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Subject: Re: Network virtualization/isolation  
Posted by [jamal](#) on Sun, 03 Dec 2006 12:26:02 GMT  
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On Wed, 2006-14-11 at 16:17 +0100, Daniel Lezcano wrote:  
> The attached document describes the network isolation at the layer 2  
> and at the layer 3 ..

Daniel,

I apologize for taking this long to get back to you. The document (I hope) made it clear to me at least the difference between the two approaches. So thanks for taking the time to put it together.

So here are my thoughts ...

I havent read the rest of the thread so i may be repeating some of the discussion; i have time today, I will try to catchup with the discussion.

\* i think the L2 approach is the more complete of the two approaches:

It caters to more applications: eg i can have network elements such as virtual bridges and routers. It doesnt seem like i can do that with the L3 approach. I think this in itself is a powerful enough reason to disqualify the L3 approach.

Leading from the above, I dont have to make \_a single line of code change\_ to any of the network element management tools inside the container. i.e i can just run quagga and OSPF and BGP will work as is or the bridge daemon and STP will work as is or tc to control "real" devices or ip to control "real" ip addresses. Virtual routers and bridges are real world applications (if you want more info ask me or ask google, she knows).

\*\*\*\* This wasnt clear to me from the doc on the L3 side of things, so please correct me:

because of the pid virtualization in the L2 approach(openvz?) I can run all applications as is. They just dont know they are running on a virtual environment. To use an extreme example: if i picked apache as a binary compiled 10 years ago, it will run on the L2 approach but not on the L3 approach. Is this understanding correct? I find it hard to believe that the L3 approach wouldnt work this way - it may be just my reading into the doc.

So lets say the approach taken is that of L2 (I am biased towards this because i want to be able to do virtual bridges and routers). The disadvantage of the L2 approach (or is it just the openvz?) approach is:

- it is clear theres a lot more code needed to allow for the two level multiplexing every where. i.e first you mux to select the namespace then you do other things like find a pid, netdevice, ip address etc. I am also not sure how complete that code is; you clearly get everything attached to netdevices for free (eg networkc scheduler block) - which is nice in itself; but you may have to do the muxing code for other blocks. If my understanding is correct everything in the net subsystem has this mux levels already in place (at least with openvz)? I think each subsystem may have its own merit discussed (eg the L3 tables with the recent changes from Patrick allow up to  $2^{32} - 1$  tables, so a muxing layer at L3 maybe unnecessary)

---> To me this 2 level muxing looks like a clean design in that there is consistency (i.e no hack thats specific to just one sub-subsystem but not others). With this approach one could imagine hardware support that does the first level of muxing (selecting a namespace for you). This is clearly already happening with NICs supporting several unicast MAC addresses.

I think the litmus test for this approach is the answer to the question: If i compiled in the containers in and do not use the namespaces, how much more overhead is there for the host path? I would hope that it is as close to 0 as possible. It should certainly be 0 if i dont compile in containers.

- The desire for many MAC addresses. I dont think this is a killer issue. NICs are beginning to show up which capabilities for many unicast MACs; many current have multicast hardware tables that can be used for stashing unicast MAC addresses; it has also been shown you can use multicast MAC addresses and get away with it if there is no conflict (protocols such as VRRP, CARP etc do this).

- Manageability from the host side. It seems to be more complex with the L2 than with L3. But so what? These tools are written from scratch and there is no "backward compatibility" baggage.

Ok, I am out of coffee for the last 10 minutes;-> But above sit my views worth about \$0.02 Canadian (which is about \$0.02 US these days).

I will try later to catch up with the discussion that started from Daniels original posting.

cheers,  
jamal

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