You can throw this page away

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AEIOU

Address Extension by

IP Option Usage

Brian E. Carpenter

CERN

European Laboratory for Particle Physics

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What if no IPng is ready to be deployed before IP addresses run out?

AEIOU proposes a way to face this risk.

It is not an IPng, but it is a new release of IP, tackling only the address space problem.

Baseline need is for flexible address extensions beyond 32 bits.

However, bigger addresses break addressing and routing architecture.

AEIOU aims to avoid this: wide area addressing and routing do not change.

Conservation measures

1. Do not extend the global Internet address space or modify the global routing architecture.

2. Do deploy CIDR and BGP4. Be very restrictive on allocations to new sites (i.e. give them the minimum CIDR space that will satisfy them for one or two years).

3. Do not allocate any new network numbers to sites that already have at least one network number of any class (A, B, C). Try to recover unused numbers and CIDRise sparse networks. Encourage use of RFC 1597.

Address extension option

4. Add two IP options "Source Address Extension" (SAE) and "Destination Address Extension" (DAE):

Type: [copied, class 0, option no. TBD]
Length: 6
Data: 4 byte address extension (AE)

AE options are carried transparently and survive fragmentation. Neither, either, or both may be present.

5. AEs are allocated by a site. The AE space is structured like Class A, B and C space and all normal subnetting techniques apply. A host in AE space has a 64-bit address (site address, AE).

Each site has a globally unique 32-bit site address, which can be any IP address from the site's IANA-allocated space. This site address "hides" all the site's AEs.

Example: the site currently allocated 128.141 could use 128.141.141.141 as its site address. This would be the wide-area address used for routing all packets to the site's 32-bit AE space.

Wide-area routing does not change. Routing to non-AE hosts does not change.

6. Hosts now fall into three classes:

OLD hosts; still running 32-bit IP only.

NEW hosts; AE implemented, but no allocated AE (i.e. NEW hosts are still in the global 32-bit space.) AE=0.0.0.0 for NEW hosts.

AE hosts; AE options implemented, and an AE allocated. AE hosts are in the new 64-bit space.

Who can talk to who:

	OLD	NEW	AE
OLD	32	32	no
NEW	32	32	64
AE	no	64	64

Deployment

1: A site address is allocated for every Internet site.
On-site routers are upgraded to AE.
Servers are upgraded from OLD to NEW.
OLD clients can still access NEW servers.

2: Ensure that all newly installed clients are AE hosts.
New clients no longer consume 32-bit addresses.

3: Progressively convert OLD clients to AE. This means upgrading software versions, and renumbering clients. At the same time, RFC 1597 addresses could be transformed into AEs if required.

4: Sites will now have many unused 32-bit addresses recovered during Stage 3. A fraction of these can be recovered by CIDR, and re-allocated as site addresses for new sites.

5: Theoretically, all servers can be converted from NEW to AE. Almost all 32-bit addresses can be recovered and re-used. We now have a two-tier Internet address scheme (32-bit site address space managed by IANA, and 32-bit AE space managed by individual sites).

Just a few details...

On-site routers, ARP, DNS and host software have to be modified. The main point is that there is less to modify than for any IPng proposal.

Most worrying is the API (for example the socket API), but we have to make that flexible in any case.

Acks: **to EIP, IPAE, TP/IX and various individuals.**