

PROVIDING A TRANSACTION RECORD

This invention relates to a method of providing a transaction record relating to the retrieval of information by a client computer from a server computer
5 and also to a system for providing such a transaction record.

The most widespread data network is at present the well known public Internet. Client computers operated by members of a large organisation are typically connected to a local network which in turn is connected to the Internet. However, client computers operated by individuals from their homes or individuals
10 belonging to a small organisation are usually connected to the Internet by a dial-up connection through a public telephone network to an interface known as a point of presence between the public telephone network and the public Internet.

When a client computer is connected to the Internet, it may be used to retrieve information from server computers also connected to the Internet.
15 Typically, such information is retrieved without a credit or debit payment.

However, where a client computer is connected to the Internet through a dial-up connection, normal telephony charges are incurred while the connection is maintained. Consequently, the user of the client computer may be deterred from retrieving information. In contrast, in some situations, an information provider may
20 want to encourage users to retrieve information.

Some information providers require payment for supplying information stored on a server computer connected to the Internet to a client computer. Unfortunately, the methods which are presently available for charging for the supply of such information are fragmented and difficult for users to understand.

25 According to one aspect of this invention, there is provided a method of providing a transaction record relating to the retrieval of information by a client computer connected to a telephone network from a server computer connected to a data network, said method comprising the steps of:

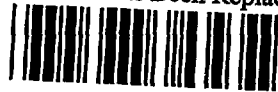
providing a connection between the client computer and the data network;
30 said client computer having a telephone network identifier and a data network address;

receiving credit or debit details from the server computer relating to said retrieval of information by the client computer from the server computer; and

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED



generating a client transaction record relating to said retrieval of information by the client computer from the server computer, said client transaction record containing credit or debit details and said telephone network identifier.

- 5 The invention thus enables credit or debit payments for retrieving information via the Internet or other data network to be integrated on to a user's normal telephone bill.

According to another aspect of this invention there is provided a system for providing a transaction record relating to the retrieval of information by a client
10 computer connected to a telephone network and having a telephone network identifier from a server computer connected to a data network, said system comprising:

an interface for providing a connection between a client computer connected to the telephone network and the data network; and

- 15 a transaction record generator arranged to:

receive credit or debit details from a server computer connected to the data network relating to the retrieval of information by a client computer connected to the telephone network from the server computer; and

- generate a transaction record relating to said retrieval of information by
20 said client computer from said server computer and containing credit or debit details and a telephone network identifier.

According to a further aspect of the invention, there is provided a method of providing a transaction record relating to the retrieval of information by a client computer connected to a telephone network from a server computer connected to
25 a data network, said method comprising the steps of:

providing a connection between the client computer and the data network;
said client computer having a telephone network identifier and a data network address; and

- generating a client transaction record relating to said retrieval of
30 information by the client computer from the server computer, said client transaction record containing credit or debit details and said telephone network identifier.

According to a still further aspect of this invention, there is provided a system for providing a transaction record relating to the retrieval of information by

THIS SHEET HAS BEEN
REPLACED

a client computer connected to a telephone network and having a telephone network identifier from a server computer connected to a data network, said system comprising:

an interface for providing a connection between a client computer
5 connected to the telephone network and the data network; and

a server computer connected to the data network, said server computer being arranged to:

generate a transaction record relating to retrieval of information by a client computer from said server computer and containing credit or debit details and a
10 telephone network identifier.

This invention will now be described in more detail, by way of example, with reference to the drawings in which:

Figure 1 is a block diagram showing how a client computer may be connected to a server computer through a telephone network and the public
15 Internet and a system for providing a transaction record for the retrieval of information by the client computer from the server computer and embodying this invention;

Figure 2 is a flow chart of the operations performed by the system of Figure 1 in providing a transaction record for a credit amount;

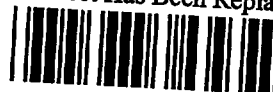
20 Figure 3 is a flow chart showing the operations which are performed by the system of Figure 1 in providing a transaction record for a debit amount; and

Figure 4 is a block diagram corresponding generally to the block diagram of Figure 1 but with a modification to the system for providing a transaction record.

