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WORKING PAPER

NAMING AND ADDRESSING CONCEPTS IN THE UPPER LAYERS

Summary

This working paper presents information about the naming and addressing architecture for the Upper Layers. It describes what addressing information is required; and how that information is used by the Upper Layer protocols to establish communication.

1. Introduction

The structure of the ATN Naming and Addressing is based on the ASO structure presented in the ULA SARPs. The ASO structure consists of a user service interface to the ASO, a Control Function which maps the user service interactions to the ASEs, a set of one or more ASEs which implement the application; and the Control Function which maps between ASE service interface requirements and between ASEs and the lower layers.

The ATN Naming and Addressing is also based on the concepts described in the OSI Naming and Addressing part (ISO 7498-3). ATN naming is based on the needs to identify ATN application and to identify the location of that application. ATN addressing is based on the service access point definitions specified in the ATN manual and the mapping from ATN names to addresses.

2. Concepts

2.1 Naming Concepts

Within the scope of the ATN, naming is associated with identification of specific pieces of software or hardware within the ATN environment. This means that each ATN application will have a unique name which can be used to identify the particular application. (An application that is constructed as an ASO as specified in the ULA SARPs will have an ASO-title as the unique name. For the remainder of this section the term ASO-title will be used to refer to the ATN application.)

The ASO-title is used to identify which ATN application is to be used in a particular instance of communication. The ASO-title does not specify a logical location or a specific instance of the ASO.

To make an ASO-title unique within the scope of the ATN environment, an additional qualifier is needed that ties the application to a particular “system”. This can be viewed as the name of the “facility” where the application resides. (This is not to imply that the “facility name” designates a physical location, only that for naming convenience an ASO-title with a “location-id” is a unique name within the scope of the ATN environment.

2.1.1 ATN Application Names

Each ATN application will be assigned a unique application name. An initial list of ATN applications and the assigned name is presented in Appendix A.

2.1.2 ATN Application Context Names

Each application in the ATN requires not only an ASO-title, but also an ASO-context name which describes the syntax of the apdus. For the initial ATN applications, there will be only one context for each application.

The OID for the initial ASO-context for each ATN ASO will be identical to the OID of the ASO-title.

2.2 Addressing Concept

Addressing is the assignment of specific attributes which identify the logical location of a resource. In the ATN environment, the addressing of an ASO is the Presentation Service Access Point (PSAP) assigned to each ASO residing in a particular ATN system.

The ULA SARPs specify that the efficiency enhancements for the Presentation and Session Layers will be used. In that case, the PSAP consists of the ATN Transport selector and Network Service Access Point (NSAP).

The assignment of addresses to ASOs is the responsibility of individual ATN operators.

2.3 Description Concepts

Within the scope of the ATN ULA, there are two choices for passing naming information in the application protocols. One technique is to use IA5 ASO-titles in the PCI. The other is to use the ASN.1 construct of Object Identifiers (OIDs). IA5 would translate into longer PCI with more processing over what would be required using OIDs.

Through-out the remainder of this paper, it is assumed that ATN names will use the OID construct.

2.4 Registration Concepts

The use of OSI has required the establishment of registration procedures for OIDs, names, and addresses to ensure consistency of the OSI environment. A registration authority is a body given authority by a superior registration authority to assign and maintain a registry of OIDs, names, or addresses.

For OIDs, there is a "tree" structure defined where a hierarchy of registration is defined. The root of the registration tree, for ATN, is ISO. ISO has established several sub-domains that further allocated domains. Under ISO is the ICD (Internationally registered Organizations). Each organization with a defined domain may allocate OIDs under its domain. ICAO is a registered organization under which OID may be registered.

It is proposed that ICAO establish an ATN domain for OID values which will be unique within the ATN environment.

As ATN becomes deployed, a registration authority or agent needs to be specified for the assignment of OID values.

3. User to Control Function Naming

This section describes the interaction between the user and the control function supporting the Application Service Object (ASO). In particular, it describes the method by which a user identifies the destination for the communication.

3.1 User Naming Requirements

The user is not concerned with addressing since it is interested in a named peer entity. In the ATN environment, the Application (or more correctly, the ASO) is explicitly identified by the user selection process. (How the user selects an application, such as ADS, is a user interface issue and is not the subject of this paper. Needless to say, there is a mechanism by which the user select the ASO it wishes to operate.)

