



Proxy ARP

Teldat-Dm 734-I

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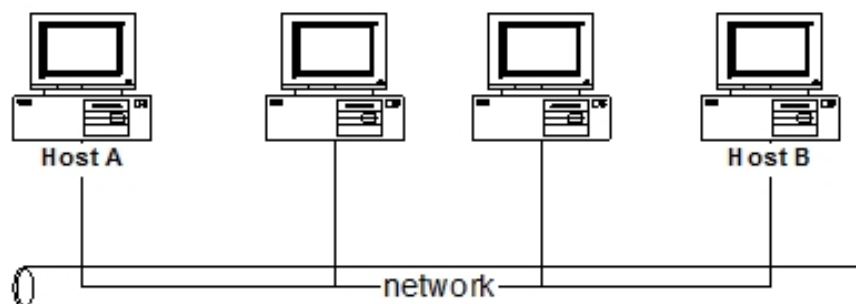
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Chapter 1 Introduction

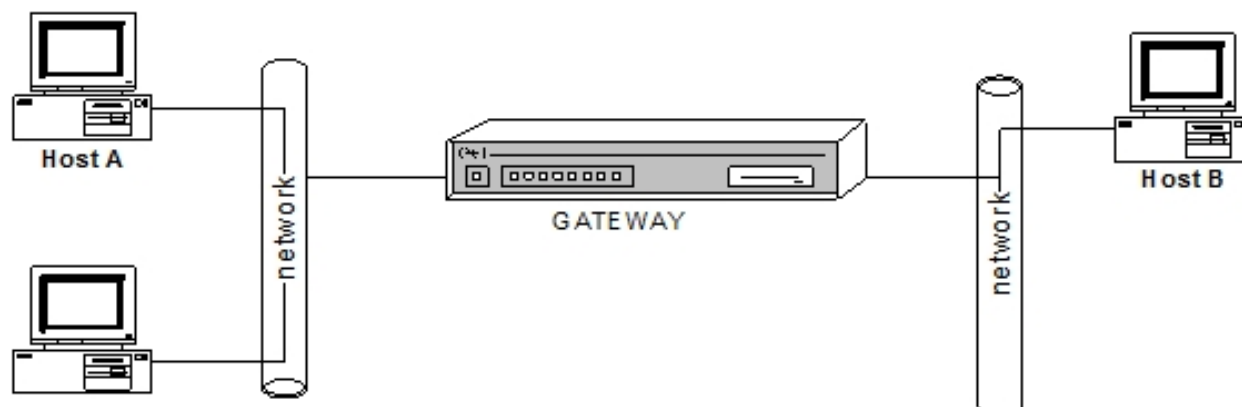
1.1 Proxy ARP

On a network that supports ARP, when host A (the source) broadcasts an ARP request to find out the network address corresponding to the IP address of host B (the destination), host B will recognize the IP address in the request as its own and will send host A a reply that includes its network address (MAC). Host A keeps the IP-to-network-address mapping in a cache and uses it for subsequent communications. This situation is displayed in Case 1 in the figure below.

CASE 1: Hosts pertaining to the same physical network.



CASE 2: Hosts A and B are located in different physical networks.



If hosts A and B are on different *physical* networks (Case 2), host B will not receive the ARP broadcast request from host A and will not respond to the request. However, if the *physical* networks of hosts A and B are interconnected through a gateway, the gateway will see the ARP request from host A. Assuming that IP addresses have been set up so that different subnets correspond to *physical* segments, the gateway can tell that the ARP request is for a host in a different physical segment. The gateway can then respond to host A *in its own name*, saying that the network address (MAC) for host B is its own (that of the gateway). From then on, host A will send packets for host B directly to the gateway and the gateway will forward them to host B via standard IP routing. This mechanism is known as “**Proxy ARP**”.

The same applies in the opposite direction, when host B replies to traffic originating from host A.

Although the *physical* networks of hosts A and B must be reachable from the gateway, they don't have to be connected to the same one.

This way, all ARP subnet handling can be done in gateways with **Proxy ARP** (from here on, we will refer to the gateway that performs this function as *Proxy ARP*).

From the point of view of the host, there are no subnets and their *physical* networks have just become a *global* IP

network.

When the *Proxy ARP* detects an ARP request, it checks that it has a route to the destination host that appears in the request. In this case, we will assume that the same network mask applies to every subnet of the same IP network. The network mask that belongs to the network interface on which the ARP request arrived can be used to obtain the network part of the target IP address that must be looked up in the routing table.

If there is a default route available, the previous check will always succeed as a route is always found for all addresses.

To make sure the *Proxy ARP* is working correctly, please pay attention to the following:

- Keep the same network mask for all the *Proxy ARP* found in the common IP network. If the source and destination hosts of the IP networks appearing in the ARP requests are different, the *Proxy ARP* does not respond.
- The *Proxy ARP* does not respond either if the source and destination host belong to the same *physical* network. In these cases, the destination host itself responds to the ARP request.

Chapter 2 Configuration

2.1 Proxy ARP Configuration

The following sections focus on what steps to take for Proxy ARP configuration.

2.1.1 Enabling Proxy ARP on the interfaces

Proxy ARP must be enabled on each of the interfaces where you want to receive and reply to ARP requests. This is similar to enabling Proxy ARP on different *physical* network segments.

2.1.2 Configuring the Parameters

To set the system's behavior, you can configure certain parameters on each interface. These are:

2.1.2.1 Checking the subnet mask

It verifies whether the source and destination that appear in the ARP request belong to the same *global* network (which is divided into subnets).

2.1.2.2 Using the default route

By using the router's default route, the Proxy ARP always has a route for any destination host that appears in ARP requests. The Proxy ARP then transmits all the packets directed to networks that do not belong to the local *physical* network itself. For routing reasons, we only recommend using the default route when it is absolutely necessary.



Warning

The Proxy ARP configuration must be carried out very carefully. Any misconfigured parameter can cause a general malfunction in the IP network when the IP-to-network-address mapping is not done correctly.

2.2 Proxy ARP global configuration commands

This section describes the commands used in the Proxy ARP global configuration. These commands must be entered at the Proxy ARP configuration prompt.

To access the Proxy ARP configuration environment, enter the following:

```
*config
Config>protocol ip
-- Internet protocol user configuration --
IP config>proxy-arp
-- Proxy ARP Configuration --
Proxy ARP cnfg>
```

The following commands are available within the Proxy ARP configuration environment:

Command	Function
? (HELP)	Lists the available commands or their options.
DISABLE	Globally disables the Proxy ARP.
ENABLE	Globally enables the Proxy ARP.
LIST	Displays the configuration.
SET	Configures the Proxy ARP parameters for a specific IP address.
EXIT	Exits the Proxy ARP configuration environment.

In older application software releases, it was possible to enable Proxy ARP on a specific interface (and address) from the global configuration menu, as well as to configure the associated parameters (verifying/not verifying the subnet mask and the use of the default route or not). While this configuration method per interface is still accepted, a

message will be displayed warning the user that these are old commands which may become obsolete in future releases. This command became obsolete as of version 11.00.03.

Example:

```
Proxy ARP cnfg>enable address 172.24.78.57
CLI Warning: This is a superseded command.
CLI Warning: It may become obsolete in future versions.
CLI Warning: Please use per interface ip proxy-arp config instead.
Proxy ARP cnfg>
```

In any case, we recommend enabling and configuring Proxy ARP on an interface and address using the interface's own configuration menu.

2.2.1 ? (HELP)

Lists the available commands or options for a specific command.

Syntax:

```
Proxy ARP cnfg>?
```

Example:

```
Proxy ARP cnfg>?
  disable    Disable the Proxy ARP function
  enable     Enables the Proxy ARP function
  list       List configuration
  set        Configures the Proxy ARP parameters for a specific IP address
  exit
Proxy ARP cnfg>
```

Command history:

Release	Modification
11.00.03	This command was obsoleted in version 11.00.03. Proxy ARP global configuration is no longer supported.

2.2.2 DISABLE

Globally disables the Proxy ARP function. Proxy ARP is disabled by default.

Syntax:

```
Proxy ARP cnfg>disable
```

Example:

```
Proxy ARP cnfg>disable
Proxy ARP cnfg>
```

Command history:

Release	Modification
11.00.03	This command was obsoleted in version 11.00.03. Proxy ARP global configuration is no longer supported.

2.2.3 ENABLE

Globally enables the Proxy ARP function. Proxy ARP is disabled by default.

Syntax:

```
Proxy ARP cnfg>enable
```

Example:

```
Proxy ARP cnfg>enable
Proxy ARP cnfg>
```


Command history:

Release	Modification
11.00.03	This command was obsoleted in version 11.00.03. Proxy ARP global configuration is no longer supported.

2.2.4 LIST

Displays the Proxy ARP configuration.

Syntax:

```
Proxy ARP cnfg>list ?
  address  Display the configuration associated to the enabled addresses
  all      Display ALL the Proxy ARP configuration information
  global   Display the Proxy ARP global situation
```

Command history:

Release	Modification
11.00.03	This command was obsoleted in version 11.00.03. Proxy ARP global configuration is no longer supported.

2.2.4.1 LIST ADDRESS

Displays the configuration of the enabled addresses involved in the Proxy ARP function.

Example:

```
Proxy ARP cnfg>list address
  Interface
  -----
  ethernet0/0  172.24.78.57  ON      OFF      OFF
Proxy ARP cnfg>
```

The meaning of the fields is as follows:

Interface	Interface identifier to which the IP address is associated.
Address	IP address.
Proxy ARP	Indicates whether Proxy ARP is enabled or disabled for this address.
Network Check	Indicates whether the check to verify that the ARP source and destination belong to the same global network is enabled or disabled.
Use Default Route	Indicates whether the default route will be used or not.

2.2.4.2 LIST ALL

Displays ALL Proxy ARP configuration information.

Example:

```
Proxy ARP cnfg>list all
Proxy ARP globally enabled

  Interface      Address      Proxy ARP Network Check Use Default Route
  -----
  ethernet0/0    172.24.78.57  ON      OFF      OFF
Proxy ARP cnfg>
```

2.2.4.3 LIST GLOBAL

Displays the Proxy ARP global situation, whether it is ENABLED or DISABLED.

Example:

```
Proxy ARP cnfg>list global
Proxy ARP globally enabled
```

```
Proxy ARP cnfg>
```

2.2.5 SET

Configures the Proxy ARP parameters for a specific IP address (or interface).

Syntax:

```
Proxy ARP cnfg>SET PARAMETERS ?
<a.b.c.d>      Interface address
<interface>   Unnumbered interface
```

Command history:

Release	Modification
11.00.03	This command was obsoleted in version 11.00.03. Proxy ARP global configuration is no longer supported.

2.2.5.1 SET PARAMETERS <ip-address>

Configures the Proxy ARP parameters for the IP address specified.

Syntax:

```
Proxy ARP cnfg> SET PARAMETERS <ip-address> <check net masks> <use default route>
```

The meaning of each of the parameters is as follows:

<ip-address>	IP address where parameters are configured.
<check net masks>	Indicates whether you want to enable the subset mask check. The valid values for this parameter are “ yes ” and “ no ”.
<use default route>	Indicates whether you want to use the default route (in this case the router always has a route to the destination host). The valid values for this parameter are “ yes ” and “ no ”.

Example:

```
Proxy ARP cnfg>SET PARAMETERS 198.75.252.27 YES YES
Proxy ARP cnfg>
```

2.2.5.2 SET PARAMETERS <interface>

Configures the Proxy ARP parameters for the unnumbered interface that has been specified.