25 Referring now to Figure 1, there is shown how a client computer 10 may be connected through a public telephone network 12 and the public Internet 14 to a server computer 16 connected to the public Internet 14. The server computer 16 is one of a very large number of server computers connected to the public Internet 14.

30 The client computer 10 is connected to the public telephone network 12. In order to connect the client computer 10 to the public Internet 14, the user of the client computer 10 instructs it to dial the telephone number of an interface 18 known as a point of presence.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED

The point of presence 18 belongs to an Internet access provider and typically a particular Internet access provider will own a set of points of presence distributed over a particular geographical area. It is usually possible to connect a client computer to a point of presence which is connected to the same local
5 network as the client computer. However, it can also happen that a client computer is connected to a point of presence outside its own local network. In such circumstances, the client computer may be connected through two or more public telephone networks owned by different organisations. For example, the client computer 10 could be connected to one local network owned by a first
10 organisation, the point of presence could be connected to another local network owned by a second organisation and the two local networks could be connected by a trunk network owned by a third organisation.

The point of presence 18 is connected to the public Internet 14 and is arranged to provide a connection between a telephone line in the telephone
15 network 12 and the public Internet 14. Where a client computer transmits and receives data as an analogue signal generated by a modem, the point of presence 18 provides conversion between the analogue signal used by the client computer and the digital signal used in the public Internet 14.

The client computer 10 may be used to retrieve information pages stored
20 on the server computer 16. Several protocols are established for retrieving information pages and these include the File Transfer Protocol, Java Script and the very well known Hypertext Transfer Protocol. Pages which are transmitted using the Hypertext Transfer Protocol are stored using the well known Hypertext Markup Language. In order to retrieve such pages, the client computer needs a suitable
25 browser program such as the well known Netscape browser. The combination of the public Internet 14 and server computers connected to it from which information pages may be retrieved is known as the World Wide Web. Information pages which may be retrieved from such server computers are commonly known as Web pages.

30 The information Web pages stored on server computer 16 are supplied by one or more information providers. They may be supplied by a single information provider who also owns the server computer 16. Alternatively, the server computer 16 may be owned by one organisation which permits one or more information providers to store Web pages on its server computer.

The arrangement described above for connecting the client computer 10 through the telephone network 12, the point of presence 18 and the public Internet 14 to the server computer 16 is of course well known. Usually, when a client computer retrieves a Web page from a server computer, there is no associated financial transaction between the user of the client computer and the information provider of the Web page. It has been identified that there are situations where this is unsatisfactory.

Firstly, while a client computer is connected to a point of presence, telephony charges are incurred. Such charges can have a deterrent effect on the user of the client computer. In contrast, in some situations, the information provider may want to encourage users to retrieve a Web page. Examples of situations where information providers may want to encourage users to retrieve a Web page include Web pages containing advertising material and Web pages which act as an on-line service desk. It has been identified that one way to encourage users to retrieve Web pages is to make credit payments which compensate for the telephony charges. In order to provide a positive incentive to users to retrieve Web pages, said payments could exceed the telephony charges.

Secondly, some information providers require payment for retrieval of their Web pages. Although various methods do exist for debiting users for retrieval of Web pages, these methods are presently fragmented and difficult for users to understand.

The arrangement shown in Figure 1 includes a system for providing a transaction record when a Web page is retrieved. As will be explained in more detail below, the transaction record generated using this system may be used either to credit or debit a user's telephone account when a Web page is retrieved. This system together with two associated billing systems will now be described. This will be followed by a description of the operations which are performed by the system in order to generate a transaction record for crediting a user's telephone account when the user retrieves a Web page and then a description of the operations which are performed in order to debit a user's telephone account when the user retrieves a Web page.

Referring now back to Figure 1, the system for generating a transaction record is indicated by reference numeral 30 and comprises the point of presence 18 and a transaction record generator 32. The point of presence 18 is essentially

a computer provided with the functionality described above together with the additional functionality described below. The transaction record generator 32 has the functionality which will be described below with reference to Figures 2 and 3. The transaction record generator may be implemented either by providing
5 additional software for the point of presence 18 or as a separate computer provided with appropriate software. The server computer 16 requires additional functionality as described below.

