

SOLUTIONS

AN IP MIGRATION PATHWAY
FOR BILLING COLLECTION CIRCUITS

THE FUTURE IS HERE



IP MIGRATION FOR BILLING COLLECTION CIRCUITS

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INTRODUCTION

Billing information is collected daily from the traditional voice telephone switches and associated equipment. As calling volumes have increased, the numbers of billing records have increased. Also additional information now required for management and market analysis has increased. These increased volumes of information are straining the ability of the communication facilities between the switching entities and the billing hosts collecting the information to handle the data traffic.

This paper briefly describes the present methods used for communication for billing collection circuits followed by a new and faster solution.

A TYPICAL EXISTING TOPOLOGY

Billing records, referred to as Call Detail Records (CDR's), are collected from the switching entities using low speed dedicated links running at 9.6 Kbps or dial-up at 28.8 kbps or lower. The billing collector host contacts the switching entity and polls it to obtain the data. Typical protocols are either X.25 or BX.25. The volume of data is growing to the point that at these line speeds, the connection is near saturation. Dial-up connection times are getting longer and longer. The connection times are lasting all day with no time left to do retransmissions, when needed. If dial-up is not used, a billing collector host is limited also in the number of dedicated private line ports it has.

Some switching entities still use tape output with manual transport required to the billing center. Tapes occasionally are unreadable, lost, or inadvertently destroyed, resulting in loss of revenue.

Two typical present day topologies are shown in **Figures 1** and **2**. In both cases, the billing collector is running a collection protocol, such as Lucent's AMATPS collection protocol per Telcordia GR-385, Nortel's XFER collection protocol, or similar protocol. These protocols run on top of a BX.25/X.25 data stream. Telesciences, Intec Telecom Systems, Lucent Technologies, Shelton Technologies, Utility Data Systems, and others implement these billing protocols as part of the billing collection applications they offer.

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Typical Billing Modem Circuit

