ATNP/WG3/WP5-18

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AERONAUTICAL TELECOMMUNICATION NETWORK PANEL
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ATNP/WG3/SG3 CNS/ATM-2 SARPs Planning

(Presented by ATNP/WG3/SG3 Chairman)

Summary
ATNP/WG3/SG3 presents its work items for inclusion in CNS/ATM-2 Upper Layer Architecture (ULA). WG3 is invited to comment on and approve the work items.

1. Introduction

The paper offers an indication of the direction of the CNS/ATM-2 Upper Layer Architecture (ULA) Standards and Recommended Practices (SARPs). This work will be presented in draft form at the ATNP/WG3 meeting in Munich in June 1996.

2. Work Items

ATNP/WG3/SG3 presents the following work items in rough order of significance. Many of the items are internal to the ULA, and are recommended for efficiency and performance benefits.

2.1 Association Control Service Element (ACSE), edition 3

As indicated at the WG3 meeting in Toulouse in March 1995, the goal ULA is ACSE, edition 3, over the Upper Layer (UL) efficiency enhancements.

The Association Control Service Element (ACSE), edition 3, is the ACSE work designed to support the extended application layer structure (XALS). The ACSE, edition 3, supports extensions for Application Service Object (ASO) naming and ASO associations. The chief benefit of the work is a reduction in communications costs, as multiple associations may be multiplexed over a single transport connection.

The work is now in Committee Draft (CD) status at the International Organization for Standardization (ISO). The draft will be reviewed at the ISO meeting in Paris in February 1996. The United Kingdom (UK) have indicated a NO vote, based on incomplete normative annexes. Given this is resolved, the ACSE, edition 3 work will progress to Draft International Standard (DIS) by the ISO SC21 meeting in Kansas City in May 1996.

The ATN community provides the editor for this effort.

2.2 ISO UL Efficiency Enhancements

The Upper Layer (UL) Efficiency Enhancements are being progressed in ISO. The UL Efficiency Enhancements offer the capability of negotiating out capabilities in the session and presentation layers. The UL efficiency enhancements also allow more efficient encoding in present implementations and use of proactive means in association establishment. The ISO UL Efficiency Enhancements build on the first-generation work standardized in the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) ’fast byte’ recommendations used in CNS/ATM-1.

The work will progress at the ISO meeting in Paris in February 1996.

The ATN community provides the editor for this effort.

2.3 ASO Template

ATNP/WG3/SG3 submitted an applications development template (the ASO template) to the meeting in Banff. The ASO template promised increased automation in applications development, by guiding the applications designer in specification of the application-specific aspects of the ULA control function (CF). The work was deferred in Banff as the CNS/ATM-1 applications had been constructed before the template; and the template required refinement in the D-START and D-END capabilities.

2.4 Application Mobility

ATNP/WG3/SG3 has been studying ULA handling of application mobility requirements. SG3 has been pursuing making application transition from center to center transparent to the application. The Canberra Brachiating[1] paper discusses this approach. The application association would be preserved while supported across different transport connections, maintained in a transport connections pool.

2.5 Construction of Useful Application Service Elements (ASEs)

The ULA accrues a significant gain in its identification of common ASEs which can be reused as new applications are constructed. The use of reusable components has advantages in the certification process. Applications designers have made various requests to SG3 for common ASEs. Analysis of CNS/ATM-1 applications for common functionality and user requirements lead to the following suggested ASEs.

2.5.1 CMA as ASE

The Context Management Application (CMA) provides initial logon and limited directory for the ATN. OSI provides a logon service in the form of the ACSE currently incorporated in the ULA. The limited directory service is implemented in the CMA ASE as described in the SG3 Boston meeting report, Flimsy 1.

2.5.2 CCR

A requirement has been raised in the ADSP for a two-phase commit capability. The Commitment, Concurrency, and Recovery (CCR) is

[1] As the monkey moves from tree to tree

the OSI standard for this activity. Its implementation is considered for CNS/ATM-2. It requires the use of session Functional Units (FUs) beyond kernel and full-duplex.