Data can be transmitted between the transaction record generator 32 and the server computer 16, between the transaction record generator 32 and a
10 telephone service billing system 34, and between the transaction record generator 32 and an information provider billing system 36, respectively, through communications links 38, 40 and 42. Where the point of presence 18 and the transaction record generator 32 are separate computers, they are connected, as shown in Figure 1, by a communications link 44.

15 Where the telephone network 12 between the client computer 10 and the point of presence 18 takes the form of a single public telephone network owned by a single organisation, the telephone service billing system 34 is the billing system for that single public telephone network. Where the telephone network 12 takes the form of two or more public telephone networks, then the telephone service
20 billing system 34 is a billing system associated with one of these networks. In either event, the telephone service billing system 34 is capable of billing a telephone account for the user of client computer 10. Although Figure 1 shows only a single telephone service billing system, it could easily be arranged that the transaction record generator sends transaction records to more than one telephone
25 service billing system and thus arranges for debiting or crediting the telephone accounts of the users of more than one telephone network.

The information provider billing system 36 is arranged to debit or credit accounts for a set of information providers, including the information provider or providers for the Web pages stored on the computer 16.

30 The construction of billing systems is well known and so the construction of billing systems 34 and 36 will not be described in further detail.

Referring now to Figure 2, they will be described the series of operations which occur when a client computer logs on to the point of presence 18, retrieves a Web page for which a credit payment is made to the user, and eventually logs

off. During this series of operations, three transaction records are generated. The first is generated by the server computer 16 and transmitted to the transaction record generator 32, the second transaction record is generated by the transaction record generator 32 and transmitted to the telephone service billing system 34 and
5 the third transaction record is also generated by the transaction generator 32 but transmitted to the information provider billing system 36. In order to distinguish between these three types of transaction records, a transaction record generated by the server computer 16 will be referred to as an initial transaction record, a transaction record generated by the transaction record generator 32 and
10 transmitted to the telephone service billing system 34 will be referred to as a client transaction record, and a transaction record generated by the transaction record generator 32 and transmitted to the information provider billing 36 will be referred to as an information provider transaction record.

Initially, in a step 50, the user causes a client computer 10 to dial the
15 telephone number of the point of presence 18 and a connection is then formed between the client computer 10 and the point of presence 18. The point of presence 18 then sends a message to the client computer 10 requesting the user's identifier and a password. The user then enters the user's identifier and password on computer 10 and these are transmitted to the point of presence 18. If these
20 are valid, the point of presence 18 allows the computer 10 to log on to the point of presence 18.

In the example shown in Figure 1, the client computer 10 does not have its own dedicated Internet address. Consequently, in step 51, the point of presence 18 allocates an Internet address to the client computer 10. This Internet
25 address is taken from a set of Internet addresses supplied to the point of presence 18 for allocation to client computers.

In a step 52, the point of presence 18 transmits the Internet address allocated to client computer 10, the calling line identifier (CLI) for the telephone line to which the client computer is connected and the log on time to the
30 transaction record generator 32. In the transaction record generator 32, the CLI and log on time are stored against the Internet address. The CLI for the telephone line to which the client computer 10 is connected corresponds to the telephone number for this line.

By way of modification, when the client computer 10 dials the point of presence 18, it may request that the telephone charges for the connection to the telephone network are made against a telephone number different from the telephone number for the line which is connected to the client computer 10. In this case, the CLI transmitted to the transaction generator 32 corresponds to this other telephone number.

After step 52, in a step 53 the client computer 10 retrieves a Web page from the Internet server 16. As this Web page is one for which a credit payment is made to the user, in a step 54 the server computer 16 generates an initial transaction record. This transaction record contains the Internet address allocated to the client computer 10 and the amount of the credit payment. It may also contain a description of the page which is retrieved for insertion onto the user's telephone account. Still in step 54, the server computer 16 transmits the initial transaction record to the transaction record generator 32.

Next, in a step 55, the transaction record generator 32 checks if the Internet address is valid for a credit payment. In order to do this, it checks whether the client computer to which the Internet address is allocated is still logged on.

Assuming that the Internet address is valid, in a step 56, the transaction record generator 32 converts the Internet address to the calling line identifier. Then, in a step 57, the transaction record generator generates a client transaction record. This contains the calling line identifier for the client computer and the credit amount. It may also contain a description of the Web page which has been retrieved for insertion onto the user's telephone account.

