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AppleTalk: Can't Enable DDP Checksums on All Out-Going Packets

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TOPIC -----

From "Inside AppleTalk" 2nd Ed, Chapter on DDP, pages 4-17:

"The DDP checksum is provided to detect errors caused by faulty operation (such as memory and data bus errors) within routers on the internet. Implementers of DDP should treat generation of the checksum as an optional feature...

[algorithm for computing 16-bit checksum (CkSum)]

Reception of a datagram with CkSum equal to 0 implies that a checksum is not performed."

Looking at DDP packets on our network shows that the DDP checksum is set to 0 on all packets. Is there a way to turn on DDP checksum generation and destination checking on Macintosh computers?

We also plan to AppleTalk subnet behind cisco routers. So the problem may localize to a few zones behind the cisco (usually a building or department).

DISCUSSION -----

There's no way to enable DDP checksums on an over-all basis. Individual applications can choose to implement DDP checksums, but there's no way to enable it for all out-going DDP packets.

All data link protocols such as LocalTalk, 802.3, 802.5, HDLC, PPP, SLIP, and so on, build in CRC or checksum validity routines. These checks are usually implemented in hardware, and are therefore very quick. Doing the CRC calculation at the network layer adds a fair amount of overhead to the transaction and effectively adds CRC checking to data that has already passed a CRC check.

It's true that the data in the network part of the packet could be damaged by random bit flipping within the hardware of the router after the packets

were checked by the data link layer. But this should be a rare condition (a real hardware problem with an interface card), and not just caused by random noise on a T1 line.

The CRC fields in the DDP header are meant to guard against forwarded packets. In other words, if you send a packet to Joe's Macintosh which is on the same Ethernet cable as you, then you needn't concern yourself about end-to-end data integrity because the data link layer will handle it.

On the other hand, in the case where you send a packet to Sue, and Sue's Macintosh is 10 states away, several routers could be involved, and your packet could be damaged while one of them is routing your packet across its bus or one of its interface cards. Again, this form of error checking is meant for applications that need to ensure end-node to end-node data integrity for forwarded packets, and not meant for data link layer type checking. That's a job best left up to the data link layer.

RTMP and ZIP packets are broadcast onto the local Ethernet/Token Ring/LocalTalk by routers that believe these packets are destined for nodes on this cable. For this reason, we let the data link layer handle the CRC checking for the RTMP and ZIP protocols.

The Apple Internet router doesn't generate CRC for RTMP or ZIP packets. It will honor and check CRC if it receives packets from a router that generates RTMP and ZIP packets with a valid CRC (CRC field set to something other than 0).

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