

Contents

Generic Requirements Notice Of Disclaimer	iii
Preface	xi
1 Introduction	
1.1 Background and Purpose	1-1
1.2 Scope	1-1
1.3 Document Organization	1-3
1.4 Key Documents	1-4
1.5 Terminology	1-5
1.5.1 Requirements Terminology	1-5
1.5.2 General Terminology	1-5
2 Overview of Server Reference Architectures and Examples of Some Possible Services	
2.1 Server Reference Architecture	2-1
2.1.1 Types of Access	2-2
2.1.2 Server Access Function (SAF)	2-2
2.1.3 Packet Network Server	2-2
2.1.4 Network Application Hosts	2-2
2.2 Service Examples	2-3
2.2.1 Host Selection	2-3
2.2.2 Security	2-4
2.2.3 Mnemonic Addressing	2-4
2.2.4 Multicasting	2-5
3 UNAM Operational Modes	
3.1 Non-Intercept Mode	3-1
3.2 Intercept Mode	3-1
3.2.1 Conversational Intercept Mode	3-2
3.2.2 Non-Conversational Intercept Mode	3-2
4 The UNAM Protocol	
4.1 The User Session	4-1
4.2 Architecture Considerations	4-1
4.3 Examples of Architectural Configurations	4-1
4.3.1 Central SAF Architecture	4-1
4.3.2 Distributed SAF Architecture	4-3
4.4 Layered Protocol Model	4-5
4.5 UNAM Primitives	4-6
4.5.1 NILS Primitives	4-6
4.5.2 UIIS Primitives	4-8

4.5.3	USAP Primitives and their Correspondence to CCITT X.25	4-9
4.6	Flows, State Diagrams and State Tables	4-11
4.6.1	Flows For Switching Using Call Control Packets with UNAM Facilities .	4-11
4.6.2	State Diagrams for the SAF	4-19
4.6.3	State Tables for the SAF	4-22
4.6.4	State Diagrams for the PNS	4-24
4.6.5	State Tables for the PNS	4-26
4.6.6	Flows for PNS Using Call Control Packets with UNAM Facilities	4-27
4.7	SAF Message Processing	4-28
4.7.1	CCITT X.25 Facilities	4-28
4.7.2	Incoming Call from User	4-31
4.7.3	Switching Request from the PNS	4-31
4.7.4	Clear Request from the NAH	4-31
4.7.5	Clear Request from the PNS	4-32
4.7.6	Clear Request from the User	4-33
4.7.7	Data Packets from the User	4-33
4.7.8	Data Packets from the PNS/NAH	4-34
4.7.9	Flow Control Handling	4-35
4.7.10	Restart Request	4-36
4.7.11	Reset Indication	4-36
4.7.12	Interrupt	4-36
4.7.13	D-bit Processing	4-37
4.7.14	Error Handling and Timeouts	4-37
4.8	UNAM Signaling	4-38
4.8.1	UNAM Facility Code	4-40
4.8.2	Mandatory Facilities In Initial Access to PNS - Non-intercept Mode . .	4-40
4.8.3	Mandatory Facilities In Initial Access to PNS - Intercept Mode	4-41
4.8.4	Optional Facilities In Initial Access to PNS	4-42
4.8.5	Mandatory Facilities In Return Access to PNS	4-43
4.8.6	Optional Facilities In Return Access to PNS	4-44
4.8.7	Mandatory Facilities In Switching Request from PNS	4-44
4.8.8	Optional Facilities In Switching Request from PNS	4-45

5 Server Architecture Support of Optional User Facilities

6 Performance

7 Administration and Operations

7.1	Memory Administration (Service Changes/Subscription Parameters)	7-1
7.2	Network Maintenance	7-4
7.2.1	Surveillance	7-4
7.2.1.1	General Requirements	7-4
7.2.1.2	Protection Switching	7-5
7.2.1.3	Alarms	7-5
7.2.1.3.1	General Alarm Requirements	7-5
7.2.1.3.2	Alarm Conditions	7-5

7.2.1.4 Protocol Abnormalities - UNAM	7-5
7.2.1.4.1 Protocol Abnormality Events - UNAM	7-5
7.2.1.4.2 Protocol Abnormality Counts - UNAM	7-5
7.2.1.4.3 Protocol Abnormality Log - UNAM	7-5
7.2.2 Testing	7-5
7.3 Network Data Collection (NDC)	7-6
7.3.1 General Requirements	7-6
7.3.2 SAF Requirements	7-7
7.4 Network Traffic Management (NTM)	7-7
7.4.1 General Requirements	7-7
7.4.2 SAF Requirements	7-7
7.5 Billing and Comptroller	7-7
7.5.1 Billing Number	7-8
7.5.2 Charging	7-8

Appendix A: References

Appendix B: Glossary

Requirement-Object Index

List of Figures

Figure 1-1	UNAM within the Server Architecture	1-2
Figure 2-1	Network Elements in the Server Reference Architecture	2-1
Figure 2-2	Packet Multicast Server within Network Server	2-6
Figure 4-1a	Central SAF Architecture - PNS Connection	4-2
Figure 4-1b	Central SAF Architecture - NAH Connection	4-3
Figure 4-2a	Distributed SAF Architecture - PNS Connection	4-4
Figure 4-2b	Distributed SAF Architecture - NAH Connection	4-4
Figure 4-3a	UNAM Protocol Stack for X.25/X.75/X.75' Access - PNS Session . .	4-5
Figure 4-3b	UNAM Protocol Stack for X.25/X.75/X.75' Access - NAH Session . .	4-6
Figure 4-4	Protocol Flows - UNAM Signalling within Call Control Packets . .	4-12
Figure 4-4-a	Example of PNS Terminating User Session	4-13
Figure 4-4-b	Example of User Terminating Session with PNS	4-13
Figure 4-4-c	Example of User Terminating Session with NAH	4-14
Figure 4-5	Example of Flow for SAF Alternate Initial Access to PNS - UNAM Q Bit Packet	4-15
Figure 4-6	Example of Flow for SAF Alternate Return to PNS - UNAM Q Bit Packet	4-15
Figure 4-7	Example of Flow for SAF Alternate Return to PNS - Using Idle VC	4-16
Figure 4-8	Example of Flow for SAF Switching to NAH - UNAM Q bit Packet	4-16
Figure 4-9	Example of Flow for SAF Switching to NAH - No Waiting for Clear Confirmation	4-17
Figure 4-10	Example of Flows Mixing UNAM Call Control with UNAM Q bit Data	4-18
Figure 4-11a	State Diagram for SAF Interaction with User, PNS and NAH	4-20
Figure 4-11b	State Diagram for SAF Problem Handling	4-21
Figure 4-12a	State Diagram for PNS Interaction with SAF	4-25
Figure 4-12b	State Diagram for PNS Problem Handling	4-26
Figure 4-13	Protocol Flows at PNS - UNAM Signalling within Call Control Packets	4-28
Figure 4-14	Examples of Packet and Window Size Negotiations	4-30

List of Tables

Table 4-1	UNAM/Packet Layers Primitive Relationship - NILS	4-7
Table 4-2	NILS Primitives	4-7
Table 4-3	UNAM Packet Layers Primitive Relationship - UILS	4-8
Table 4-4	UILS Primitives	4-9
Table 4-5	UNAM Packet Layers Primitive Relationship - USAP	4-10
Table 4-6	USAP Primitives	4-11
Table 4-7	State Transition Table for SAF UNAM Layer	4-23
Table 4-8	State Transition Table for PNS UNAM Layer	4-27