Then, in a step 58, the transaction record generator transmits this client transaction record to the telephone service billing system 34. The telephone service billing system can then integrate the credit payment into the user's telephone account.

Next, in a step 59, the transaction record generator generates an information provider transaction record. This contains the name of the information provider and the amount of the credit payment to be made against the user's telephone account. Where the server computer 16 stores Web pages for only a single information provider, the name of the information provider can be stored in the transaction generator 32 against the Internet address for the server computer

16. However, if the server computer 16 stores pages for more than one information provider, then it is necessary for the name of this information provider to be included in the initial transaction record generated by the server computer 16.

5 Next, in a step 60, the transaction record generator 32 transmits the information provider transaction record to the information provider billing system 36. The billing system 36 can then integrate the credit payment into the account for the information provider. In the case of the information provider, the credit amount is of course debited to the account for the information provider.

10 Next, in a step 61, the client computer logs off and, in a step 62, the point of presence transmits the Internet address allocated to client computer 10 and the log off time to the transaction record generator 32. For reasons of simplicity Figure 2 shows the retrieval of only a single Web page for which a credit payment is made. In a real situation, the client computer 10 will be used to
15 retrieve many Web pages between logging on and logging off the point of presence 18. For each Web page for which a credit payment is made, steps 53 to 60 are performed. For each Web page for the user's telephone account is debited, steps 73 to 84 described below with reference to Figure 3 are performed.

 In order to encourage users of client computers to retrieve Web pages,
20 the credit payment for retrieving each page is set to a value which corresponds approximately to the telephone charges which are incurred whilst the page is being retrieved. Alternatively, as mentioned above, in order to provide users with a positive incentive to retrieve a Web page, the credit payment can be set to a value which exceeds the telephone charges which are incurred while retrieving the page.

25 In a modification, a calculation is made of the time which is spent in retrieving a Web page for which a credit payment is made and the credit payment is set to the telephony charges for this time period. This modification will now be described.

 With this modification, each time the client computer 10 retrieves a Web
30 page from server computer 16, the point of presence 18 transmits the time of retrieval and an identifier, for example the Universal Resource Locator, for the page retrieved. When a page is retrieved for which a credit payment is made, the initial transaction record contains an indication that the credit payment is to be set equal

to the telephony charge for the time spent retrieving the page rather than specifying a credit amount.

In step 57, in order to calculate the credit payment, the transaction record generator 52 determines the time which has elapsed between retrieving a Web
5 page for which a credit payment is to be made and the next Web page retrieved by the client computer 10. The credit payment is then set to the telephony charge made for this time period.

With this modification, there could be an excessive delay between the user retrieving the Web page for which a credit payment is made and the user
10 retrieving the next page or the user might not retrieve another page. In order to avoid making an excessive credit payment in such circumstances, the credit payment could be limited to a maximum value.

There will now be described with reference to Figure 3 the series of operations which are performed when a client computer logs on to the point of
15 presence 18, retrieves a single Web page for which a debit is made against the telephone account of the user of the client computer, and the client computer then logs off. As a safeguard for both the user of the client computer 10 and the information provider, where a user wishes to retrieve a Web page for which his telephone account is debited, the user registers his calling line identifier with the
20 transaction record generator 32 for this purpose. Thus, transaction record generator 32 contains a table of the calling line identifiers for telephone accounts which can be debited when a Web page is retrieved.

Referring now to Figure 3, in a step 70, the client computer logs on to the point of presence 18, in a step 71 the point of presence allocates an Internet
25 address to the client computer 10 and in a step 72 the point of presence transmits the Internet address, calling line identifier for the client computer 10 and the log on time to the transaction time generator 32. Thus, steps 70 to 72 correspond to steps 50 to 52 described with reference to Figure 2.

Next, in a step 73, the client computer 10 requests a Web page from the
30 server computer 16 for which a payment has to be made to the information provider. Next, in a step 74, the server computer 16 sends a request to the transaction record generator 32 to check if the Internet address is valid for debiting a telephone account.

