
# Dual Stack Transition Mechanism

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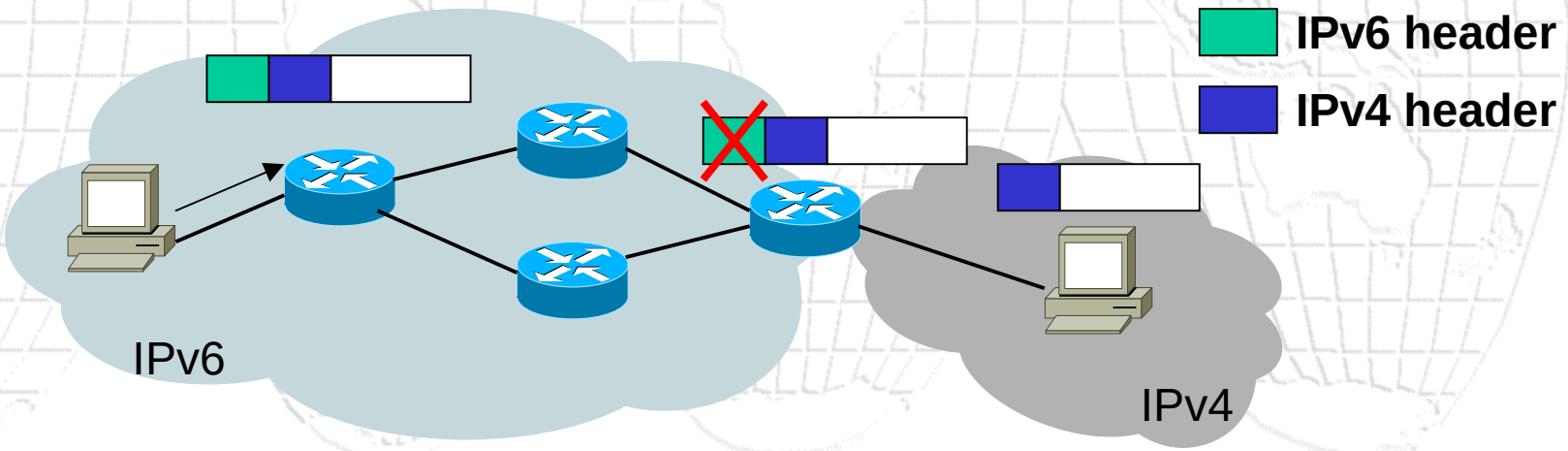
# Outline


- DSTM Overview
- DSTM Architecture
- Operation of DSTM components
- Worked example
- Advantages
- References

# DSTM Overview

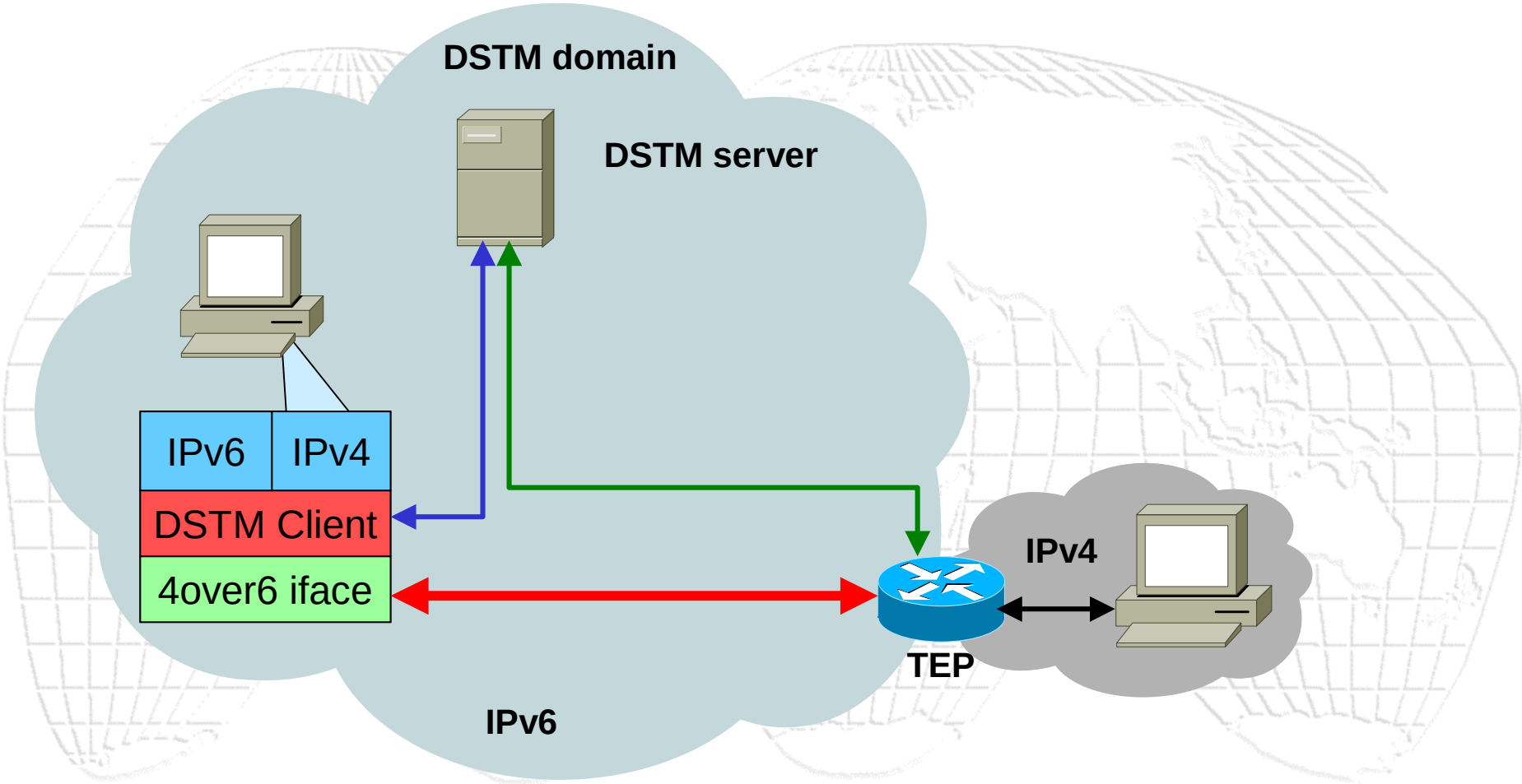
- Described in <draft-ietf-ngtrans-dstm-06>
- Designed to connect native IPv6 clouds to IPv4 –only remote nodes
- IPv4 traffic is tunnelled in IPv6 datagrams



