

Datatek

Solutions

THE INSTANT TCP/IP INTERFACE FOR THE LMOS OPERATIONS SYSTEM

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INTRODUCTION

This document is a description of how existing readily available components may be used to change deployment of the LMOS system from a Datakit[®] Network to a TCP/IP network.

A single Datakit single shelf node is maintained as a TCP/IP Mediation device. Application functions, interfaces, and protocols are all preserved in their entirety.

The deployment may be accomplished without user interruption, and without a change in user procedures.

The conversion presented is applicable to other operations support systems based on the Datakit network as well. However, this paper is specific to the LMOS operations support system.

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GLOSSARY

The sections that follow use terms defined in this glossary.

AtoB	A DKAP application that allows an ordinary asynchronous terminal to access a BiSync host. In this application, the BiSync host is the LMOS system.
ANS	A Host application that is used in conjunction with the CRT DKAP application to provide security for LMOS installations. The ANS application verifies that a user has the right to access a particular LMOS system. This is normally a NAC function.
BHIM (SYNC8)	BiSync Host Interface Module. The BHIM emulates the clusters attached to a multi-dropped Binary Synchronous line. It is typically attached directly to a Host front-end processor. The BHIM (like the BTIM) separates each logical unit into its own Datakit virtual circuit. The data for that logical unit may then be uniquely sent anywhere in the Datakit network. The destination is typically a DKAP, or a BTIM. In the case where the destination of the logical unit data is a BTIM module, that BTIM module is typically at a remote node site and the data traverses one or more trunks.
BTIM (SYNC8)	BiSync Terminal Interface Module. The BTIM emulates the BiSync Host Front End processor as if it were connected to a multi-dropped Binary Synchronous line. It is attached to the actual cluster controllers. The BTIM (like the BHIM) separates each logical unit into its own Datakit virtual circuit. The data for that logical unit may then be uniquely sent anywhere in the Datakit network. Unlike the BHIM, the BTIM logical unit data virtual circuit is routed typically only to a BHIM. In that case, that BHIM module is typically at a remote node site and the data traverses one or more trunks.
CCM	Control Computer Module.
CPM	A Fiber Interface Module to attach the LMOS host.
CRT	One of two legacy applications used for security of LMOS systems. The CRT application is resident on a DKAP module, and the ANS application is resident on an external host attached with a CPM module. The CRT application is used to pass data during a user session; and redirect to the ANS application when a user session has not been initiated. This is normally a NAC function.
DKAP / HSDKAP	Datakit Applications Processor. A module that allows custom protocol processing. The DKAP exists in both low speed and high-speed varieties. The Low Speed DKAP supports approximately 80Kbps of aggregate throughput. The High Speed DKAP (HSDKAP) supports an aggregate throughput of about 12 times the low speed DKAP.



