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Document Title: Live System Performance Report for February 2000

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Abstract: This document reports on the performance of the live system. This version covers the period January and February 2000.

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0 DOCUMENT CONTROL

0.1 DOCUMENT HISTORY

Version	Date	Reason
1.0	27/8/99	First version – start of live trail until mid August. Issued for comment in TDA only. Not distributed fully.
2.0	31/10/99	Until end of October. Added data for reference data components and the ISDN network.
3.0	29/01/00	Report covering the month of December 1999. Additional performance monitoring was introduced on the live estate during the month and some of this data is captured in this report.
4.0	29/03/00	Report for January and February 2000

0.2 ASSOCIATED/ DOCUMENTS

Ref.	Vers.	Date	Title	Source
Model	5	30/10/99	See Pathway Performance Team	Pathway
PerfScalStrat	2	25/5/99	Performance and Scalability Strategy PA/PER/015	Pathway
PerfMan	0.2	7/10/99	Performance Management Service Outline Design	Pathway
BusVols	0.5	30/6/99	Pathway Performance – Business Volumes	Pathway
Brief	5.3	n/a	Pathway- Workload Brief	POCL

0.3 ABBREVIATIONS

APS	Automated Payment Service

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Foreigns	OBCS Foreign Transactions i.e. OBCS payments not made at the normal or 'home' Post Office
Host	Sequent NUMA-Q system
LSR	Live System Report
LUC	Cluster Lookup Service
NINO	National Insurance Number
NUMA-Q	Sequent implementation of the NUMA architecture
PRI	Primary Rate Interface of the ISDN Router
RDDS	Reference Data Distribution Service
RDMC	Reference Data Management Centre
SLA	Service Level Agreement
SMC	Systems Management Centre

0.4 CHANGES FORECAST

Reissued on a monthly basis. The content of the report will be continually monitored and revised.

Addition of section on resources used at the physical layers i.e. correspondence server, agents and host.

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1 INTRODUCTION

1.1 Scope

The Pathway Performance & Scalability Strategy [PerfScalStrat] describes the process that ICL Pathway has implemented to manage and predict the performance of the system.

One of the key components of the strategy is the measurement and monitoring of the live system and comparing the performance of the live system (workload processed and resources used) with the performance predicted using:

- Data derived from Technical Testing and
- Performance models.

The performance predictions are input into the scalability plans for each component of the system that will:

- Document the capability and scalability of each layer of the architecture
- Relax the stringent targets set out in the default scalability plan, where applicable
- Identify any shortfall in performance that will impact on the scalability of the system.

The edition of the Live System Report documents, in summarised form, the monitoring of the live system for January and February 2000.

The Live System Report has four main purposes:

- To document the workload processed (no of messages, transactions, etc) by the key components of the live system.
- To document the resources used (e.g. processor, disk, time) by each of the key components of the system.
- To compare the workload and resource usage with that predicted by the performance models [Model].
- To highlight any discrepancies, and any action taken or recommended.

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1.2 Overview

The live system report is divided into sections covering the following services:

- OBCS (see §2)
- APS (see §3)
- TPS (see §4)
- Reference Data (see §5)
- Riposte (see §6)
- ISDN Network (see §7)
- Issues (see §8)

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In each section the key metrics are presented in graphical and/or tabular form.

In each of the graphs the ***monitoring*** data is normally presented for each individual day in the sample period. The ***predicted*** data is the maximum value expected during a particular week. Where appropriate the actual volume of transactions or resources used is compared against the predicted value and any differences are identified and reviewed.

The current prediction models have been calibrated using data gathered during Technical Testing for Pathway Release CSR (NR2). As the workload volumes on the live system increase, the models will be re-calibrated using data from the live system. The point in the rollout at which the models will be re-calibrated will depend on the particular component and the usage of that component.

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1.3 Management Summary

This report covers the months of January and February 2000. Rollout of Post Office Outlets recommenced on 24th January and since then the number of outlets has increased from 1860 to 3300.

The load on the hardware platforms has increased steadily and has reached a level when the resources used on key platforms like the Correspondence Servers can be monitored and the measurements used to extrapolate future resource usage.

This issue of the Live System Report looks at both the workload being processed and the resources being used.

The following summarises the current performance:

- **TPS** – The EPOSS workload is growing in-line with predictions.
- **OBCS** – The OBCS workload is growing more slowly than predicted and the current projection is that the number of payments by book in a full year with all outlets rolled out would be approx. 630M i.e. approx. 20% lower than the contractual volumes. The OBCS volumes will be monitored closely and if, over the next two sampling periods this trend continues, the capacity models for the platforms and the network will be updated to reflect these changes.

  The order book bar-code scanning issue has not been resolved so the number of OBCS 'foreign' transactions being process is much lower than predicted. Discussions are continuing between Pathway and POCL about re-instating the barcode scanning of order books.
- **Reference Data** – Procedural and application changes have been made to the processing of reference data. The POCL generated peaks experienced earlier in rollout have been significantly reduced. The focus is now on eliminating the Pathway generated peaks that are caused by e.g. reference data to support new releases.
- **Network** – The issues identified with the ISDN network has resulted in a significant improvement in the frequency and length of calls. The focus has now changed to identifying the source of calls and trying to reduce the number of ISDN calls.

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1.4 Performance Changes

- During January the number of PRIs in the routers was reduced to protect the routers from peak on peak overload. This PRIs will be re-installed during March in the new ISDN Routers that are planned. The new router configuration will support full roll out volumes.

1.5 Issues

- **TPS** – The time to harvest TPS is under review. The TPS bulk harvester agents are processing data input from the Correspondence Server at, or above, the expected level, but because the number of messages input is much greater than expected [1] the overall time to process is longer than expected. This is not an issue with the current volumes.
- **Performance Data from the Live System** – The production of this report relies on data feeds from the live system. The report relies on manual data feeds and problems obtaining the feeds in time caused the January LSR to be delayed and merged with the February LSR.

  Data feeds from:

  - NT & Riposte meters
  - Maestro Logs
  - Energis phone bills
  - Data Warehouse extracts

  have been used in the production of this report.

  A CP and briefing paper have been produced for the purchase of Athene from Metron Technology a long-standing ICL partner. Athene provides the tools to collect manage and report on performance data collected from the live estate and will be used by OSD, SSC, CS and the performance team.

[1] The TPS Bulk Harvester reads all messages but does only process EPOSS messages. The large number of additional messages generated by cash accounting trial balances are read but not processed.

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- **Network** – Two periods very long calls have been experienced on the ISDN network. Mitigating actions have been put in place whilst the Riposte bug is resolved.

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2 OBCS

2.1 OBCS Summary

The 3 key components OBCS workload are:

- **Harvesting** – the harvesting of the OBCS transactions that have be done at the Post Offices (e.g. payment of benefit). These are then processed by the host system (see §2.1).
- **Foreigns** – The processing of OBCS foreign by the data centre (see §2.2).
- **Stops** – The processing of OBCS stops from the benefit agency and loading them into Riposte (see §2.3).

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The volume of OBCS order book transactions (see Figure 2-2 – Number of OBCS Messages Processed per Day) is lower than expected at this point in the roll out. Extrapolating the current volumes to full rollout would result in approx. 630M order book transactions being processed in a full year. This is approx. 20% lower than the contractual volumes.

Currently only the original 300 live trial Post Offices are bar-code scanning order book encashments. However most of the remaining Post Offices are now registering new order books before they are issued. The Pathway objective is to get all Post Offices registering all new order books to minimise the *learning* effect when the bar-code scanning of order books is re-instated. However, 319 of the remaining Post Offices did **not** registered any books during February and a list of these Post Offices has been provided to POCL who are investigating.

The average OBCS 'foreign' response time (see Figure 2-10 – OBCS Foreign Response Times) is artificially low. The 'foreign' response time is computed from the time to:

- Processing 'foreign' order book encashments **and**
- Register new book receipts

New book receipts typically have a lower response time and as they currently make up a higher proportion of all OBCS foreigns than would be normal, this results in a lower than typical mean 'foreign' response time. A new chart has been added to this report (see Figure 2-10) which

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separates out the small number of OBCS 'foreign' encashments from the bulk of 'foreigns' that are created by the registration of new order books.

The percentage of OBCS 'foreigns' that fail is artificially low since new book receipts *must* contact the data centre. The percentage of transactions that fail (see Figure 2-9) has continued to decline as the network problems are resolved.