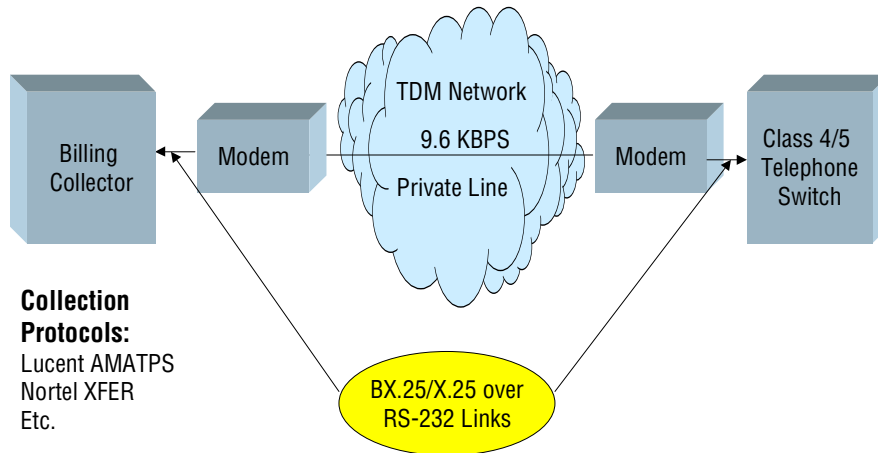


Figure 1

Typical Billing Circuit - Dial-Up

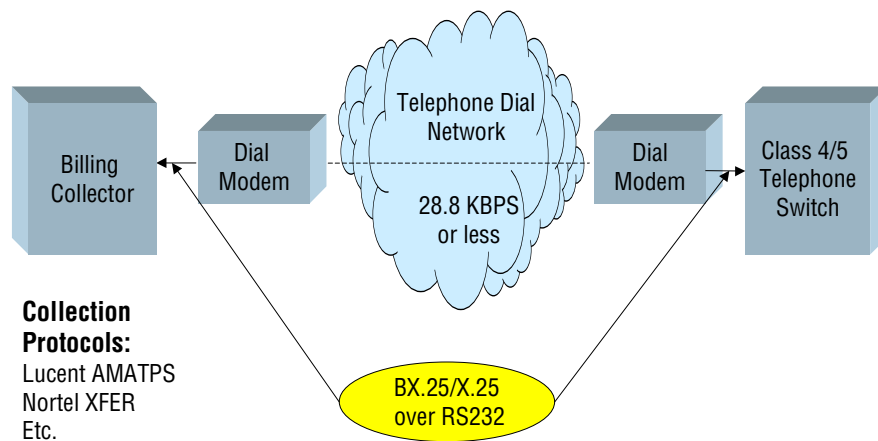


Figure 2

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A MODERN SOLUTION

Because of the proliferation of TCP/IP networks, a new solution is available from Datatek Applications, Inc., which not only offers relief from the problems stated above but also provides some other advantages.

By using a TCP/IP network, the low-speed modems and dedicated private line ports are eliminated. This saves capital costs as well as monthly charges and support costs for the private lines. When modems are used, they are required on both ends of the circuit. In a TCP/IP network, a mediation device is needed on only one end of the path between the billing collector host and the switching entity. On the switching entity end of a circuit, a Datatek Applications' DT-XX8X (DT) mediation product is installed, and one of its serial ports is connected to the switching entity billing port.

New-Use IP Billing Circuits

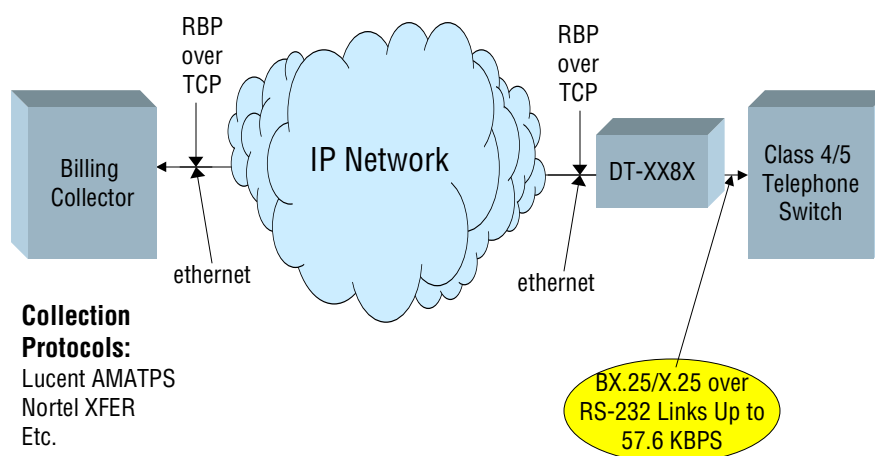


Figure 3

Both the billing collector host and the DT device are then connected to the internal TCP/IP network through their ethernet ports (See **Figure 3** above). A private line and associated modems or dial modems are no longer needed.

Datatek makes several, different DT mediation products. These products offer a seamless connectivity between switching entities and the billing collector host over a TCP/IP network. The applicable products in the DT-XX8X family of products include the 16-serial-

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port DT-4180, the 32-port DT-4280, the 4-port DT-4284, and the single-port DT-9480¹. Using a single, serial port from any of these products allows the connection to the switching entity to be increased to a maximum speed of 57.6 Kbps, which is typically the maximum speed that the billing ports on a switching entity can run. The port on the DT device can be configured to provide modem functions if required by the switching entity. The other, unused ports on the DT device can be connected to other ports on the same switching entity or to ports on other network elements (NE's) in the Central Office (CO). Each DT port can be configured independently of the other DT ports with the protocol, speed, and other characteristics needed for interfacing with a port on the switching entity or network element. These additional switching entity and network element ports are used for control, provisioning, traffic data collection, etc. as well as billing.

