Token-Ring Media Management with the IBM MultiProtocol Switched Services (MSS) Client

In June of 1998 IBM will make generally available the MSS Client, which is a continuation of the delivery on the leadership technology introduced with the MultiProtocol Switched Services (MSS) Server. The MSS Client offers the traditional SNA token-ring customers a “smart” agent for providing best-of-breed management that has not been available since networking vendors abandoned pure bridging for switching technology. The purpose of this white paper is to provide a high-level review of the implementation of this new switch feature.

One of the chief values offered by the token-ring architecture is its inherent management capabilities. Many large SNA customers are dedicated to this media because of its reliability, stability, and event-driven error notification and fault isolation. IBM’s LAN Network Manager for OS/2 has thousands of customers who have implemented complex network management operations: monitoring and managing their Local Area Networks across hundreds of source-route bridges without implementing SNMP agents.

LAN Network Manager for OS/2 is also the reporting station for Tivoli’s TME 10 NetView for OS/390 (formerly NetView for MVS), providing a remote managing station for hundreds of bridged token-ring LANs, with full two-way control at the NetView console across an SNA network.

LNM is unable, based on token-ring architecture, to manage remote LANs without the presence of several “surrogate” agents within source-route bridges. The challenge to networking vendors was how to implement, into switching technology, a management infrastructure built around LAN isolation of the MAC layer management frames by source-route bridging. Switches generally isolate these MAC frames at the port level, with no system-wide knowledge of the adapter control flows.

Now, with the availability of the MSS Client and the MSS Domain Client, as orderable features for the IBM 8270-800 and 8272-216 LAN switches, LAN Network Manager for OS/2 customers can move into the switched network technology without breaking their network management operations.

The MSS Client has multiple purposes, one of which is to add layer-3 bridging and routing to an edge device, thereby moving the intelligence of the MSS Server further out into the customer networking hierarchy. The LAN switch containing the full MSS Client can transport data from legacy LAN switches onto an ATM backbone more efficiently and intelligently, depending on the learned knowledge of the MSS Server. The MSS Domain Client, which is a subset of the full MSS Client, offers legacy LAN devices the same rich enhancements to its bridging and routing technology as the MSS Client although without the ATM connectivity. For IBM token-ring LAN switch customers, possibly one of the most important value-adds is the LAN Network Manager for OS/2 agent. The MSS Domain Client, when configured within an 8270-800 or 8272-216, takes over the broadcast domain and bridging configuration and control. An LNM agent may be configured on each interface in the MSS Client that represents a domain on the LAN switch. A domain in the LAN switch that is managed by an LNM agent can have at most one physical port assigned to it. The LNM agent then reports on all the media activity seen on that associated port. The maximum number of LNM agents configurable within a MSS Domain Client today is 16.

When configuring the bridges within the MSS Domain Client, the network administrator configures an interface (which maps to a domain on the switch) and specifies which LNM surrogate functions

are to be enabled on that interface. The choices are: Ring Parameter Server (RPS), Configuration Report Server (CRS) and Ring Error Monitor (REM). The network administrator will also configure a ring number for the interface. The system (MSS Domain Client software) will create a virtual ring segment, which will be reflected in the LNM network view, as well as MAC addresses for both the real and virtual segments. These MAC addresses will be the ones used by LNM to connect to the agent in the MSS Client. The switch configuration tools can be used to determine the values of the virtual MAC addresses.

LNM will view the switch and its agents as a virtual segment with multiple (up to 16) bridges connected to that virtual segment. One of the important features of this implementation is that this virtual segment does not actually constitute an additional hop in the source-route bridging; it is just used for communications between LNM and its agents in the MSS Client.

The RPS, CRS, and REM functions within the MSS Clients LNM agents provide the following media management functions (not an all-inclusive list):

- **Ring Parameter Server** is the target for all Request Initialization MAC frames that are sent during their attachment to the ring segments. The RPS function responds to each ring station at adapter insertion time with the Ring Number and Ring Station Soft Error Report Timer value. The RPS agent will also notify LNM of each adapter insertion.
- **Configuration Report Server (CRS)** forwards configuration notifications to the LNM station. It also responds to LNM commands such as Query Adapter, Remove Adapter and Set Station Parameters. CRS is the agent that allows LNM to draw an adapter level segment view showing the Nearest Active Upstream Neighbor configuration of the LAN with dynamic status changes.
- **Ring Error Monitor (REM):** Possibly the most important function of the Client LNM agent is the Ring Error Monitor (REM). This agent function compiles error statistics from received `Soft_Error_Report` MAC frames and selectively generates reports for the LNM station. REM also provides BEACONING notification to LNM. This includes watching the timer of beacons, distinguishing between temporary and permanent beaconing states, and knowing when an adapter has been kicked off the ring.

For customers with IBM 8230 CAUs models 001 or 002, the MSS Domain Client will now provide a network view through the IBM token-ring LAN switches that will allow LNM to automatically discover the 8230s presence in the managed LNM domains. Logical Link Control flows to/from the 8230s has always been allowed through the 8272 switch ports, but it required the LNM network administrator to define a segment “qualifier” for the 8230 CAU in order to administer it, and they did not show up in the LNM network diagrams.

Bottom Line

IBM Networking Hardware Division has responded to the requests placed on them by loyal IBM token-ring customers by providing a path to allow the continuing best-of-breed management of their networking infrastructure while giving them switching technology. Also, by implementing the MSS Domain Client (or the full MSS Client in the 8270-800), the customer has positioned them-

selves for connecting their legacy LAN traffic onto an ATM backbone when they are ready for that move.

Marketing Technical Notes

- MPC V3.1 is required on each 8272 LAN switch port that is to be managed by an LNM agent within the MSS Client.
- Each switch port that is to be managed by an LNM agent within the MSS Client must be operating in half-duplex mode.
- The only switch blade for the 8260 Nways Intelligent Switching Hub that offers the FULL client support (ATM + LNM agent capabilities) is the 8272 3-slotter (51H4598: 6308).