Site-specific IP configurations in IBM Recovery Manager DR

Simplifying DR migration operation when the local and DR sites have different network configurations

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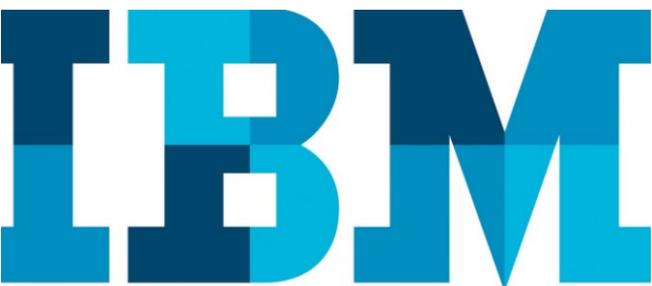
Overview

Challenge

In DR management, if the local site and DR site has different network configurations, users have to edit the network configuration file for every DR migration operation.

Solution

This paper helps users to understand the automation process for updating the network configuration files just one time and the same can be used for every DR migration operation.

Introduction

This paper helps users to understand about site-specific IP scripts and the network configuration files and the importance of these scripts and files in the disaster recovery (DR) migration operation.

This paper also explains the steps complete the network configuration successfully for IBM® AIX® and Linux® operating systems.

Architecture overview

This section describes about site-specific IP scripts and the network configuration files used for DR migration. The site-specific IP scripts are used to avoid the process of manually updating the network configuration details such as IP, Domain Name System (DNS) and so on, for every DR migration operation in the network configuration file. The network configuration files hold the information of the network that needs to be configured at the remote site. The network configuration files will be used by site specific IP scripts.

This section describes more about the importance and areas of application of site-specific IP scripts. These scripts are mainly used when the system setup has different network configurations for the home site and the remote site.

For example, in a DR migration operation, if the virtual machine (VM) from the local site is migrating to a remote site and the remote site is having a different network, the VM network configuration file should be updated before starting the operation, so that the VM on the remote site will start with a different network based on the details given in the network configuration file. And, if a VM from the remote site is migrating to a local site, the local site network details should be provided in the VM network configuration file.

It is a tedious job to edit the network configuration for every migration operation. To avoid this, one external network configuration file is created, which provides the provision to the user to hold the local site and remote site network details. This file will be updated only once with the network information of both the sites. The site-specific IP script has the mechanism to read the network information according to the site and apply it.

Architecture

Software

- IBM VM Recovery Manager DR for Power Systems version 1.5.0.0 (supports site-specific IP scripts for IBM AIX and Linux)

- IBM VM Recovery Manager DR for Power Systems version 1.5.0.1 (supports site-specific IP scripts for AIX and Linux

Hardware

- VM: Virtual machines also known as logical partitions (LPARs)

- VIOS: A special logical partition that host I/O resources to provide advanced virtualization capabilities across other client logical partitions (or VMs)

Network

- Different network configuration for local and remote sites
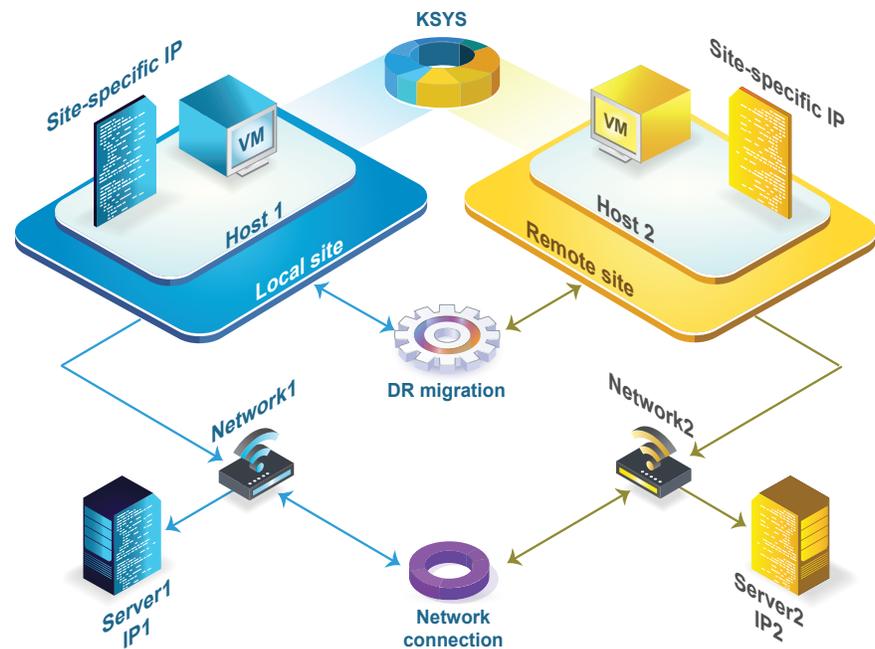
Figure 1. Site-specific IP scripts on different network configuration

Figure 1 depicts a scenario where the local site and remote site are having different networks. That is, local site is having network1 with server1 and IP1, and the remote site is having network2 with server2 and IP2.

If the VM with IP1 and server1 on the local site is migrated to a remote site, it has to start on server2 and with IP IP2.

Prerequisites

To complete the tasks mentioned in this paper, make sure that the following prerequisites are fulfilled:

- Knowledge on DR cluster type and its migration operation
- Ability to log into each managed VM (with admin access)

Currently, site-specific IP scripts are supported for AIX and Linux OS versions.

Network configuration for AIX VMs

This section explains about the files that are required to configure the network for the AIX OS version and the input that user need to provide to the network configuration file.

The script used to configure the network for AIX is *setup_dr_hostname_ip_via_config_file*.

The purpose of this script is to reconfigure the VM network with the appropriate network details provided in the configuration file. This script is called by the setup_dr.sh script. This script is not meant to be run directly.

This script relies on a customized configuration file, site_specfic_ip_config.cfg. This script reads the contents of the site_specfic_ip_config.cfg configuration file and sets the hostname, IP address, and base network of the VM.

If different network configurations are configured, the site_specfic_ip_config.cfg file must be manually edited with that information for once at the start of first DR migration operation.

Refer to the following code example.

```
Host serial numbers of primary site
IP address of LPAR at primary site
IP address of LPAR at secondary site
Network netmask to be used at primary site
DNS name server to be used at primary site
Network domain name to be used at primary
site
Default gateway IP address to be used at
primary site

Host serial numbers of secondary site
IP address of LPAR at secondary site
IP address of LPAR at primary site
Network netmask to be used at secondary
site
DNS name server to be used at secondary
site
```

This configuration file is used to provide primary and secondary site network configuration information at the same time.

Steps

There are a series of steps to be performed to set up the required network configuration for AIX VMs.

The steps involve copying customized scripts written for AIX VMs to the required VM network configuration directory and then run the necessary script.

1. Copy the sample scripts.
   a. Locate the scripts installed in the KSYS node at: /opt/IBM/ksys/samples/site_specific_nw/AIX
   b. Copy the scrips into the following directory: /usr/local/bin/ of the production VMs.

   ```
   # scp setup_dr* site_specfic_ip_config.cfg
   failover_config.cfg data_collection
   <user>@<VM IP/hostname >:/usr/local/bin
   ```

2. Run the *data_collection* script.
   This script is meant to be run on the production VM and stores information in the /usr/local/dr/ directory. This data is used to run the setup_dr.sh script at the DR site VM.

   The data collected includes the following information:
   - System hostname
   - Network adapter information
   - HBA adapter configuration
   - DNS server, domain
   - VM attributes
   - Disk configuration
   - Volume group attributes, major numbers, hdisks
   - AIX kernel (sys0) configuration

   ```
   #. /data_collection
   ```

3. Customize the VM *site_specfic_ip_config.cfg* configuration file with the appropriate IP address, netmask, and name server corresponding to the target VM.

4. Run the following commands to enable the `ghostdev` parameter in the AIX system.

   a. Set the `ghostdev` parameter so that after the DR migration operation, AIX performs cleanup, which also includes the cleanup of the network IP addresses.

b. Run the following commands to enable the `ghostdev` parameter:

    i. Run the `chdev -l sys0 -a ghostdev=1` command to enable the `ghostdev` parameter of the AIX system so that after DR migration, it clears the interface and network information of the booted system.

    ii. Run the `savebase` command to save the AIX base, which saves the `ghost` parameter (enabled in the previous step) to the AIX base.

    iii. Run the `bosboot` command to create the boot image with the saved changes:
`bosboot -ad /dev/ipldevice`

```
# chdev -l sys0 -a
ghostdev=1
# savebase
# bosboot -ad /dev/ipldevice
```

5. After completing the DR migration operation, connect to the VM console through the Hardware Management Console (HMC).

    a. Log into the HMC command line as an administrative user

    b. Run the `vtmenu` command to display the managed systems Central Electronics Complex (CEC) list.

    c. Select the appropriate managed CEC from the list.

    d. Select the appropriate VM from the VM list of the CEC.

    e. The virtual terminal to the VM will be displayed. Copy the sample scripts to the VM from the KSYS node.

