NAT64/464XLAT Deployment Guidelines in Operator and Enterprise Networks

draft-ietf-v6ops-nat64-deployment-00

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History

- Discussion in IETF regarding using only NAT64 in our network

- Suggested deploying 464XLAT instead

- Discussion: DNS64 breaks DNSSEC

- 464XLAT can be used w/o DNS64, which is not possible for (only) NAT64

  – Document presented in IETF 100

- WG suggested to be an "overall" NAT64 deployment guidelines document

What is/What is not this doc

- Not a discussion of NAT64 vs other transition mechanisms

- Not just discussing about DNSSEC, however is key

- If you already decided to go for something based in NAT64, here are your choices (section 3. Scenarios) and what you should take care about (section 4. Issues)

1. Introduction

- 3 issues
  - DNS64 may break DNSSEC
  - NAT64/DNS64 don't work with literals and older APIs
  - NAT64, alone doesn't work for IPv4-only hosts/apps

3. NAT64 Deploy. Scenarios

- Since DNS64 was published (with 3 scenarios), there are new ones to consider

- For an operator, the network should work in all the cases

- Scenarios described in two groups:
  - known to work
  - known to work under special conditions

3.1. Known to Work

3.1.1. Service provider NAT64 with DNS64
– Internal or outsourced (NAT64 / DNS64)

3.1.2. 464XLAT with DNS64
– Internal or outsourced (NAT64 / DNS64)

3.1.3. 464XLAT without DNS64
– Internal or outsourced (NAT64)

3.2. Known to Work Under Special Conditions

3.2.1. Service provider NAT64 without DNS64

3.2.2. Service provider NAT64.

DNS64 in the IPv6 hosts.

3.2.3. Service provider NAT64.

DNS64 in the remote IPv4-only network.

3.3. Comparing Scenarios

a.   DNSSEC: Are there hosts validating?

b.   Literal/APIs: Are being used?

c.   IPv4-only: Any IPv4-only usage?

d.   Foreign DNS: Is the scenario surviving?

Rate each item per scenario as good (+) or bad (-)

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+-----------------+---+---+---+---+---+---+---+---+---+----+----+----+
| Item / Figure   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
+-----------------+---+---+---+---+---+---+---+---+---+----+----+----+
| DNSSEC          | - | - | - | - | - | - | - | + | + | +  | +  | +  |
+-----------------+---+---+---+---+---+---+---+---+---+----+----+----+
| Literal/APIs    | - | - | - | - | + | + | + | + | + | -  | -  | -  |
+-----------------+---+---+---+---+---+---+---+---+---+----+----+----+
| IPv4-only       | - | - | - | - | + | + | + | + | + | -  | -  | -  |
+-----------------+---+---+---+---+---+---+---+---+---+----+----+----+
| Foreign DNS     | - | - | - | - | + | + | + | + | + | -  | +  | -  |
+-----------------+---+---+---+---+---+---+---+---+---+----+----+----+
```

4. Issues to be Considered (1)

4.1. DNSSEC Considerations & Approaches

    4.1.1. Not using DNS64

    4.1.2. DNSSEC validator aware of DNS64

    4.1.3. Stub validator

    4.1.4. CLAT with DNS proxy and validator

    4.1.5. ACL of clients

    4.1.6. Mapping-out IPv4 addresses

4.2. DNS64 reverse mapping considerations

4.3. Using 464XLAT with/without DNS64

4. Issues to be Considered (2)

4.4. Manual configuration of "foreign" DNS

4.5. DNS Privacy

4.6. Well-Known Prefix (WKP) vs Network-Specific Prefix (NSP)

4.7. IPv4 literals and old APIs

4.8. IPv4-only hosts or apps

4.9. CLAT translation considerations

Other Sections

5. Summary of Deployment Recommendations for NAT64

6. Deployment of NAT64 in Enterprise Networks

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10. ANNEX A: Example of Broadband Deployment with 464XLAT

11. ANNEX B: CLAT Implementation

12. ANNEX C: Benchmarking

Next steps

- Questions ?

- Inputs ?