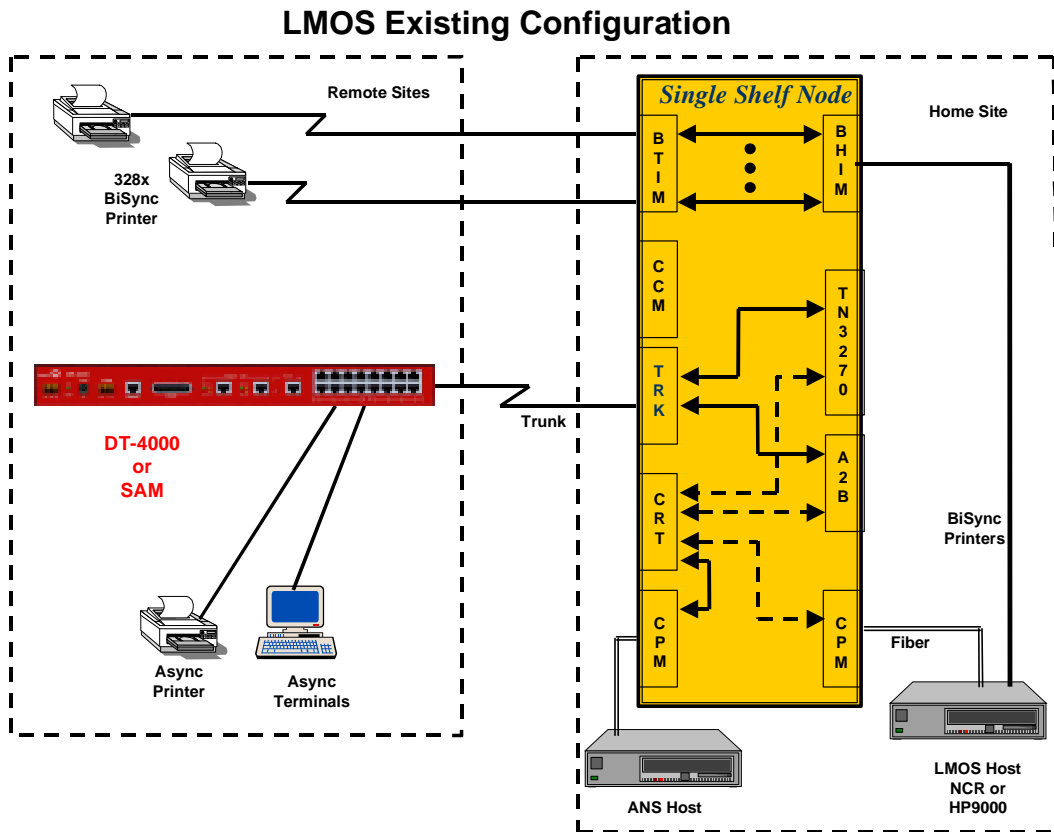
DT-4000	A SAM16 replacement with a built in UTM functionality. The DT-4000 may also operate in both Datakit and IP infrastructures simultaneously. In the absence of a Datakit infrastructure, the DT-4000 is a multi-protocol terminal server. Port speeds of 115.2Kb async and 56K sync are supported.
IP	Internet Protocol. A connectionless datagram protocol used in most router networks to carry other protocol data. The IP protocol is never used by itself, but as a routing header for all other protocols (e.g. UDP, TCP, ICMP, etc.)
NAC	Network Access Controller. A modern alternative for user security. It may be used in either the IP or the Datakit infrastructure.
SAM	Synchronous/Asynchronous Multiplexor.
TCP	Transmission Control Protocol. A connection oriented protocol that is carried above IP to provide unique connections. The TCP protocol originates from the specification of the Department of Defense. It is widely used today. The services provided are error detection and correction. The TCP protocol is nearly identical in features and capabilities as the URP protocol with the notable exception that it cannot provide encapsulation features. In order to overcome that weakness, it is typically used with a telnet encapsulation layer.
Telnet	An encapsulation protocol typically used over TCP to provide encapsulation of special characters (e.g. a break sequence), delineate messages, denote options, and other special functions.
TN3270	A DKAP application that allows a 3270 Client terminal to access a BiSync host. In this application, the BiSync host is the LMOS system.
UMI	Universal Mediation Interface. A mediation module that resides between the Datakit Infrastructure, and a TCP/IP infrastructure. The UMI provides the protocol processing to allow TCP/IP endpoints to connect to Datakit endpoints seamlessly.
URP	The Universal Receiver Protocol. A protocol that is native to the Datakit Network. The Universal Receiver protocol was created in the mid 1970s in the research community. It is widely used today. It is used to provide error checking, and fault recovery. The URP protocol is nearly identical in features and capabilities as the net combination of the TCP and Telnet protocols.
UTM	Universal Trunk Module. A modern Trunk module that can emulate many existing Datakit trunks. It allows connectivity on TDM, IP, Frame Relay, or ATM infrastructures as well. Trunks may be simplex or duplex for reliability.



LMOS EXISTING DEPLOYMENT

The LMOS system is typically deployed via a Datakit network. That network consists of SAMs for terminal and asynchronous printer access, SYNC8 modules to provide the BiSync Printer connectivity, and a Fiber connection to the LMOS host. User security is provided by the ANS host application. The ANS host application uses a CRT DKAP application for its data transport.

