



IP-SLM: A HIGH-CAPACITY MIGRATION SOLUTION FOR OS NETWORKS USING BX.25

721 Route 202-206
Bridgewater, NJ 08807
fax: 908.218.1736
phone: 908.218.0500
email: sales@datatekcorp.com
<http://www.datatekcorp.com>



INTRODUCTION

IP networking has become a universal infrastructure underlying virtually all intra-enterprise data communications. This IP revolution has been accompanied by the appearance of new and more flexible kinds of equipment offerings which make it possible to migrate and/or extend existing mission-specific distributed networks that still work reasonably well, yet are increasingly costly to operate and probably difficult to adapt to changing requirements.

Datatek Applications' product family exemplifies this theme, by facilitating the migration of legacy BNS-2000 networks to networks based on IP networking and utilizing newer, more flexible/scalable, and more easily maintained devices. Three key members of this product family are the **DT-4000**, a multi-protocol access device, the **DT-6061 Embedded Network Processor**, and the **Universal Mediation Interface (UMI) Module**, a new BNS-2000 module that provides an IP-BNS gateway function. In this document, it will be shown how these products work together to achieve a significant cost reduction in Network Data Collection Operations Systems applications that use BX.25 telemetry connections to remote network elements.



THE PROBLEM

A Network Data Collection Operations System (NDC OS) is a computer-based system that collects and analyzes traffic data from many Network Elements (NE). NDC OS applications (such as EADAS and SCCS) require connections to remote NE's via BX.25 data links, as specified by Telcordia Technologies' TR-740 and TR-746.¹

A typical BNS-based legacy NDC OS networking solution uses the Synchronous Line Module (SLM) to provide the BX.25 protocol termination function on behalf of the OS host. The SLM occupies 2 slots in a BNS-2000 cabinet yet provides only 4 physical ports at 2400 bps, or only a single port if higher speed (up to 9600 bps.) is required.

In TR-746 Issue 5, the NDC OS / NE interface was updated with the specification of new packets to provide additional traffic surveillance support. This has forced NE vendors to implement a higher-speed NDC OS interface than previously used (e.g., at least 9600 bps. is recommended for #5ESS release 5E14). This would in turn require redeployment of BX.25 interfaces wherever more than one port is currently in use per SLM, resulting in a reduction of effective per-BNS-shelf port density from 60 to 15. The **IP-SLM** application for the **DT-6061 Embedded Network Processor** was specifically designed to offer an alternative to the purchase and installation of additional SLM modules and BNS shelves to address the above problem.

¹ TR-740 contains the general requirements for interfacing Stored Program Control Systems (SPCSs) with a Network Data Collection Operations System (NDC OS) for collecting SPCS traffic data, including the dedicated synchronous data link requirements and BX.25 message protocols. TR-746 describes the SPCS-to-NDC OS interface that provides for the transmission of messages in both directions.



DATATEK'S MIGRATION PRODUCT FAMILY

An earlier solution document, *BNS-2000/IP Network Integration Strategies*² gives a general overview of the three products that can be used together to solve the problem just discussed. Additional details about each product (physical descriptions, cabling, configuration commands, etc.) can be found in their individual User Manuals. They will be discussed in this document in the context of the specific implementation being illustrated.

Why are three boxes required to do the job currently done by a single module? The answer is that these units represent a decomposition of three key functions currently combined into each specialized BNS module (of which the SLM is only one example) that facilitates a high degree of flexibility, scalability, and re-use. As a typical BNS module, the SLM contains an interface to the BNS network for Wide-Area Networking (WAN) connectivity, an internal protocol translation function, and physical ports. In Datatek's SLM migration solution, the **UMI** provides the first function, the **DT-6061** running the **IP-SLM** application provides the second function, and the **DT-4000** provides the third. The glue that ties these three components together is your IP networking fabric, typically in the form of an existing corporate intranet, although it could also be a stand-alone dedicated sub-net. Not only does this solution provide a high port capacity with lower per-port cost than the option of building out your BNS/SLM equipment, it can also be used to migrate other BNS-based services *at the same time*. As an example, another solution document *An Optimized Print-Spooling Arrangement for LMOS Networks*, shows how the same three boxes work together to solve a completely different problem. In that case, the **DT-6061** is running a different application, which could co-exist with the **IP-SLM** application (subject to capacity constraints).³