2.5.3 Time

A time ASE is an effective candidate for ATN standardization. A time ASE would provide performance measures necessary for CNS/ATM-2 applications.

2.5.4 Message Reference Numbers

A message reference number ASE would greatly simplify the construction of message applications. Such an ASE would provide correlation between message reference numbers to allow multiple responses to a single message, as well as tracking of outstanding messages.

2.5.5 Confirmed Data Service Element

A confirmed data service element (CDSE) would provide for confirmation of protocol data unit (PDU) delivery to the corresponding AE-User rather than to the corresponding transport entity.

2.6 Session ASOs

Certain proposed applications such as CCR require the use of Session FUs beyond kernel and full-duplex. Recasting session FUs as ASOs is consistent with the ATN ULA. The work involves reproducing the session FU protocol for the data-transfer phase.

An advantage of ASO standardization is that it is entirely a matter for the ATN community -- no ISO activity is involved.

2.7 System Management

SG3 can accept a small item to profile Remote Operations Service Element (ROSE) and Common Management Information Protocol (CMIP) over the CNS/ATM-1 ULA.

The ATN community has contributed significantly to the current DIS draft of ISO 10164-14 Managed Objects for Upper Layers. The work should be followed, and incorporated in CNS/ATM-2 system management activity.

SG3 can investigate management requirements for ATN applications.

SG3 can also serve as a coordination point for consistency with the lower-layer management paradigm.

2.8 Security

On user request, security requirements will be incorporated in the ATN ULA. It is noted that ACSE, edition 2, currently supports the authentication FU. SG3 can also study the Generic Upper Layer Security (GULS) work, as required. This work should lead to a common ATN security ASE.

2.9 Relative OIDs

The ATN naming architecture is based on the construction of Object Identifiers (OIDs). The OIDs provide a global naming capability. However, in the ATN, it is possible to predict much of the high-order portion of an OID (e.g., iso.icd.icao.atn ...). There is current work in ISO to provide relative OIDs, that express only the OID string of interest. This would allow a reduction of one-half in ATN OID size. Work should also be encouraged in better Packed Encoding Rules (PER) encoding of OIDs.

3.0 General Principles in Design of CNS/ATM-2 Package

3.1 CNS/ATM-1 Application Compatibility

All versions of future applications must coexist with CNS/ATM-1 applications. This implies that CNS/ATM-1 applications must be able to exist in any CNS/ATM-2 ULA.

3.2 CNS/ATM-1 ULA Compatibility

All CNS/ATM-2 ULA elements must interoperate with CNS/ATM-1 ULA elements. Thus, the ACSE, edition 3, is designed to interoperate with the ACSE, edition 2.

4.0 Recommendation

WG3 is invited to comment on the proposals and approve the further work of SG3 towards the Munich WG3 meeting.

Editor’s Note -- The following recommendations were received after the Toulouse SG3 meeting.

2.10 Connectionless Upper Layer Architecture

Certain of the CNS/ATM-1 applications could benefit from a connectionless ULA. All relevant OSI standards are in place. Minor modifications to the dialogue service would be required.

2.11 Pools

An extremely useful feature would be the creation of transport pools, such that a transport connection would not have to be set up in real time, but could exist before the application association actually had need of it.

2.12 New Reliable Transfer Service Element (RTSE)

in line with the recasting of Session FUs as ASOs, the specification of a new RTSE is suggested.

2.13   Fast Byte Checkpoint ASE

In line with the useful ASE discussion, the creation of a fast-byte-based ASE to handle checkpoint and recovery is worth investigating.

2.14 X.500

During the TULIP era, it had been generally accepted that CMA was an air-ground ASE which might usefully be interfaced to a ubiquitous ground-ground X.500 directory service. X.500 could be investigated as priorities permit.

2.15 Multicast

Use of ground-ground applications has indicated that multicast of messages is a useful feature. As the OSI work on multicast is well under way, simple ATN extensions for multicast could be investigated.

2.16 CMA Note

It is noted that CMA does not provide the AP-title, so that all names provided are of the form ’local’.ADS. Thus, ULA extensions to naming for mobility could be confined to the name-address table described in the SG3 Boston meeting report.