The existing deployment of LMOS may be characterized by the following diagram:



In the diagram above, a user on an asynchronous terminal would make a call to the **AtoB** DKAP application. The **AtoB** DKAP application would then request the LMOS system to be reached from the end user. If the **CRT** and **ANS** applications were not



installed, the **AtoB** application would then make a call to the LMOS host via the **CPM** module. If the **CRT** and **ANS** applications are installed, security information is then requested of the user prior to connection to the specified LMOS host via the **CPM** module.

Also in the diagram above, a printer may be either an asynchronous printer, or a 328x Bisynchronous Printer. These are each treated differently.

Asynchronous printers have a predefined connection originating from the **AtoB** DKAP application to the printer **SAM** port. The **AtoB** DKAP will also originate another PDD to the LMOS host to provide connectivity. The **AtoB** DKAP application provides the Bisynchronous to Asynchronous protocol conversion.

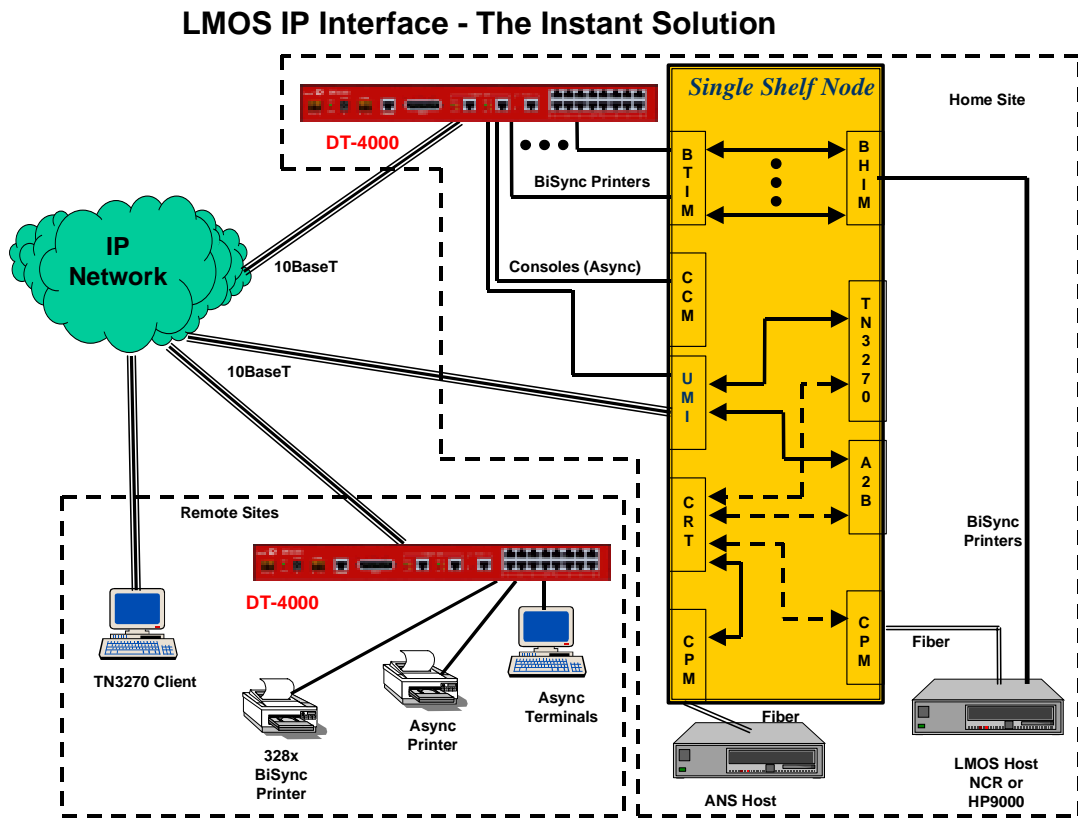
A pair of **BHIM** and **BTIM** modules connects Bisynchronous printers. The **BHIM** separates each logical unit in the BiSync line from the LMOS host into a unique Datakit virtual circuit. A PDD call is then made between the **BHIM** and **BTIM** module to which the printer is attached. The **BTIM** module remaps each virtual circuit into a logical unit on the printer's Bisync line. The actual printer connection is via DSU.



