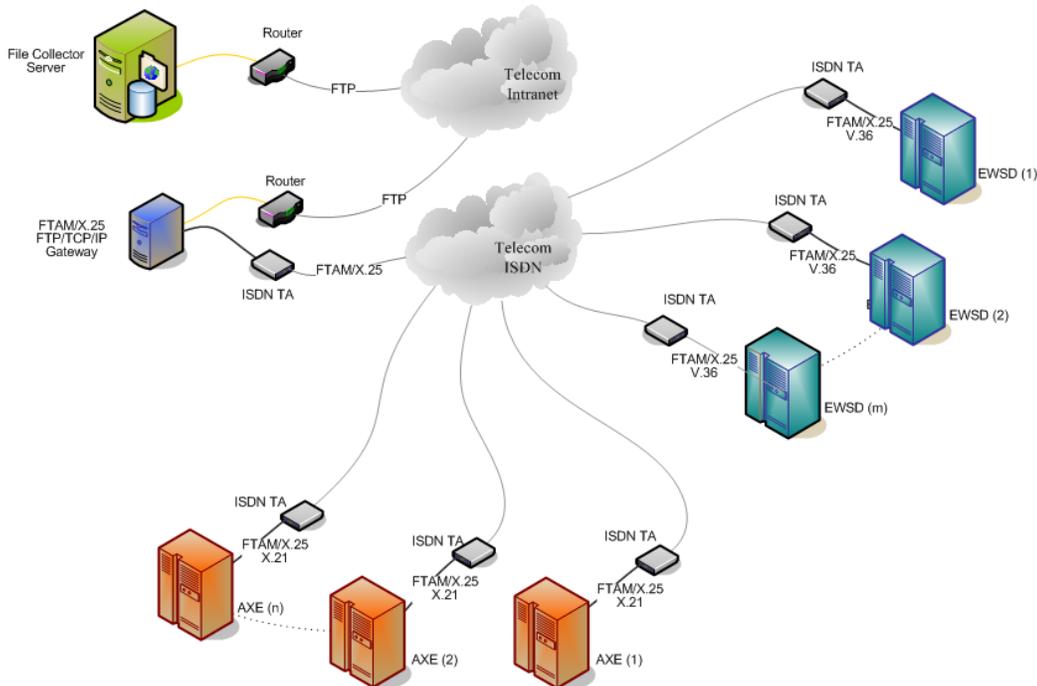


Swisscom FixNet CTT PXS Application

In October 2006 Aartesy (Biel), our Swiss partner, contacted us on behalf of Swisscom to pilot test our PXS as FTAM/X.25-to-SFTP/TCP/IP gateway for Swisscom's FixNet CTT. Since April 2006, Swisscom had successfully been using our PXS X.Net product as X.25-to-TCP/IP gateways for their *Pay Phone* application. If the pilot tests proved successful, and if employment of our PXS would be commercially feasible, Swisscom would consider upgrading about 140 switches, (a mix of Siemens EWSD and Ericsson AXE), from FTAM/X.25 to SFTP using our PXS. Testing started November 2006. The project had Swisscom's full support, and they provided remote access to a EWSD and an AXE test site.

Aartesy, our partner, are experts in data communication and very experienced in these types of legacy products. They provided essential local support during the testing and they acted as interface between Swisscom's technical staff and us. In addition they developed and supplied network management applications and hardware, customer training and user documentation.



Swisscom FixNet CTT Previous CDR Collection Network



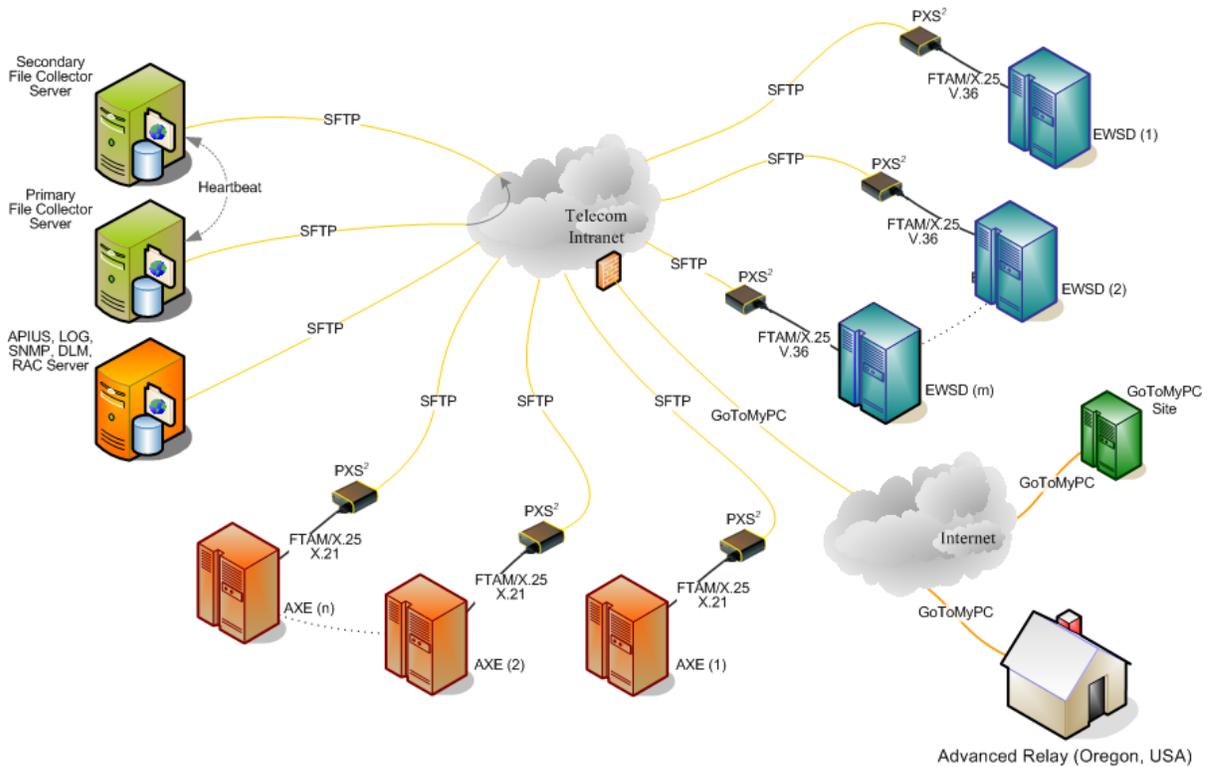
Because there are many variances in FTAM, the first task was to determine the currently used FTAM scheme. The PXS was configured as hardware Data Line Monitor Tap to capture current FTAM/X.25 sessions. After several trials we were able to reconfigure and use the PXS as FTAM/X.25-to-RFS/TCP/IP (Remote File Services) gateway, and successfully copy CDR-files from the EWSD to the PC test collector.

The same tests were repeated for the Ericsson AXE, which used a different FTAM scheme. In both scenarios, Swisscom verified that the CDR-files collected via the PXS were correct.

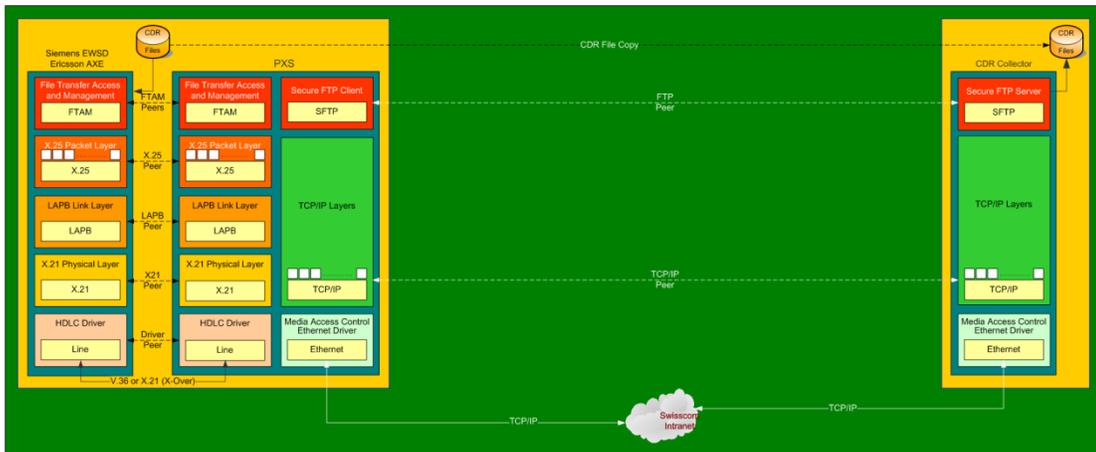
Swisscom was firm in wanting secure SFTP connections between PXS and collector. After analyzing several options, we selected Mocana's SFTP client for the PXS eCOS. For the SFTP server we recommended a Linux platform, which was part of Artesys' delivery.

We made modifications to the SFTP client software related to the authorization between client and server and (at a later stage) to correct time-out conditions where the EWSD suspended communication to the PXS for more than 15s. Besides the SFTP, and the existing DLM, Logging, SNMP, SMTP, NTP, we developed and added additional client server functions:

1. APIUS (Automatic PXS Installation & Update Services)
2. Logging Services using TCP instead of UDP
3. LayGO API Java interface for RAC (Remote Application Control)
4. Support of a Primary and a Secondary (Redundant) Collector



Swisscom FixNet CTT Existing CDR Collection Network



Conclusion: The PXS has been working since April 2008 without any problem. There is no better reward for the team efforts of Swisscom, Aartesy and ARC. By terminating the FTAM/X.25 at the switch, the CDR-File collection is much simpler and saves Swisscom money. The PXS adds secure SFTP connections between the switches and the collectors. In addition the PXS provides additional remotely accessible services, and new ones as listed above.

Recommendation: The FTAM/X.25-to-SFTP/TCP/IP gateway and including all client/server modules are much more complex than other gateways we implemented, such as AMATPS or Advanced Relay Corp. • 1896 Columbia St., Eugene, OR 97403 USA • (541) 345-9178 • fax (541) 484-0216 www.advancedrelay.com • sales@advancedrelay.com

AFT. ARC recommends taking advantage of pre-emptive maintenance, by using SNMP traps and SMTP message system. It should be evaluated, if the EWSD and AXE operator consol port, normally a VT100 terminal emulation could be handled as well by the PXS_e as Telnet application.

Other issues: According to the technical people at the German Telekom Darmstadt the EWSD synchronous interface was limited to 64 kbps. We tested up to 128 kbps without any problems. We still would like to test higher speeds, although the SFTP encryption reduces the synchronous throughput from 8.192 Mbps to below 256 kbps.

Unique to the EWSD was the V.36 (RS-449) physical interface that uses a DB37 connector. To connect successfully, the EWSD requires the RI (Ring Indicator) signal to be raised and then dropped. The RI is a non-differential RS-232 type signal, not part of the PXS RS-422 interface. Nevertheless we were able to use the DTR+ as alternative and made the required software changes. Aartesys modified the cables accordingly. The AXE uses a much simpler X.21 DB15 physical interface. We tested the AXE up to 1 Mbps without problems (no SFTP).

Special thanks to:

Swisscom: Daniel Rakic, Greg Gallai, Armin Bratschi; Santschi Rudolf, Bernhard Zwahlen

Aartesys: Andreas Grossenbacher, Patrick Gerber, Martin von Känel

Advanced Relay: David Tiktin, Hernando Convers, Esther Celis

8/21/2008 Greg Gallai (Swisscom FixNet): Hi Ulrich, everything is working fine; I am not aware of any data loss during transfer which means it's working perfectly.

6/2/2009 Greg Gallai (Swisscom FixNet): Things are going well over here. We have just closed the Fixnet Mediator migration project; as you might recall, CTT was a pre-requisite for the new mediation system.