X3S3.3/91-18R
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Title: Proposal for a NWI to Dynamically Assign Area ES and IS Prefixes

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Reference: DIS 10589

1 Background

Hierarchically-assigned addresses that are rooted at the backbone are currently being proposed for scaling purposes. (Reference the 1 March 1991 Internet Draft *Guidelines for OSI NSAP Allocation in the Internet*.) Additionally, the IS-IS routing protocol (DIS 10589) (Section B.3.1 of "Addressing Considerations for Inter-Domain Routing") indicates that routing tables can only be compact if the hierarchical assignment of addresses follows the hierarchical topology. For instance, if all NSAPS under a particular backbone share a part of the address space, and if no other NSAPs share the same address space, then all the NSAPs can be compressed into one address prefix. When a stub domain attaches to a backbone, the backbone will give it a subset of its NSAP address space. If the stub domain detaches from that backbone and attaches to another backbone, a new NSAP address space will be assigned. Thus, a requirement exists for address assignment procedures that facilitate ES and router address changes to reflect a change in attachment.

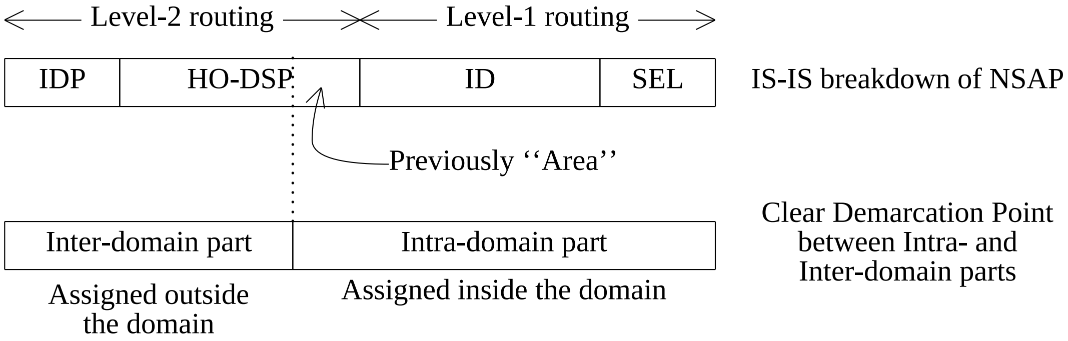
The purpose of this new work is not to assign individual addresses to ESs or routers, but new prefixes to all ESs and routers in an area. It is useful to be able to limit the address assignment to a single area since everything in an area has the same prefix; the prefix, however, is not necessarily shared by the rest of the domain, as in the case where one area connects to a backbone and another area connects to another backbone because the areas are in different countries. In addition, it should be possible to assign all area prefixes within a whole domain as well.

Proposed text for ISO 9542 and ISO 10030 Address Administration (X3S3.3/91-83 and 84) have been submitted under NWI JTC1.6.41.1.1. These texts provide a mechanism by which an ES can discover its own address by means of a protocol exchange. They are limited in scope, in that only a single address is provided. They do not assign multiple addresses, nor do they provide mechanisms to change addresses (short of an ES requesting a new address).

2 Approach

2.1 Clear Demarcation Point Between Intra- and Inter-Domain Address Parts

Currently, the IS-IS routing protocol organizes an NSAP address into the following parts: IDP (initial domain part), HO-DSP (high-order domain specific part), ID, and SEL (selector).



Notice that part of the HO-DSP falls within the purview of IS-IS routing, and part is dictated by the backbone the stub domain connects to. In previous versions of 10589, two octets on the right of the HO-DSP were specified to identify the level-1 area; these two octets were defined by the stub domain. Under the new work, DIS 10589 would be modified to again explicitly define this two-octet "area" so that a clear demarcation point exists between the "intra-" and "inter-domain" parts of the address, and that all ESs and routers in an area or domain have one intra-domain part (but one or more inter-domain parts). By doing this, mass address assignment becomes nothing more than adding or deleting the inter-domain part. Note that the intra-domain part for each ES or IS is determined by other means.

2.2 Permanent and Alias Address Spaces

An option for a permanently-assigned address prefix is recommended for maintaining addressing stability in the domain. This "primary address space" is not associated with any backbone and is presumably used for internal communications. That is, it is used for communications between two ESs within the domain, but not between an ES within the domain and an ES outside the domain. This stable addressing space will not change because of external topology or backbone changes. Accordingly, the proposed address administration technique CANNOT modify this prefix. By making it impossible to modify this prefix, it would be impossible to accidently wipe out all internal communications if this option were selected.

Zero or more "alias" address spaces used for external communications are assumed. Alias addresses allow traffic to multi-homed ESs to be routed via the address. These addresses are assigned by the backbones and explained more fully in X3S3.3/90-334. These addresses are added and deleted by the new technique.

2.3 Router Address Assignment Update

There are two methods which could be used to assign new prefixes: via routing algorithms or via system management. Upon initial investigation, there does not appear to be an existing mechanism by which address administration could be easily accomplished through system management. Thus, it would be ad hoc and not standardized. Alternatively, prefixes could be assigned and de-assigned in ISs by piggy-backing explicit prefix information on DIS 10589 LSUs. This information could subsequently be conveyed to ESs via IS0 9542 and IS0 10030 configuration messages. Elements of address assignment currently exist within 10589, as the manualAreaAddresses parameter can remove and add addresses today. Additionally, router consistency can be maintained if address assignment is done as a function of routing. Thus, we believe that flooding prefix assignments using the existing 10589 flooding algorithm is a viable approach and an NWI that develops this approach and considers the ramifications of it (for instance, on directory service) should be started.