

Datatek

Solutions

EQUIPMENT CONSOLIDATION IN BNS-2000 NETWORKS

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INTRODUCTION

The telecommunications industry is witnessing a period of profound change, stimulated by the coinciding impacts of innovative new technology and global de-regulation - an environment, which offers unprecedented growth opportunities. One result we are seeing is that new entrants to the business (part of what has come to be called the "new economy"), who have the advantage of being able to build up their infrastructures "from scratch", have been able to achieve significant market presence, if not dominance, seemingly overnight. The challenge for established service providers as well as enterprises, therefore, is to find cost-effective ways to migrate their infrastructures and operations so that they too can take full advantage of the productivity benefits offered by the newer technology, without jeopardizing the service their users expect and depend on.

Telecommunications carriers are by their nature widely dispersed operations, as are many large enterprises. This has forced them to deploy Wide-Area Networks (WANs) to connect large numbers of remote sites with centralized work centers, using the best available technology. Today, the popular model for many business operations being conducted over a wide area is the corporate "intranet", based on the same Internet Protocol (IP) technology that has driven the explosive growth of the worldwide Internet. At the same time, more robust technologies such as Asynchronous Transfer Mode (ATM) and Frame Relay, themselves used in the core of the IP infrastructure, are also available as direct interconnect options. While the new entrants to the business have the luxury of quickly building infrastructures using these technologies, established carriers and enterprises are faced with the requirement to more gradually migrate to them from a base of older technology. These older technologies, although now viewed as limited in terms of scalability and harder to maintain, have nevertheless, in many cases, proven themselves to be highly reliable over long periods of time. Lucent Technologies' BNS-2000 product family represents one of these proven technologies.



Lucent's BNS-2000 product family has been successfully utilized as a reliable WAN infrastructure element supporting the internal operations of many carriers and enterprises for more than a decade. Much of its success can be attributed to its flexibility in being able to support a diversity of legacy applications utilizing many different protocols, with high reliability. In 1998, Datatek Applications was formed for the purpose of developing strategies for BNS-2000 users to move to newer technologies. After consulting with many large BNS-2000 users to gain a better understanding of their present and future needs, Datatek Applications has developed a portfolio of new products based on the general theme of offering a smooth migration path from BNS-2000 based infrastructures to networks based on the newer technologies mentioned above. Within that context, there are several specific opportunities that can be explored. In this document, we will look at some interesting options for consolidating BNS equipment, i.e., reclaiming space consumed by BNS nodes and/or concentrators by migrating existing services over to newer networking technologies.

Datatek Applications has developed several products that address the goal of consolidating BNS networking equipment. Let's take a closer look at what these products do and some of the benefits of using them.

USING DT-2020 AND DT-2020i TO ELIMINATE BNS NODES

The Synchronous Asynchronous Multiplexor (SAM) family of endpoint interface concentrators has long been a reliable workhorse for many customers of the BNS-2000 family of products. Datatek's **DT-2020/2020i** allows the re-use of a SAM concentrator as well as all associated endpoint equipment on an IP infrastructure *without any BNS-2000 node equipment*. The selection of the **DT-2020 vs 2020i** depends on the type of SAM and on whether co-located LAN access is available at each site where a SAM is



deployed. Where LAN access is available, the **DT-2020i** is the ideal solution for a SAM 64/128/504, being a direct replacement for the existing SAM trunk module. Through its I/O board, it interfaces directly to the IP network. If LAN access is not available at a SAM site, the **DT-2020** (a compact stand-alone unit) can be co-located with a LAN segment, and connected to the remote SAM via a SAM trunk. The **DT-2020** must be used with a SAM8 or SAM16 in any case, as these do not have the replaceable trunk module. Either product maintains all the features and functionality of the SAM.

The **DT-2020/2020i** in effect transforms a SAM concentrator into a versatile IP-based terminal server, through the application of Datatek Applications' *mediation* technology. Services provided by the Internet Protocol stack are blended with BNS call-control logic to provide the same level of security and transparency which previously was provided by the control computer in the BNS node. This provides a TELNET over TCP path, or a transparent TCP path, for each user port on the SAM concentrator. These ports may then connect to an arbitrary IP host, in many cases without an intermediary interface. ¹

Mediation is an important and powerful concept in the Datatek Applications product family, so let's take a closer look at what it means and what it offers. BNS-2000 and earlier Datakit[®] products all use the Universal Receiver Protocol (URP) to carry data end to end in a network, at selectable grades of service (e.g., with or without error correction). Mediation permits endpoints to communicate with each other using either URP or TELNET/TCP/IP, without actually being "aware" of any difference in the underlying infrastructure. Mediation actually goes much further than that, since it also allows the **DT-2020/2020i** and **DT-4000** (introduced later in this document) to emulate

¹ Datatek Applications' **DT-6061** is an example of such an intermediary device. It is an embedded network processor which performs customer-specific protocol translation and termination in network connections that require such a function.