Syntax:

```
Proxy ARP cnfg>SET PARAMETERS <interface> <check net masks> <use default route>
```

The meaning of each of the parameters is as follows:

<interface>	Interface identifier where the parameters are configured.
<check net masks>	Indicates whether or not you want to enable the subset mask check. The valid values for this parameter are “ yes ” and “ no ”.
<use default route>	Indicates whether you want to use the default route (in this case the router always has a route to the destination host). The valid values for this parameter are “ yes ” and “ no ”.

Example:

```
Proxy ARP cnfg>SET PARAMETERS ETHERNET0/0 YES YES
Proxy ARP cnfg>
```

2.2.6 EXIT

Exits the Proxy ARP configuration environment and returns to the previous configuration prompt.

Syntax:

```
Proxy ARP cnfg>exit
```

Example:

```
Proxy ARP cnfg>exit
IP config>
```

2.3 Proxy ARP configuration commands per interface

This section describes the commands used when configuring Proxy ARP per interface. These commands must be entered from the configuration menu of the interface in question.

First, access the interface configuration menu where you wish to configure Proxy ARP.

Example:

```
*config

Config>network ethernet0/0

-- Ethernet Interface User Configuration --
ethernet0/0 config>
```

Once in the interface configuration menu, Proxy ARP is configured through the '**ip proxy-arp**' command.

Command history:

Release	Modification
11.00.04	This command was modified in version 11.00.04. Proxy ARP configuration per IP address is now obsolete, leaving global configuring options that cover all the configured IP addresses. Therefore, making use of the "ip-address" option is no longer necessary.

Syntax:

```
<interface> config>ip proxy-arp {enable | check-masks | default-route}
```

The available options are:

enable	Enables the Proxy ARP in the specified interface.
check-masks	Checks that the source and destination appearing in the ARP request belong to the same global network (which is divided into subnets).
default-route	Enables the use of the default route (always providing the router with a route to the destination host).

Any of these options can be disabled using the negative form of the above-mentioned command.

Syntax:

```
<interface> config>no ip proxy-arp {enable | check-masks | default-route}
```

2.3.1 ip proxy-arp enable

Enables, in the specified interface, the Proxy ARP functionality. This way, the device can respond to any ARP requests this interface receives. It is like enabling Proxy ARP in a particular *physical* network segment.

Example:

```
ethernet0/0 config>ip proxy-arp enable
ethernet0/0 config>
```

To disable the Proxy ARP on an interface, use the negated form of the aforementioned command.

Example:

```
ethernet0/0 config>no ip proxy-arp enable
ethernet0/0 config>
```

2.3.2 ip proxy-arp check-masks

It verifies whether the source and destination that appear in the ARP request belong to the same *global* network (which is divided into subnets). By default this option is disabled.

Example:

```
ethernet0/0 config>ip proxy-arp check-masks
ethernet0/0 config>
```

To disable this option, use a negated form of the above command:

Example:

```
ethernet0/0 config>no ip proxy-arp check-masks
ethernet0/0 config>
```

2.3.3 ip proxy-arp default-route

When using the default route option, the Proxy ARP always has a route to any destination host that appears in the ARP requests. The Proxy ARP then transmits all the packets addressed to networks that do not belong to the local *physical* network itself. The default route is not enabled by default. For routing reasons, we only recommend using it when it is absolutely necessary.