LMOS TCP/IP DEPLOYMENT

The conversion from the legacy deployment, shown in the previous section, to a complete TCP/IP deployment is incredibly simple.

Consider the following diagram:



In the diagram above, any SAM used for remote access would be replaced with a **DT-4000**. These **DT-4000s** are used standalone. That is, they are multi-protocol IP terminal servers without any direct connectivity to any Datakit node. The data is provided connectivity by mediation in the **UMI** module.

All Datakit nodes, except for the single node at the host site, are no longer required. Transport of data will now occur on the IP infrastructure. These nodes may be removed from service if they have no other function.



The **UTM**, or any other Datakit Trunk which can be used to access the **SAM**, is replaced with a **UMI** module to provide URP to TCP/IP mediation services. This allows complete connectivity to all endpoints through a single module.

A **DT-4000** is provided local to the node to terminate the BiSync printer lines from the **BTIM**. These connections are then PDD'd through the IP infrastructure to another **DT-4000** port on which the printers are actually resident. This allows all DSUs and other dedicated line equipment to be removed in their entirety.

The Control Computer Complex console and the UMI console are connected to ports on the **DT-4000**. This allows *IP/TCP/telnet* access to all configuration points of the interface.

User procedures are the same as before. A user at an asynchronous terminal would dial the address of the **AtoB** application at the **DT-4000 Destination** prompt. This would connect the **DT-4000** to the **UMI** module. The **UMI** would then set up a call to the **AtoB** DKAP application. The data transport from this point forward identical to the pre-conversion scenario.

An Asynchronous printer would reside on a **DT-4000** user port. When the DKAP **AtoB** application makes its PDD to the **UMI**, the **UMI** will in turn make a PDD to the **DT-4000** port on which the printer resides. This operation is identical to the original pre-conversion deployment. The difference is that the **AtoB** PDD now resides as a **UMI** mediation session. The data transport from this point forward is identical to the pre-conversion scenario.

A Bisynchronous printer would have its link connected directly to a port on the **DT-4000** configured for either EBCDIC Bisync or ASCII BiSync as necessary. The **DT-4000** port would be PDD'd to another **DT-4000** port at the host site configured identically. The host site **DT-4000** port is then connected to the **BTIM** port for that printer. The data transport from this point forward is identical to the pre-conversion scenario.

A TN3270 client would access the IP infrastructure directly to the **UMI**. The **UMI** would then connect the TN3270 client to the **TN3270** DKAP application. The **TN3270**



DKAP application works identically to the **AtoB** DKAP application except for a specialized client set instead of a generic terminal.

If connectivity to another operations system is required (e.g. MLT, Craft Access, etc.), this connectivity is also completely provided by the IP infrastructure. On a per virtual circuit basis, the LMOS host would make a Datakit call to the **UMI** as if it were an endpoint on a Datakit network. The **UMI** will mediate that Datakit call onto the IP infrastructure and make a TCP/IP call to the destination endpoint. If the destination endpoint is also a Datakit based operations system; the TCP/IP call will terminate on a second **UMI**. That second **UMI** would then make a Datakit call setup to the operations system. Neither **UMI** is required to be local to the operations system they support.



SUMMARY

In comparing the LMOS existing configuration and the TCP/IP instant solution, the ease and simplicity of the instant conversion is readily apparent.

The **UMI** and **DT-4000** products provide complete connectivity in an IP infrastructure without altering the base protocols used. As such, there is little testing to be performed and a large benefit to be immediately realized.

Almost all of the existing hardware can be utilized in the conversion, making it exceptionally cost effective. Further, the fact that no application changes are required allows it to be immediately deployed.

The TCP/IP LMOS Instant Solution is the obvious choice for networking of LMOS components.

