Setting Standards for Future Generation Networks – Lessons Learned from a Past Pitfall

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The case: the X.400 series of standards

Common wisdom has it that	But
The Internet marginalised all other networking standards!	In 1986, the Internet comprised some 2,000 hosts, and OSI was backed by all major governments. -> Back then, the Internet was no threat at all.
X.400 was installed-base hostile!	Yes, in the sense that it initially required the full underlying OSI stack. No, it was specifically designed to enable interoperation between proprietary e-mail systems

The Internet wasn't the real culprit.

Why Then Did X.400 Fail?

Poor Timing	The initial version was incomplete, and necessary underlying and related standards were still missing. But the standard had to be published because of the CCITT's 4-year-cycle.
Inadequate First Implementations	As the standard was incomplete, implementations could not offer the full functionality. Their functionality was simply inadequate.
Wrong Assumptions	In the 70s, the IT world was dominated by mainframes/minis. Such an environment was assumed to underlie X.400. PCs and LANs didn't really fit into the model.
An Ill-advised Paradigm Shift	X.400 was originally designed to connect proprietary e-mail systems. This gave way to the the new idea of 'X.400 to the desktop'. But it clashed with the then popular LAN-based e-mail systems.

Lessons to be Learned

- **Adapt standardisation to ongoing (technical) developments**
- **Don't try to develop all-embracing standards**
- **Make sure that all referenced standards are actually available**