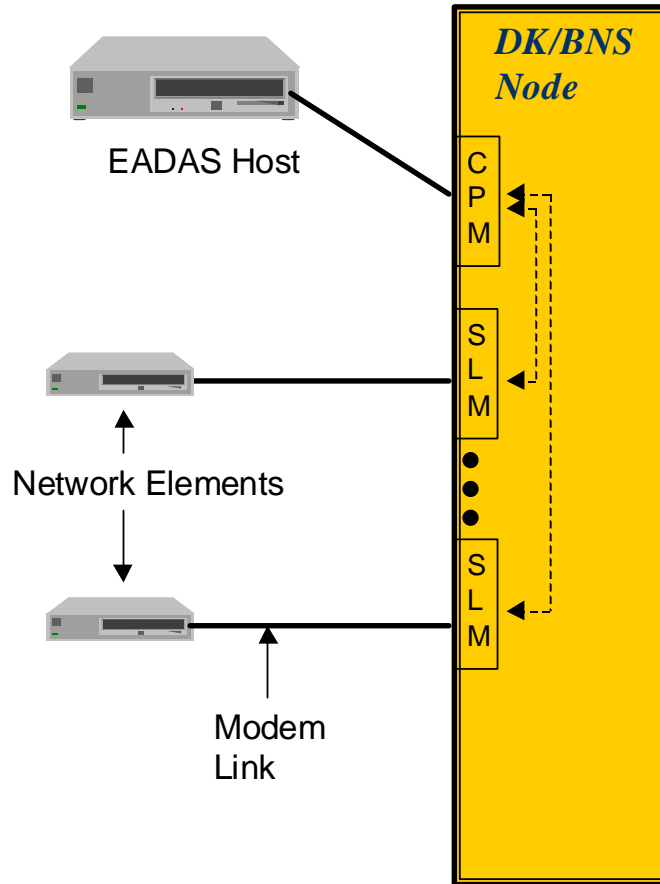
² This and other referenced documents are available from Datatek's web site, www.datatekcorp.com. Use the "Solutions" link for solution documents; use the "Documentation" link for all other documents, such as individual product User Manuals.

³ Eight different applications are currently available for the **DT-6061**.



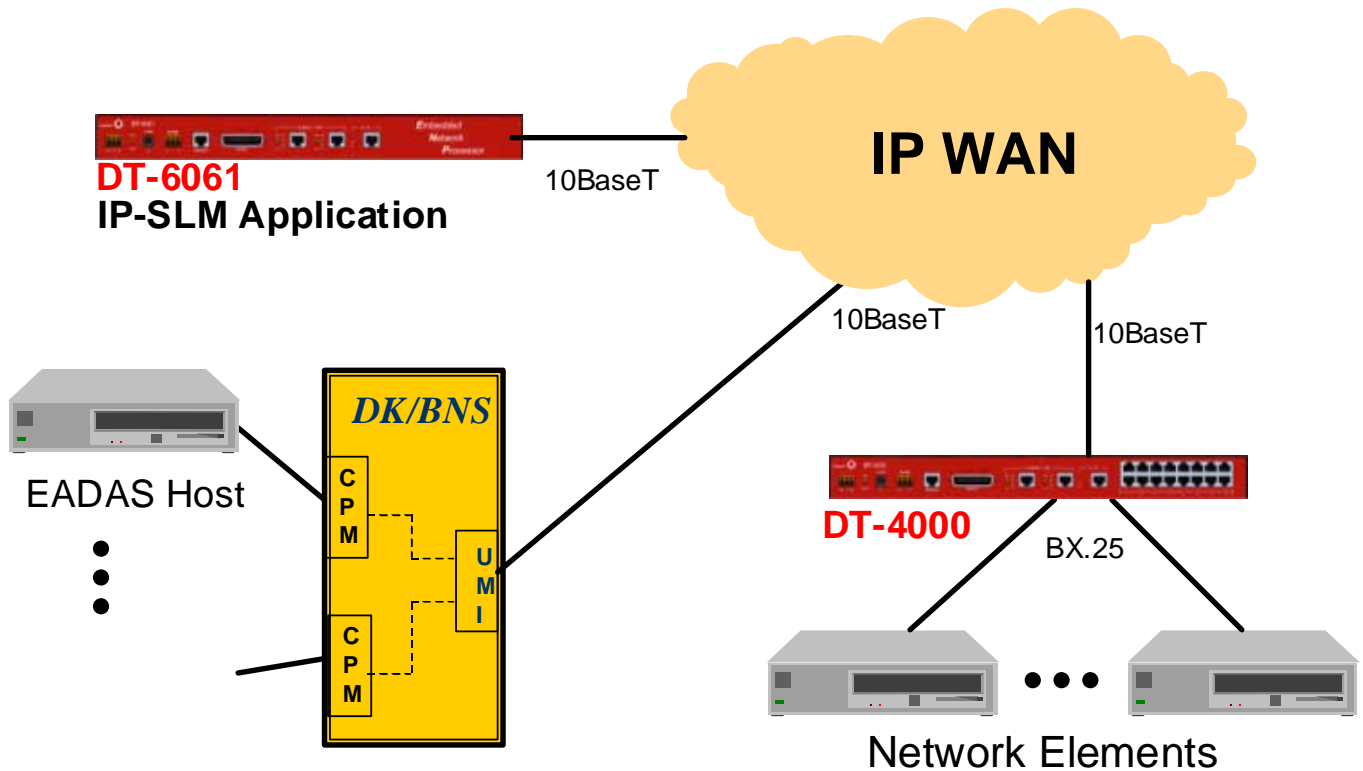
A TYPICAL CONFIGURATION AND SIMPLE MIGRATION SOLUTION