In a step 75, the transaction record generator checks if the Internet address is valid for debiting a telephone account. In order to do this, the transaction record generator 32 firstly determines if there is a computer logged on to point of presence 18 having this Internet address. If a computer is logged on
5 with this Internet address, it then finds the corresponding calling line identifier and then checks if the calling identifier is listed in the table of calling line identifiers which are valid for debiting telephone accounts. Then, in a step 76 the transaction record generator 32 sends a reply to the Internet server 16 stating that the Internet address is either valid or invalid for debiting a telephone account.

10 By way of modification, and as a security measure, where a user wishes to retrieve a Web page for which his telephone account is debited, the user registers both his calling line identifier and his password with the transaction record generator 32. With this modification, in step 72, the point of presence 18 transmits the password together the Internet address, calling line identifier and log
15 on time to the transaction record generator 32. Also, with this modification, in step 75, the transaction record generator 32 checks the password for validity.

Next, in a step 77, the server computer 16 checks the reply from the transaction record generator 32. If the reply is that the address is not valid for debiting, in a step 78 the server computer 16 refuses the request to supply the
20 Web page. Although not shown in Figure 3, following step 78 the client computer 10 may attempt to retrieve other Web pages or log off.

If the Internet address is valid for debiting an account, in a step 78, the server computer transmits the Web page to the client computer.

Then, in a step 79, the server computer generates an initial transaction
25 record which specifies the amount to be debited and the Internet address of the client computer. It transmits this initial transaction record to the transaction record generator 32.

Then, in a step 80, the transaction record generator converts the Internet address to the calling line identifier. In a step 81, the transaction record generator
30 generates a client transaction record. The client transaction record contains the calling line identifier for the client computer 10 and the amount to be debited to the user's telephone account. In a step 82, the transaction record generator 32 transmits the client transaction record to the telephone service billing system 34.

Next, in a step 83, the transaction record generator generates an information provider transaction record. This contains the amount to be credited to the account of the information provider and the name of the information provider. Then, in a step 84, the transaction record generator transmits this
5 information provider transaction record to the information provider billing system 36.

Lastly, in a step 85, the client computer logs off and in a step 86 the point of presence 18 transmits the Internet address and log off time to the transaction record generator 32.

10 The transaction generator 32 calculates, at periodic intervals, the cumulative amount to be credited or debited to each information provider and transmits the amount to the billing system 34.

By way of a modification, in step 52 or step 72 the point of presence 18 can also transmit the user's identifier to the transaction record generator 32. In
15 this modification, the transaction record generator 32 maintains a table of user identifiers and corresponding calling line identifiers which are valid for the purposes of crediting and debiting the corresponding telephone accounts. With this modification, in step 52 the transaction record generator 32 checks that the user's identifier and the calling line identifier received from the point of presence 18 are
20 valid for debiting or crediting a corresponding telephone account. This modification would be beneficial, for example, to stop children in a household from incurring high debits against their parents' telephone account.

By way of modification steps 54 to 60 in Figure 2 or steps 79 to 84 in Figure 3 need not be performed in real-time. For example, in step 54, the server
25 computer 16 can transmit the initial transaction record to the transaction record generator 32 several hours after the Web page is retrieved by the client computer 10 or the server computer 16 can transmit the transaction records in batches to the transaction record generator 32. Where there is a delay in transmitting the transaction records, each transaction record also contains the time at which the
30 Web page was retrieved. For each transaction record, the transaction record generator 32 then checks that the Web page was retrieved at a time when the client computer 10 was logged on to the point of presence 18. Also, the client and information provider transaction records may be transmitted over links 40 and

42 or sent on magnetic disks or tape on a batch basis to the billing systems 34 and 36.

Referring now to Figure 4, the arrangement shown is generally similar to that shown in Figure 1 except that in this arrangement client computers are provided with permanent Internet addresses. With this arrangement, where the user of a client computer wishes to retrieve Web pages for which a credit payment is made or for which a telephone account is to be debited, the user of the client computer registers the calling line identifier for the user's telephone account and the computer's Internet address with the transaction record generator 32.

With this arrangement, when a user retrieves a Web page for which a credit payment is made, the series of operations are the same as described with reference to Figure 2 except that the calling line identifier is not transmitted in step 52. Similarly, when a user retrieves a Web page for which his telephone account is debited, the series of operations are the same as described with reference to Figure 3 except that the calling line identifier is not transmitted in Step 72. This arrangement provides the advantage that the point of presence 18 does not have to extract and transmit calling line identifiers. This arrangement also provides the advantage that the client computer can access the point of presence on any telephone line and credits and debits will be made against the user's telephone account registered with the point of presence.