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2.2 OBCS Harvesting

This section looks at the harvesting and processing of OBCS messages. OBCS messages include:

- The payment of benefit by book (local & foreign)
- The registering of new books upon receipt at a Post Office and
- The issue of new books at a Post Office.

Figure 2-2 shows the number of OBCS messages harvested per day. The difference between the actual and predicted numbers should be because of Northern Ireland (NI) Post Offices as they do not support OBCS (the OBCS workload model assumes that all Post Offices process OBCS). Even taking the NI effect into consideration the number of OBCS messages is significantly lower than would be expected from the contractual volumes:

Year	Order Book Txns
1999-2000	776M
2000-2001	750M

Figure 2-1 - Contractual Volume of OBCS Order Book Transactions

Projecting the current volumes forward would result in the expected number of OBCS order book transactions to be approx. 630M. The growth in OBCS order book transactions will be carefully monitored as the rollout progresses.

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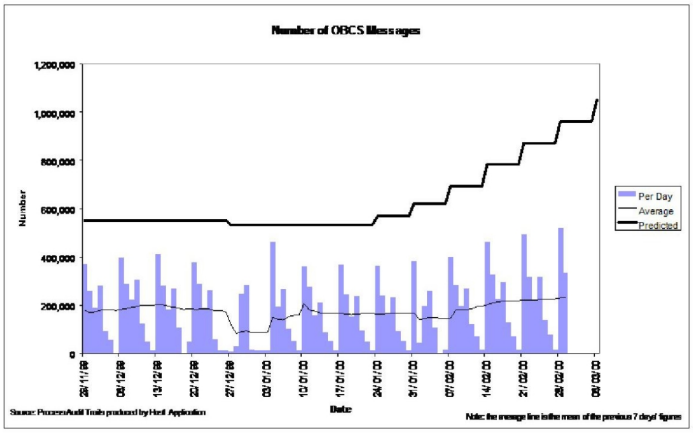

Figure 2-2 – Number of OBCS Messages Processed per Day

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The breakdown of OBCS transactions by day of the week given in Figure 2-3.

Week Starting	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mon 27-Dec-99	2%	5%	41%	47%	2%	2%	2%
Mon 03-Jan-00	1%	42%	17%	24%	9%	5%	1%
Mon 10-Jan-00	31%	24%	14%	18%	8%	4%	1%
Mon 17-Jan-00	32%	21%	13%	20%	8%	4%	1%
Mon 24-Jan-00	31%	21%	14%	20%	8%	4%	1%
Mon 31-Jan-00	38%	4%	19%	26%	11%	0%	1%
Mon 07-Feb-00	30%	21%	14%	20%	9%	5%	1%
Mon 14-Feb-00	30%	21%	15%	19%	8%	5%	1%
Mon 21-Feb-00	31%	20%	14%	20%	9%	5%	1%
Predicted	**32%**	**23%**	**14%**	**21%**	**7%**	**3%**	**0%**

Figure 2-3 - Breakdown of OBCS Transactions by Day

The distribution of OBCS transactions across the week given in Figure 2-3 is similar to the pattern documented in the Performance Business Volumes [BusVols]. In particular the %age of OBCS transactions processed on the busiest day is a very close fit to the prediction.

Figure 2-4 shows the time to harvesting OBCS from the Correspondence Servers and the time to process the messages on the host.

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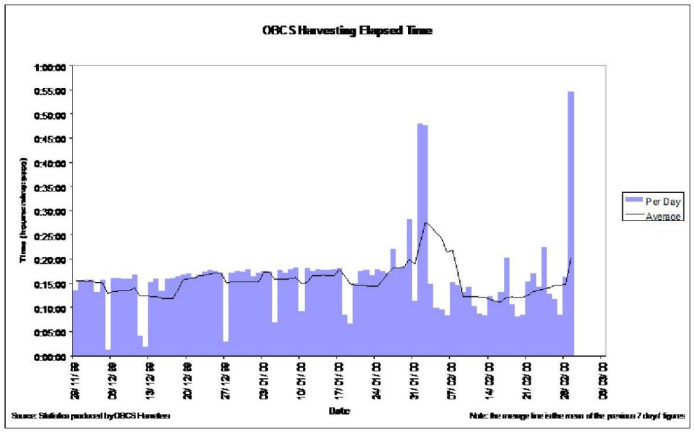

Figure 2-4 - Elapsed Time to Harvest OBCS Transactions

Figure 2-4 is based on the workload being processed at all Post Offices and includes both order books scanned and order books processed using the non bar-coded order book function. The elapsed time is gathered from metrics in the OBCS Bulk Harvester agent.

The workload peaks were caused by:

- 1st/2nd February – The introduction into the system of TPS reconciliation
- 29th February - The APS bulk harvester agents at Wigan were not available so all harvesting used the 8 bulk harvester agents on the Bootle site.

The overheads of setting up the harvester jobs, and the short execution times, mean that if the elapsed times are used to project future run-times, the time will tend to be a over estimate. However, as the number of messages processed grows the impact of the overheads will be reduced and more accurate run-time estimates can be extrapolated from measured run-times.

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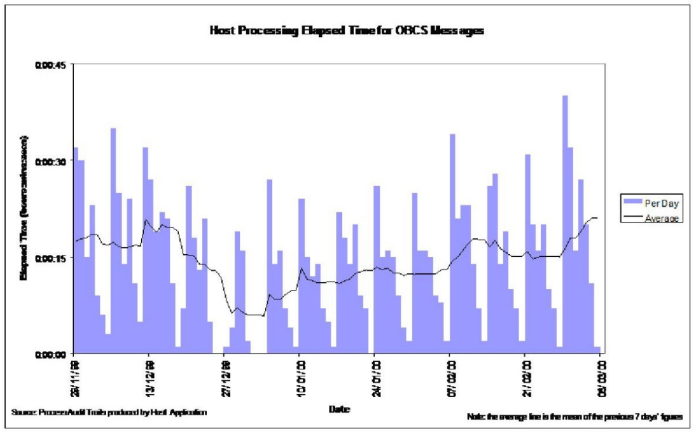

Figure 2-5 - Elapsed Time for the Host to Process OBCS Messages

The Host processing times for OBCS messages are still very short and within expected limits.

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2.3 OBCS 'Foreign' Transactions

There are two key performance measures for OBCS 'foreign' transactions:

- The volume of 'foreigns' (which effects the number of phone calls) and
- The average response time (which effects the SLAs).

The number of OBCS 'foreigns' is shown in Figure 2-6 below. The graph shows all 'foreigns' initiated at the counters and splits them into:

- 'Foreigns' those that failed [1] i.e. did not receive a response within the 20 second time-out time because:
  - The phone call to the data centre failed or
  - The response was longer than expected because e.g. the OBCS Host system is unavailable
- and those that succeeded.

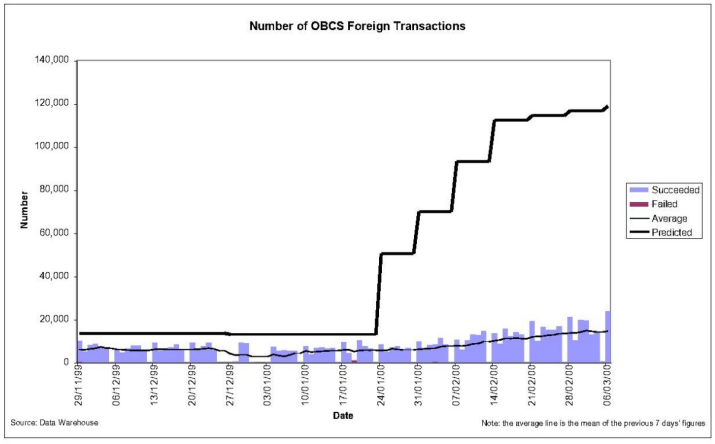

Figure 2-6 - Number of OBCS Foreign Transactions per Day

[1] 'Foreign' transactions that fail have a zero response time. These transactions are excluded from the average.

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The number of 'foreigns' being processed is far lower than expected because the bar-code scanning of order book encashments are only being processed the first 300 Post Offices rolled out.