The following diagram shows a typical existing configuration, where the NE BX.25 links are directly connected to SLM ports via modem sets:



The next diagram shows the migration topology that would be the easiest to implement if one were starting with the configuration shown in the preceding diagram:





The preceding diagram shows how the **DT-6061**, **DT-4000**, and **UMI** are interconnected via IP to replace the SLMs. In this configuration, where the IP network is depicted as a wide area network (WAN), the **DT-4000s** are co-located with the network elements, which eliminates the modem connections. This requires having IP WAN access at each NE site. However, another approach could be to retain the modem links and co-locate the **DT-4000s** with the **DT-6061**, which effectively collapses the IP WAN cloud to a simple stand-alone LAN hub. A combination of these two approaches would of course also be possible.

Each **DT-4000** port can be operated at up to 115.2 Kbps, which easily addresses the new NE port speed requirement previously discussed. From the standpoint of capacity, this configuration has virtually unlimited growth potential. A single **UMI** supports up to

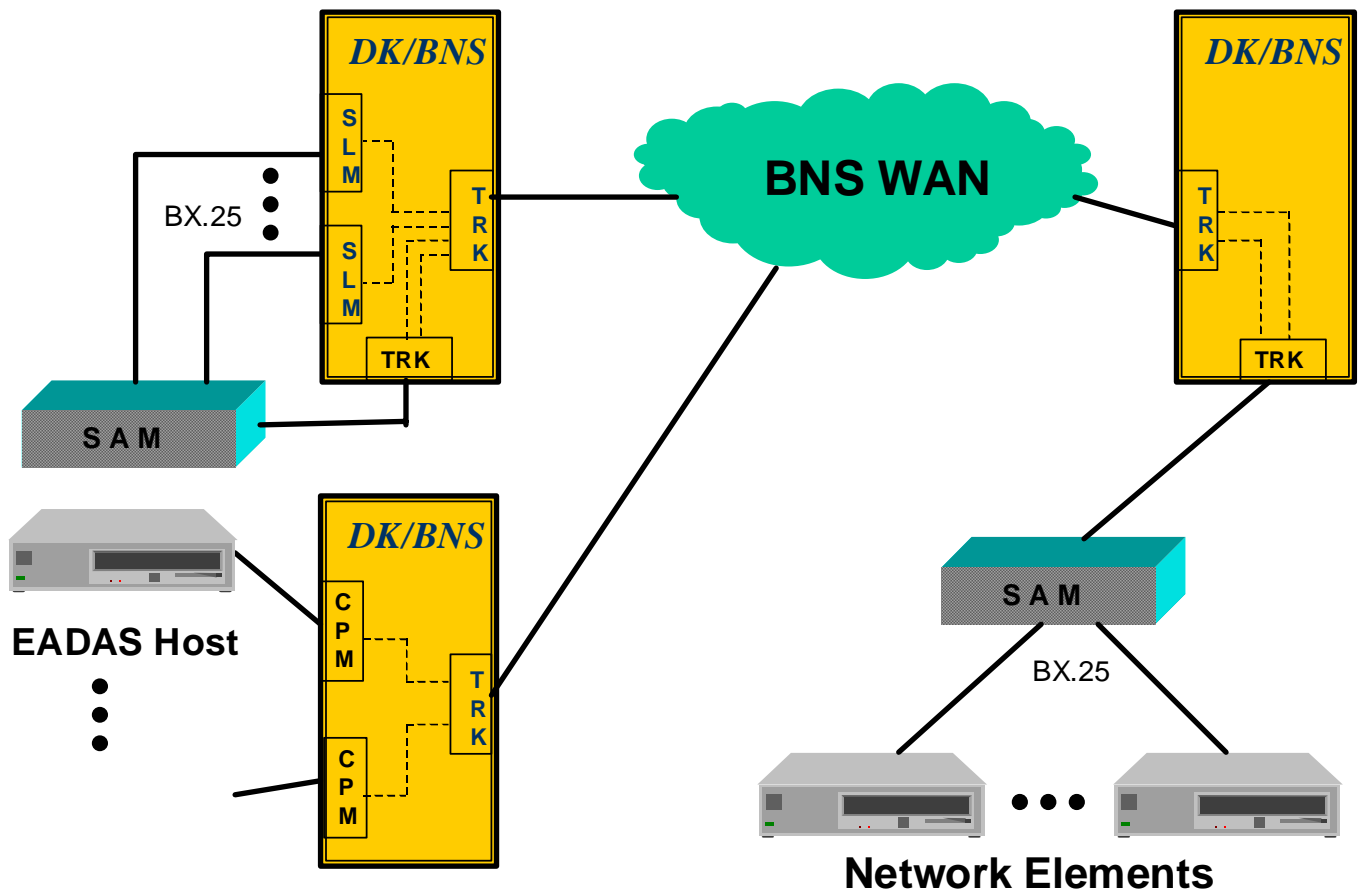


504 OS-host-to-NE circuits. Each **DT-6061** supports up to 30 NE ports (a separate instance of the **IP-SLM** application is required for each), but multiple **DT-6061**s can be connected to the network to reach the required port capacity. An “Installation Cookbook” for this migration solution, showing how each unit is configured, is provided in the *IP-SLM Application User’s Manual*.



BX.25 OVER BNS SOLUTION TOPOLOGY

A different solution topology may be chosen in the case where the BX.25 links are currently being carried over the BNS infrastructure rather than via direct modem connections, which further illustrates the flexibility of the *UMI* and *DT-4000*. The following diagram shows a representative SLM networking scenario:



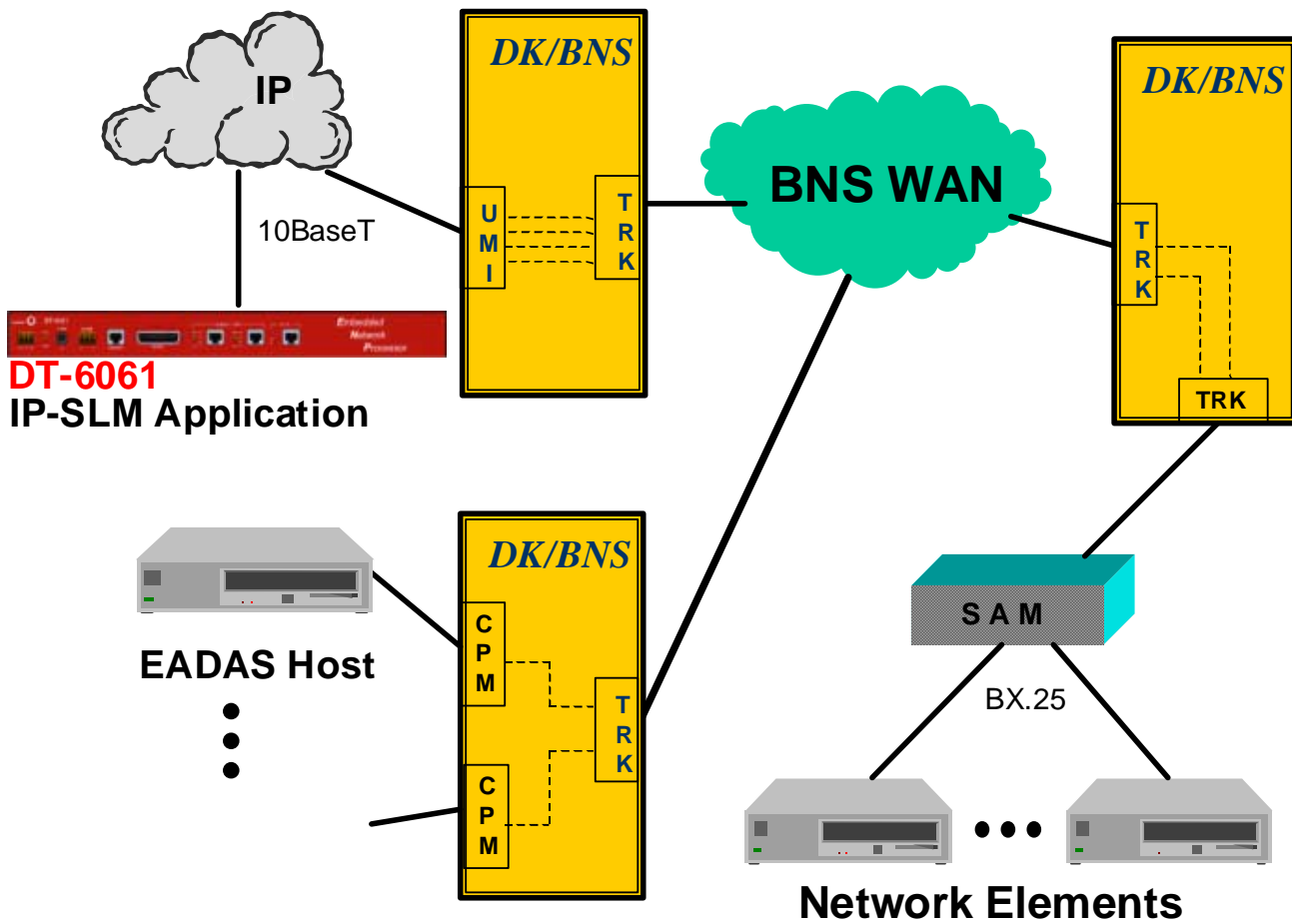
The preceding diagram shows a typical deployment for some RBOCs. In this arrangement, a SAM at each NE site allows multiple BX.25 connections to be



A High-Capacity Migration Solution For OS Nets. Using BX.25

multiplexed and carried transparently over the BNS infrastructure to another SAM co-located with the SLMs, where the BX.25 is terminated.⁴

The migration solution for this configuration could be exactly the same as the one shown in the previous section, assuming IP network access is available at every NE site. However, for illustration purposes, let's assume there are NE sites lacking IP network connectivity, and/or the network operator does not want to disturb the NE sites at all. In other words, we want to do the minimum necessary to address the SLM problem. That would give us the following migration solution:



⁴ The Transparent Synchronous Module (TSM) has also been used in place of the SAM connected to the SLMs.



It should be noted that in this migration configuration, the **UMI** carries two connections per NE port – one to the OS, the other to the NE. This cuts its NE port capacity in half (to 252) relative to the first migration solution, which used the IP WAN to carry the BX.25 links. The NE port capacity of the **DT-6061** is unchanged. Since NE port speed is limited to that of the SAM ports (9600 bps.), an option to consider would be to replace SAMs with **DT-4000s**, which can emulate a SAM-16 while operating at a port speed up to 115.2 Kbps. Once a **DT-4000** is in place, it can interconnect with both BNS and IP networks simultaneously, and each port can be configured to be an endpoint on either network. This would allow for an incremental migration of all traffic to the IP infrastructure. The “Installation Cookbook” for this migration solution (using **DT-4000s** in place of SAMs) is also provided in the *IP-SLM Application User’s Manual*.



CONCLUSIONS

There are many examples of legacy BNS networks that can now be migrated to more modern networking infrastructures by taking advantage of Datatek's migration products, resulting in greater flexibility and lower maintenance costs. This document highlighted a set of possible solutions to a problem stemming from a limitation of the SLM module, which illustrate the use of the ***DT-4000***, ***UMI***, and ***IP-SLM*** application for the ***DT-6061 Embedded Network Processor***. These products work together to form a scalable migration infrastructure that can solve short-term problems such as this, as well as permitting a longer-term incremental modernization of the network.

