Impact of IPv6 Site-Local Addressing on Applications

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What is Site-Local

* IPv6 introduces scoped unicast addressing
  * Link-local, site-local and global
* Site-local addresses are constrained to a single administrative site (not well-defined)
* Packets to/from site-local addresses are dropped at site borders

Properties of Site-Local Addresses

* IPv6 site-local addresses are:
  * Ambiguous: The same site-local addresses may be used in more than one site
    - Disambiguated within a site-border node by a zone ID
  * Unreachable from outside the site
    - Traffic may be dropped, or reach an unintended end node
* These properties impose requirements and restrictions on applications

Site-Local vs. NAT

* Site-local addresses are dropped, not translated, at site borders

  * Lack of NAT ALGs places burden on upper layers not to leak site-local addresses

* Site-local does not offer the "security" of one-way connectivity

  * Hosts will need separate global addresses for global communication

  * Hosts with global addresses will be reachable from the outside, unless firewalls or filters are used

Applications Impact of Site-Local

* Three categories of application impact
  * Apps that do not exchange IP addresses in application layer packets
  * Two-party apps that exchange IP addresses
  * Multi-party apps that exchange IP addresses

* Need to refine categories and give real-world examples of each type of application

Application Impact of Site-Local

* For apps that do not exchange IP addresses
  * User interface needs to allow entry of zone ID
  * Applications may need to express preference regarding address scope
    - Especially important if access control is based on a site-local source address
  * Need to associate a zone ID with any non-global addresses received (via DNS, API calls, etc.)
    - Used to disambiguate overlapping address spaces on send

Application Impact of Site-Local

* For two-party apps that exchange IP addresses
  * Apps need to avoid leaking site-local addresses
    - App-specific mechanisms required, but could be based on draft-stewart-tsvwg-sctpipv6-01.txt
  * Leaked addresses may result in lost connections, or reaching the wrong node
    - Robustness/security implications differ by application

Application Impact of Site-Local

* For multi-party apps that exchange IP addresses
  * IP addresses may be handed from one node to another, to another, etc. at the application layer
  * Also need to avoid leaking site-local addresses
    * Will require app-specific mechanisms, but it is entirely unclear how/where apps will get the information to detect and enforce site borders
  * Restrict these applications to global addresses?

Status of Site-Local in IPv6 WG

- Scoped Addressing Architecture underway:
  - draft-ietf-ipngwg-scoping-arch-04.txt
- WG consensus to limit site-local addressing within range of two major choices
  - "Limited" usage -- only on disconnected networks
  - "Moderate" usage -- no site-border nodes
- Site-local impact documented in individual draft:
  - draft-wasserman-ipv6-sl-impact-02.txt

Apps Area Input Needed

* Help define application categories with real-world examples

* Provide input on the types of applications that exist and how they may be affected by addressing

* Come to IPv6 on Thursday to discuss
  * 0900-1130 in Continental 1-4

Questions or Comments?