Aeronautical Telecommunication Network Panel
Working Group 2
Banff, Canada
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Proposed Resolution of Open CCB Issues Arising From
Presentation of Flimsy 6 - Routing Architecture: Considerations for the
Update of ATN Internet SARPs Draft 2.1,
at the ATN WG2 Fifth Meeting, Rome 21 July 1995

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.During the ATN Panel Working Group 2 Rome Meeting, deliberations concerning the ATN architectural aspects contained in Appendices 6 and 11 of Draft 2.1 of the proposed ATN Internet SARPs, several issues were identified requiring detailed review and technical analysis.

This document discusses the implications and proposes resolution of those technical issues arising from Flimsy 6 and assigned to the CCB consideration and resolution.

The issues are related to the following areas:

- Mobile Routing Initiation
- Robustness of Connectivity (Multiple Connectivity)
- Routing Domain Route Propagation
- Backoff Procedures
- Clearing Causes and Leave Events

ATNP WG2 members are invited to review and comment on the issues and the proposed resolutions presented. Appropriate CCB action will commence to formalize agreed upon resolutions.

References:

1)   Flimsy 6 - Routing Architecture: Considerations for the Update of ATN Internet SARPs Draft 2.1, Issue 1.0, 21 July 1995

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1.0 Background

During the ATN Panel Working Group 2 Rome Meeting, deliberations concerning the ATN architectural aspects contained in Appendices 6 and 11 of Draft 2.1 of the proposed ATN Internet SARPs, several issues were identified requiring detailed review and technical analysis.

This document discusses the implications and proposes resolution of those technical issues arising from Flimsy 6 and assigned to the CCB consideration and resolution.

The issues are related to the following areas of the ATN version 2.1 Draft SARPs:

- Mobile Routing Initiation
- Robustness of Connectivity (Multiple Connectivity)
- Routing Domain Route Propagation
- Backoff Procedures
- Clearing Causes and Leave Events

Participation is needed by ATNP WG2 members to review and comment on the issues and the proposed resolutions presented. The intent of this document is to enable appropriate CCB action to commence to formalize agreed upon resolutions.

2.0 Discussion

Issue 1 - Mobile Routing Initiation

In support of recommendation 4 of section 3.4, Mobile Routing Initiation of Flimsy 6 (Issue 1.0 21 July 1995), it is necessary that, in all cases, ground-initiated subnetworks must establish 8208 connectivity (and exchange ISH PDUs) with airborne routers, or ground-based subnetworks initiating a Join Event for such airborne routers, to enable the mobile subnetwork to be aware of the presence and availability of all ground subnetworks.

This capability is not specifically outlined in 3.5.2.3, Ground-Initiated Route Initiation of Section 3, ATN Routing . Lack of a specific route initiation requirement may lead to network implementations whereby connectivity and therefore routes may not be available to aircraft for routine or emergency use even though the aircraft is in coverage of that ground subnetwork.

The first sentence in 3.5.2.3 should be changed to state:

"On receipt of a Join Event, the Air/Ground Router shall:

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a) Issue an ISO 8208 Call Request with the DTE address reported by the Join Event as the Called Address. "

Note 3 in 3.5.2.3 should also be changed to state:

"Note 3. - In no case will an air/ground router fail to issue an ISO 8208 Call Request from an airborne router. Validation functions relating to whether or not a subnetwork connection is acceptable do not apply and no Join events shall be ignored by the air/ground router."

Issue 2 - Robustness of Connectivity

In general for airborne subnetworks, more than one link to ATN Backbone RDCs will enhance the robustness of connectivity between mobile and fixed routing domains. Such multiple links may be required under conditions of poor ground connectivity or where it is desirable to choose between types of connections for economic or operational policy reasons (i.e. choose VHS over SATCOM when aircraft comes within range for economic reasons).

Connectivity with more than two ground routing domains would further enhance robustness but may be viewed as too costly (in terms of resource consumption) to be mandated in general.

