

A Test Environment for Microsoft BI based on VMWare Workstation

Summary

The goal of this document is to describe a test environment for various Microsoft server products complemented by development environments.

The concept can be used for different scenarios, not only Microsoft BI scenarios. However, it might be oversized if none of these complex software pieces like Sharepoint with its massive requirements are involved.

The author is not a network specialist, but a BI expert. Maybe the network guys have much better ideas. Feedback is welcome.

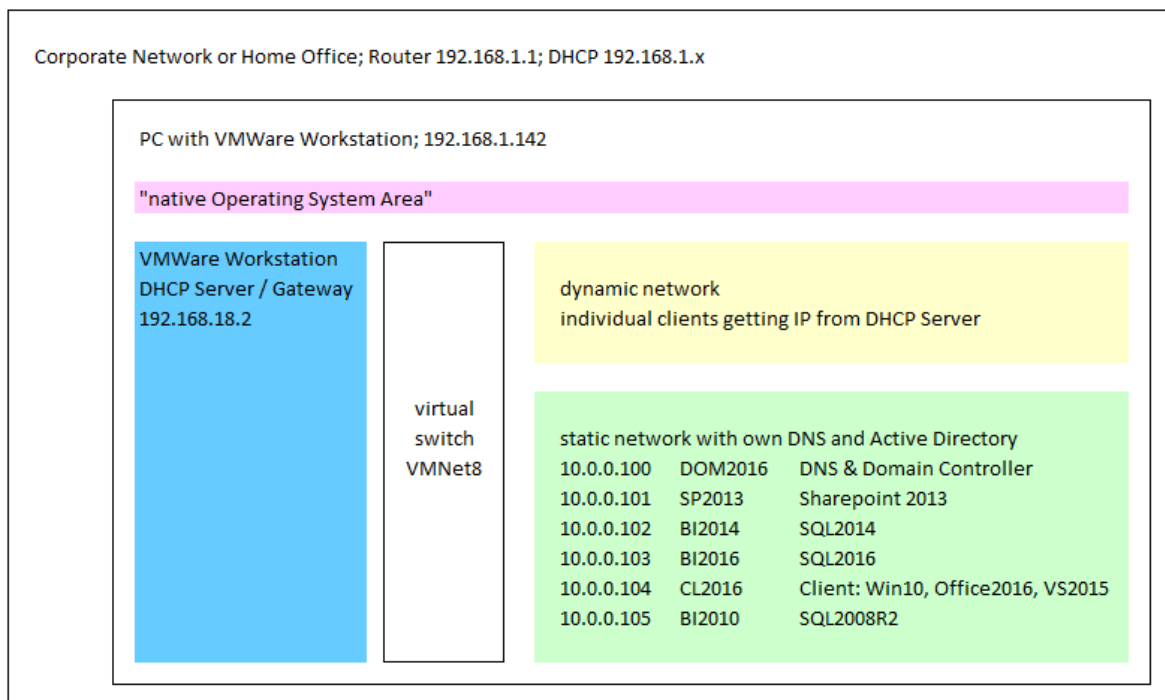
Requirements

- Allow for use with complex server products like Sharepoint
- Allow for use on a (high end) laptop
- Allow for use in a restricted corporate network (no “bridge mode” allowed)
- Allow for use in a home office network (so behind a standard router)
- Separate “main” test VMs from additional machines that are setup quickly “on demand”
- “main” VMs are using an Active Directory and the DNS running on one of these machines (not the VMWare virtual services)
- All virtual machines must have access to the Internet

Solution

The basic idea is to combine two networks in one VMWare virtual network, one with a static IP range 10.0.0.x for the main machines that interact with each other, and one with a dynamic range 192.168.18.x for additional machines

The following illustration shows the networks that are involved. Of course the IP ranges can be set in a totally different way – the ones I used here are just examples.



The inner box stands for the computer running the VMWare workstation software. Theoretically VMWare player could be used, but it doesn't come with the network editor and the snapshot functionalities. In the example the IP address is 192.168.1.142. This can be a dynamic address.