The percentage of OBCS 'foreigns' is shown in **Error! Reference source not found.** below:

Week Ending	Actual	Predicted
Sun 02-Jan-00	3.5%	2.4%
Sun 09-Jan-00	3.2%	2.4%
Sun 16-Jan-00	3.6%	2.4%
Sun 23-Jan-00	3.7%	2.4%
Sun 30-Jan-00	3.9%	8.9%
Sun 06-Feb-00	4.6%	11.3%
Sun 13-Feb-00	5.5%	13.4%
Sun 20-Feb-00	5.8%	14.3%
Sun 27-Feb-00	6.4%	13.1%
Sun 05-Mar-00	6.4%	12.1%
Sun 12-Mar-00	6.7%	11.3%
Sun 19-Mar-00	6.9%	10.6%
Sun 26-Mar-00	5.9%	10.0%

Figure 2-7 - %age of OBCS Order Book Transactions that generate OBCS 'Foreign' Transactions

Figure 2-7 records the total number of OBCS 'foreign' transactions i.e. encashments and book receipts. An increasing proportion of the rolled out Post Offices are now registering new books but only 300 Post Offices are scanning order books when they are presented for encashment. The actual number of 'foreigns' will rise significantly when the bar-code scanning of order-book encashments is re-introduced.

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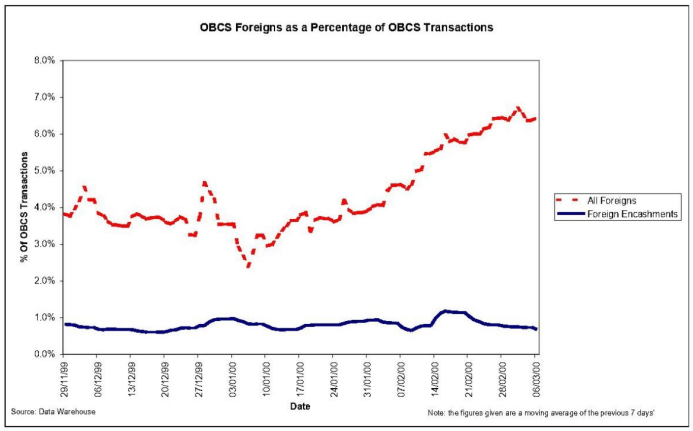

Figure 2-8 - OBCS Foreign Encashments as a %age of OBCS Transactions

The number of OBCS 'foreign' encashments are averaging approx. 1% of the number of OBCS Transactions currently. This will rise when the bar-code scanning of order books is re-introduced.

The percentage of OBCS foreigns that fail is shown below. The table shows the average failure over the month and the worst day.

Month	Average Failure Rate	Worst Day
June	17.6%	100.0%
July	22.2%	100.0%
August	16.7%	100.0%
September	7.3%	100.0%
October	4.5%	17.1%
November	1.5%	12.4%
December	0.4%	1.5%

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January	1.2%	80.8%
February	0.5%	4.8%

Figure 2-9- OBCS Foreign Failures

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The percentage of OBCS 'foreign' failures has steadily reduced as a result of actions put in place to rectify ISDN network problems.

However, the percentage of OBCS 'foreigns' that fail is currently artificially low as the figure is made up from:

- The number of OBCS 'foreign' encashment failures, plus
- The number of OBCS 'foreign' book receipt failures

and the vast majority of 'foreigns' in the sample period are OBCS 'foreign' book receipts which *must* contact the data centre.

Note : The failure of an OBCS 'foreign' encashment does not mean that the transaction is *lost*. All OBCS 'foreign' transactions are written to the counter message store but, for a variety of reasons, some messages fail to contact the datacentre and in such circumstances the counter clerk will operate the fall back procedure which *may* include telephoning the Help Desk.

The average response time for OBCS 'foreigns' is shown in Figure 2-10 below.

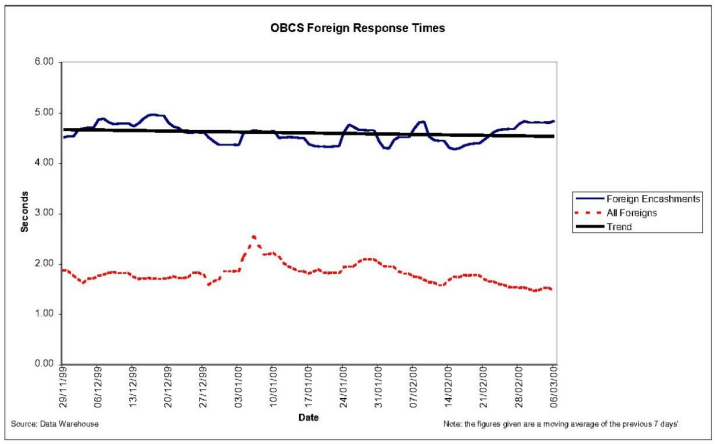

Figure 2-10 – OBCS Foreign Response Times

The mean OBCS 'foreigns' response time for all 'foreigns' is obtained from an analysis of the response times for:

- OBCS 'foreign' encashment, plus
- OBCS 'foreign' book receipt

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that are harvested and stored in the Data Warehouse. This time is currently artificially low because of the order book scanning problem.

Separating out the OBCS 'foreign' encashments from book receipts gives a better indication of the current response times.

The response time that is currently being measured on the live system is better than the response time measured in the OBCS 'Foreign' acceptance test benchmark i.e. 5.4 seconds.

2.4 Stops Processing

Each night the Benefits Agency sends Pathway details of books that should not be encashed. This list covers *all* OBCS beneficiaries irrespective of whether they normally claim benefit from a Pathway automated Post Office or not. This means that the number of changes to the Stops List received by Pathway was at a maximum from day 1 and is not expected to grow over time.

Within the OBCS Stops database on the Host system are details of all Pathway automated Post Offices where the order book has been used. When a stop is received by Pathway details of the stop are sent to Riposte and replicated to each automated Post Office were that book has been used.

The variation in the volumes of changes from the benefit agency is hard to predict. Average volumes of approximately 40,000 stops per night are expected with a contractual maximum in one night of 100,000. The dip in volumes during December is within the normal limits expected.

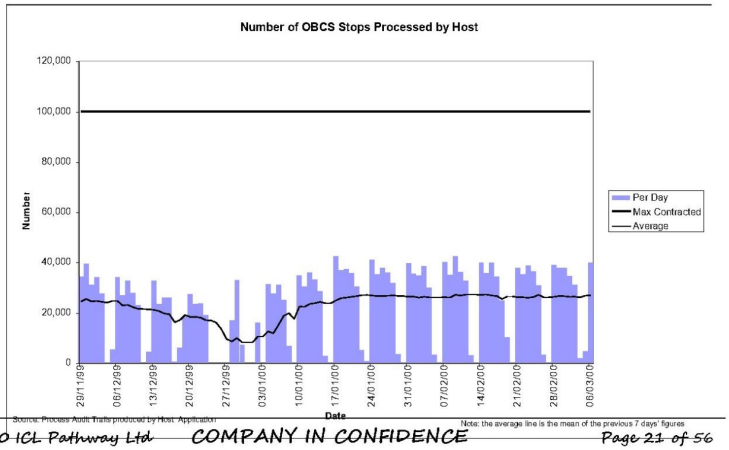

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Figure 2-11 OBCS Stops received from the Benefits Agency

The number of OBCS Stops processed remains within the expected limits.

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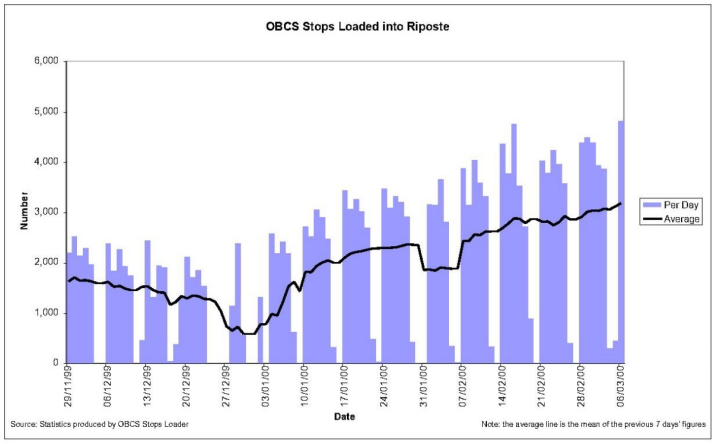

Figure 2-12 – Number of OBCS Stops loaded into Riposte per day

The OBCS Stops model assumed that the proportion of Stops loaded into Riposte would be proportional to the number of Post Offices rolled out.

The number of OBCS Stops being loaded into Riposte is not rising as expected because order books are not being resistered at many Post Offices and Stops can only be distributed to offices that *know* about a particular order book.

As current order books expire, the new order books *should* be registered when they are received and the number of OBCS Stops loaded into Riposte should start to increase even before the order book scanning service is re-started.

The time to process OBCS Stops by the host and the time to load them into Riposte are shown in Figure 2-13 and Figure 2-14 below.

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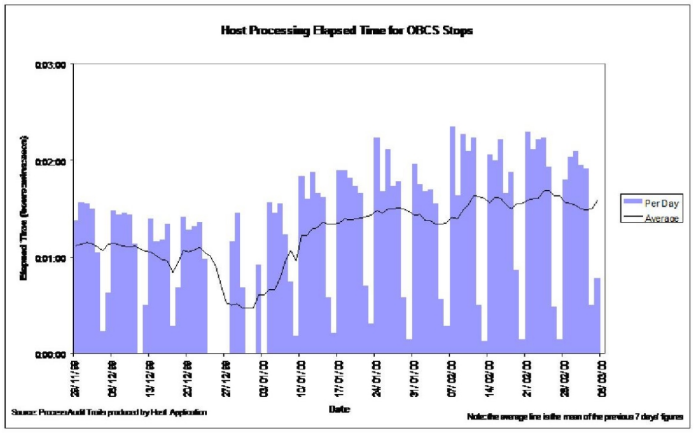

Figure 2-13 - Elapsed Time for the Host to Process the Daily Stops File

The time to process the Daily Stops file (see Figure 2-13) is less than three minutes and does not impose a major load on the host system.

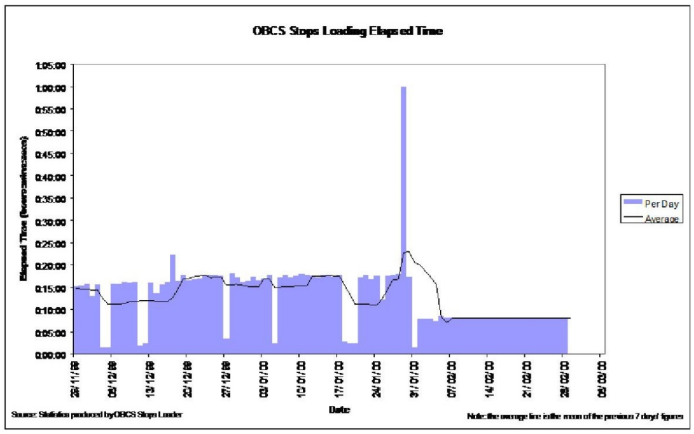

Figure 2-14 - Elapsed Time to Load OBCS Stops into Riposte on the Correspondence Server

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The elapsed time in Figure 2-14 is gathered from metrics in the OBCS Stops Bulk Loader agent. The overheads of setting up the loader jobs and the short execution times mean that the elapsed times do not give a true picture of the elapsed time .v. number of OBCS Stops being processed.

The reduction in elapsed times in February resulted from the (partial) resolution of a problem with LUC that had caused the time to connect to LUC to be much longer than expected (up to 15 mins), thus increasing the elapsed time for the job.

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3 APS

3.1 APS Summary

The graphs below show the number of Automated Payment transactions processed by the system and a breakdown of transactions by day of the week.

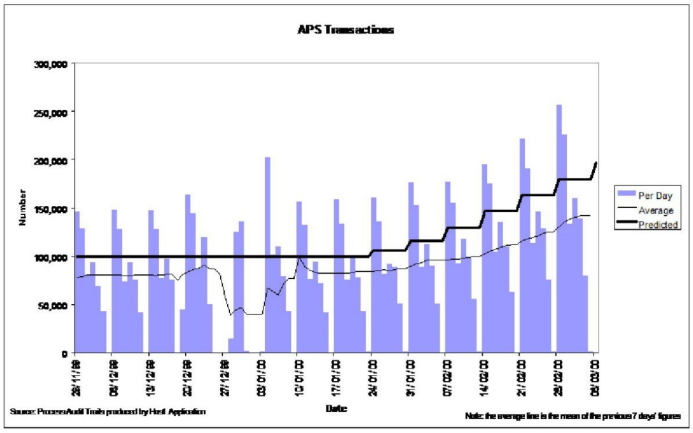

Figure 3-1 - Number of APS transactions processed per day

The number of APS transactions continues to grow in-line with previous projections i.e. approx. 270M across 18,500 Post Offices.

Week Starting	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mon 03-Jan-00	0%	38%	19%	20%	15%	8%	0%
Mon 10-Jan-00	27%	23%	13%	16%	13%	7%	0%
Mon 17-Jan-00	27%	23%	13%	17%	13%	7%	0%
Mon 24-Jan-00	26%	22%	13%	15%	15%	8%	0%

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Mon 31-Jan-00	26%	23%	13%	17%	13%	8%	0%
Mon 07-Feb-00	25%	22%	13%	17%	14%	8%	0%
Mon 14-Feb-00	25%	22%	13%	17%	14%	8%	0%
Mon 21-Feb-00	25%	22%	13%	17%	15%	9%	0%
Mon 28-Feb-00	26%	23%	13%	16%	14%	8%	0%
Predicted	**27%**	**23%**	**13%**	**17%**	**14%**	**7%**	**0%**

Figure 3-2 - Proportion of APS Transactions processed per day

Figure 3-2 above tabulates the distribution of APS transactions processed per day. The distribution of automated payments was not included in the Workload Brief so it was assumed that it followed a similar profile to TPS. The data collected from the live system suggests that the assumptions used were correct.

3.2 APS Harvesting

The elapsed time to harvest APS messages from the Correspondence Servers and write them into the host APS database is shown in Figure 3-3 below.

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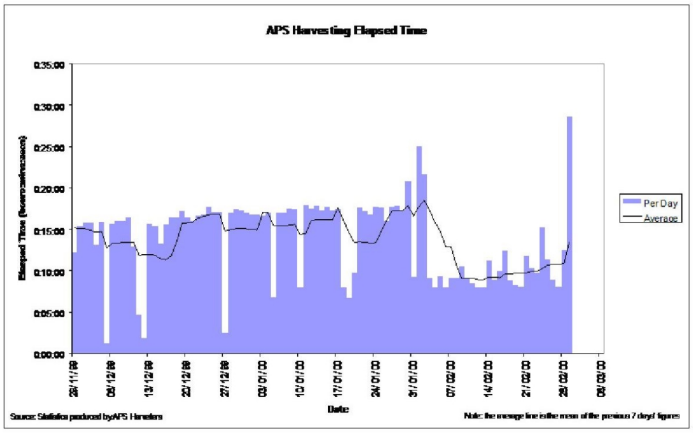

Figure 3-3 - Time to Harvest APS Messages from the Correspondence Server

The elapsed time in Figure 3-3 is gathered from metrics the APS Bulk Harvester agent.

The reduction in elapsed times in February resulted from the (partial) resolution of a problem with LUC that had caused the time to connect to LUC to be much longer than expected (up to 15 mins), thus increasing the elapsed time for the job.

On 29th February the APS bulk harvester agents at Wigan were not available so all harvesting used the 8 bulk harvester agents on the Bootle site.

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3.3 APS Host Processing

The elapsed time to process the harvested APS messages stored in the Host APS database is shown in the Figure 3-4 below.

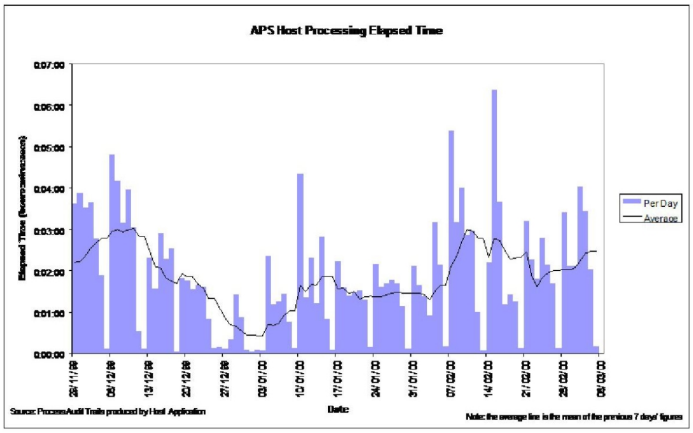

Figure 3-4 - Elapsed Time to Process Harvested APS Messages

The elapsed times for APS Host processing are currently so short (less than 5 minutes) that trends cannot be established until thje volumes grow to the point were the time to processess APS transactions cannot be distorted by job overheads, inc. Maestro job start-up times.

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4 TPS

4.1 TPS Summary

This section looks at the transactions processed by TPS.

The number of EPOSS transactions is growing in-line with expectations.

Figure 4-1 below shows the number of Riposte messages passed to TPS for processing.

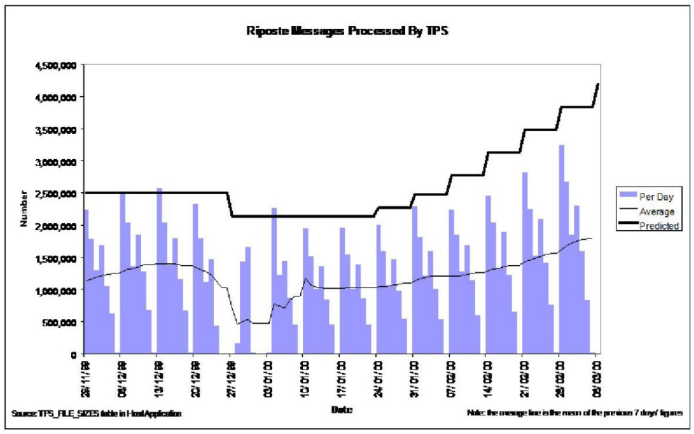

Figure 4-1 - Number of Riposte Messages Processed by TPS

Notes : The figures in Figure 4-1 above do not include messages generated by cash accounts and stock declarations.

The number of TPS messages **predicted** by the TPS model (see Figure 4-1) is for the busiest day in the week. Figure 4-1 shows that there is a good correlation between the model and the live system.

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The breakdown by day of the week is given below.

Week Starting	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mon 03-Jan-00	0%	36%	20%	23%	14%	7%	0%
Mon 10-Jan-00	27%	21%	14%	19%	12%	6%	0%
Mon 17-Jan-00	27%	21%	14%	19%	12%	6%	0%
Mon 24-Jan-00	26%	21%	14%	19%	13%	7%	0%
Mon 31-Jan-00	27%	21%	14%	19%	12%	6%	0%
Mon 07-Feb-00	25%	21%	15%	19%	13%	7%	0%
Mon 14-Feb-00	25%	21%	14%	20%	13%	7%	0%
Mon 21-Feb-00	26%	21%	14%	19%	13%	7%	0%
Mon 28-Feb-00	26%	21%	15%	18%	13%	7%	0%
Predicted	**27%**	**21%**	**14%**	**19%**	**12%**	**6%**	**0%**

Figure 4-2 - Proportion of EPOSS Transactions processed per day

The distribution of TPS transactions across the week is very similar to the pattern documented in Performance Business Volumes [BusVols]. In particular the %age of EPOSS transactions processed on the busiest day is a very close fit to the prediction.

4.2 TPS Harvesting

TPS harvesting is driven by the Maestro schedule. The harvesters are started at 18:00 and terminated at approximately 20:30. During this period the harvesters continuously scan for end-of-day markers from

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Post Offices and harvest the EPOSS messages when the end-of-day marker is received.

The time that the harvesters run is not a function of the amount of data harvested nor the number of automated Post Offices rolled out. There is no meaningful data available at present about the performance of the TPS Bulk Harvesters.

However, metrics from the TPS Bulk Harvester Agents indicate that the rate at which EPOSS messages are being processed is lower than expected from CI2 Technical Testing.

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Analysis of metrics from the TPS Bulk Harvesters indicate that the problem may be associated with the number of EPOSS messages scanned but not harvested, which is much higher than expected. The analysis so far indicates that this is due to a much higher number of:

- Riposte system messages and
- Cash accounting messages.

See §6.1 - Number of Riposte Messages for further details.

Because most cash accounting is run after end-of-day on a Wednesday this adds a significant load to the TPS Bulk Harvesters on a Thursday evening. This is also being monitored but changes such as the reduction in the number of 'user lock requests' (CP2253) will reduce the impact on the TPS Bulk Harvester.

Currently there is no issue with the time taken by the TPS Bulk Harvesters but the performance is being monitored carefully and investigations are taking place with B&TC.

4.3 TPS Host Processing

Figure 4-2 shows the elapsed time to process TPS on the host.

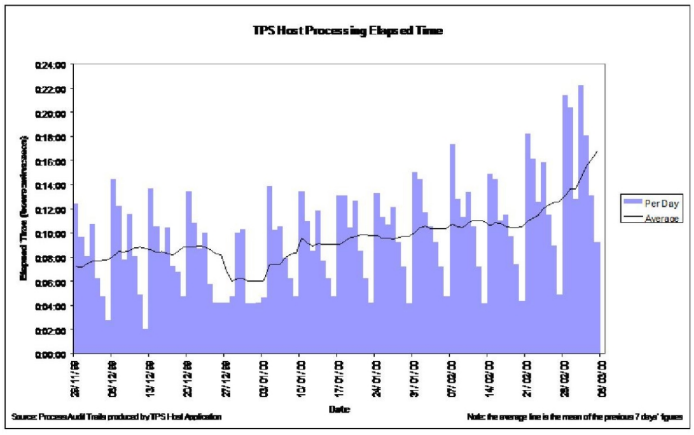

Figure 4-3 - Elapsed time to process TPS messages on the Host

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The time to complete TPS host processing is growing in-line with the predicted time.

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5 REFERENCE DATA

5.1 Reference Data Summary

Reference data processing is split into three main components:

- The processing of reference data changes received from POCL. This takes place on the Host system,
- The loading of non-core reference data changes into Riposte and
- The loading of core reference data changes into Riposte.

The issues discussed in the December LSR concerning the high volume of messages being processed on a small number of nights is in the process of being resolved by changes to operational practices combined with updates to the reference data applications.

The stress points in the reference data system are increasingly due to operational requirements within Pathway to download new reference data before a change is made to the system. Smoothing this operation over a number of nights is not normally possible as new POCL generated changes cannot be applied until the download of Pathway reference data is complete.

During January and February the number of POCL generated changes remained below the level predicted [1].

5.2 Reference Data Processing

Before the bulk loader agents can load reference data into Riposte the data has to be extracted from the RDDS.

A number of changes have been applied to the extraction process (inc. CP2298) to improve performance. The situation will continue to be monitored.

There is no available information on the amount of data being extracted. Metrics have been added to the version of the application that will be delivered at CI4.

[1] The prediction of the rate of reference data change was probably the most difficult to predict as there was no information against which to test the prediction.

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Figure 5-1 shows the elapsed to extract the reference data. The spike on 3rd March was due to multiple changes (undo the previous change & apply the new change) to the price of postage stamps being applied following the decision to alter the date of the price increase.

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The elapsed time for the reference data extraction process is shown in Figure 5-1 below. The elapsed time data is extracted from the Maestro schedule log.

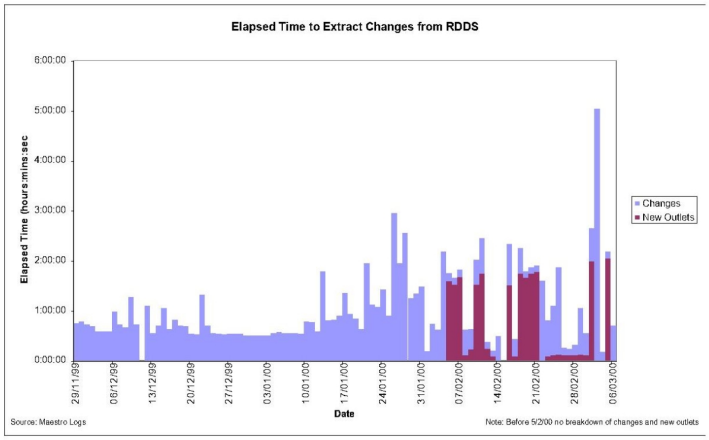

Figure 5-1 - Elapsed time to Extract Reference Data Changes

Based on the data that is available, the actions that have been put in place by Pathway to manage the variability in the amount of reference data processed appears to be having the desired effect. This will continue to be monitored.

The RDDS extract load on 3rd March was due to multiple changes (undo the previous change & apply the new change) to the price of postage stamps being applied following the decision to alter the date of the price increase.

5.3 Non Core Reference Data Loading

Reference data loading is done in one of two ways depending on whether the reference data is core or non-core.

For non-core reference data changes, the reference data is loaded directly from the host system into the Riposte message store for a particular Post Office.

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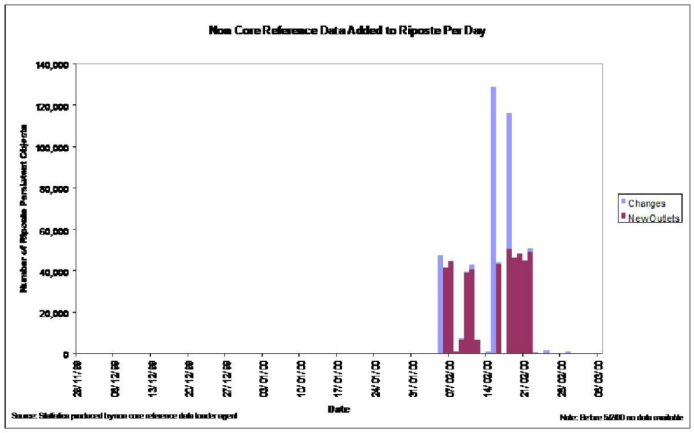

Figure 5-2 - Number of Riposte Persistent Objects Added to Riposte per Day

The metrics shown in Figure 5-2 were introduced into the system at CI2.2R2 so the number of persistent objects that are created in Riposte can be accurately tracked.

Following the introduction of VPN late in February problems were experienced with the Tivoli feed into the reference data system which resulted in no reference data for new outlets being added to Riposte for a number of days.

The problem has since been resolved.

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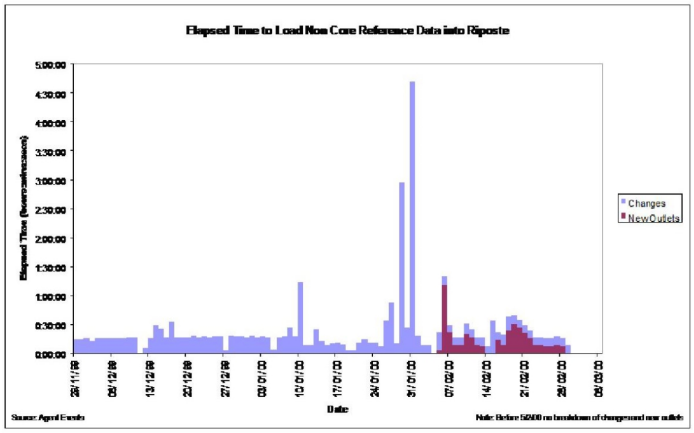

Figure 5-3 – Elapsed Time to load non-core reference data into Riposte

In Figure 5-3 the long loading time on the 31st January corresponds to the failure of an agent that required manual intervention by operations to resolve.

Actions have been put in place to smooth the number of reference data changes per night. CS has implemented a number of changes in association with POCL that appear to be having the desired effect.

5.4 Core Reference Data Loading

For core reference data changes, the reference data is first loaded into the message store for a 'dummy' Post Office on the Correspondence Server. Once this is done the changes are then replicated from the 'dummy' Post Office to all the automated Post Offices on the Correspondence Server.

In addition, when a new Post Office is automated the complete reference data required for that Post Office is also replicated.

The number of core reference data changes loaded into the 'dummy' Post Office and the elapsed time to execute this process are shown Figure 5-4.

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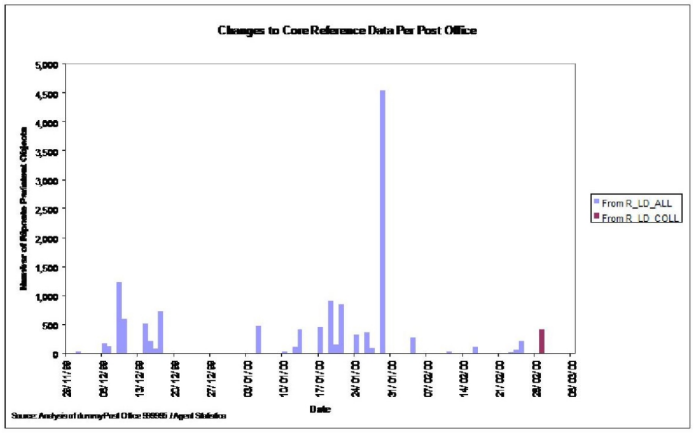

Figure 5-4 - Number of changes to Core Reference Data per Post Office per Day

Note R_LD_ALL is the bulk loader agent that loads POCL core reference data into the dummy outlet on the Correspondence Server.

R_LD_COLL is the bulk loader agent that loads the Class D reference data (i.e. Pathway reference data) into the dummy outlet on the Correspondence Server.

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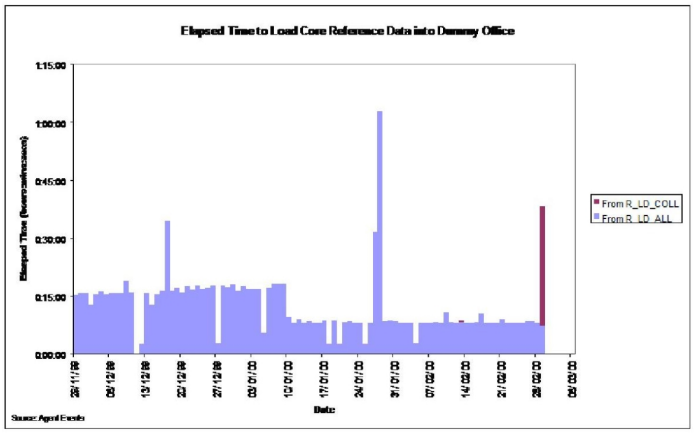

Figure 5-5 - Elapsed time to load Core Reference Data into the 'dummy' Post Office

The number of changes to core reference data were small but the elapsed time of the loading process is fairly consistent as this is the default time to run the process even when no changes are required. At CI4 changes will be made to the reference data system to stop the jobs running if no changes are to be made.

Figure 5-6 shows the number of Riposte messages replicated from the dummy Post Office and the elapsed time to execute the replication process.

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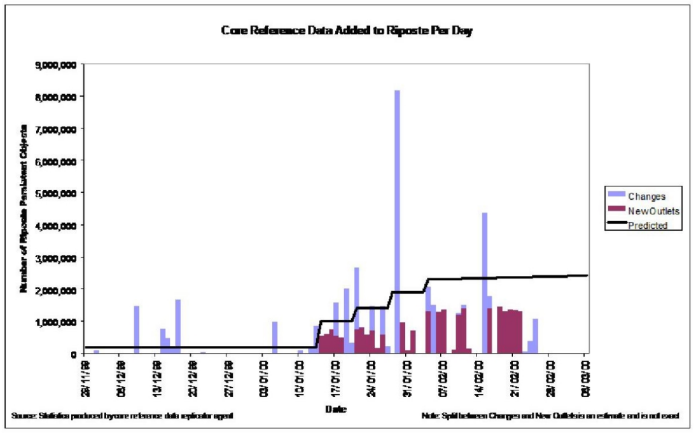

Figure 5-6 - Number of Core Reference Data changes per day

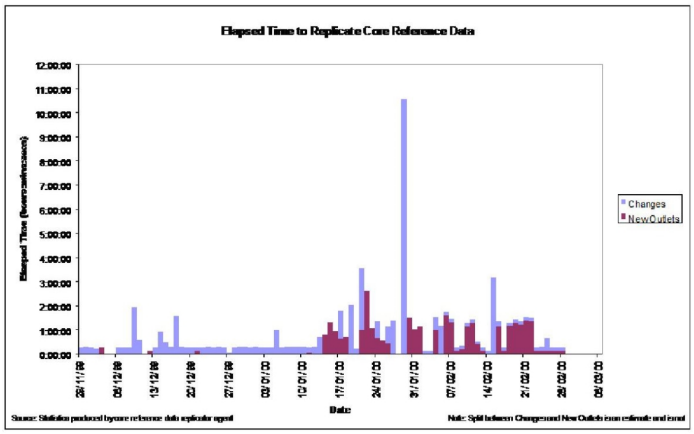

Figure 5-7 - Elapsed time to Replicate Core Reference Data per day

The replication time is dominated by the process that replicates reference data to outlets just prior to them being rolled out and this process remains well within the allocated slot in the Maestro schedule.

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The major loads seen in Figure 5-6 and Figure 5-7 result from reference data being downloaded by Pathway in support of a system change. Methods for smoothing this load are under investigation.

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6 RIPOSTE

This section looks at Riposte related performance including:

- The number of Riposte messages generated
- The size of the messages
- The time taken to run Riposte Archiving.

6.1 Number of Riposte Messages

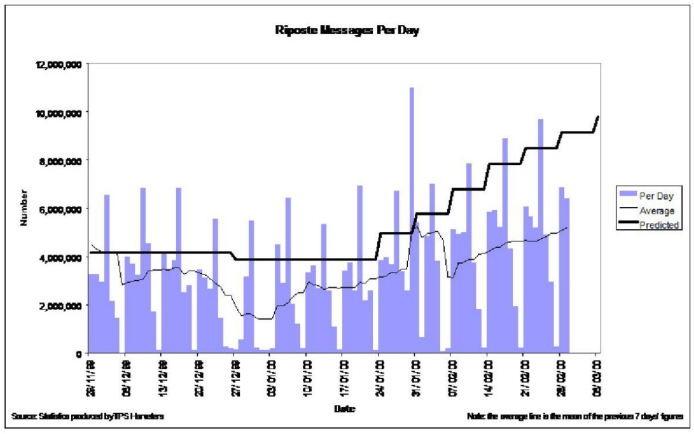

Figure 6-1 - Number of Riposte messages generated per day

The growth in the number of messages generated per day is following the prediction but the model is currently under predicting the maximum number of Riposte messages generated per day. The biggest discrepancies identified are in:

- The large volumes of reference data changes (see Section5)
- The number of messages generated by cash accounting
- The number of Riposte system messages.

The prediction in Figure 6-1 represents the number of Riposte messages generated on the busiest day in each week. If the number of Riposte

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messages generated for the month of March follows a similar pattern then the models will be updated to reflect the actual measurements from the live system.

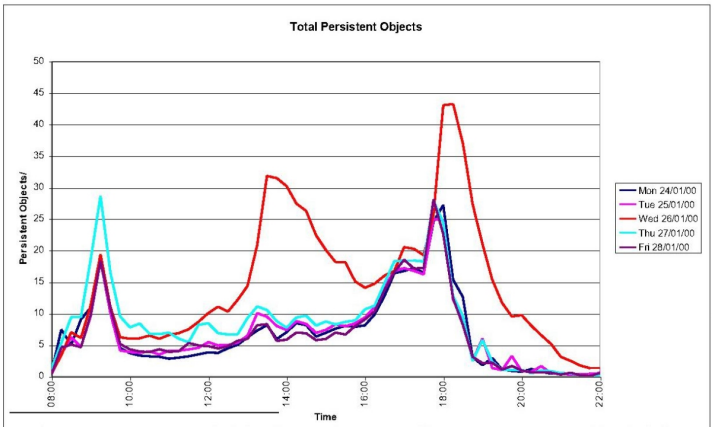
6.1.1 Cash Accounting

The cash accounting process was one of the most difficult to estimate as the volume of data generated is based on:

- The number of stock units in a Post Office and
- The number of trial balances generated by the postmaster.

Based on CSR(NR2) Live Trial data, the expected number of cash accounting messages was approximately 1300 per Post Office per week. An analysis of the Riposte message store data indicates the number is currently nearer 1900 per Post Office.

As well as creating more messages per Post Office, postmasters are taking much longer than was expected to complete cash accounting on a Wednesday evening. The messages generated by cash accounting after approx. 18:00 on a Wednesday evening are not processed [1] by the TPS Bulk Harvester Agent until Thursday evening adding significantly to the time to harvest TPS messages on a Thursday.



1 The messages generated by the cash accounting process are replicated from the Post Office counter to Correspondence Server message store but most of these messages are **not** harvested by the TPS Harvester. The additional load on the TPS Harvester is caused by the harvester having to scan all of the messages (inc. cash accounting messages) generated that day to find the messages that it has to harvest.

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Figure 6-2 - Load over the Day due to Cash Accounting

The red line (Wed 26/01/00) in Figure 6-2 shows the number of Persistent Object created in Riposte. The difference between the number of Persistent Objects created on a Wednesday afternoon/evening provides a good indication of the load created by cash accounting and when when cash accounting/stock roll-over is performed on the Post Offices i.e.

- 10:00 – 16:00 for outlets that close Wednesday lunchtime
- 17:30 – 21:30 for outlets that close at 17:30 on Wednesday
- Cash accounting also adds to the load on Thursdays up to lunchtime.

6.1.2 Riposte System Messages

The number of messages generated by Riposte functions e.g.:

- Log on/log off
- End of day reports
- Session transfers
- etc.

is significantly greater than the prediction which was based on the CSR(NR2) Live Trial system. The prediction was that 200 messages per counter per day would be generated. Data from the live system indicates that the number currently exceeds 500 per counter per day.

These messages are a function of the way the counter terminals are used and not a function of the number of OBCS, EPOSS, APS, etc transactions processed by the counter.

6.1.3 User Lock Requests

CPs to remove unnecessary messages are being raised starting with CP2253 which significantly reduces the number of User_Lock_Requests generated by the counter. This will both reduce the number of messgaes in the message store and significantly reduce the load on the Persistant Object Index in the Correspondence Server during the peak hour.

CP2253 will be introduced at CI3.2R2 i.e. before CI4.

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6.2 Size of Riposte Data

Until Riposte archiving is enabled [1]the amount of data being generated in the message store of the Correspondence Servers has been carefully monitored.

The initial sizing of the message store was very conservative, as it was difficult to predict the variability between the amount of data generated by outlets of the same size (number of counters). A significant amount of data about the content of the message store has been collected which has allowed the target date for the switch on of Riposte Archiving to be relaxed to March 2000 when the Riposte Integrity Checker will become available.

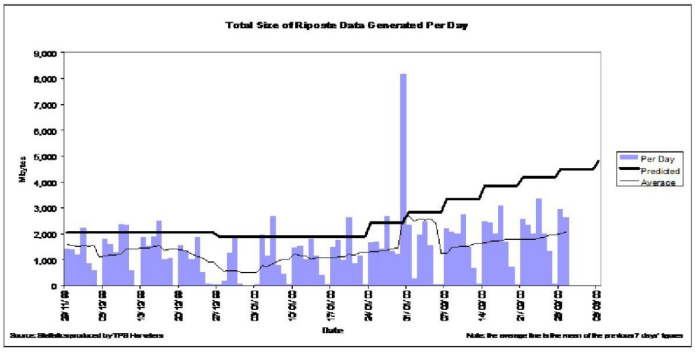

Figure 6-3 - Size (Mbytes) of Riposte Data Generated per Day

The peak on the 30th January was due to the introduction of TPS Reconciliation into the system.

CP2253 to remove unnecessary messages have been approved starting with which significantly reduces the number of User_Lock_Requests generated by the counter. This will both reduce the number of messgaes in the message store and significantly reduce the load on the Persistant Object Index in the Correspondence Server during the peak hour.

[1] Riposte Archiving deletes messages that have expired from the message store.

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6.3 Archiving

This section looks at Riposte archiving.

Riposte archiving is currently switched off at the data centres. This section is therefore not reported on.

Riposte Archiving was originally switched off because of operational problems that resulted in the archiving process interacting with other processes running on the Correspondence Servers resulting in Riposte failures.

These problems have been resolved but Archiving will remain switched off until the SMC Support Server is introduced into service and the Riposte Integrity Checker has been run on all Correspondence Servers to ensure that there are no inconsistencies in the message store.

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7 ISDN NETWORK

This section looks at the performance of the ISDN network.

This is split into three sections:

- The number of calls per day.
- The call duration per day.
- The peak usage of the routers (calls per second and ISDN lines in use).

The phone calls are divided into 4 types:

- Core – Made during the core part of the day (7am to 8pm).
- Non Core – Made outside the core part of the day.
- In – Calls into the data centre from the Post Offices.
- Out – Calls out to the Post offices from the data centre.

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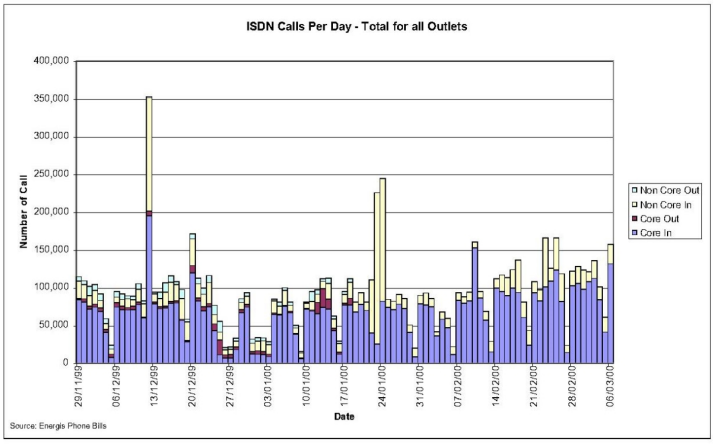

7.1 Calls

Figure 7-1 – Total ISDN Calls per Day for all Outlets

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Note: No data for outbound calls (calls *from* the datacentre) is currently available for the period 19th January to the end of February.

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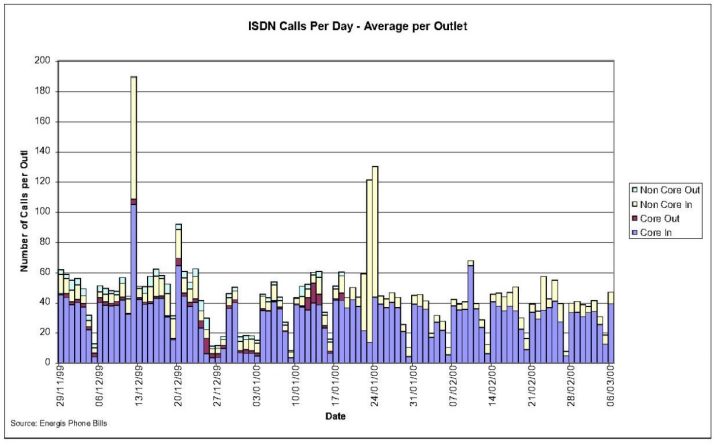

Figure 7-2 – Average Number of ISDN Calls per Day per Outlet

Note: No data for outbound calls (calls *from* the datacentre) is currently available for the period 19th January to the end of February.

The number of ISDN calls per outlet per day has been reduced by the elimination of most of the network problems that resulted in multiple calls being made.

The average number of calls per day is currently higher than expected even though OBCS 'foreigns' are not being processed at most offices. During the normal working day – 09:00-17:30 – 35 calls would be made by Riposte synchronising every 15 minutes. Figure 7-2 confirms that this is approx. the number of calls being made (Core-In).

The default broadcast interval was increased from 15 to 20 minutes at the end of February and this has made caused a further small reduction in the number of calls.

The challenge is to reduce the number of calls made for other reasons e.g. there should be a negligible number of calls *out* during the *core day*.

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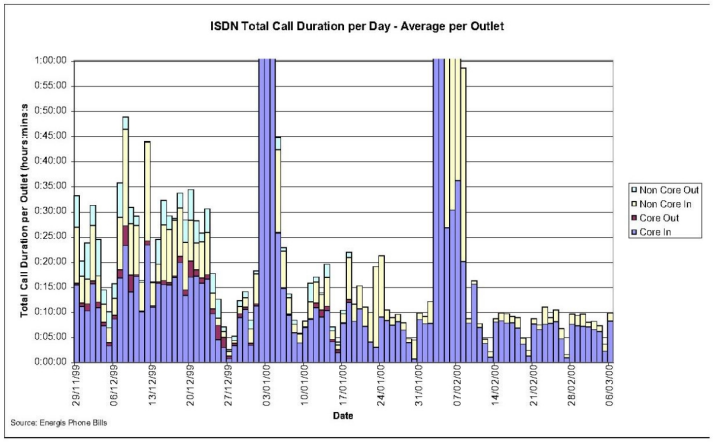

7.2 Duration

Figure 7-3 – Total Time of Telephone Calls per outlet per day

Note: No data for outbound calls (calls *from* the datacentre) is currently available for the period 19th January to the end of February.

The two periods of very long calls have been traced to a bug in Riposte. The problem occurs when the NT clock wraps after approx. 49 days. If an ISDN call is open at the time the clock wraps the call is not torn down as expected and the line can remain open for many hours.

The cost to Pathway of ISDN calls is a function of the number and length of calls. Prior to Christmas, a number of issues were identified:

- CP 2135 – ISDN Timeout value
- Eicon network driver in the gateway counter PC

which were causing the ISDN connection to be regularly kept open longer that was necessary to transfer data. Many of these problems have now been resolved and the time the telephone line is in use per outlet per day has dropped significantly.

The usage of phone lines is under investigation and further changes are anticipated to reduce the duration of calls further.

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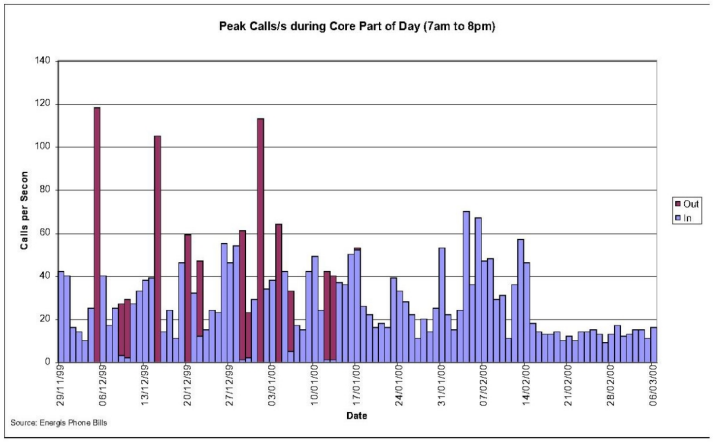

7.3 Peak Usage

Figure 7-4 – Phone Calls per Second across the ISDN Network

Note: No data for outbound calls (calls *from* the datacentre) is currently available for the period 19th January to the end of February.

The peak load is the number of calls during the peak second during the core day. On several days (e.g. 12/13 January) there was more traffic *out* in the peak second which is not the normal model for a weekday.

The number of calls *in* during the *core day* is currently lower than expected because calls associated with OBCS 'foreigns' are not taking place at present.

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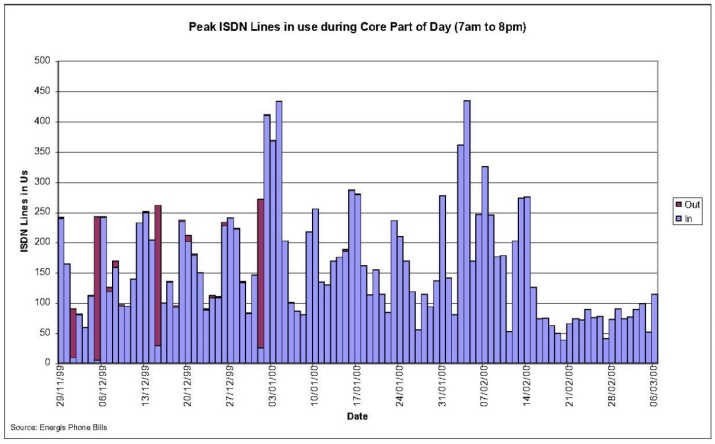

Figure 7-5 - Peak Number of ISDN Lines in Use during the Core Day (07:00-20:00)

Note: No data for outbound calls (calls *from* the datacentre) is currently available for the period 19th January to the end of February.

The peak number of ISDN lines in use has reduced considerably as actions have been put in place to resolve problems. The number of lines is still higher than predicted by the network model but is well within the capability of the system. Currently 720 lines are available and when the ISDN Routers are upgraded in March this will rise to 1440.

However, the usage should be lower and the usage of the ISDN network including:

- The source of calls
- Eliminating unnecessary calls
- Reducing the elapsed time of calls
- Specific scheduling of overnight calls

are under review to determine the best way of reducing the total cost of calls.

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8 ISSUES

This section briefly describes a number of areas of concern that are being investigated.

Note: An entry on this list does not necessarily mean it is a performance problem that will require changes to fix it. Changes will only be required if there is insufficient spare capacity in the system to absorb the problem.

8.1 Under Investigation

The following are under investigation:

- The number and total size of Riposte messages are much higher than expected. On a typically day 30% of messages generated each day are not processed by TPS. This can rise to 60% on Wednesday and Thursday. The majority of this data is generated by counter applications e.g. trial cash account balances, log on/off, etc. This is impacting the elapsed time of the TPS Bulk Harvester.
- Reference data changes in support of system changes. These can create a very heavy load on one night. Methods to spread the load are under investigation.

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8.2 Solutions Identified

A number of problems have been identified and are being resolved. These will be fully reported on in the March LSR.

- The cause of the long ISDN network connect times has been identified. The change to Riposte is in production.

8.3 Closed

- A number of changes in the area of the ISDN network have been applied and these have significantly reduced the incidences of long calls and repeated short calls.