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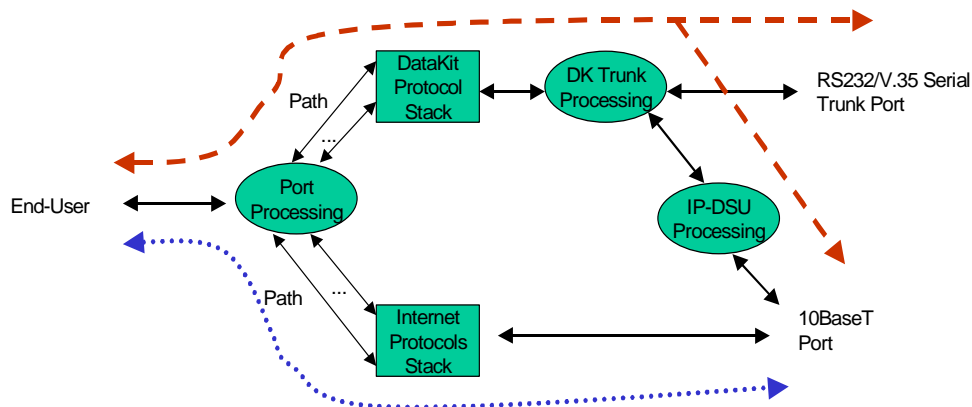
the most important BNS-2000 call control features. For example, Closed User Groups (CUGs) is an important feature for protecting sensitive endpoints in a corporate network without the burden of special “security servers”. Also supported are Hunt Groups for simplified access to pooled resources, and Mnemonic Addressing for user “dialing” transparency.

DT-4000: A HIGHLY FLEXIBLE “NEW SAM”

We’ve just discussed using **DT-2020/2020i** to allow SAM-connected devices to communicate with devices anywhere on the corporate IP network – subject to CUG-based access controls. Similarly, a device on a SAM with a **DT-2020/2020i** can communicate with a device on another SAM and **DT-2020/2020i** over the IP infrastructure, all without the intervention of a BNS-2000 node. However, we may still need the ability to communicate with devices on any remaining BNS-2000 nodes. If some endpoints on a SAM need to communicate with devices in the BNS network while other endpoints on the same SAM need to communicate with devices on the IP network, then the **DT-4000** is the ideal solution.

The **DT-4000** is a multi-protocol access device that can be used as a drop-in replacement for the SAM, and can exist in both a BNS-2000/BNS-2000 VCS infrastructure and an IP infrastructure *simultaneously*, since it has a physical interface to each. Neither infrastructure is explicitly required, however. It has 16 async/sync ports with speeds up to 115 Kbps synchronous and 56 Kbps asynchronous. To better illustrate what the **DT-4000** does, the following diagram is a logical representation of its internal functional components.





In the above diagram, the upper dashed path, from “End User” through “RS232/V.35 Serial Trunk Port”, represents data flow exactly equivalent to that of a SAM, which illustrates the use of the **DT-4000** simply as a SAM replacement. If we now take the path through “IP-DSU Processing” to “10BaseT Port”, we have the functionality equivalent to using the SAM with an external **IP-DSU**: the private-line connection back to the BNS node has been replaced by a logical connection through the corporate intranet.² So far in this discussion, the **DT-4000** is still acting like an entity in a BNS-2000 network.

Now let’s consider the lower dotted path, from “End User” to “10BaseT Port”. That path is equivalent to using a SAM with a **DT-2020/2020i**, as was discussed in the previous section of this document. The choice of which path user data will take is provisioned on a *per-port* basis; hence the earlier statement that the **DT-4000** can simultaneously exist in two networking infrastructures. Keep in mind that connectivity through either infrastructure – IP or BNS-2000 – “feels” the same to the device connected to a **DT-4000** port (the only obvious difference being “who” it is connected to) because of the **DT-4000**’s mediation capability. Over time, as the entire network



gradually migrates from the old technology to the new, no hardware changes or reconfigurations are required for endpoint devices; only the **DT-4000** ports would need to be re-provisioned.

Going back to using the **DT-4000** as an entity in a BNS-2000 network (i.e., as a SAM replacement), it's worth also pointing out that the **DT-4000** is in this mode fully compatible with the **Universal Trunk Module (UTM)**. This means it can be connected to a **UTM** in a remote BNS-2000 node over an IP, Frame Relay, or ATM networking infrastructure, not just via a dedicated private line. It also incorporates the **UTM's** duplex trunking capability. This allows it to provide highly-reliable data transport by utilizing two separate physical connections over independent core networks (one must be IP), with one connection acting as a protection path for the other.

CONCLUSIONS

Datatek Applications has developed a family of products that allow existing BNS-2000 networks to migrate towards newer networking technologies and/or operate at lower cost. In this paper, it has been shown how the use of the **DT-2020/2020i** and **DT-4000** utilize Datatek Applications' mediation technology to eliminate BNS-2000 nodes and SAMs without impacting user services. Please contact Datatek Applications directly, using the phone number or email address shown at the top of this document, to learn more about these and other Datatek Applications products.

² This requires that the BNS node at the other end of the connection have either a matching **IP-DSU** or **Universal Trunk Module** – see *WAN Facility Consolidation in BNS-2000 Networks*, or individual brochures covering these Datatek Applications products.