The ability of an airborne subnetwork to establish such multiple ground routing domain connections is not specifically mentioned in Section 3 of the SARPS. It is required, therefore, that the following material be inserted in 3.5.1, Interconnection Scenarios, as section text following Note 5:

" Minimum connectivity shall be established between an airborne routing domain and at least one ground routing domain with direct or indirect connectivity to an ATN Backbone RDC. Connectivity with more than one ground routing domain shall be attempted by the airborne router when such connectivity is possible and necessary.

The IS-SME in the Air/Ground Router receiving the Join Event from the airborne routing domain shall facilitate route initiation unless prohibited by routing policy, as a local matter."

Issue 3 - Route Propagation To RDs More Than One Hop Away From A Backbone RDC.

In 3.7.3 of Section 3 ATN Routing, there is not specific reference or requirements for propagation of routing information to routing domains more than one hop away from an ATN Backbone RDC.

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It is the intent of ATN routing policy to insure that routers in such one hop away routing domains receive routes to mobiles via the connected backbone RD or RDC.

The following text is to be inserted as Section 3.7.3.4:

3.7.3.4 ATN RDs More Than One Hop Away From an ATN Island Backbone RDC

"When IDRP is being used to exchange routing information, and an ATN TRD is more than one hop away from a ATN Backbone RDC which is advertising routes to mobiles, the ATN TRD shall receive these mobile route advertisements via an adjacent RD which is a member of that backbone RDC."

Issue 4 - Backoff Procedures

Section 3.5.2.2.1.1, Call Request Failure, defines backoff procedures which apply in general to any Clear Indication. The Clearing Cause must be referenced to determine when backoff procedures should actually be applied.

Backoff procedure must not preclude initiation of emergency Call Requests.

The first paragraph in 3.5.2.2.1.1, Call Request Failure, is to be replaced as follows:

"Whenever a Clear Indication is received in response to a Call Request that indicates rejection by the called DTE, the clearing cause shall be referenced by the airborne router's IS-SME to determine appropriate action. If the Airborne Router implements a "back off" procedure based upon the Clear Indication, this procedure shall comprise the effective quarantining of the called subnetwork address for a period configurable on a subnetwork basis from 5 to 20 minutes. During this period, a Call Request shall not be issued to the subnetwork address."

"Note: - Implementation of the "back off" procedure does not preclude initiation of emergency Call Requests as specified in 3.5.2.1.1, Emergency use of a Mobile Subnetwork."

Issue 5 - Clearing Causes and Leave Events

When a Leave Event is reported to an ATN IS-SME in cases of ISO 8208 clearing of calls or connections, the SARPS must specify that the IS-SME shall reference the clearing cause (e.g., idle timer expiration) to determine the proper action to be taken. Such clearing cause values are specified in Table 7-6 of Section 7, Subnetwork Service and Protocol Specification.

The fifth paragraph in Section 3.5.2.1.2, Air-Ground Route Termination, beginning with "When an IS-SME receives..." should be changed to state the following:

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"When an IS-SME receives a Leave Event for a subnetwork connection or a DTE on a Subnetwork, then it shall first reference the call clearing cause represented as a specific octet value in the ISO 8208 cause/diagnostic field. The diagnostic values shall be as specified in Table 7-6 of Section 7 of the ATNP SARPS. The IS-SME shall determine, based upon policy constraints, whether to reject the Leave Event or clear the virtual circuit.

If the clearing cause is acceptable, the IS-SME shall then clear the virtual connection or take other appropriate actions, based on the procedures specified in 7.6.4.10, Call Clearing Provisions.

Note: - If the clearing cause received for a ISO 8208 connection is identified as an Idle Timer expiration, a route may still be maintained for that subnetwork.

If a valid Leave Event for a subnetwork connection or a DTE on a subnetwork is received, then the IS-SME shall ensure that, respectively, either the affected subnetwork connection or all subnetwork connections on that subnetwork and with the identified DTE are cleared."

3. Conclusions

Based upon the issues presented and the accompanying proposed resolutions, it is recommended that appropriate changes be made to the identified areas of the SARPs to reflect agreed upon resolutions.

4. Proposal

It is proposed that:

WG2 accept the above discussions, conclusions and proposed resolutions to provide updated CNS/ATM-1 SARPS procedures. WG2 direct the CCB to move to close these open action items with the proposed resolutions.