# DSTM Architecture

- DSTM Server
  - IPv4 address allocation within IPv6 network
- DSTM Client
  - Process running on the client which request IPv4 addresses to the DSTM server
- Gateway (a.k.a Tunnel End Point – TEP)
  - Performs all the encapsulations/decapsulations
- DSTM Hosts
  - They are dual-stacked
  - Request & autoconfigure IPv4 addresses
  - Establish 4over6 tunnels towards the TEP

# DSTM Architecture (2)



# Operation of DSTM nodes


- How to dectect when an IPv4 address is needed?
  - IPv4 address as a result of a DNS Query
  - An application opening an IPv4 socket, etc
- How to configure the IPv4 stack?
  - Request an IPv4/port address from DTSM server (if it is not one already available)
  - Configure 4over6 interface with the received values
  - Address all IPv4 traffic to the 4over6 interface

# Operation of DSTM nodes (2)


- How does the node know the TEP address?
  - Statically configured (not recommended)
  - Learned from the answer of the DSTM server
- How is the packet built?
  - Source should be the IPv6 address of the physical interface on which the packet will be sent
  - Destination address is set to TEP
  - Next header type = 4 (IPv4 packet)

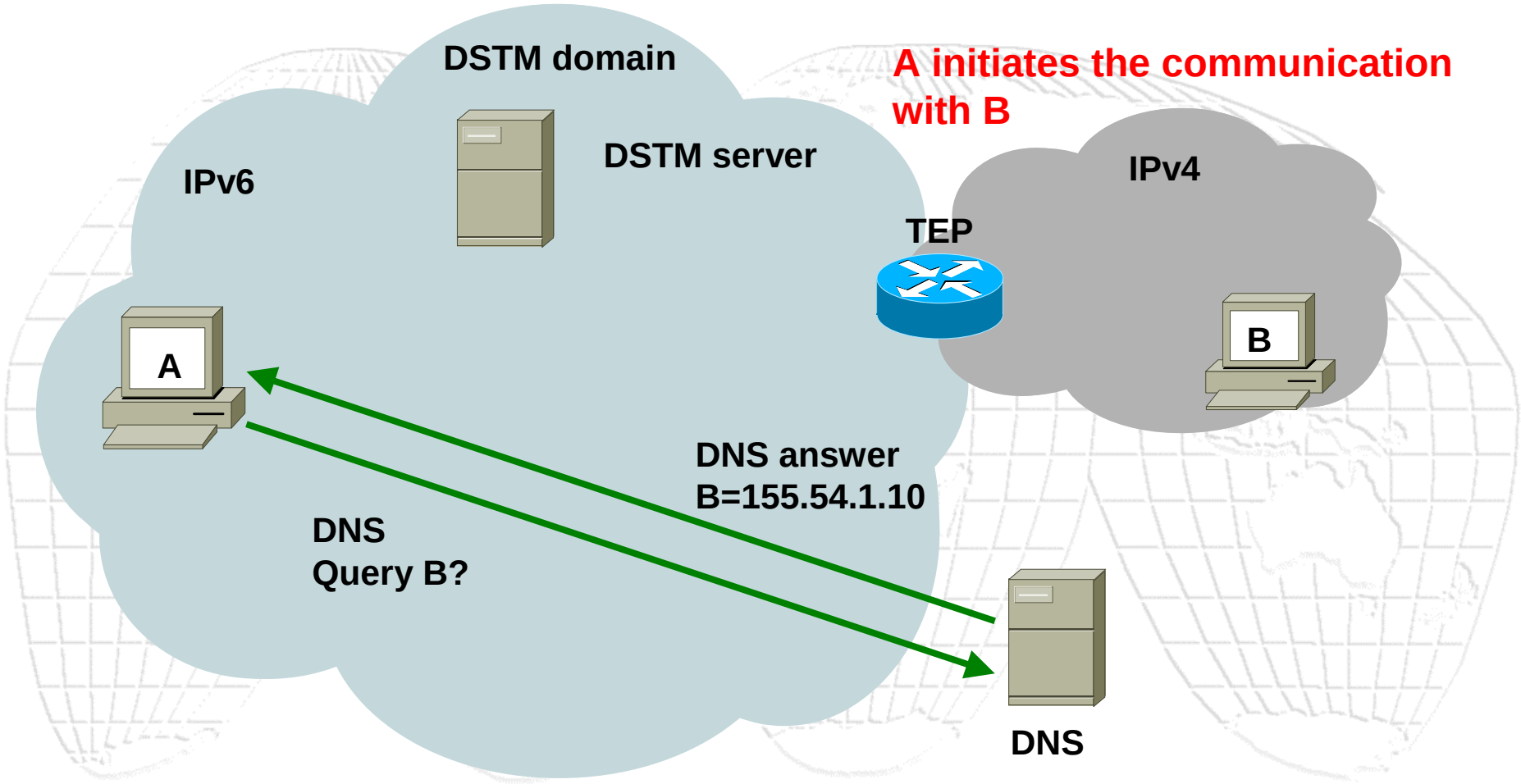
# Operation of the DSTM TEP

- How is it configured?
  - Manually (not recommended)
  - Via the DSTM Server
  - Dynamically
- What is configured?
  - Mappings between IPv6, IPv4, [port]
- When the 4over6 packet arrives
  - It is decapsulated
  - Forwarded according to IPv4 routing table
  - Eventully it would need to announce routes towards IPv4 addresses assigned by DSTM Server into the IPv4 cloud.

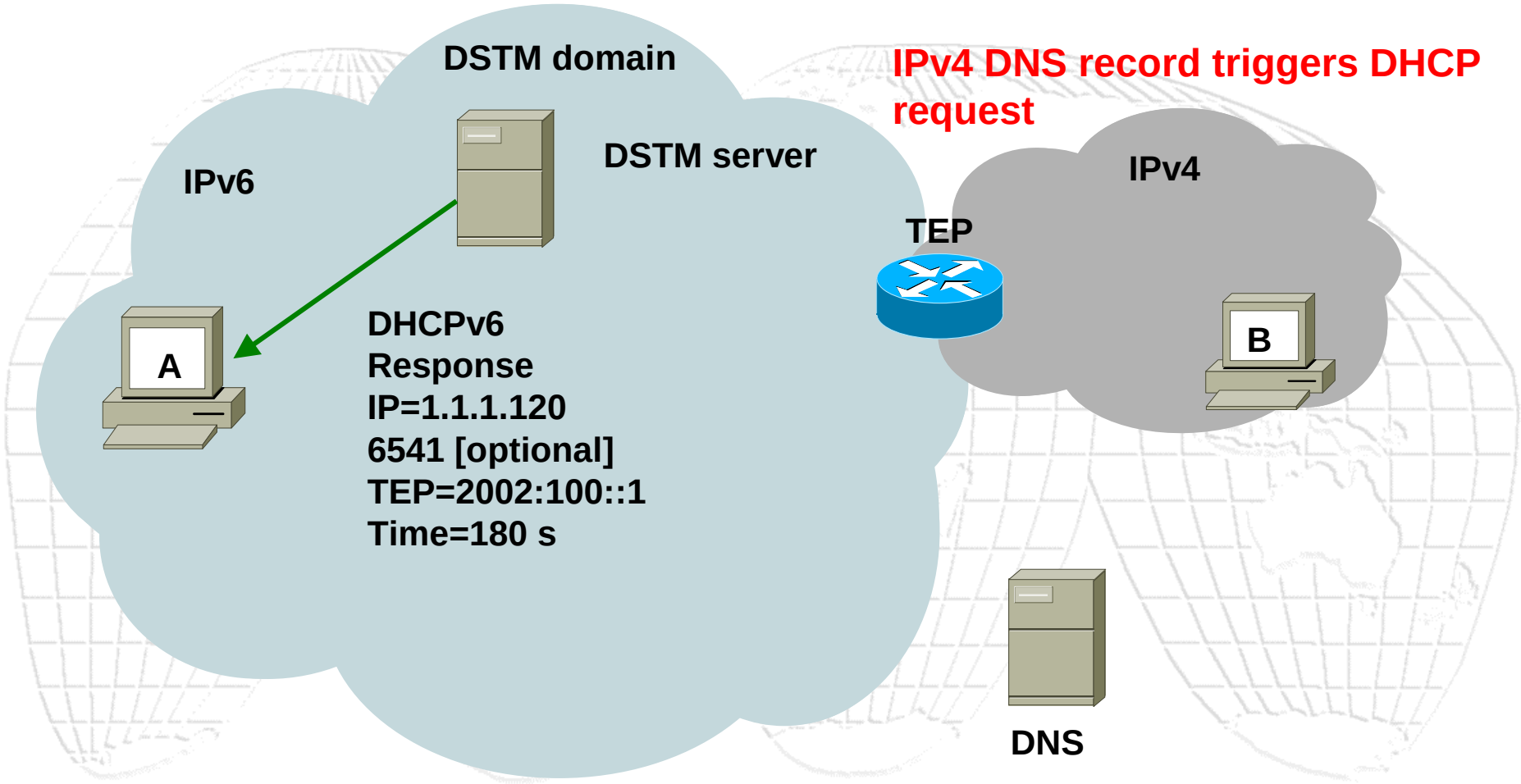
# Operation of the DSTM Server

- The protocol for addr allocation is left open
- What to do after receiving a request?
  - Answer with (IPv4, [port], TEP, duration)
  - Store the mappings between IPv6 and IPv4
  - Optionally it can auto-configure the TEP mappings
- Client authentication should be available