The pink area stands for the "normal" usage of the PC. However, I don't use the PC for anything else then running the virtual machines.

Blue stands for the virtual machine software that runs the machines, provides a virtual switch and the Gateway / DHCP services on IP 192.168.18.2. In VMWare terms it is called VMNet8, using Network Address Translation (NAT).

The yellow area uses DHCP in the range of 192.168.18.x. This is for machines that don't require Active directory and don't interact with each other. Just for quick setups without the need for special network configuration.

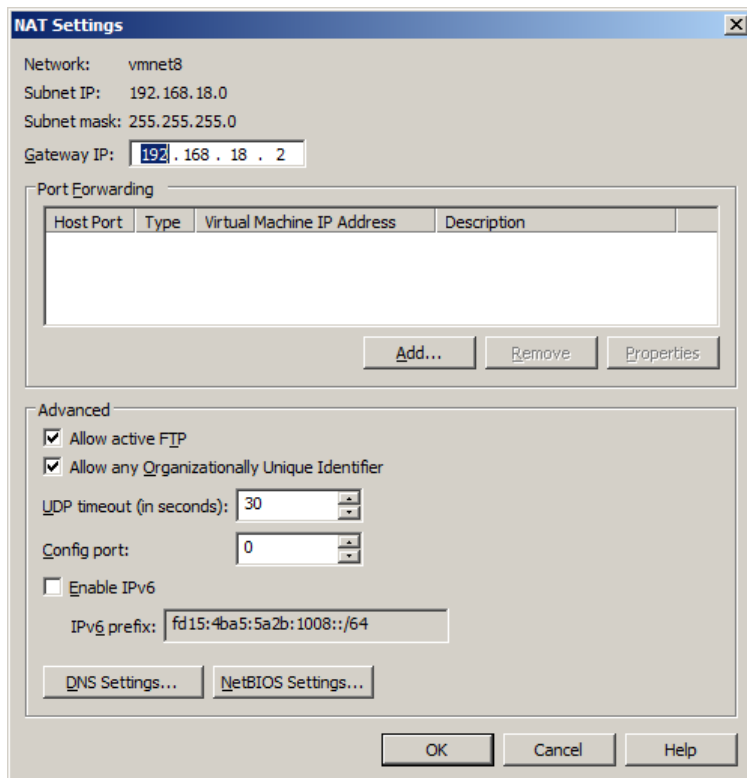
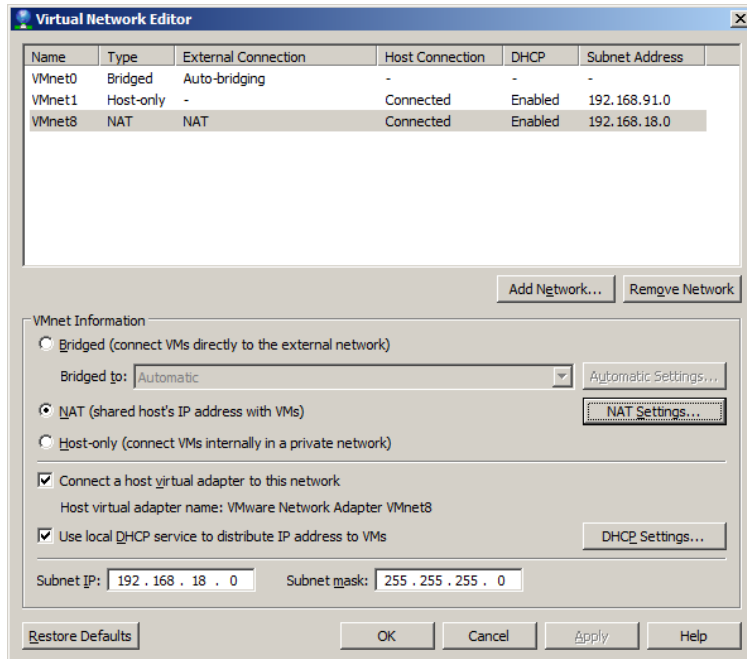
The green area is the main testing area. The machines use a separate IP range 10.0.0.x with static IP addresses. One of the machines (10.0.0.100) serves as a DNS and Active Directory Domain Controller. This machine must be up all the time. All other machines are configured to use the DNS on 10.0.0.100. All machines are administered by a domain admin account.