In another alternative arrangement, the transaction record generator is not used. Instead, the server computer 16 generates the client and information provider transaction records. In this arrangement, when a user retrieves a Web page for which a credit payment is made to, or required from, the user's telephone account, the server computer 16 interrogates the point of presence to obtain the calling line identifier. The server computer 16 then transmits the transaction records to the billing systems 34 and 36 over communications links or sends them in batches on magnetic disks or tapes.

Although this invention has been described with reference to the public Internet, it may also be used with any data network.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



CLAIMS



5

1. A method of providing a transaction record relating to the retrieval of information by a client computer connected to a telephone network from a server computer connected to a data network, said method comprising the steps of:

providing a connection between the client computer and the data network;

10 said client computer having a telephone network identifier and a data network address;

receiving credit or debit details from the server computer relating to said retrieval of information by the client computer from the server computer; and

15 generating a client transaction record relating to said retrieval of information by the client computer from the server computer, said client transaction record containing credit or debit details and said telephone network identifier.

2. A method of providing a transaction record as claimed in claim 1,
20 comprising the further step of:

transmitting the transaction record to a telephone network billing system.

3. A method of providing a transaction record as claimed in claim 1 or claim 2, comprising the further steps of:

25 generating an information provider transaction record relating to said retrieval of information and containing credit or debit details and an identifier for the provider of said information; and

transmitting the information provider transaction record to an information provider billing system.

30

4. A method providing a transaction record as claimed in any one of the preceding claims, in which:

said step of receiving credit or debit details from the server computer comprises receiving an initial transaction record from the server computer

THIS SHEET HAS BEEN
REPLACED



containing said credit or debit details relating to said retrieval of information and said data network address; and

said step of generating a client transaction record includes the step of converting said data network address to said telephone network identifier.

5

5. A method providing a transaction record as claimed in any one of the preceding claims, in which said step of providing a connection between the client computer and the data network includes the steps of:

allocating said data network address to the client computer; and

10 storing the data network address against the telephone network identifier.

6. A method providing a transaction record as claimed in any one of the preceding claims, comprising the further steps of:

15 receiving a request from the server computer to check if said data address is valid for debiting;

checking if said data network address is valid for debiting; and

sending a reply to the server computer.

7. A method of providing a transaction record as claimed in any one of the preceding claims, in which said telephone network identifier is a telephone number and said data network is the public Internet.

8. A system for providing a transaction record relating to the retrieval of information by a client computer connected to a telephone network and having a telephone network identifier from a server computer connected to a data network, said system comprising:

an interface for providing a connection between a client computer connected to the telephone network and the data network; and

a transaction record generator arranged to:

30 receive credit or debit details from a server computer connected to the data network relating to the retrieval of information by a client computer connected to the telephone network from the server computer; and

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED



generate a transaction record relating to said retrieval of information by said client computer from said server computer and containing credit or debit details and a telephone network identifier.

- 5 9. A system for providing a transaction record as claimed in Claim 8, in which said transaction record generator is further arranged to:

transmit the transaction record to a telephone network billing system.

- 10 10. A method of providing a transaction record relating to the retrieval of information by a client computer connected to a telephone network from a server computer connected to a data network, said method comprising the steps of:

providing a connection between the client computer and the data network;
said client computer having a telephone network identifier and a data network address; and

- 15 generating a client transaction record relating to said retrieval of information by the client computer from the server computer, said client transaction record containing credit or debit details and said telephone network identifier.

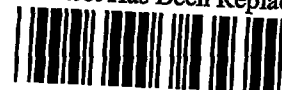
- 20 11. A system for providing a transaction record relating to the retrieval of information by a client computer connected to a telephone network and having a telephone network identifier from a server computer connected to a data network, said system comprising:

an interface for providing a connection between a client computer
25 connected to the telephone network and the data network; and

a server computer connected to the data network, said server computer being arranged to:

- generate a transaction record relating to retrieval of information by a client computer from said server computer and containing credit or debit details and a
30 telephone network identifier.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED