Annex

How the NIUF is making real the promise of ISDN

A.1 An Overview of the North American ISDN User's Forum (NIUF)

Following the Department of Commerce's National Institute of Standards and Technology (NIST) congressional mandate to assist in the development and exploitation of telecommunications standards, NIST solicited broad industry contacts to investigate the ISDN, the development of ISDN conformance testing methodology, and the development of ISDN implementation agreements. Those responding recognized a paucity of user representation in the ongoing development of ISDN. Because of the increasingly urgent need to provide public standardized solutions driven by users, the participants sought to establish a mechanism that would continuously articulate user needs, focus on user application profiles, and, in turn, efficiently influence the implementation of those ISDN applications in a multivendor, multi-service provider environment. The result was the creation of the NIUF.

The NIUF was formed to address three principal objectives:

a. To promote an ISDN forum committed to providing users the opportunity to influence the developing ISDNs to reflect their needs;

b. To identify ISDN applications, develop implementation agreements, and facilitate their timely and harmonized implementation;

c. To solicit user, product provider, and service provider participation in this process.

To expedite the timely introduction of ISDN user applications and products, there is an urgent need for a strong ISDN user voice. This voice is required to address many high level concerns over a broad range of ISDN issues as well as to reach consensus on ISDN implementation agreements. While many of the technical ISDN issues are being addressed in the ANSI accredited Committee T1, the power and promise of portable and interoperable ISDN products and applications will not be realized until ISDN user and ISDN implementation issues are resolved.

The actual work of the NIUF is accomplished in two workshops: The ISDN Users' Workshop (IUW) and the ISDN Implementors' Workshop (IIW). These workshops, which consist of various working groups and special project teams, meet several times a year and develop the following products: Application Requirements, Application Analyses, Application Profiles, Implementation Agreements, an Application Software Interface, Version Agreements and Conformance Criteria. The activities between the two workshops are coordinated by the NIUF Executive Steering Committee. A few of the above mentioned NIUF products and activities are reviewed in this Annex.

A.1.1 Invitation to Users

Any organization with "Users" of analog, digital, broadband or intelligent communication services or CPE may become either NIUF Members, Attendees or Participants. The NIUF may be the only OPEN forum whose Implementors' activities are driven by the Users'. All other open forums are typically driven by technology- or vendor-oriented members although they may invite Users' to interact with them.

Any organization may "champion" their communication-based application requirement by using the NIUF's structured three (3) page application-description and filing it with the NIUF Secretariat whose contact information follows. It is not mandatory to attend any NIUF Meeting to be a Participant. In fact, by utilizing the NIUF Bulletin Board System (BBS), any group of Users' or individuals can influence the NIUF and "drive" the Implementors' Workshop provided they make contributions.

NIUF SECRETARIAT % NIST
BLDG 223 Rm. B-364
GAITHERSBURG, MD 20899
301-975-2937
301-926-9675 FAX
301-869-7281 BBS

You need to attend the NIUF meetings to receive the Proceedings. You need to execute an agreement with NIST to become a Member.

A.1.2 Invitation to Implementors

Any organization may send "Implementors" to the NIUF Meetings to participate in the open consensus process which develops the NIUF products reviewed in this Annex. The Implementors in the NIUF are challenged by the "vision" of producing Application Profiles that will enable multi-vendors to independently create products that will interoperate over the National ISDN with their competitors offerings. This vision will enable Users to some day mix and match different vendor's products based on their performance, price, support or other non-functional benefits. This vision is currently evolving through the international standardized profile process.

Any Implementor who wants to contribute to these cooperative NIUF endeavors, such as the production of this NIUF Catalog, is invited to contact the NIUF Secretariat as in A.1.1.

A.2 Relevance Of This NIUF Catalog

After the Application Analysis is produced from the User Champion's Application Requirements , it is approved by the User Champion and the Applications Analysis Working Group. The "solutions" of Section 3 may be one form of the Application Analyses.

Each of the guides contained in this catalog demonstrates a possible solution for at least some aspect of one or more of the NIUF applications. Table A-1 shows the correlation of the guides in Section 3 of this catalog to the specific NIUF applications. It is important for the casual reader to note that not all aspects of the NIUF applications are satisfied by every guide contained in this catalog. Table A-2 shows the NIUF Application Profile Team agreements that have been approved by the NIUF's Plenary. The reader interested in more information about the NIUF practices is encouraged to seek out the descriptions from the NIUF.

TABLE A -1

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.1.1 Integrating telephones and workstations	89-006.2 - Telephone / ISDN Workstation Integration
3.1.2 Access on demand to local-area networks	88-019.6 - Remote Terminal Access to LANs 91-008.8 - Project Homeroom
3.1.3 High performance access on demand to local-area networks	88-019.6 - Remote Terminal Access to LANs
3.1.4 Linking workstations with supercomputers	88-002.1 - Engineering Workstation Interface to ISDN
3.1.5 Leased line replacement	88-004.1 - Data Conferencing - LAN Type Access 88-021.6 - High Speed File Exchange
3.1.6 Screen sharing for two users	88-022.6 - Multipoint Screen Sharing

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.1.7 Screen sharing for many users	88-022.6 - Multipoint Screen Sharing
3.1.8 Screen sharing with workstation connected to a remote local-area network	88-022.6 - Multipoint Screen Sharing
3.1.9 Desktop video conferencing	89-007.4 - Video Conferencing
3.1.10 Centralized management of video images	88-007.1 - On Demand Video Marketing and Follow-up
3.1.11 Video conferencing facilities	89-007.4 - Video Conferencing
3.1.12 Caller identification	91-006.5 - Automatic Number Identification (Caller ID)
3.1.13 Call coverage	88-023.4 - New Account Customer Inquiry Handling 89-035.3 - At Home Agents 91-003.4 - Call Deflection with Unique Call Identification
3.1.14 ACD agents at home	88-024.4 - Customer Service Call Handling 89-035.3 - At Home Agents 91-003.4 - Call Deflection with Unique Call Identification
3.1.15 Flexible bandwidth allocation	89-028.5 - Dataconferencing/EDI 90-018.5 - Multi-Document Image Storage and Retrieval Integrated with Data and Voice Communications 89-016.1 - Variable Bandwidth for Voice/Image Communications

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.1.16 File exchange between personal computers	88-021.6 - High Speed File Exchange
3.1.17 File exchange between a personal computer and a host computer	88-021.6 - High Speed File Exchange
3.1.18 High speed transfer of large text and image files	88-021.6 - High Speed File Exchange
3.1.19 Telecommuting with casual data requirements	89-039.4 - Tele-commuting
3.1.20 Telecommuting and transferring files	89-039.4 - Tele-commuting
3.1.21 Telecommuting accessing interactive services	88-022.6 - Multipoint Screen Sharing
3.1.22 High performance telecommuting (interactive graphics and text)	89-039.4 - Tele-commuting
3.1.23 Group III facsimile	90-001.3 - Centralized FAX Server with ISDN Access
3.1.24 Receiving faxes as electronic documents	90-001.3 - Centralized FAX Server with ISDN Access
3.1.25 High speed access to electronic document image system	90-018.5 - Multi-Document Image Storage and Retrieval Integrated with Data and Voice Communications 89-016.1 - Variable Bandwidth for Voice/Image Communications
3.1.26 Multimedia real estate listings	90-003.3 - Centralized Document Storage Access 90-018.5 - Multi-Document Image Storage and Retrieval Integrated with Data and Voice Communications 89-016.1 - Variable Bandwidth for Voice/Image Communications

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.1.27 Medical Document Imaging	90-018.5 - Multi-Document Image Storage and Retrieval Integrated with Data and Voice Communications 89-016.1 - Variable Bandwidth for Voice/Image Communications
3.1.28 Credit card authorization at the point of sale	89-040.4 - ISDN for Point of Sale (POS) or Point of Banking (POB)
3.1.29 Electronic Data Interchange (EDI)	89-030.4 - Small Business EDI Access
3.1.30 Insurance Verification at the point of service	89-032.5 - Remote Access to Synch Host and Credit Card Authorization 89-040.4 - ISDN for Point of Sale (POS) or Point of Banking (POB)
3.1.31 Supermarket Checkout	89-032.5 - Remote Access to Synch Host and Credit Card Authorization 89-040.4 - ISDN for Point of Sale (POS) or Point of Banking (POB)
3.1.32 Host computer access	88-032.5 - Multipoint Permanent Data Circuits 89-041.2 - Combined SNA/ISDN Session Setup 88-008.3 - Async to SNA/SDLC 88-009.3 - Sync Terminal to Controller 88-010.3 - Ethernet to SNA/SDLC 88-011.3 - Sperry/UDLC to SNA/SDLC 88-012.3 - SDLC Link to Front End Processor

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.1.33 Remote Access to Minicomputers	91-001.1 - ISDN Dial-up Access to Host for Order Entry
3.1.34 Integrating voice and data communications	91-009.6 - Unified Retrieval of Mail Messages 89-009.6 - Async Access to Host Computer
3.1.35 Integrated messaging	91-009.6 - Unified Retrieval of Mail Messages
3.1.36 Automatic utility meter reading	89-013.3 - Building Controls
3.1.37 University dormitory	89-004.1 - Passive Bus
3.1.38 Access to frame relay services	90-019.5 - Frame Relay Support
3.1.39 Switched access to frame relay services	90-019.5 - Frame Relay Support
3.1.40 High Fidelity Voice Transmission Systems	93-005.1 - High Quality Audio Transmission 88-027.5 - Use of Existing Secure Terminal Over ISDN
3.2.1 Rollabout videoconferencing systems	89-007.4 - Videoconferencing
3.2.2 X.25 back up	89-004.1 - Passive Bus
3.2.3 Packet mode screen sharing for many users	88-004.2 - Data Conferencing - LAN Type Access
3.2.4 - Home Office	89-004.1 - Passive Bus 89-014.3 - Transparent Outbound Service Selection 89-013.3 - Transparent Distribution of Incoming Calls to a Single ISDN Number

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.3.1 Local-area network interconnection	88-004.1 - Data Conferencing - LAN Type Access 88-006.1 - TOP and MAP Interface
3.3.2 File transfer and LAN access in a PBX environment	88-021.6 - High Speed File Exchange
3.3.3 Private Line Overflow and Disaster Recovery	89-034.2 - Call Alternate Routing
3.3.4 ISDN Concentrator to Campus Connectivity	88-003.1 - MAP 3.0 Interface 90-005.3 - Remote 128 Kbps Access to Academic Networks
3.3.5 PRI Videoconferencing	89-007.4 - Video Conferencing
3.3.6 Multimedia Desktop Video via Ethernet and Multirate ISDN	89-007.4 - Video Conferencing
3.3.7 Multipoint Video Conferencing	91-008.8 - Project Homeroom 89-007.4 - Video Conferencing
3.3.8 Videoconferencing facilities	89-007.4 - Video Conferencing
3.3.9 Caller identification to PBXs and other devices	91-006.5 - Automatic Number Identification (Caller ID) 89-050.3 - Primary Rate Interface to Airline ACD
3.3.10 Emergency-services call management	88-024.4 - Customer Service Call Handling 89-050.3 - Primary Rate Interface to Airline ACD
3.3.11 Call by call service selection	93-004.1 - Call By Call Service Selection 91-002.1 - IEC Dynamic Call Routing

CATALOG DESIGNATION	RELATED NIUF APPLICATION
3.3.12 Fax mail	90-001.3 - Centralized Fax Server with ISDN Access
3.3.13 Teleradiology	88-021.6 - High Speed File Exchange
3.3.14 High Quality Audio Transmission	93-005.1 - High Quality Audio Transmission
3.3.15 Access to litigation support system	88-021.6 - High Speed File Exchange
3.3.16 Call Center Load Balancing	91-002.1 - IEC Dynamic Call Routing 91-003.4 - Call Deflection with Unique Call Identification
3.3.17 Networked Voice Mail Systems	88-016.6 - Transparent Networking of Voice Message Systems

A.3 Application Profiles

The Implementor's Workshop achieves Application Profiles (APs) by providing an application-interoperable and service-interoperable specification of the NIUF applications related to the "ISDN Solutions" presented in the catalog. These profiles are generically described in the NIUF foundation document, "Application Profile Methodology 1.0". Profiles are made stable when all matters involving standards, conformance requirements, and parameters are resolved for every layer of a potential implementation.

Once these APs are made stable, it is the user's expectation that they are suitable for use when procuring products. Two of the APs are undergoing this final step in stabilization. Incoming Call Management and Voice Messaging Systems. Table A-2 shows the correspondence between NIUF applications and the NIUF Application Profiles..

TABLE A -2

NIUF Application	NIUF Application Profile
88-002.1	Engineering Workstation Interface
88-004.1	Data Conferencing -- Point-To-Point
88-004.2	Data Conferencing -- Multipoint
88-035.1	Unified Message Notification
88-013.3	Building Controls
88-024.4 88-005.1 88-023.4 88-025.4	Incoming Call Management
88-016.6 88-018.6 88-034.1	Voice Messaging Systems
89-006.2	ISDN Telephone Workstation Integration
89-035.3	Remote Agent
89-029.6	ISDN Station Event Recording
90-015.5 NIUF 406-92	Secure Voice Mail

A.4 Implementation Agreements

A major focus of the NIUF is the creation of Implementation Agreements, which are driven by the NIUF products mentioned in A2.1. These agreements apply, refine, limit, or specify the particulars of standards and identify those options which are to be commonly supported within North America. The agreements reached to date are included in the Bibliography of Section 6. A set of Implementation Agreements is defined for all protocols that must be present to support a particular user application or set of applications; this set is known as an Application Profile. To further aid the industry, the NIUF has been developing conformance test specifications based upon these agreements.

A.5 Versions

An NIUF Version maps the consolidated application, feature and service requirements from the NIUF's Applications and Profiles into the National ISDN levels of needed capability (NI-1, NI-2, NI-3). Both the NIUF workshops participate in the definition of Versions by identifying user priorities for the suite of services and features aligned to the Version functional entity concepts.

A.6 Conformance Criteria and ISDN Testing

Conformance requirements are typically depicted within the standards by M= mandatory, C = conditional or O = optional designators. The NIUF, or vendors, should preserve these designators in their implementation agreements as a visual (manual) first step to determine the ability of multi-vendor products to interwork or interoperate. The NIUF Conformance Test (CT) specifications provide test suites to be used to verify the conformance of ISDN equipment to the designated requirements, specification and implementation agreements. NIUF CTs are written in abstract form which means that these tests are only applied to the "logical" Implementation Under Test (IUT), i.e. no real product functions, features or capabilities are assumed.

There are several types of generic (multi-vendor) ISDN testing objectives that may be required by various forums, vendors, providers, users, testing centers, or carriers. Such types of testing objectives may include verification, validation, conformance, performance, or acceptance testing. Section 5 will describe the particular verification/conformance tests that originate within the NIUF. All other generic types are outside the scope of the NIUF test suites.

A.7 Application Software Interface

Today there exists an ever increasing number of ISDN Network Adapters (NAs) from different manufacturers, each with the same basic subset of features, plus additional features the manufacturers hope will differentiate them from the competition. Currently, each NA vendor presents a different software interface to the ISDN application. This introduces additional cost to the ISDN applications developer. Each interface represents the efforts on the part of the vendor to provide access to all ISDN services provided by the NA; yet each, done in isolation, differs from the others. In developing an ISDN application, therefore, the developer is faced with the task of (a) binding with an initial NA (one hopes a popular one), and (b) once his application is fielded, working to enhance his application product to interface with other NAs as well. Exemplifying this process are products in the market today that advertise "currently works with Network Adapters A, B, C; will support Network Adapters D and E in the near future".

The ASI is a software interface between an application and an NA within an operating environment (the operating environment includes the operating system, hardware platform, bus, etc.). The ASI does not guarantee interoperability between the end-to-end applications that may use the ASI.

The primary goal of the ASI is to provide a consistent set of application software interface services and implementation agreement(s) in order that an ISDN application may operate across a broad range of ISDN vendor products and platforms.

The NIUF team addressing this need has defined "the" interface as a number of progressively more generic software interfaces. They have been defining the specifications for use on a number of the prevalent personal computing operating environments. Those that have been completed are identified in the Bibliography of Section 6.

A.8 Cost Justification Worksheet

The NIUF Cost Justification Working Group presented "A Generic Model for ISDN Cost Analysis" at the Forum in February, 1993. The complete report is available from the NIUF Secretariat. This report is intended to help the decision maker conduct a cost/benefit analysis of ISDN for their situation by providing a framework for evaluation.

A generic spreadsheet has been developed based on the NIUF checklists which incorporates elements of standard financial analysis. Users should perform this analysis for both the present method of operation and all proposed system options, including ISDN, to obtain the most accurate view of the incremental costs and benefits of ISDN. This spreadsheet is presented here. Similar models have been developed by other organizations For more details, see the complete report, which is available from the NIUF Secretariat, and the Bibliography. See also Section 2 of this document for an illustration of its use.

A GENERIC MODEL FOR ISDN COST ANALYSIS

	A	B	C
1			
2		Monthly	One Time
3	**BENEFITS:**		
4	faster data rates		
5	New telephone set and terminal functions		
6	Access to packet data transfer		
7	Transparent switch/Automatic Call Distribution (ACD) networking		
8	Calling number identification		
9	Faster call set up and disconnect		
10	Reduced time in call answer/forward		
11	Increased call completions		
12	Reduced queuing		
13	Reduced agent keystroke time		
14	Faster information access		
15	Increased customer satisfaction		
16	Improved data accuracy		
17	Reduced time/dollars required for travel/messenger service		
18	Improved productivity		
19	Network-wide call management service		
20	**Assumptions/Variables:**	Monthly	
21	• *Estimated increase in productivity (%)*		
22	• *Number of affected workers*		
23	• *Average cost per worked hour*		
24	**Total Monthly Productivity Enhancement Benefits**	$0	
25	• *Amortization period for One-Time Costs*		months
26			
27	**COSTS ELIMINATED/AVOIDED:**	Monthly	
28	• Service Charges		
29	• Equipment		
30	• Cabling		
31	• Salaries		
32	• Floor Space		
33	• Environmental		
34	• Electrical		
35	• Maintenance		
36	• Moves and changes		
37	**Total Monthly Costs Eliminated/Avoided** :	$0	
38			

A GENERIC MODEL FOR ISDN COST ANALYSIS

	A	B	C
39		Monthly:	One-Time:
40	**COSTS OF IMPLEMENTING ISDN:**		
41	• Wiring, including connectors		
42	• Wiring design, certification		
43	• Contract termination charges		
44	• Network termination equipment (NT1, etc.)		
45	• Telephone sets and other terminal or office equipment		
46	• Training		
47	• Basic service		
48	• Usage fees		
49	• Special services (tie trunks, etc.)		
50	• Consulting or contractor fees		
51	• Legal fees		
52	• Cost of space	$0	
53	**Monthly Costs:**	$0	#DIV/%
54	**Monthly Equivalent of One-Time Costs (Amortized Over _ Months)**		#DIV/%
55	**Total Monthly Costs to Implement ISDN:**		
56			$0
57	**Total Monthly Productivity Enhancement Benefits:**		$0
58	**Total Monthly Costs Eliminated/Avoided:**		#DIV/%
59	**Less Total Monthly Costs to Implement ISDN:**		#DIV/%
60	**Total Savings per Month:**		