Configuration of VMWare PC

No special configuration necessary!

Configuration of VMWare Network

The virtual network of type NAT is used. The subnet 192.168.18.x is configured, providing DHCP services in this subnet on address 192.168.18.2:



Basic Configuration for all virtual machines of dynamic network

Just get the IP dynamically from 192.168.18.2.

Basic Configuration for all virtual machines of static network

The network configuration is set to use a static IP address in the range of 10.0.0.x (while 10.0.0.100 is reserved for the DNS/Domain Controller machine (called DOM2016, for configuration see below)).

The machines join the Domain d16. This means they can be administered by a domain admin account.

Although they are in the 10.0.0.x IP range, they use 192.168.18.2 as standard gateway for accessing servers outside (e.g. Internet).

The screenshot shows the Windows Network Settings interface. On the left, the 'Ethernet0' adapter is selected, showing the domain 'd16.intern' and the adapter name 'Intel(R) 82574L Gigabit Ethernet Controller'. Below this, it says '1 item | 1 item selected' and 'View your active networks'. The main part of the screenshot is the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box. The 'General' tab is active, showing the following settings:

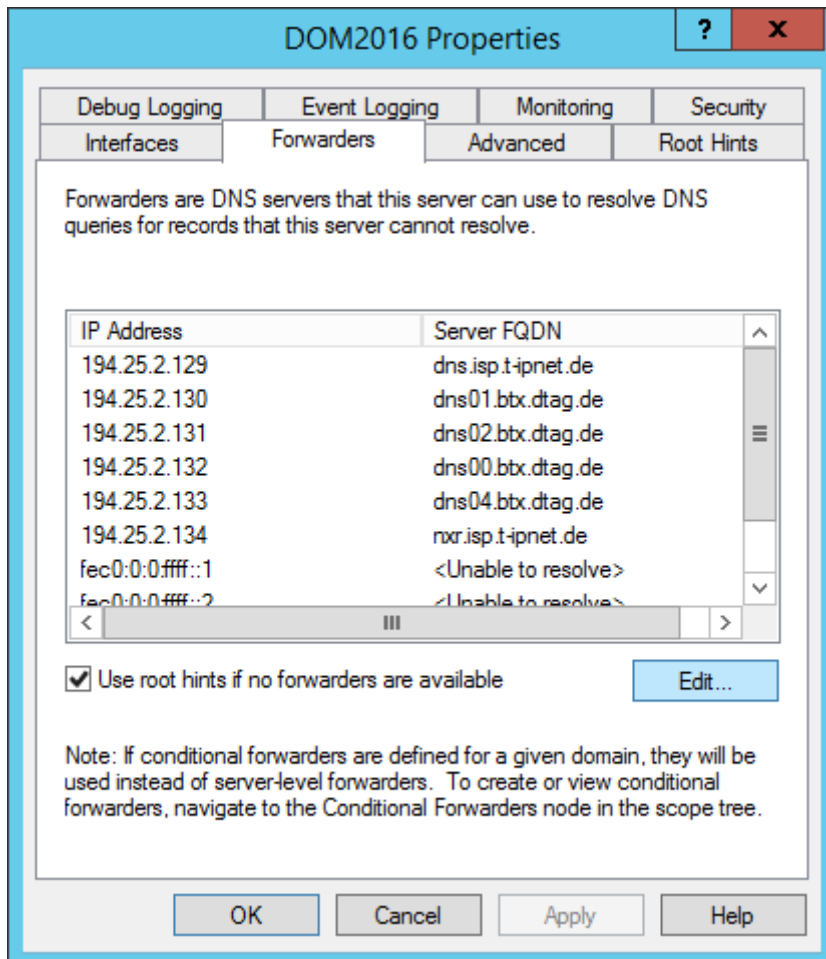
- Obtain an IP address automatically
- Use the following IP address:
 - IP address: 10 . 0 . 0 . 100
 - Subnet mask: 255 . 255 . 255 . 0
 - Default gateway: 192 . 168 . 18 . 2
- Obtain DNS server address automatically
- Use the following DNS server addresses:
 - Preferred DNS server: 10 . 0 . 0 . 100
 - Alternate DNS server: . . .
- Validate settings upon exit
- Advanced... button
- OK and Cancel buttons

Domain controller and DNS on server DOM2016 (10.0.0.100)

The machine is set up using the standard basic network configuration described above (especially static IP address 10.0.0.100).

A domain DOM2016.d16.intern is set up, as well as the DNS service. All other (static) machines join this domain. They are registered as hosts in the DNS.

There must be DNS Forwarders to allow for access outside the network.



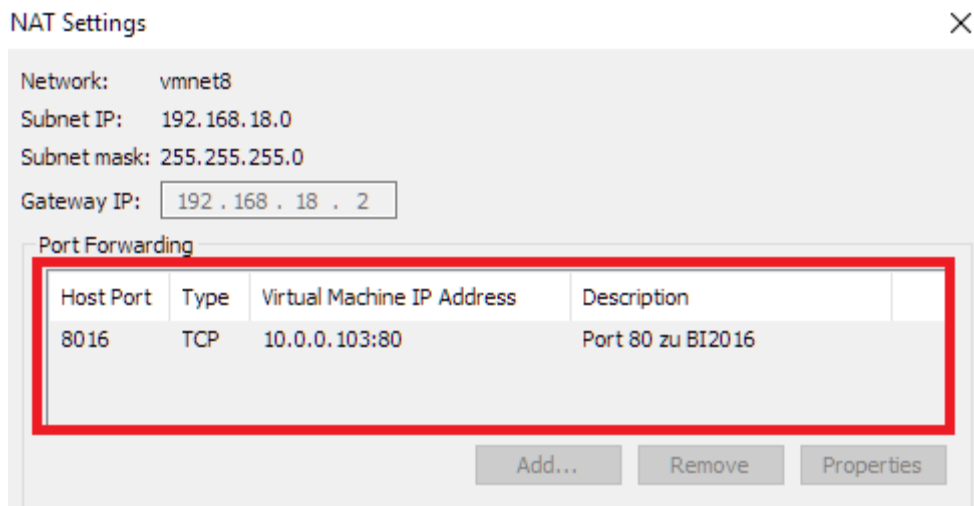
Firewall settings

The standard ports for the basic networking communication should be free in the default firewall settings, as well as the HTTP(S) ports for managing/using Sharepoint. In the BI environment the ports for accessing the SQL-Server instances have to be opened in the firewall settings of the respective machines.

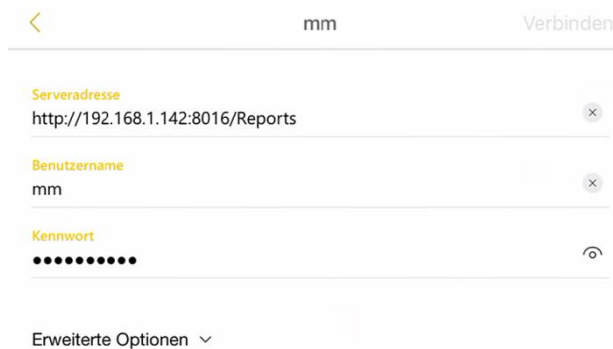
Port Forwarding

It is possible to use services that are provided by virtual machines from the area which I called “native OS area” (pink area in illustration) or other machines in the corporate or home office network. This can be done using Port forwarding in the VMWare network configuration.

The following settings forward the port 8016 (naming convention “80”->”16” for SQL 2016) in the corporate / home office network to port 80 of the BI2016 server on which the SQL2016 Reporting Services are running. This allows for accessing the Reporting Services from a mobile client like “Power BI” on IOS / iPad.



For example, here is the configuration for accessing Reporting Services from Power BI, using Airplay on iPad and AirServer on VMWare Machine (running in the “native OS area”):



Sample Report:

