A-65-72-6F-
480 00-59-6F-75-20-63-61-6E-6E-6F-74-20-75-73-65-20-
496 74-68-65-20-6D-65-6E-75-20-66-72-6F-6D-20-77-69-
512 74-68-69-6E-20-74-68-69-73-20-66-6C-65-78-66-69-
528 65-6C-64-2E-20-20-43-6F-6E-74-61-63-74-20-79-6F-
544 75-72-20-73-75-70-70-6F-72-74-20-20-72-65-70-72-
560 65-73-65-6E-74-61-74-69-76-65-2E-0A-0A-43-65-72-
576 74-61-69-6E-20-66-6C-65-78-66-69-65-6C-64-73-20-
592 64-65-66-69-6E-65-64-20-77-69-74-68-20-74-68-65-
608 20-6F-6C-64-20-74-72-69-67-67-65-72-20-64-65-66-
624 69-6E-69-74-69-6F-6E-20-64-6F-20-6E-6F-74-20-73-
640 75-70-70-6F-72-74-20-74-68-65-20-6D-65-6E-75-2E-
656 20-20-54-68-65-20-23-46-4E-44-20-50-4F-50-49-44-
672 20-63-61-6C-6C-20-69-6E-20-74-68-65-20-66-6F-72-
688 6D-20-6D-75-73-74-20-62-65-20-63-68-61-6E-67-65-
704 64-20-74-6F-20-20-75-73-65-20-74-68-65-20-6E-65-
720 77-20-74-72-69-67-67-65-72-20-66-6F-72-6D-61-74-
736 2C-20-69-6E-63-6C-75-64-69-6E-67-20-74-68-65-20-
752 61-72-67-75-6D-65-6E-74-20-4E-41-56-49-47-41-54-
768 45-3D-59-2E-00-54-68-65-20-66-6C-65-78-66-69-65-
784 6C-64-20-63-6F-6E-63-61-74-65-6E-61-74-65-64-20-
800 73-65-67-6D-65-6E-74-73-20-66-69-65-6C-64-20-64-
816 6F-65-73-20-6E-6F-74-20-63-6F-6E-74-61-69-6E-20-
832 76-61-6C-75-65-73-20-66-6F-72-20-61-6C-6C-20-74-
848 68-65-20-65-6E-61-62-6C-65-64-20-73-65-67-6D-65-
864 6E-74-73-20-74-68-61-74-20-61-72-65-20-64-69-73-
880 70-6C-61-79-65-64-2E-00-50-6C-65-61-73-65-20-65-
896 6E-74-65-72-20-74-68-65-20-72-65-71-75-69-72-65-
912 64-20-63-6F-6E-74-65-78-74-20-66-69-65-6C-64-20-
928 76-61-6C-75-65-20-69-6E-20-74-68-65-20-26-46-4C-
944 45-5E-46-49-45-4C-44-20-66-6C-65-78-66-69-65-6C-
960 64-2E-20-20-54-68-65-20-63-6F-6E-74-65-78-74-20-
976 66-69-65-6C-64-20-28-61-6C-73-6F-20-6B-6E-6F-77-
```

**ROUTINE was unab**  
le to find the s  
egment qualifier  
. The flexfield  
user exits #FND  
LOADID, #FND PO  
PID, or #FND VAL  
ID have been cal  
led incorrectly.  
Make sure the  
segment qualifie  
rs specified mat  
ch those defined  
in the Define Q  
ualifiers form.  
Enter a partial  
value to limit t  
he list, % to se  
e all values Ple  
ase choose a low  
value that is l  
ower than the hi  
gh value You mus  
t enter a maximu  
m size that is l  
ess than the col  
umn size You mus  
t enter a maximu  
m size that is g  
reater than zero  
You cannot use  
the menu from wi  
thin this flexfi  
eld. Contact yo  
ur support repr  
esentative. Cer  
tain flexfields  
defined with the  
old trigger def  
inition do not s  
upport the menu.  
