

Re: MultiHomed Workstation – Which NIC is being used?

Source:

<http://www.tech-archive.net/Archive/Win2000/microsoft.public.win2000.networking/2005-01/0586.html>

From: Steve Riley [MSFT] (*steriley_at_microsoft.com*)

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Reply traffic follows whichever route it has to, according to the source addresses of the inbound traffic. Regardless of which interface received the inbound traffic, the same routing rules apply for return traffic. So if it comes in on NIC2 but NIC1 is able to route back to the source, your computer will use NIC1 to send the reply so long as that NIC is bound highest.

Windows (like nearly all operating systems) follows what's called the "weak end-system" model where there is no real link kept between interfaces and flows. It's all up to the routing engine to decide where to send traffic, and that decision is made on a per-packet basis.

Steve Riley
steriley@microsoft.com

- > Steve.....Thanks this answers almost all of my questions. However,
- > recalling my PS and your #4 below:
- >
- > 4. All other traffic will leave the adapter that's highest bound.
- >
- > ps...I assume that any incoming traffic to my workstation webs
- > and/or
- > databases from devices (servers and/or users) on any of the
- > three subnets will always return via the NIC on which it was
- > received?...
- > Let's assume that NIC1 is the "highest bound", does this mean that
- > traffic from the 10.0.1.* subnet (coming in via NIC2) to a web server
- > on my workstation from an Internet source (firewall DMZ for example)
- > will exit back to the Internet via NIC1, or will it know that it has
- > to exit via NIC2?
- >
- > Thanks.....RDK
- >
- > "Steve Riley [MSFT]" <steriley@microsoft.com> wrote in message
- > news:46779632411208050874498@news.microsoft.com...
- >

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>> *OK. So you have three NICs, each in its own subnet, and each with a
>> default gateway configured. If you haven't changed any default
>> settings, these will all have the same metric. Therefore, routing
>> will behave this way.*
>>
>> *1. Any traffic destined for subnet 10.0.0.0/24 will go out NIC1.*
>>
>> *2. Any traffic destined for subnet 10.0.1.0/24 will go out NIC2.*
>>
>> *3. Any traffic destined for subnet 10.0.2.0/24 will go out NIC3.*
>>
>> *4. All other traffic will leave the adapter that's highest bound.*
>> *Open the Network Connections folder, choose Advanced from the menu,
>> choose Advanced Settings. Look at the Connections box on the Adapters
>> and Bindings tab. Whichever interface is listed first is the one that
>> gets used. Windows will never initiate outbound connections using the
>> other two.*
>>
>> *Default gateways are used only when the destination address of a
>> packet is on some network other than the local segment, as defined by
>> the subnet mask. Thus, for the first three conditions, no default
>> gateways are used at all. In the fourth condition, the highest-bound
>> NIC will process all traffic. This will include any other subnets
>> inside your internal network as well as the Internet at large.*
>>
>> *Now say you have another subnet in your network, 10.0.3.0/24, and you
>> would like all traffic to that subnet to use NIC2. So long as there
>> is connectivity between 10.0.1.0/24 to 10.0.3.0/24, you can add this
>> static route:*
>>
>> *route add 10.0.3.0 mask 255.255.255.0 10.0.1.1*
>>
>> *Make sure that 10.0.3.0/24 knows how to route back through
>> 10.0.1.0/24 for any traffic that it receives from that subnet.*
>>
>> *Oh, and Shalom B. -- no, there is no facility in the stack to do any
>> load balancing of multiple NICs and default gateways.*
>>
>> *Steve Riley*
>> *steriley@microsoft.com*
>>> *Steve....255.255.255.0 is the subnet mask. Thanks...Rob*
>>> *"Steve Riley [MSFT]" <steriley@microsoft.com> wrote in message*
>>> *news:46162632410783153518016@news.microsoft.com...*
>>>> *Before I can fully answer, I need to know one thing: what is the*
>>>> *subnet mask on these interfaces?*
>>>>
>>>> *Steve Riley*
>>>> *steriley@microsoft.com*
>>>>> *Steve...Thanks for the information, except now I'm a bit confused*
>>>>> *by the reference article you sent me to. May I elaborate on my*
>>>>> *setup:*

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>>>>>
>>>>> *NIC1 10.0.0.5 has a gateway (firewall router address) of 10.0.0.1*
>>>>> *and*
>>>>> *its "modem" is connected to ISP1 – 5 MBS*
>>>>> *NIC2 10.0.1.5 has a gateway (firewall router address) of 10.0.1.1*
>>>>> *and*
>>>>> *its "modem" is connected to ISP2 – 1 MBS*
>>>>> *NIC3 10.0.2.5 has a gateway (firewall router address) of 10.0.2.1*
>>>>> *and*
>>>>> *its "modem" is connected to ISP3 – 0.25 MBS*
>>>>> *except via my workstation these three subnets are not connected*
>>>>> *(well*
>>>>> *I guess they are connected via the Internet).*
>>>>> *In this mode if I fire up an app on my Win2k workstation which*
>>>>> *wants*
>>>>> *to access the interent, I'm never sure which NIC is actually*
>>>>> *servicing the request. In a development and production*
>>>>> *environment*
>>>>> *I prefer to keep the 5 MBS pipe clear for business traffic and use*
>>>>> *one of the others for testing. But, I do need to access devices on*
>>>>> *the 5 MBS subnet periodically. Now, my read of the reference*
>>>>> *article is that I should leave the gateway field blank for NIC's 1*
>>>>> *and 3, and to populate NIC2 with all three router addresses. Is*
>>>>> *this correct? And then I have to use the Router.exe to define*
>>>>> *routes for the other two??*
>>>>> *Networking is not my speciality, can you provide a couple concrete*
>>>>> *examples.*
>>>>>
>>>>> *Thanks....RDK*
>>>>>
>>>>> *ps...I assume that any incoming traffic to my workstation webs*
>>>>> *and/or databases from devices (servers and/or users) on any of the*
>>>>> *three subnets will always return via the NIC on which it was*
>>>>> *received?...*
>>>>>
>>>>> *"Steve Riley [MSFT]" <steriley@microsoft.com> wrote in message*
>>>>> *news:45224632410457423941917@news.microsoft.com...*
>>>>>
>>>>>> *The Windows IP stack supports only one default gateway. If all*
>>>>>> *three of your interfaces have routes out to the Internet, you*
>>>>>> *will be using only one interface. Which interface gets used*
>>>>>> *depends on how you've configured the stack.*
>>>>>>
>>>>>> *In no instance will you get any form of traffic load balancing.*
>>>>>> *You can configure varying metrics, but that usually makes sense*
>>>>>> *only if you're trying to make routing decisions based on cost. If*
>>>>>> *you use a lower (that is, more preferred) metric for faster*
>>>>>> *connections then *all* your traffic will go out that connection.*
>>>>>> *If you use the same metric everywhere, Windows XP and 2003 will*
>>>>>> *use only one interface for all traffic -- the one that's listed*
>>>>>> *first in the binding order in the advanced settings dialog.*

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>>>>> *Windows 2000 just randomly picks one.*
>>>>>
>>>>> *See <http://support.microsoft.com/?id=157025> for some more details*
>>>>> *on your configuration.*
>>>>>
>>>>> *It sounds like you're describing a need for "ISP load balancing."*
>>>>> *Rainfinity makes a product called RainConnect that does exactly*
>>>>> *that. Check it out.*
>>>>>
>>>>> *Steve Riley*
>>>>> *steriley@microsoft.com*
>>>>> *You could do it 2 ways and still achieve the same result.*
>>>>>
>>>>> *In the Advanced properties of your network connections set a*
>>>>> *metric for each connection, a lower metric set to an interface*
>>>>> *makes that connection a preferred route for all outgoing*
>>>>> *traffic. Setting multiple interfaces with the same metric*
>>>>> *enables load sharing across these connections.*
>>>>>
>>>>> *If you are looking to set an application process (iexplore.exe*
>>>>> *in*
>>>>> *your case) to use a connection-of-choice for that process all*
>>>>> *the*
>>>>> *time, i don't think there is a way (but i am willing to be wrong*
>>>>> *about*
>>>>> *this).*
>>>>> *The next method used the Route.exe command line executable to*
>>>>> *set*
>>>>> *the metric for gateways using a default route which is*
>>>>> *persistent*
>>>>> *across system reboots.*
>>>>> *% Route Add 0.0.0.0 Mask 0.0.0.0 10.0.2.5 Metric 20 -p Let's say*
>>>>> *this was your 5MB connection*
>>>>> *% Route Add 0.0.0.0 Mask 0.0.0.0 10.0.1.5 Metric 22 -p and this*
>>>>> *was your 2MB connection*
>>>>>
>>>>> *% Route Add 0.0.0.0 Mask 0.0.0.0 10.0.0.5 Metric 35 -p and this*
>>>>> *was your 0.25MB connection*
>>>>>
>>>>> *RDK wrote:*
>>>>>
>>>>>> *....I have a Windows 2000 workstation which has three NICs.*
>>>>>> *Each NIC (subnets 10.0.2.5, 10.0.1.5 and 10.0.0.5) has an*
>>>>>> *independent route to the internet. That is we have three*
>>>>>> *redundant routes to the internet (three different suppliers).*
>>>>>>
>>>>>> *One of these routes is low speed (250 KBS) while the others are*
>>>>>> *1MB and 5MB.*
>>>>>>
>>>>>> *How can I tell which NIC is being used when I open up IE? Or,*
>>>>>> *how can I specify (without disabling the other NICs) which NIC*

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>>>>>>> *should be the primary (preferred) NIC, secondary, ... for*
>>>>>>> *internet access?*
>>>>>>>
>>>>>>> *Thanks....RDK*
>>>>>>>