



AT&T (Pacific Bell) DMS-100 and 5ESS CDR Collection using XOT

In 1998, we implemented for Pacific Bell a subsidiary of South Western Bell (SBC now AT&T) a large network of about 400 switches, a mix of DMS-100 and Lucent 5ESS. The DMS-100 uses X.25/LAPB/X21bis over RS-232; the 5ESS uses X.25/LAPD over a proprietary ISDN BRI 0B+D ST-interface (no B-channel traffic!). Of the 16 maximal supported 0B+D ports, only 2 were used.

Both types of switches are directly or indirectly connected via their X.25 interface to Cisco routers. The Cisco routers use XOT to encapsulate the X.25 packet layer traffic into TCP/IP, using different sockets for each Virtual Circuits (no LCN0!). ARC developed a LayGO XOT client to remotely communicate to the Cisco XOT servers. For our own tests, we also developed a XOT server.

Nevertheless, there were some hitches with Cisco's XOT implementation:

Cisco's X.25 software did not support configuration of non-standard defaults for packet and window size, and required all DMS-100 switches to be upgraded to later Nortel X.25 software compatible with the 1988 CCITT Recommendation X.25 (blue book).

Cisco's X.25 software could not be configured to use SAPI-0 (service access point identifier) as X.25 D-Channel service; only the standard SAPI-16 is supported. As it happens, the 5ESS uses SAPI-0 instead of SAPI-16. A Microtronix X.25 LAPD to X.25/LAPB converter is inserted between the 5ESS and the Cisco router.

Besides handling the XOT client protocol, we also captured CDR data from both switches into a C-Tree data base. Non-CDR data were forwarded to a Telnet application.

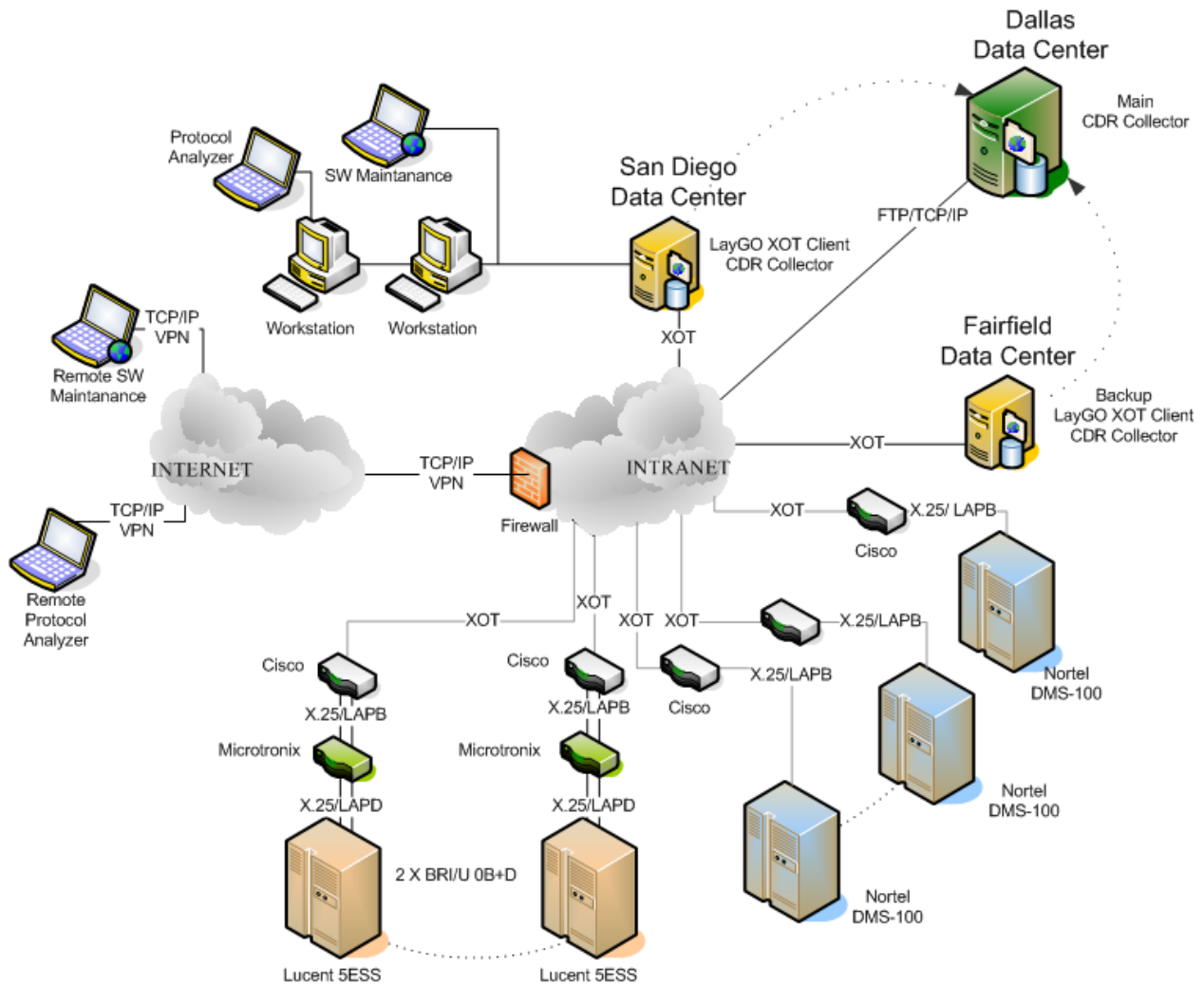
For other SBC installations, we access multiple DMS-100 or 5ESS switches through standard dial-up or leased-line connections. In some cases, we use RPC to connect from a SUN Sparc Solaris platform (LayGO RPC Client) to multiple local PC NT systems (LayGO RPC servers). Our LayGO API works just the same, it is not aware that data arrive via a synchronous port or via RPC or XOT. The same LayGO application runs in all scenarios.