The #FND POPID  
call in the for  
m must be change  
d to use the ne  
w trigger format  
, including the  
argument NAVIGAT  
E=Y. The flexfie  
ld concatenated  
segments field d  
oes not contain  
values for all t  
he enabled segme  
nts that are dis  
played. Please e  
nter the require  
d context field  
value in the &FL  
EXFIELD flexfiel  
d. The context  
field (also know

```

992      6E-20-61-73-20-61-20-73-74-72-75-63-74-75-72-65-
1008     20-66-69-65-6C-64-29-20-61-70-70-65-61-72-73-20-
1024     61-73-20-6F-6E-65-20-6F-66-20-74-68-65-20-66-69-
1040     72-73-74-20-73-65-67-6D-65-6E-74-73-20-69-6E-20-
1056     79-6F-75-72-20-66-6C-65-78-66-69-65-6C-64-2E-00-
1072     50-72-6F-67-72-61-6D-20-65-72-72-6F-72-3A-20-50-
1088     6C-65-61-73-65-20-63-6F-6E-74-61-63-74-20-79-6F-
1104     75-72-20-73-75-70-70-6F-72-74-20-72-65-70-72-65-
1120     73-65-6E-74-61-74-69-76-65-2E-0A-0A-44-41-54-41-
1136     5F-46-49-45-4C-44-20-70-61-72-61-6D-65-74-65-72-
1152     20-6D-69-73-73-69-6E-67-20-66-72-6F-6D-20-61-20-
1168     66-6C-65-78-66-69-65-6C-64-20-75-73-65-72-20-65-
1184     78-69-74-2E-0A-0A-49-66-20-79-6F-75-20-73-70-65-
1200     63-69-66-79-20-55-53-45-44-42-46-4C-44-53-3D-22-
1216     4E-22-20-69-6E-20-6F-6E-65-20-6F-66-20-74-68-65-
1232     20-23-46-4E-44-20-50-4F-50-44-45-53-43-20-7C-20-
1248     56-41-4C-44-45-53-43-20-7C-20-4C-4F-41-44-44-45-
1264     53-43-20-75-73-65-72-20-65-78-69-74-73-2C-20-79-
1280     6F-75-20-6D-75-73-74-20-75-73-65-20-74-68-65-20-
1296     44-41-54-41-5F-46-49-45  E4-4C-5F-22
NCP
0        77-77 00 02 01-00-96-01 66-3E-00-00 00-00-30-D2
16       00-00-00-00 06-08 06-09 00-00-08-08 00-00-00-00
32       05-98 00-00 00-00-00-00-00-00-08-00-50-72-6F-67-
48       72-61-6D-20-65-72-72-6F-72-3A-20-49-6E-76-61-6C-
64       69-64-20-61-72-67-75-6D-65-6E-74-73-20-74-6F-20-
80       74-68-65-20-66-6C-65-78-66-69-65-6C-64-20-72-6F-
96       75-74-69-6E-65-73-2E-20-20-50-6C-65-61-73-65-20-
112      20-69-6E-66-6F-72-6D-20-79-6F-75-72-20-73-75-70-
128      70-6F-72-74-20-72-65-70-72-65-73-65-6E-74-61-74-
144      69-76-65-20-74-68-61-74-3A-0A-0A-52-6F-75-74-69-
160      6E-65-20-26
IPX
0        FF-FF 05-DA 00 11 00-00-01-01 00-60-97-5C-C9-6A
16       40-0A 00-10-0E-EE 00-00-00-00-00-01 04-51
Ethernet
0        00-60-97-5C-C9-6A 00-00-1B-16-71-C4 05-DA

```

```

n as a structure
field) appears
as one of the fi
rst segments in
your flexfield.
