



# Unmanaged network transition to IPv6: Evaluation of mechanisms

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# Structure of the document

- ◆ Four cases
  - A. Gateway does not provide IPv6
  - B. ISP and gateway are dual stack
  - C. Gateway is dual stack, ISP is IPv4 only
  - D. ISP is IPv6 only
- ◆ For each case, recommendations on
  - Addressing + Connectivity
  - Name services
  - Security

## Important assumption: dual stack

- ◆ In this document, we make the hypothesis that the IPv6 only nodes do not need to communicate with IPv4 only nodes; devices that want to communicate with both IPv4 and IPv6 nodes are expected to implement both IPv4 and IPv6, i.e. be dual stack.
- ◆ Results in “a ton of simplifications”

# Case A: Gateway does not provide IPv6

## ◆ Addressing + Connectivity

- Either Teredo or UDP tunnel
- Teredo for "auto deploy" mode
- UDP tunnel makes sense if provided by ISP

## ◆ Name resolution

- Use IPv4

## ◆ Security

- Need to protect existing apps from IPv6...

# Case B: ISP and gateway are dual stack

## ◆ Addressing + Connectivity

- Need to finish standardization of prefix provisioning for gateway (DHCPv6 option)
- May use "RA proxy" for "informal sharing"

## ◆ Name resolution

- Need standard solution for provisioning the DNS resolver in IPv6 only hosts,
  - ◆ either by standardizing a "DHCPv6 light",
  - ◆ or by recommending an alternate convention.
- Need LLMNR for local name resolution

## ◆ Security

- Nothing in particular

# Case C: Gateway is dual stack, ISP is IPv4

## ◆ Addressing + Connectivity

- 6to4 is the obvious default solution
- Support configured tunnels as an option
- Support “configured relay” in 6to4 implementations

## ◆ Name resolution

- Same issues as case B

## ◆ Security

- Same as case B

## Case D: ISP is IPv6 only

### ◆ Addressing + Connectivity

- IPv6: same as case B
- IPv4: the IETF needs to develop a scalable "4 over 6" solution

### ◆ Name resolution

- The gateway need to be provisioned over IPv6, needs a way to obtain a DNS relay address.

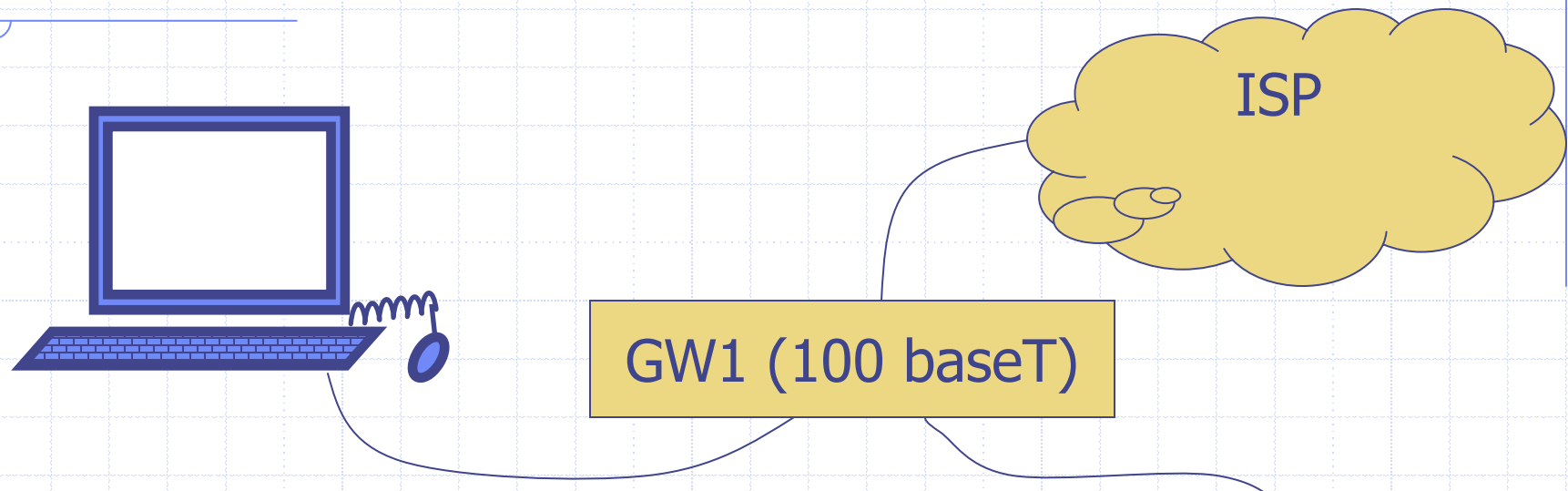
### ◆ Security

- Same as case B.

# Conclusion

- ◆ Completed the analysis of solutions
- ◆ Clear recommendation on “work to do”
  - Teredo and UDP tunnel
  - DHCPv6 for prefix provisioning
  - Formalize “RA proxy” for “informal sharing”
  - DHCPv6 light for provisioning DNS relay
  - Scalable “4 over 6” solution

# Bonus issue: the “stackable gateway”



The current “market” solution is to stack two IPv4 NAT – easy to deploy, but reduced functionality.

The “good” IPv6 solution would be a “multi link subnet” technology. We don’t have it yet.