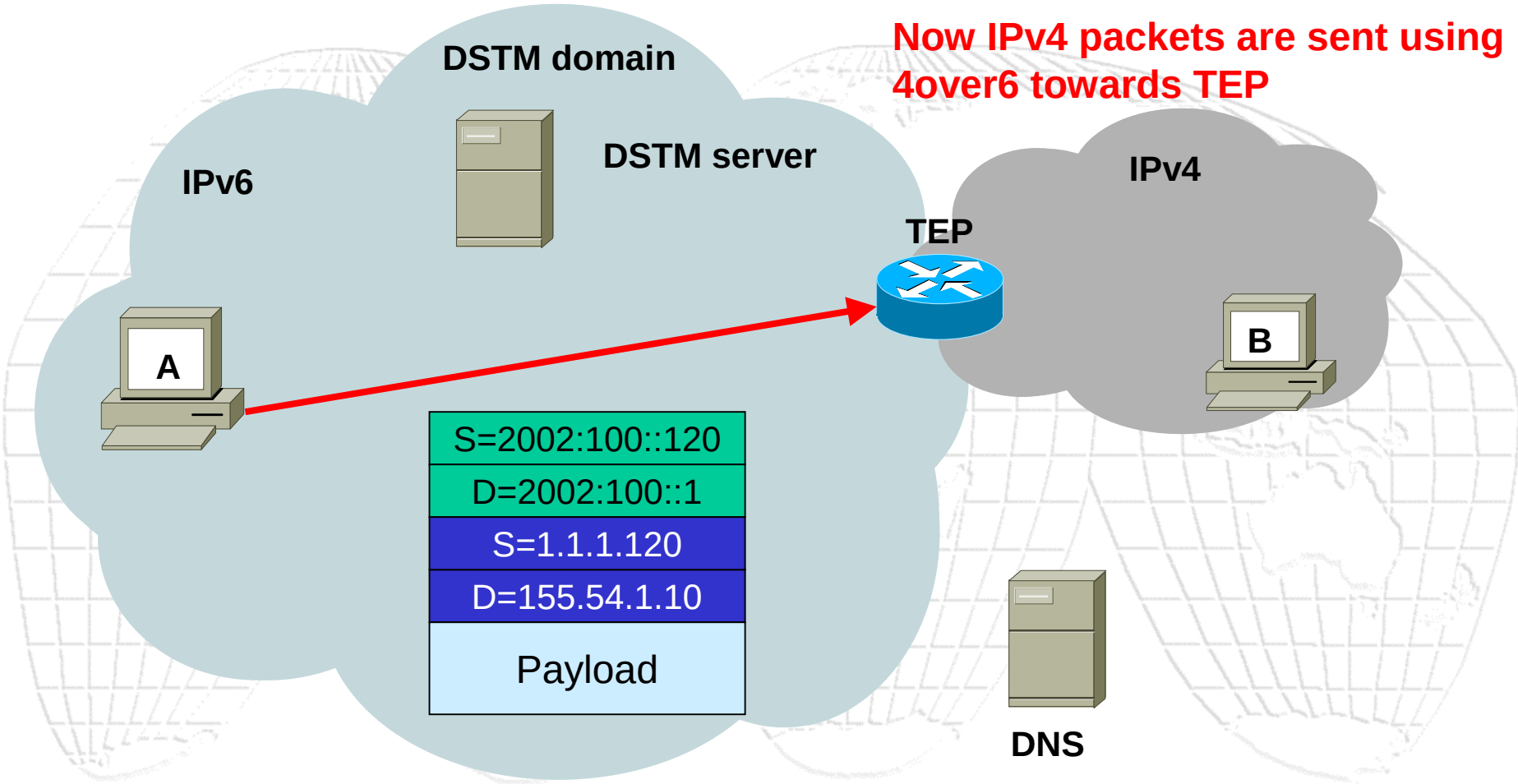
# Worked Example (1)



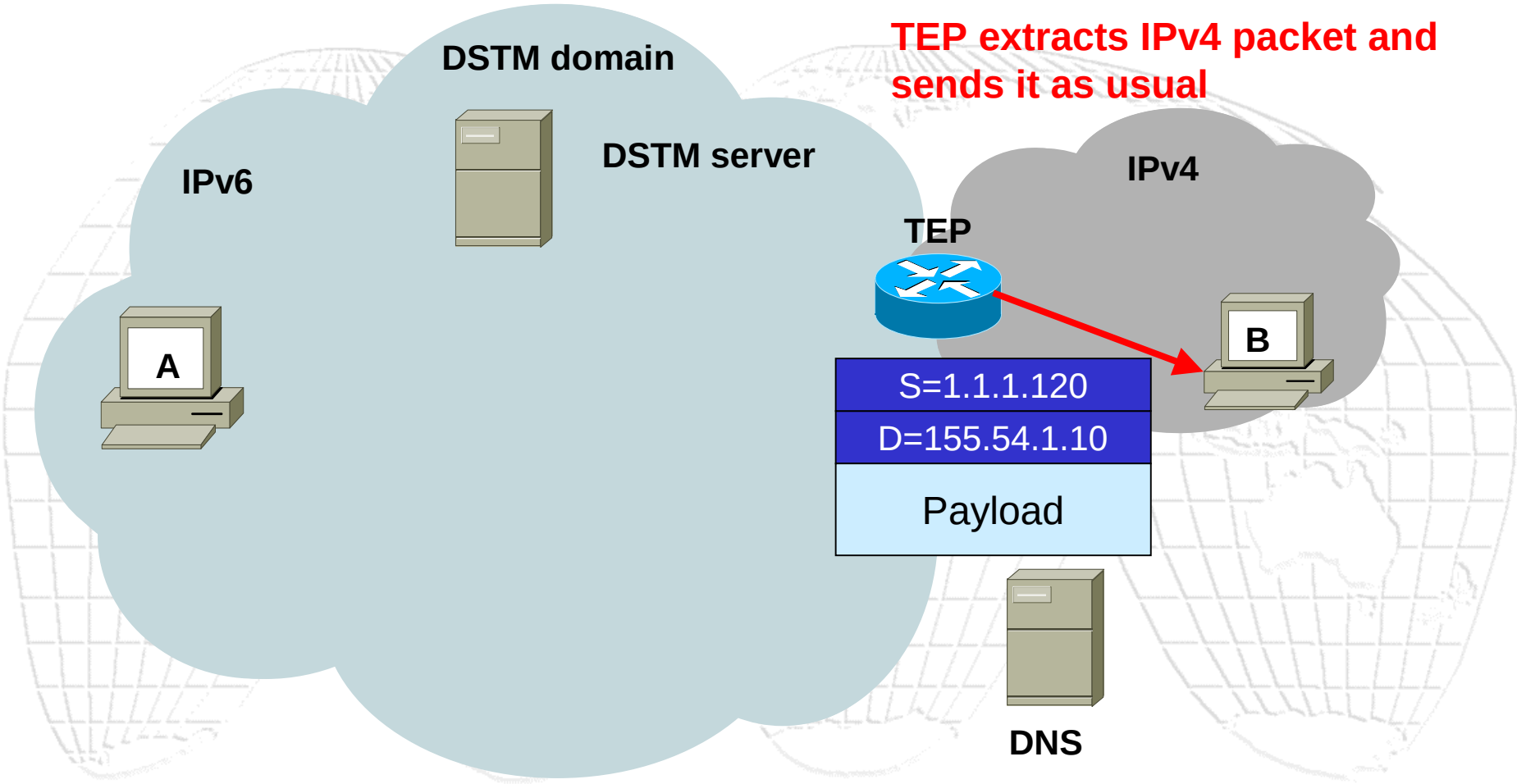
# Worked Example (2)



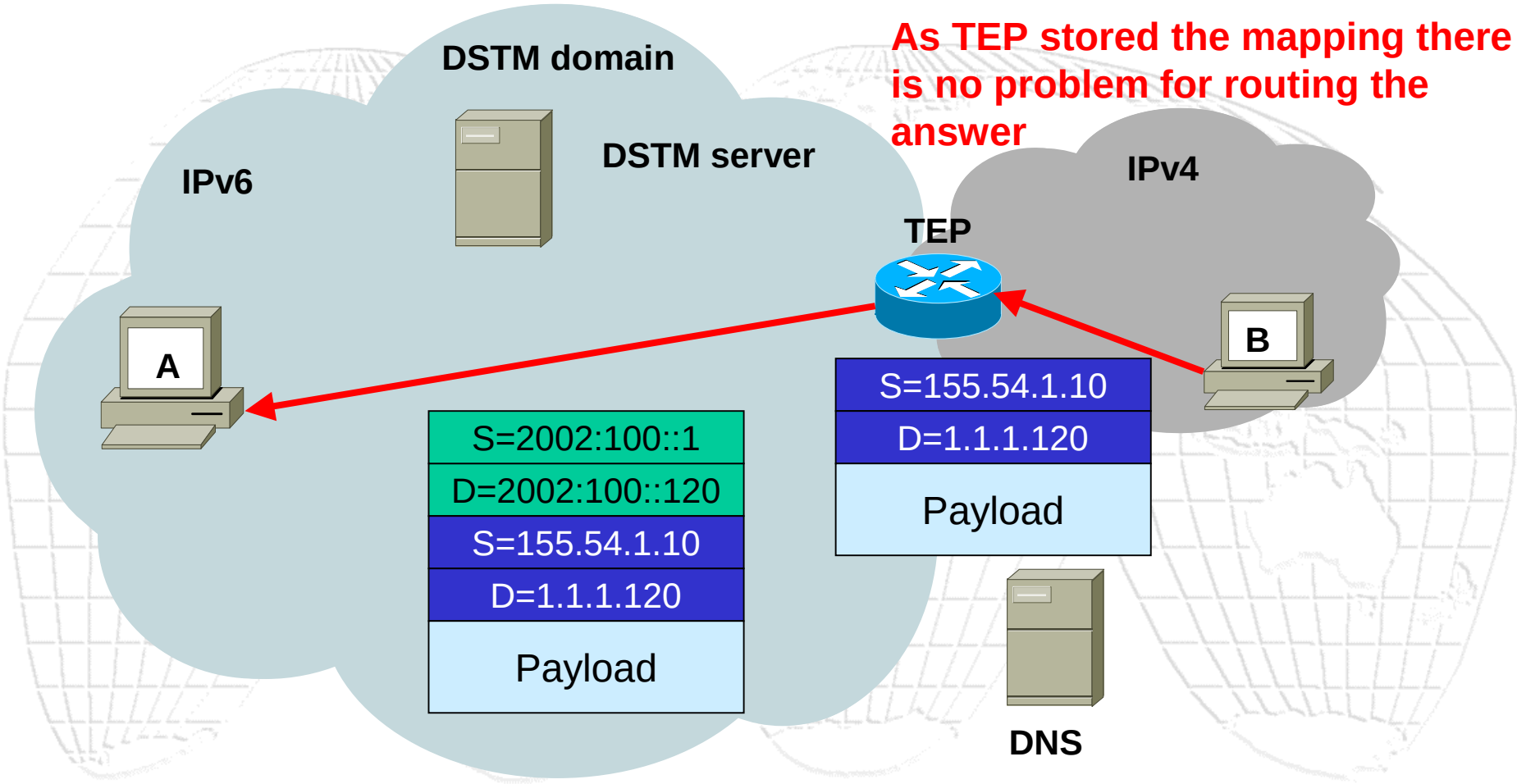
# Worked Example (3)



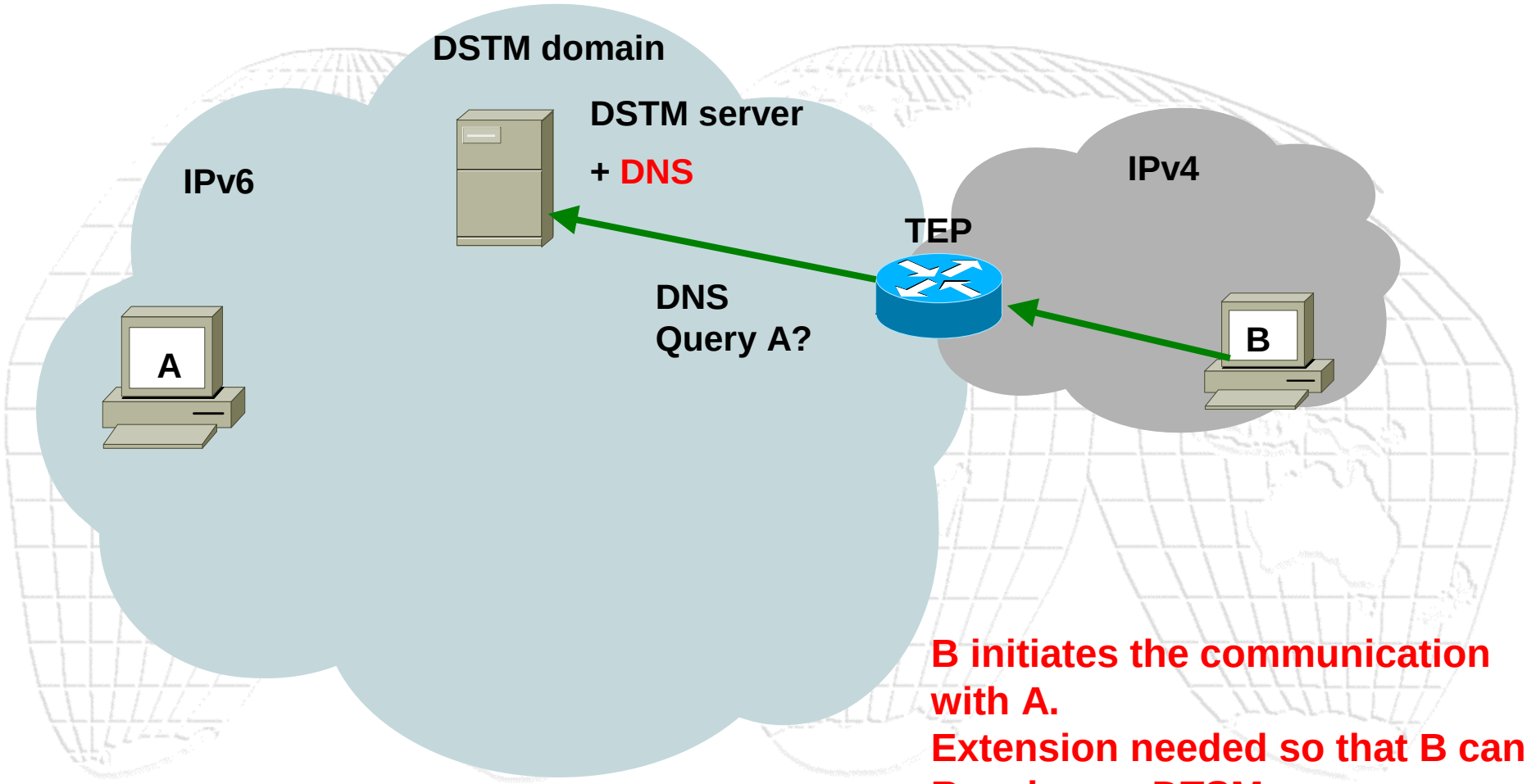
# Worked Example (4)