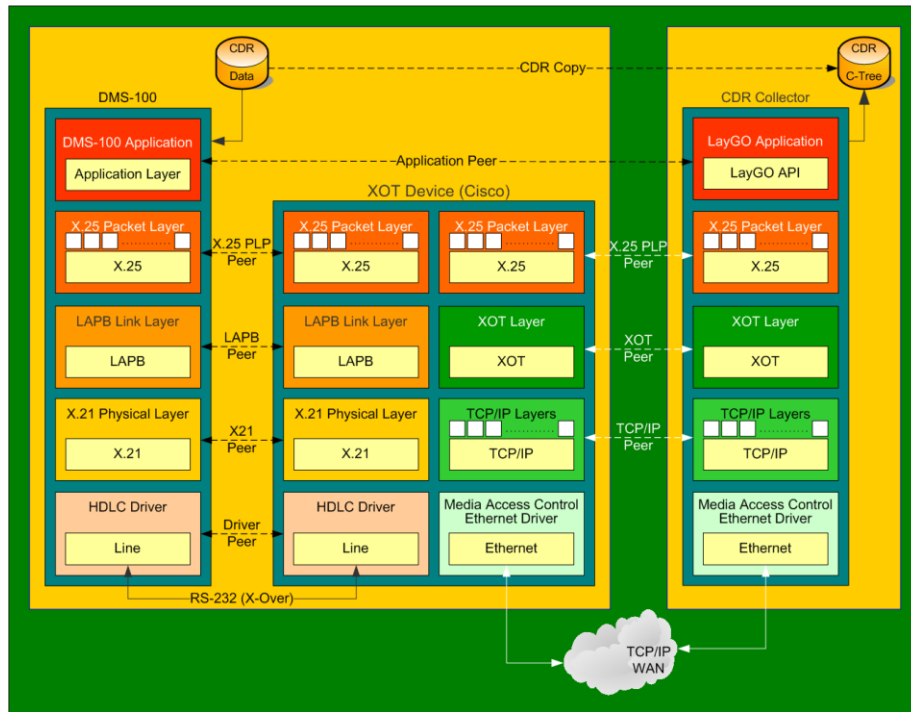
The XOT is a possible solution where both ends use X.25 equipment and the Inter/Intranet replaces an X.25 network or a point-to-point X.25 connection. In our case, XOT worked out, since SBC used already our LayGO API on other implementation. Our LayGO API interfaces to the X.25 packet layer and is not aware if X.25/LAPB, X.25/LAPD or XOT (X.25 over TCP/IP) is used as an underlying service.

The solution using the Microtronix and Cisco devices is very expensive and cumbersome. In 2004 we successfully tested at SBC a front-end solution where a PC with an ISDN BRI adaptor connects directly to 5ESS 0B+D port replacing the Microtronix and Cisco devices at great cost savings. This solution has not been employed yet by SBC. If possible, the X.25 should be terminated at the switch site as we did with our PXS (see Cable & Wireless).

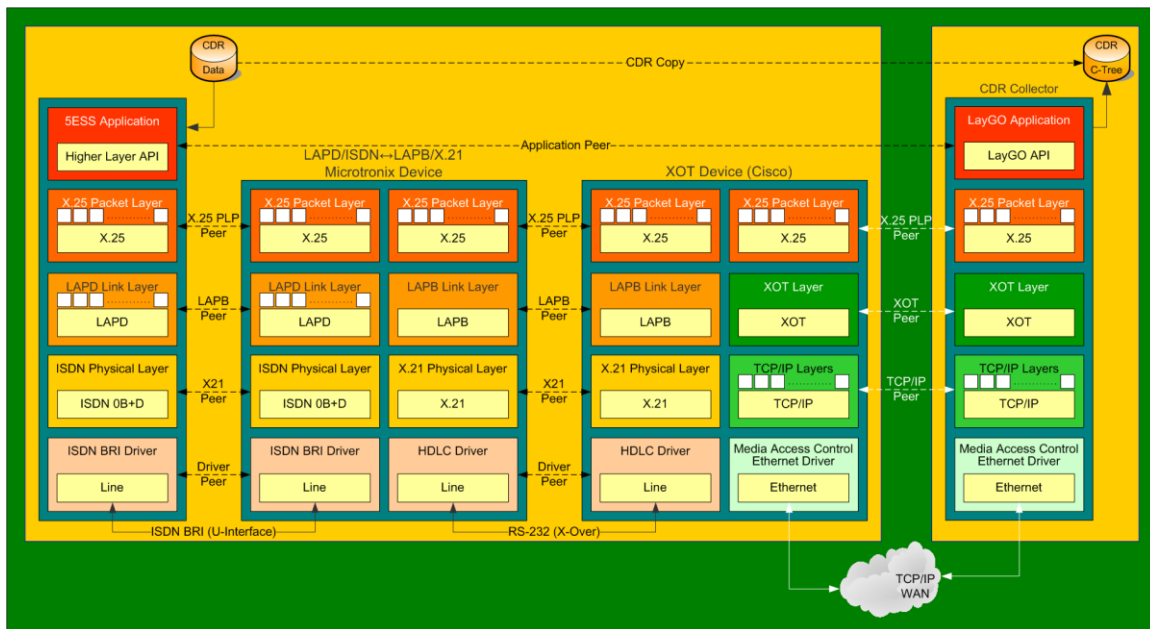
Since 1998 AT&T (PacBell) uses our LayGO software, there was not one (!) failure.

at&t (formerly Pacific Bell)
Nortel DMS-100 and Lucent 5ESS
LayGO XOT Client/CDR Collector (384 Switches Total)



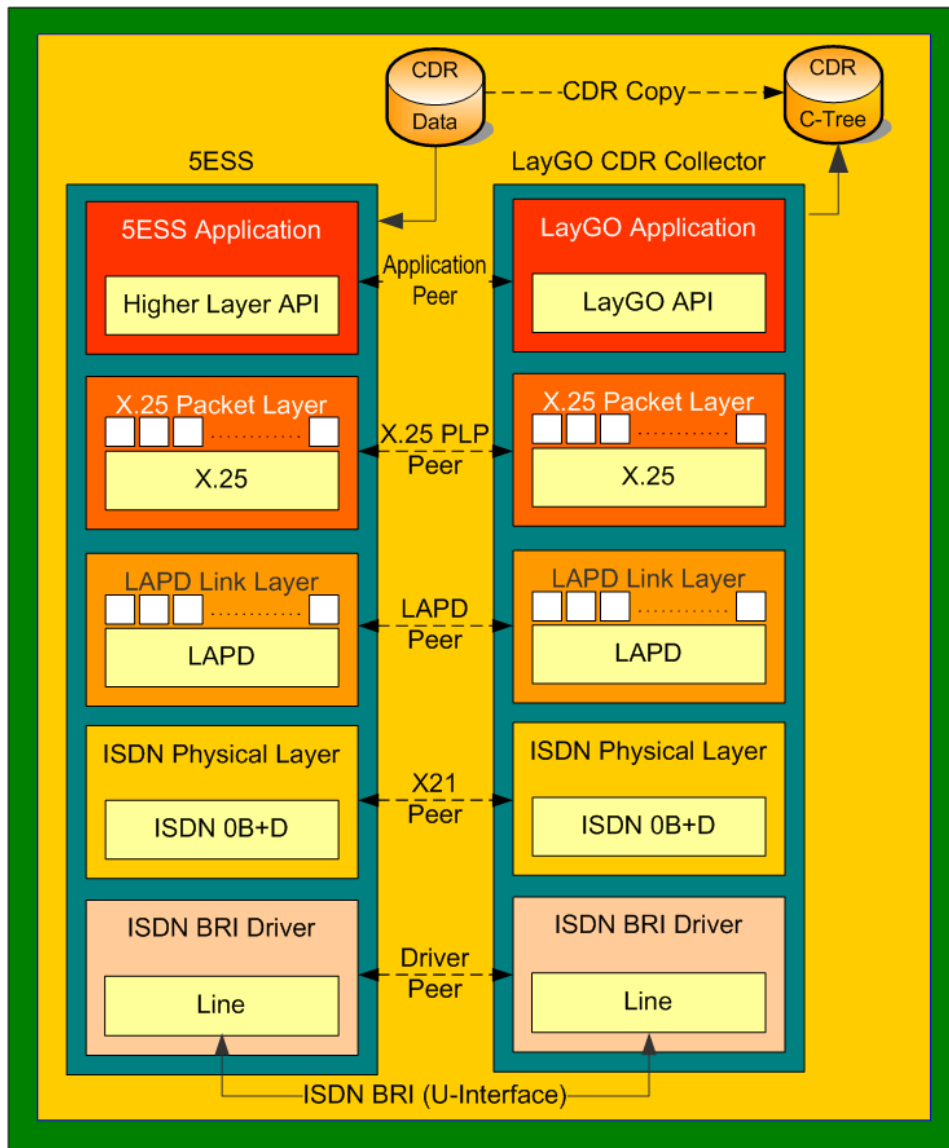
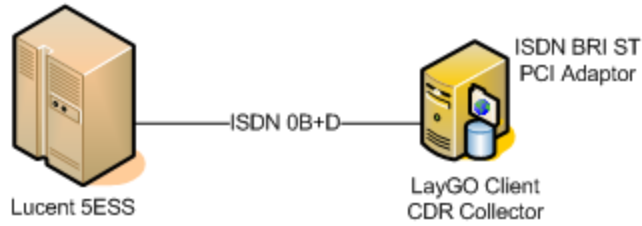


AT&T (PacificBell SBC) CDR collection for Nortel DMS-100 using LayGO XOT to Cisco Router



AT&T (PacificBell SBC) CDR collection for Lucent 5ESS using LayGO XOT to Cisco Router

at&t (formerly Pacific Bell) Lucent 5ESS
 LayGO Client/CDR Collector using ISDN BRI PCI Adaptor ST-Interface



Front-end solution with PC and a BRI ISDN PCI card, and LayGO X.25/LAPD protocol stack.