Example:

```
ethernet0/0 config>ip proxy-arp default-route
ethernet0/0 config>
```

To disable this option, use a negated form of the above command:

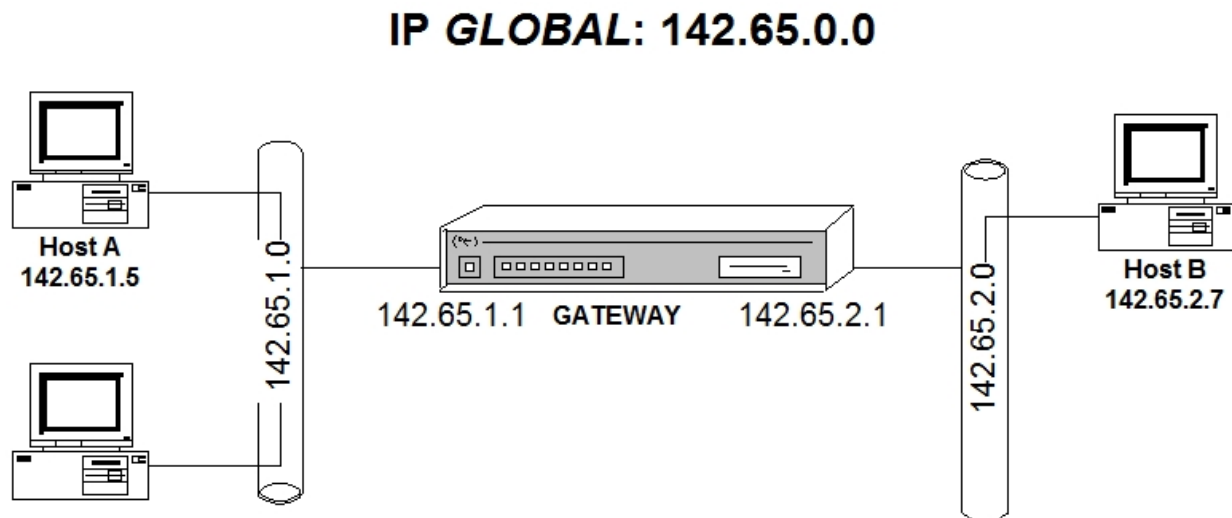
Example:

```
ethernet0/0 config>no ip proxy-arp default-route
ethernet0/0 config>
```

Chapter 3 Example

3.1 Proxy ARP configuration example

Let's consider the situation shown in the following figure:



The *global* IP network corresponds to the 142.65.0.0 address with the 255.255.0.0 mask. It must be considered a Class B address.

In addition, and as shown in the figure, there are two separate physical segments within the same global IP network. These correspond to two Class C subnets (142.65.1.0 and 142.65.2.0).

Hosts are configured with Class B addresses.

If the Proxy ARP is not enabled, the ARP requests from host A to host B (and, generally speaking, to any segment host belonging to subnet 142.65.2.0) do not reach their destination. This means that, despite belonging to the same *global* IP network, communication between host A and B is not possible.

The necessary steps to configure the Proxy ARP and solve this situation are described below:

3.1.1 Enabling the Proxy ARP in each router address

The Proxy ARP is enabled in both router addresses (in order to “connect” both physical segments):

```
Config>network ethernet0/0

-- Ethernet Interface User Configuration --
ethernet0/0 config>ip proxy-arp enable
ethernet0/0 config>exit
Config>network ethernet1/0

-- Ethernet Interface User Configuration --
ethernet1/0 config>ip proxy-arp enable
ethernet1/0 config>exit
Config>
```

The configuration is as follows:

```
;
network ethernet0/0
; -- Ethernet Interface User Configuration --
  ip address 142.65.1.1 255.255.255.0
;
  ip proxy-arp enable
;
exit
;
network ethernet1/0
```

```
; -- Ethernet Interface User Configuration --
ip address 142.65.2.1 255.255.255.0
;
ip proxy-arp enable
;
exit
;
```

Since we are connecting two segments that are directly accessible through the gateway that executes the Proxy ARP and both belong to the same IP global network, no additional parameters need to be modified.

You must disable the network check when carrying out “supernetting” on the hosts (this involves using a less restrictive network mask than the one that corresponds to the network). For example, if the hosts in the previous example are configured using Class C IP address 200.x.x.x and Class B mask 255.255.0.0, the network check will prevent the Proxy ARP from replying to ARP requests sent from 200.65.1.0 to 200.65.2.0 (since they belong to different networks).