ADSL

Standards, Implementation, and Architecture

Charles K. Summers

Series Editor-in-Chief
Saba Zamir

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TABLE 2.1
ADSL Standards Bodies and Standards

Standards Body	Working Group	Standard	Purpose
ADSL Forum	Many, including UAWG SNAG	TR-00x	Industry Advisory Papers
ANSI T1	T1E1.4	T1.413, Issue 2	Basic ADSL Standard
ETSI	TM6		Close interworking with ANSI
ITU-T	Study Group 15	G.992.1	International Standards
		G.992.2	
		G.994.1	
		G.995.1	
		G.996.1	
		G.997.1	

2.4.2.1 ADSL Forum and UAWG

The ADSL Forum (http://www.adsl.com/), formed in 1994, has been in the forefront in publicizing ADSL and acting as a working group to explore architectural issues not yet covered by the standards bodies. It also acts as a "prod" to the standards bodies to get them working on standards. Most of the technical issues, addressed by the industry participants of the forum, deal with interworking. There are four subgroups that are particularly active. These are the UAWG (mentioned above), the System Network Architecture Group (SNAG), the Management Information Base (MIB) group, and the test group which coordinates test environments between forum participants and other manufacturers of equipment. Many of the issues being looked at by the ADSL Forum are also of interest to the Asynchronous Transfer Mode (ATM) Forum (http://www.atmforum.com/).

2.4.2.2 ANSI

The American National Standards Institute (http://web.ansi.org) oversees various committees composed primarily of industry technical people. The committee T1 and, more specifically, the subcommittee T1E1 is associated with ADSL standards. The T1E1 subcommittee has the responsibility of overseeing standards work for interfaces, power, and protection for networks.

Each subcommittee may be broken down into working groups. The T1E1.4 working group is actually the group responsible for DSL access, including ADSL. DSL access includes physical layer standards and transmission techniques for interfaces. The T1E1.4 working group was responsible for the T1.413 ADSL standard, which will be covered in detail in the next chapter. T1.413 was published in 1995. A new version (T1.413, release 2) is now available, in draft form, which incorporates some of the UAWG simplification issues.

2.4.2.3 ETSI

ETSI (http://www.etsi.fr) is also
Transmission and Multiplexing (T
which roughly corresponds to T1E
that international issues are addre

2.4.2.4 TU-T

The International Telecommunicat
the last body to get involved with
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international desire to incorporat
recommendations, such as I.325 n
recommendations being worked o
fall into physical layer protocol ca
are G.DMT which is largely a re
of the work of the UAWG, G.te
G.OAM concerning operations, a
and G.HS for handshaking protoc

G.lite has now been informal
during the next meeting of ITU-T
in June 1999. It is currently avail
Forum. The standard is not expecte
is guaranteed. The versions of G.l
as G.992.1, G.992.2, G.994.1, G.9
T recommendations at present are

G.992.1 (G.dmt)	Asymme Transcei
G.992.2 (G.lite)	Splitterl Line (Al
G.994.1 (G.hs)	Handsha Line (D
G.995.1 (G.ref)	Overvie Recomn
G.996.1 (G.test)	Test pro Transcei
G.997.1 (G.ploam)	Physical (DSL) T

2.5 THE xDSL FAMILY OF

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2.4.2.3 ETSI

ETSI (http://www.etsi.fr) is also broken down into groups and subgroups. The Transmission and Multiplexing (TM) group contains the working subgroup TM6 which roughly corresponds to T1E1.4. TM6 often works with T1E1.4, making sure that international issues are addressed.

2.4.2.4 TU-T

The International Telecommunications Union (ITU, http://www.itu.int) is sometimes the last body to get involved with a new technology. However, the fact that the ITU-T did join ADSL standardization efforts in 1998 is an indication of the growing international desire to incorporate such services. The ITU-T generates technical recommendations, such as I.325 mentioned above. The present set of ADSL-related recommendations being worked on by the ITU-T are named by 'G' prefixes, as they fall into physical layer protocol categories. Recommendations currently under study are G.DMT which is largely a rewrite of T1.413, G.lite which incorporates much of the work of the UAWG, G.test which concerns test specifications for xDSL, G.OAM concerning operations, administration, and maintenance aspects of xDSL and G.HS for handshaking protocols to allow startup negotiation.

G.lite has now been informally accepted by the ITU-T and will be voted on during the next meeting of ITU-T Study Group 15 to be held in Geneva, Switzerland in June 1999. It is currently available via special user's groups, such as the ADSL Forum. The standard is not expected to change much in that process although nothing is guaranteed. The versions of G.DMT, G.OAM, G.HS, and G.lite will be released as G.992.1, G.992.2, G.994.1, G.995.1, G.996.1, and G.997.1. Specifically, the ITU-T recommendations at present are:

G.992.1 (G.dmt)	Asymmetrical Digital Subscriber Line (ADSL) Transceivers
G.992.2 (G.lite)	Splitterless Asymmetrical Digital Subscriber Line (ADSL) Transceivers
G.994.1 (G.hs)	Handshake procedures for Digital Subscriber Line (DSL) Transceivers
G.995.1 (G.ref)	Overview of Digital Subscriber Line (DSL) Recommendations
G.996.1 (G.test)	Test procedures for Digital Subscriber Line (DSL) Transceivers
G.997.1 (G.ploam)	Physical layer management for Digital Subscriber Line (DSL) Transceivers

2.5 THE xDSL FAMILY OF PROTOCOLS

The ADSL Forum refers to the protocols covered in this section as "Copper Access Technologies." Although pure analog modems are also included in this category, we