# NAT64/464XLAT Deployment Guidelines in Operator and Enterprise Networks

## draft-ietf-v6ops-nat64-deployment-03

Jordi Palet

jordi.palet@theipv6company.com

# 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
    - Small %, may be ok in some cases (cellular, no validation)
  - NAT64/DNS64 don’t work with literals and older APIs
    - Sorted out partially with Happy Eyeballs v2
  - NAT64, alone doesn’t work for IPv4-only hosts/apps
    - This may be ok in some scenarios (cellular), unless there is a need for IPv4 (example, tethering)

# 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)
- 4 possible sub-scenarios (1-4)

3.1.2. 464XLAT with DNS64

- Internal or outsourced (NAT64 / DNS64)
- 3 possible sub-scenarios (5-7)

3.1.3. 464XLAT without DNS64

- Internal or outsourced (NAT64)
- 2 possible sub-scenarios (8-9)

# 3.2. Known to Work Under Special Conditions

3.2.1. Service provider NAT64 without DNS64

- Sub-scenario 10

3.2.2. Service provider NAT64 DNS64 in the IPv6 hosts

- Sub-scenario 11

3.2.3. Service provider NAT64 DNS64 in the remote IPv4-only network

- Sub-scenario 12

# 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 (-)

| 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. Split DNS

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

4.8. IPv4 literals and old APIs

4.9. IPv4-only hosts or apps

4.10. CLAT translation considerations

# Other Sections

5. Summary of Deployment Recommendations for NAT64

6. Deployment of NAT64 in Enterprise Networks

…

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

11. ANNEX B: CLAT Implementation

12. ANNEX C: Benchmarking

# Next steps

- Questions ?
- Inputs ?