The user must provide only location information sufficient to identify the remote site to which it wishes to communicate. This location information is semantically equivalent to the ICAO facility designator or aircraft identifier.

The combination of ASO and location identifier is sufficient to establish communication.

It is recommended that the user interface present information about the identification of the application and the location in a format which is readily understood by the user. That is, for location identification

the ICAO designation should be used; and for applications the application name given below should be used.

4. Control Function to Application Service Element

The Control Function (CF) needs to perform little work in mapping the user information into the information need by the specific Application Service Element (sASE). The control function must map the appropriate button pushes or other input mechanism from the user to the syntax required of the sASE.

For ATN ASOs, the CF will provide the ASO-title according to the registered ATN ASO-title. This name will be presented in an IA5 syntax.

For ATN location identification, the CF will provide the information as either a 24-bit binary identifier; or as an IA5 string consisting of a valid ICAO location identifier.

5. Application Service Element use of Dialogue Service

The sASE does not need to perform any transformations on the CF information; but it merely passes it to the CF through its realization of the abstract Dialogue Service.

At this point, the information available at the sASE/CF interface is the:

Application-title
location-id

Each sASE must define the syntax of the addressing information; but it is recommended that the syntax match that of the naming and addressing information presented here. In particular, the sASE must define the syntax of the location-id. It is recommended that in the initial version of the sASEs, the 24-bit ICAO address be used where possible. For other locations, the ICAO AFTN facility ID may be used.

6. Control Function to ACSE

The CF must translate the ASO-title and location identifier into:

- OID identifying the ASO,
- OID identifying the ASO-context,
- PSAP of the source application, and
- PSAP of the destination application.

The two OIDs comprise the naming information required to establish the association. The two PSAPs establish the addressing information needed to establish the association.

The critical processing by the CF is the directory or mapping function between names and addresses. It is here at the CF interfacing with the ACSE that the conversion between names and addresses occurs.

7. ACSE Processing

The ACSE maps the OIDs to specific parameters required for association establishment. It uses the addressing information for selecting lower layer functions.

8. ACSE Mapping to Lower Layers

The ACSE uses the information provided in the service calls to form proper apdus for its peer; and to form lower layer service requests. The lower layer service requests consists of passing appropriate

addressing information. This information consists of Presentation Service Access Points (PSAPs). In the context of the ATN, a PSAP consists of:

- Null Presentation selector;
- Null Session selector;
- Transport selector; and
- NSAP.

Appendix A - ATN Application Names

ATN Application Name	ATN Application
ADS	Automatic Dependent Surveillance
GWA	AFTN/ATN Type A Gateway
GWB	AFTN/ATN Type B Gateway
AMHS	ATN Message Handling
CPDLC	Controller Pilot Data Link Control
AIDC	
CMA	
TWDL	

Appendix B - ATN OID Values

ATN OID are assigned according to the following algorithm:

-	ATN Management	00-15
-	Ground-Ground Communication	16-31
-	Air - Ground	32-47
-	Gateways	48-55
	Private	56-63

For expansion, the algorithm is repeated by adding 64*n where n>1.

ATN Application Name	OID
ADS	{ISO(1) ICD(3) ICAO(27) ATN(0) ADS( )}
GWA	{ISO(1) ICD(3) ICAO(27) ATN(0) GWA( )}
GWB	{ISO(1) ICD(3) ICAO(27) ATN(0) GWB( )}
AMHS	{ISO(1) ICD(3) ICAO(27) ATN(0) AMHS( )}
CPDLC	{ISO(1) ICD(3) ICAO(27) ATN(0) CPDLC( )}
AIDC	{ISO(1) ICD(3) ICAO(27) ATN(0) AIDC( )}
CMA	{ISO(1) ICD(3) ICAO(27) ATN(0) CMA( )}
TWDL	{ISO(1) ICD(3) ICAO(27) ATN(0) TWDL( )}

The defined OID values will be used for both the ASO-name and the ASO-context. If additional ASO-contexts are needed for a given application, additional OID values may be assigned.