# Worked Example (5)

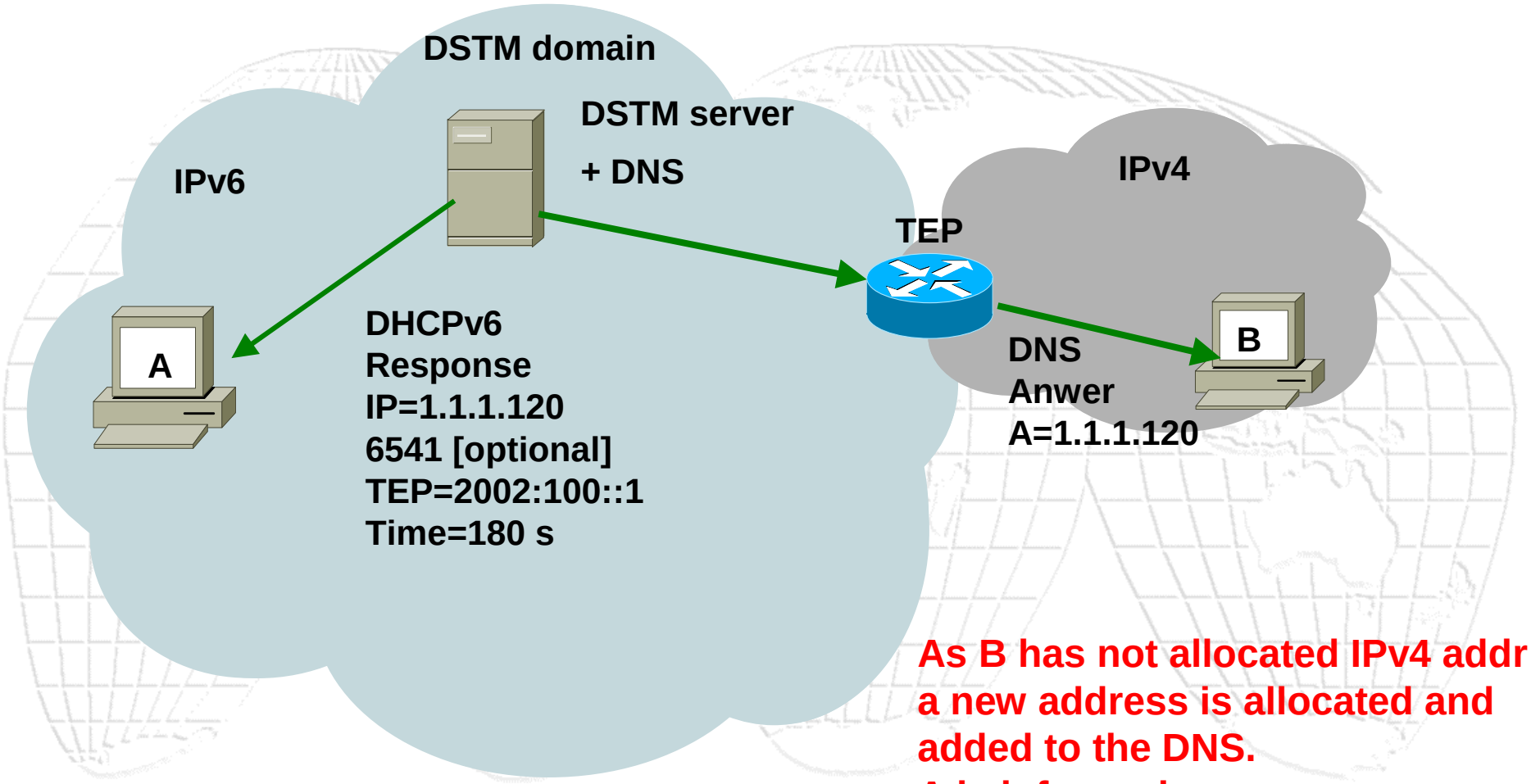


# Worked Example (6): Extension IPv4 Query to IPv6 address



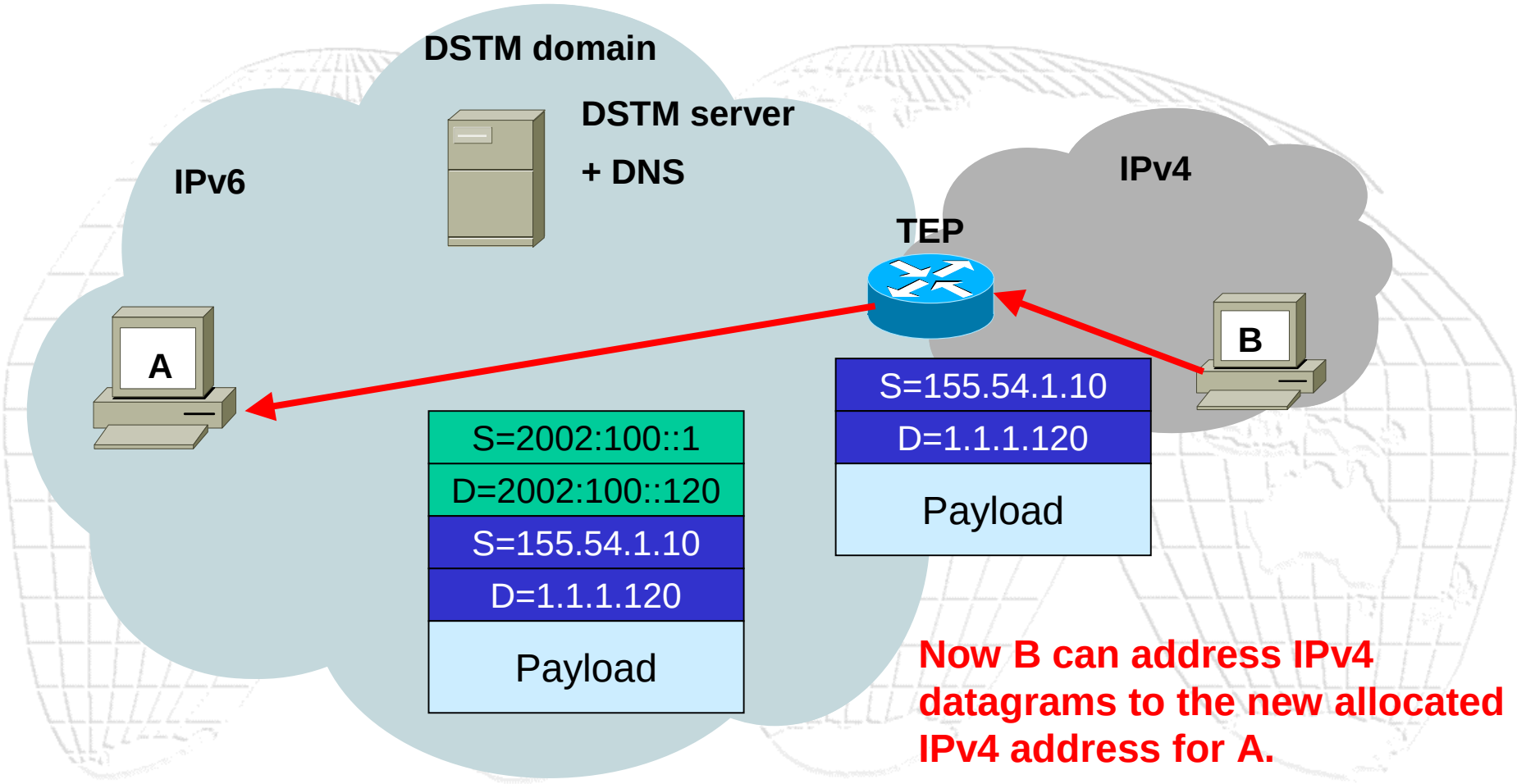

**B initiates the communication with A.**
**Extension needed so that B can Resolve on DTSM server**

# Worked Example (7)

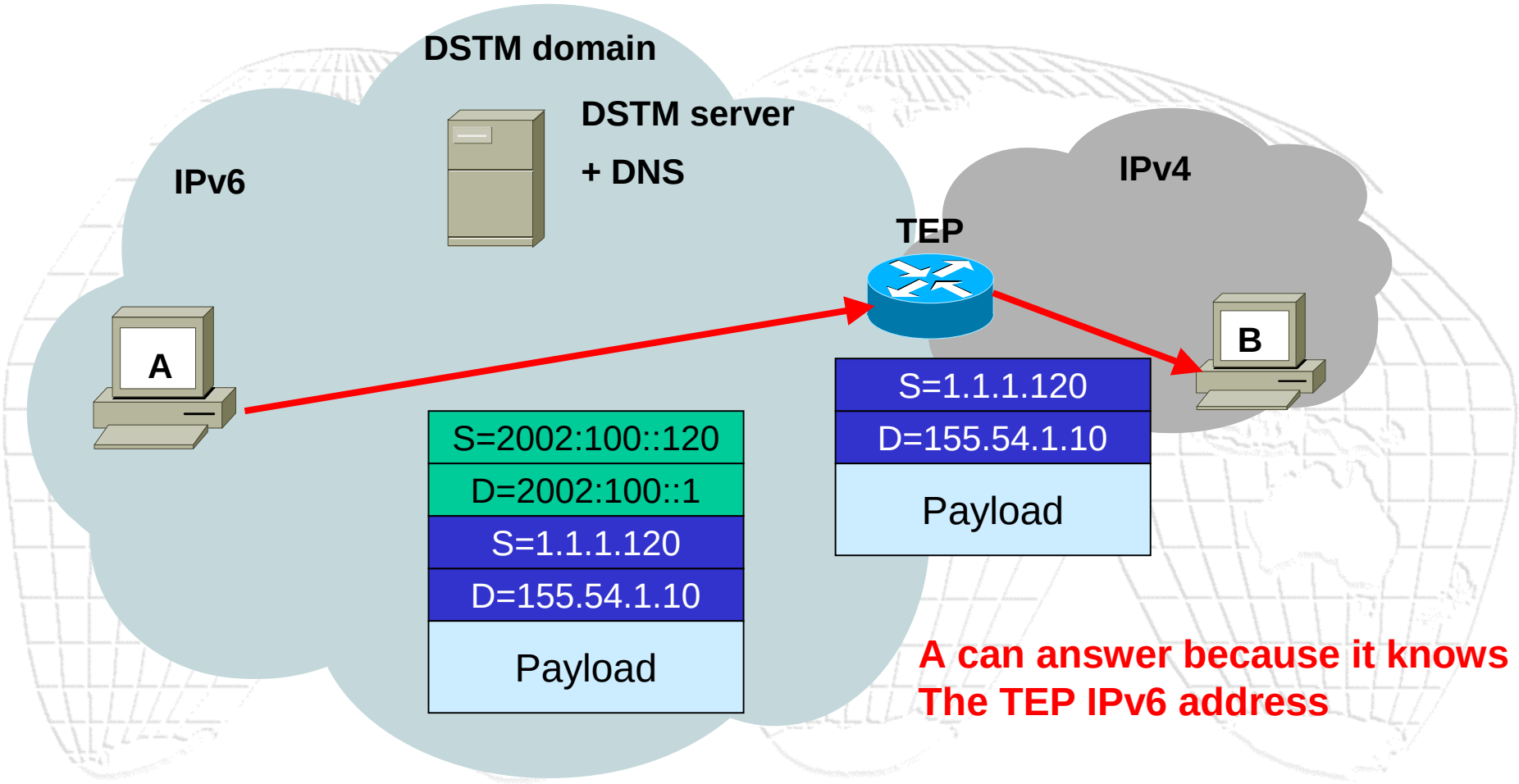



As B has not allocated IPv4 addr a new address is allocated and added to the DNS.
A is informed

# Worked Example (8)



# Worked Example (9)



# Advantages

- Transparent to the network
  - As IPv4 messages are encapsulated, no IPv4 routing needs to be maintained
- Transparent to the application
  - No changes are needed for the applications to work in the dual-stack host
- DHCPv6 allows the dynamic allocation of IPv4 addresses.
- Based on standard protocols
- Easy to manage (no IPv4 routes needed)

# Weaknesses

- Asymetric paths are not supported
  - Return IPv4 packets must enter the IPv6 cloud through the same DSTM TEP who maintains the association
- Initial delay may be excessive for real-time traffic.

# References


- J. Bound, L. Toutain, O. Medina, F. Dupont, H. Afifi, A. Durand. Dual Stack Transition Mechanism (DTSM). <draft-ietf-ngtrans-dstm-06.txt>. Work in progress. January, 2002.
- H. Soliman, E. Nordmark. Extensions to SIIT and DTSM for enhanced routing of inbound packets. <draft-ietf-ngtrans-siit-dstm-01.txt>. Work in progress. January, 2002.
- IST-1999-20393/PTIN/WP2.1/DS/P/1/01. Description of IPv4/IPv6 available transition strategies. LONG Project deliverable. May 2001.