Program error: P
lease contact yo
ur support repre
sentative. DATA
_FIELD parameter
missing from a
flexfield user e
xit. If you spe
cify USEDBFLDS="
N" in one of the
#FND POPDESC |
VALDESC | LOADDE
SC user exits, y
ou must use the
DATA_FIE L_"
ww      f>      0
Program
error: Inval
id arguments to
the flexfield ro
utines. Please
inform your sup
port representat
ive that: Routi
ne &
` \ j
@      Q
` \ j      q

```

**Oracle Financials Recommendations**

1. The traces should be reviewed and any issues uncovered should be disclosed with the developers.
2. The installation of files must be revisited for the WAN is getting a .DLL file related message.
3. File Servers where the Oracle Financials runtime resides should be reviewed and sized for this additional activity. A test should be performed to see the CPU and DASD impact from three users simultaneously loading the application and using it.
4. Research into re-architecting Novell server location and user distribution and location of only Oracle runtime software on one large Novell server.

**3.4 GMD Open Up time**

The GMD OPEN UP TIME application was analyzed on our local Ethernet segment. The traffic originated from a remote user over the WAN. The resulting performance was very positive for all functions with only two to three second response times for queries. This information was not modeled for impact.



## **4.0            General issues and recommendations**

### **4.1 Infrastructure**

As of this writing The Oracle Financials and GMD applications were tested and modeled against a 10 Mbps Ethernet path to the SP2 Tower Oracle Server. These users should be and must be pointing to the FDDI nodes of the tower for greater performance.

It is unclear if the ESS Custom Applications and IMI applications are pointing towards the FDDI backbone and not Ethernet to get to the Oracle server. All workstations and configurations prior October 1<sup>st</sup> must have their TNSNAMES.ORA and ini files changed otherwise the current Ethernet links to segment 100 will become saturated quickly.

It is believed that the above tasks has been completed on 9/11/97.

### **4.2 Workstation**

Our analysis in June and July showed discrepancies in the Workstation shells to be utilized for the Novell IPX transport. Some Workstations utilize the Microsoft compatible driver and others utilize the Novell Client32 drivers. Downloading of form software and performance may be attributed to the use of different shells. A decision and standard must be set, for this will help reduce troubleshooting and support time.

### **4.3 Novell server**

Some of the servers that feed the client these applications experience high server CPU utilization from other applications and file/print demands. This causes intermittent delay in forms to be accessed from the users. If this is not addressed soon, users will be mistaking response issues to be ESS related and not Novell.

The current crop of Novell servers should be sized properly for distribution of Oracle Forms and IMI based applications. This will include process, memory, and NIC throughput. These servers should all be moved to the One US Manufacture Computer room and place on a server segment for optimum performance.

### **4.4 Network management**

The lack of a complete network management system will hinder and defeat the IT department's effort to manage this network and support the ESS applications effectively. With such a system in place we can determine bandwidth issues early and take proactive measures to ensure that ESS is not affected. Without such tools we will have to continue to rely on protocol analyzers after the problem has occurred or constantly move our analyzers around the network to obtain a cyclical baseline of utilization and error statistics.

### **4.5 Change Control**

We need to know when changes are made to the applications relative to network and remote querying so we can re-analyze the application and determine if there was any improvement in network performance.

## **5.0**        *Next Steps*

1. Review this report with management
2. Prioritize the issues and recommendations to be addressed before October 1<sup>st</sup>.
3. Prioritize the issues and recommendations to be addressed after October 1<sup>st</sup>.
4. Assign tasks to the appropriate personnel

## **6.0** *Model Summary*

The following tables lists the applications analyzed in late June, July and early September. The alphanumeric code in the first column is the application module's id. The second column lists what type of application system is the module was developed in. The indication of CUSTOM APPLICATIONS means that this application was written in Oracle's developer tools and utilizes Oracle Forms as the runtime and front-end and Oracle TNS protocol over TCP/IP as the transport. The indication of IMI means that the application was written using proprietary tools by an outside consulting group and utilizes the TCP/IP protocol. The last column indicates the application module's function. Any field with a N/A means that the application module was a one time batch process or it's utilization was too low to model.

The following pages present a summarized model of the network impact of the Client/server based applications.