Chapter 1: Solution Overview

Introduction

Uptime is a key client expectation for IBM i workloads. Across geographic locations, this is accomplished with a disaster recovery (DR) solution. IBM Power Virtual Server (PowerVS) meets that requirement by enabling clients to leverage DR solutions between two IBM i Virtual Server Instances (VSIs) in separate IBM Cloud datacenters.

An important characteristic of DR solutions for PowerVS is that they are based on **logical or operating system-level replication**. Many Power Systems clients today use storage-based replication for DR, which is not an option with PowerVS.

Replication solutions between two datacenters always involve prerequisite network configuration between them to allow the necessary data flow to occur securely. This also applies to DR with PowerVS, which requires specific networking steps in IBM Cloud before implementing the replication software itself.

This tutorial will provide step-by-step instructions to accomplish both phases of configuring DR for IBM i workloads in PowerVS:

1. Performing the required network configuration.
2. Implementing the DR solution itself.

Use Cases

PowerHA Geographic Mirroring

In this case we will demonstrate how to implement PowerHA Geographic Mirroring in IBM i, which provides DR by using operating

system (OS) clustering and replication. **Note that this solution requires that the IBM i VSI and client application(s) use Independent Auxiliary Storage Pools (IASPs).** If the IBM i VSI and application(s) use only *SYSBAS, this DR option will not work.

Other Logical Replication Options

For IBM i VSIs and application(s) that use only *SYSBAS, other non-IBM logical replication options exist, but they are beyond the scope of this tutorial.

Solution Components and Requirements

Components

This solution uses the following components

1. *Open an IBM Cloud account*
2. *Create two Power PowerVS location Services and a private subnet in each PowerVS location.*
3. *Provision IBM i VSIs in each PowerVS location*
    a. *A "production" IBM i cloud instance with an Independent ASP (IASP) that has been IASP-enabled (i.e. All changes/modifications allowing the IASP to function in a working environment should be completed before Geographic Mirroring is set up for a DR solution.)*
    b. *A "DR" IBM i cloud instance with non-configured disks to be used for Geographic Mirroring. It is highly recommended that the number, type and capacity of disks match that of the production IASP.*
4. *Order Direct Link Connect Classic to connect each PowerVS location to IBM Cloud*
5. *Order two Vyatta Gateways one in each datacenter to allow for PowerVS location-to-location communication*

6. *Request a Generic Routing Encapsulation (GRE) tunnel to be provisioned at each PowerVS location.*
7. *Configure three GRE tunnels in the Vyatta Gateways. Two to connect Vyatta Gateway to the PowerVS location GRE tunnels created in Step 6 above and one across Vyatta Gateways to connect Vyatta-to-Vyatta. This will allow end-to-end PowerVS location-to-location communication for the VSIs in the PowerVS locations and to the IBM Cloud VSIs and other services such as Cloud Object Storage (COS) (if used).*
8. *Configure a Reverse-proxy Centos VSI to allow access to Private Cloud Object Storage endpoint from PowerVS location*

Requirements

Open an IBM Cloud account

Login to https://cloud.ibm.com and follow the procedure to open an Internal to external account.

For internal accounts, you can use your IBM intranet ID and password. For external accounts you will need to provide a billing source such as a credit card.

Create PowerVS location Service and Subnet(s)

All Power VSIs are provisioned in what is called a PowerVS location. This is a separate datacenter adjacent to IBM Cloud datacenters. In order to setup your PowerVS location, you will setup a PowerVS location service in the IBM Cloud UI. The PowerVS location service is a service within IBM Cloud which allows you to provision IBM i VSIs. There is a limit of one PowerVS location service per datacenter in IBM Cloud. In our scenario we have created two PowerVS locations, one is Toronto and one in London datacenters.

Prior to provisioning Power VSI in the PowerVS location, you will need to create at least one subnet. You can have as many subnets as you require in each PowerVS location service on which you can provision your Power VSIs. Additional subnets beyond the initial one can be added later, after the VSI's are created.

Provision AIX and IBM i VSIs in each PowerVS location

In each PowerVS location service you can create IBM i VSIs. The details are provided in the next section.

Order Direct Link Connect Classic to connect PowerVS location to IBM Cloud

You will need to order Direct Link (DL) Connect Classic to allow your Power VSIs to communication with Linux/Window VSIs in IBM Cloud and also with all other IBM Cloud services such as VMWare VMs, and Cloud Object Storage (COS). Ordering a DL may take 1-2 weeks to complete. There is no charge for this service as of June 2020.