The billing collector host no longer is required to have either physical BX.25/X.25 serial ports or the software stack to handle BX.25/X.25. New hosts usually do not offer this interface option anymore. Instead, the billing collector host and the remote DT device communicate with each other through their respective ethernet ports via a TCP/IP network. The billing collector host generates a TCP call to the Datatek DT device. The DT device then initiates a BX.25/X.25 session (Switched Virtual Circuit - SVC or Permanent Virtual Circuit - PVC) with the switching entity. The Datatek DT device maps the TCP call to a unique BX.25/X.25 Virtual Circuit (VC) on the switching entity. The only BX.25/X.25 communication is between the DT device and the switching entity's billing port. The DT device originates and terminates all BX.25/X.25 communication. The billing collector uses only TCP/IP for its communication in this operation because BX.25/X.25 communication is not available to it.

Note that BX.25/X.25 is packet-based and uses the "M" bit (More bit) to concatenate packets together to form a single, logical record. However, TCP is stream-based, does not know what a BX.25/X.25 packet is, and has no constructs for records. To remedy this problem, the Record Boundary Preservation (RBP) protocol is used with TCP. RBP adds a 6-byte header to a TCP message denoting the length of the logical record, which allows each end of the TCP session to preserve the record boundaries. The DT-XX8X product family supports this protocol. This protocol must also be implemented in the host on top of the TCP stack. Most modern billing collector applications, such as those from Telesciences and Intec, use RBP protocol over TCP/IP.

ADVANTAGES OF USING RBP PROTOCOL AND TCP/IP NETWORKING

There are several advantages for using RBP over a TCP/IP network. Some were discussed above and are included below:

¹ The DT-9480 has only one serial port that is physically a female DB25 connector. The serial ports on the other members of the DT-XX8X family are physically female RJ45 connectors.

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1. No dial-up modems or private line modems and dedicated private lines are needed.
2. A mediation device is only needed on one end of the circuit.
3. Hosts do not need (and may not necessarily have) the capability of supporting legacy interfaces or protocols. Hence, modern hosts with faster and perhaps multiple processors and much larger storage capacities can be used, resulting in faster collection and processing of billing records.
4. The change to a TCP/IP network is transparent to the switching entities.
5. The DT mediation equipment is modular, needs no special environmental conditioning, and is very reliable.
6. Billing and other OA&M ports can run at faster speeds up to their maximums.
7. Record boundaries are preserved.
8. Closed user group (CUG) and other TCP/IP security methods can be employed to ensure the billing circuits are secure.
9. Alternate paths through the network are available in the event that one pathway should fail.

CONCLUSION

Datatek's solution has been presented that allows billing collection to run faster in a reliable and secure manner. This solution also allows the use of modern host and networking technology. It addresses the problems associated with dedicated lines and slow dial-up circuits and provides additional advantages.

Contact Datatek Applications at sales@datatekcorp.com or info@datatekcorp.com if there are questions or if you would like to trial or purchase any of the products mentioned in this paper. Also check out our website at URL www.datatekcorp.com .

SUGGESTED READING

The documents shown on the next page provide additional detail and are available for download from the Datatek web site: www.datatekcorp.com.

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Document	Scope
DT-9480 – DT-4180 – DT-4280 – DT-4281 – DT-4284 Multiple Protocol Integrated Access Device User's Manual	Describes the equipment installation and configuration of the DT products including the command set, hardware specifications, and SNMP MIB. Included are several examples in the appendices of use of these products and their associated cabling.
DT-9480 Brochure	Highlights of the DT-9480 Features and Uses
DT-4284 Brochure	Highlights of the DT-4284 Features and Uses
DT-4180 Brochure	Highlights of the DT-4180 Features and Uses
DT-4280 Brochure	Highlights of the DT-4280 Features and Uses
DT-4xxx Comparison Chart	Side-by-side comparison of all the DT and DT-4xxx Datatek products



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