6. Log into the DR VM as a root user and run the main script, *setup_dr*. The *setup_dr_hostname_ip_via_config_file* script will run as part of the main *setup_dr* script.

```
#. /setup_dr
```

7. Verify the VM network configuration by running the `ifconfig -a` command. This command displays the network configuration details such as IP, name server, and so on.
If the IP address displayed on the console and the IP address given in network configuration file are the same, it means that your configuration is successful.

```
#ifconfig -a
```

Network configuration for Linux VMs

The Linux network configuration is different from the AIX network configuration. The Linux network configuration is performed based on the TCP/IP configuration files of the Linux system. The setup_ip.sh script checks for the hardware-dependant configuration in the network directory and copies it to the Linux network configuration file. This script is run from the vmr_ip_conf.service file while booting the target system.

Steps

The steps involved in Linux network configurations are Linux system commands. Perform the following steps to set up Linux VM network configuration successfully:

1. Set up the configuration files.

   The TCP/IP configuration files are at /etc/sysconfig/network-scripts or /etc/sysconfig/network.

   This directory contains the appropriate configuration files for each environment.

   a. Create hardware-dependent config files:
      i. Find the serial number string of the system using the `cat /proc/device-tree/system-id` command.

      ```
      # cat /proc/device-tree/system-
      id
      ```

      ii. Copy your *ifcfg-eth0* script to <system-id>_ifcfg-eth0,that is, 02102EF0V_ifcfg-eth0.

      ```
      #cp ifcfg-eth0 <system-id>_ifcfg-
      eth0
      ```

      iii. Perform this task for each potential source and target locations for your VM.

   b. For each file you created in the previous step, enter the input like IP address, Ethernet address, and name server into the respective file.

   c. For the default route `ifroute-xxxx` parameter and/or other routes parameter in network configuration file, if needed repeat steps a and b

2. Copy the *setup_ip* script.
   These scripts will be installed in ksys at:
   /opt/IBM/ksys/samples/site_specific_nw/LINUX

   a. Copy the *setup_ip* script to the /usr/local/vmr/bin directory
      of the VM.

   b. Add the execution bit (+x) to the *setup_ip* script, so that the
      system can run this script after DR migration. Use the chmod
      +x command for instance.

   ```
   #chmod +x setup_ip
   ```

3. Copy the *systemd* service file:
   The *systemd* service file will be installed in ksys at:
   /opt/IBM/ksys/samples/site_specific_nw/LINUX

   a. Copy the *systemd* service file.
      Copy the *vmr_ip_conf.service* file to the required directory
      (/etc/systemd/system).
   b. Change the permissions to 644 (using the chmod 644
      vmr_ip_conf.service command).

   ```
   # chmod 644 vmr_ip_conf.service
   ```

   c. You must enable *the vmr_ip_conf.service*, so that it starts
      automatically upon boot. To enable the new service, run the
      systemctl enable vmr_ip_conf.service command.

   ```
   # systemctl enable vmr_ip_conf.service
   ```

4. After completing the DR migration operation, verify the VM network
   configuration using the ifconfig -a command. This command
   displays the network configuration details such as IP, name server,
   and so on. Verify if the IP displayed and the IP given for the
   configuration are the same. If it is the same, then the given network
   configuration is configured successfully.

   ```
   # ifconfig -a
   ```

Note: After successfully configuring the network for the Linux VM, you check
the logs in the /var/log/vmr/local/setup_ip.log file.

Limitations

Site-specific IP scripts should be used only for DR cluster type. For other cluster types such as HA, HADR, and HADRHA these scripts are not supported.

Summary

This paper explained how to simplify the DR migration operation when the local and DR sites have different (AIX and Linux) network configurations. In order to complete the operation successfully, you need to make sure the VMs are running, and you are able to log in to the systems before performing the network configuration.

Related links

For basic understanding of DR operation, refer:
https://www.ibm.com/support/knowledgecenter/SSHQV4_1.4/base/concepts_dr_mech.html

About the author

Ramya Bommineni is an advisory software engineer in IBM VM Recovery Manager production team. She has more than 2 years of experience in high availability and disaster recovery. You can reach Ramya at ramyabom@in.ibm.com.