Order two Vyatta Gateways, one in each datacenter

In order to setup communication between the two PowerVS location datacenters, you will need to use Generic Routing Encapsulation (GRE) tunnels. GRE tunnels are provisioned on Vyatta Gateways so you will need to order one Vyatta Gateway in each PowerVS location.

The example here involves ordering one Vyatta in LON06 and the other in TOR01 datacenters where the PowerVS locations exist.

Request a Generic Routing Encapsulation (GRE) tunnel to be provisioned at each PowerVS location

You will need to open a support ticket with Power Systems and request that a GRE tunnel be provisioned in each PowerVS location. They will provision their end of the GRE tunnel and send you the information so you can continue and provision your end on the Vyatta Gateways. You will need to provide the subnets information in each PowerVS location in the ticket.

Configure three GRE tunnels in the Vyatta Gateways

We used the following link to configure the GRE.

https://cloud.ibm.com/docs/power-iaas?topic=power-iaas-configuring-power

After the support team finishes configuring the GRE tunnel, you will need to configure your end of the GRE tunnel on the two Vyatta Gateways.

You will need three GRE tunnels

1. *GRE tunnel on Vyatta to terminate the PowerVS location GRE in LON06 (or "datacenter 1")*
2. *GRE tunnel on Vyatta to terminate the PowerVS location GRE in TOR01 (or "datacenter 2")*
3. *GRE tunnel across the two Vyatta gateways. One on each side.*

Configure a Reverse-proxy Centos VSI

In this section we will discuss the procedure to configure a reverse proxy to allow access to private COS endpoint.

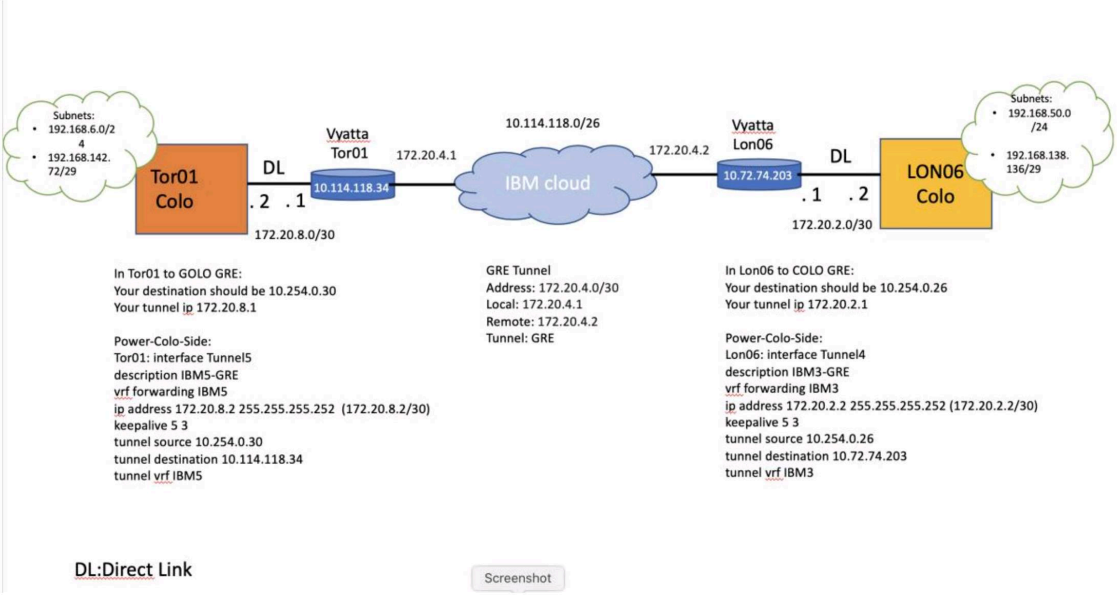
All access to COS from Power VSI is via this reverse proxy.

You will access it via https://<reverse_proxy_ip>.

You will need to provision a Centos or Red Hat VSI in IBM cloud to configure at reverse proxy. This VSI must have public access. After configuration, the public access can be disabled.

Diagrams

The overall architecture of our deployment is shown in Figure 1.



Create PowerVS location Services and Subnet(s)

You will need an IBM Cloud account to start this process.

Go to the main IBM Cloud UI page and click on “Catalog” on upper right side of the UI.