IBM i Disaster Recovery with IBM Power Virtual Server

An IBM Systems Lab Services Tutorial

IBM Systems Lab Services

Infrastructure services to help you build the foundation of a smart enterprise.

Kyle Bliss Vess Natchev ibmsls@us.ibm.com

TABLE OF CONTENTS

CHAPTER 1: SOLUTION OVERVIEW	1
Introduction	1
Use Cases PowerHA Geographic Mirroring	1 1
Other Logical Replication Options	2
Solution Components and Requirements Components	2 2
Requirements	3
Diagrams	6
Solution Diagram	41
CHAPTER 2: IMPLEMENTATION	42
PowerHA Geographic Mirroring	42
CHAPTER 3: TROUBLESHOOTING	54
CHAPTER 4: ADDITIONAL RESOURCES	55

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. <u>IBM Power Virtual Server</u> (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 <u>https://cloud.ibm.com</u> 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-configuringpower

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.



Search for "Power"



Select "Power System Virtual Servers".

0.0 0	A https://daud.htm.com/catalon/services/nower-systems-virtual-se	arver -		10 10 0
oo 🖽 IBMTeam 💙 fa	ad - Dropbos III deerreplant III AnsibieTower III BMInsurance III My account - Hyper III BW	n ven		. W
IBM Cloud	Search resources and offerings	Q Catalog Docs Support Manage	a ∨ 2085896 - IBM 🗊	e 0
Catalog / Servic	an /		Summary	
Power S	Systems Virtual Server ate of last update: 05/12/2020 - Docs		Power Systems Virtual Servor Region: Dallas	
Create	About		Plan: Power Systems Virtual 5 Service name: Power System Server-0k	Server Grou s Virtual
Select a region			Resource group: Default	
Select a region				
Dallas Select a pricing p	lan			
Dallas Select a pricing p Displayed prices do no Plan	C3.	Pring	~	
Dallas Select a pricing p Displayed prices do no Plan Power Systems Virth Server Group	Can Include tax. Monthly prices shown are far country or region: United States Features Catalog provisioning of Placer Virtual Server UMAb in the chases region.	Philing 10.33.33.15057.fox8 Out Source Would Processor Core Hour	 Apply promo code 	
Dallas Select a pricing p Displayed prices do no Plas Power Systems Virtu Server Group	23.	Pulsing 55.18.12 UDD/scole Dof Stared Minute Processor Do Anti-Minute Out Desizated What Processor 58.02.44 UDD Clearger Water Processor Care Hand	Apply prome code	Apply
Dallas Select a pricing p Displayed prices do no Plan Power Systems Virtu Server Group	Callen Instituted tax. Northly process shows are for country or region; United States. Peatures at Coalities providening of Pouser Virtual Server UMA in the chosen region.	Ficing 10.13.13.10.05% and 50week Visual Processor 0.2012 - 10.00% and 0.00% and 0.00% and 0.00% 30.4444 (0.00% and 0.00% and	Ajgly promo code	409
Dallas Select a pricing p Displayed prices do no Plas Power Systems Vith Server Group	An Ian Factors Factors An Interface shown are for country or region: United States Factors at Catalog previousing of Paser Virial Server 1986s in the chases region.	Proces 43:1312 UDIN/sice Dri Dener Virian Procesor Con-tau Biol 441 UDINasi Ori Delicato Virian Procesor Con-tau Biol Constanti Constanti Virian Procesor Constanti Biol 2010 Dingli Una Delicato Virian Procesor Biol 2010 Dingli Una Delicato Virian Biol Dingli Una Delicato Biol 2010 Dingli Una Delicato Viriano Biol 2010 Dingli Dingli Delicato Viriano Biol 2010 Dingli Ding	Apply prome code Coate Add to estimate	A004

Under Select Region, choose your region. You are limited to only one service per region.

Firefox File Edit View H	istory Bookmarks Tools	Window Help	Anti: IP IP Calman IA	6. Inne 🕜 neefall con: 🔹 IBM Walter 📑 6. Views			Ved 4:51 PM	Q +
→ C @	A sa https://cloud.ibm.co	m/catalog/services/po	wer-systems-virtual-server				IN ED.	
ahoo 🛅 IBMTeam 😝 faad - Dropbox	🛅 deerreplant 🛅 AnsibleTower	E BMineurance My	account - Hyper_ 🛅 IBMCIouid					
IBM Cloud	Search resources and offering			Q. Catalog Docs Support	Manage ~ 20858	76 - IBM 6	9 E 4	2
APer	Que en Spatiens, tribuil Server group In	r the specified IBM Cloud	ngas	Nac. 51:050-07 (2010)-em 107 Hanaga Gagisten-Hour 10:051-07 (2010)-em 107 Hanaga Gagisten-Hour 10:051-07 (2010)-10:051-07 Hanaga Gagista Gagiste 10:051-07 (2010)-10:051-07 Hanaga Gagista 10:051-07 (2010)-10:051-07 Hanaga Gagista 10:051	-	Summary Power Systems Visual William Condition (Condition Condition) Plane Power Systems (Condition) Service and the Visual Systems Resource (proce Orbital)	Estimate tual Server Gro stems Virtual	
Configure your resource						Apply promo code		
Service name			Select a resource	proup (j)			Acoly	
Power Systems Virtual Server-	3k		Default				_	-
Tags (D)						Create		
Examples: env:dev, version-1								
						Add to estimate		
						View terms		
		. m						

Select a "Service Name" or chose default name provided.

Then press "Create"

- C @	② A ≈ https://cloud.ibr	n.com/catalog/services/power-systems-virtua	i-server			IIN D	Ð
too 🛅 IBMTeam 🐺 taat	- Dropbee 🛅 deerreplant 🛅 AnalitieTov	ver 🛅 BM/nsurance 🚺 My account - Hyper 🗄] IBMCIould				
10M Cloud			Q, Catalog Docs Support Ma	ngr ~ 2085896	- 1814	6 2	4
Catalog / Service	e.						
Power St Author: 1994 - Dat	ystems Virtual Serv e of last update: 05/12/2020 - Duck	er			Power Systems Virtu Server Region: London 06		
Create	About			_			
Select a region							
Select Kington,							
London Dö							
		Service exected		×			
		Service created					
Displayed prices do not	include tax. Monthly prices shown are	The service might take time to provision, ro	su are being redirected to the resource list now.	×			
Plan	Features		Pricing				
Power Systems Virtua	Enables previsioning of Passer Virt	ual Server 1/PARs in the chosen region.	\$0.1725 USD/Scale Out Shared Virtual Processon	0			
Server Group			Core enter 30.4Y01 USD/Scale Out Deducted Virtual Processor				
			Gurni Histor \$0.56327 (202)(Exterprise Showed Vertial Processes Processes				
			52.415 USD/Entergrise Dedicated Vehical Processor Concessor				
			\$0.0343 USD/RAM Ggabyte-Hour \$0.0244 USD/Hugh Use RAM (sa405/cove) Ggabyte-				
			Hear \$0 000294 USC/SSE Storage Cigaliyte Hour				
			\$0.000147 USD/HOD Storage Gigatyre Houe \$0.0A25 USD/AIX Scale Out License/Core Houe				

Your PowerVS location service will now appear under the Services tab.

You will repeat this process to create a second PowerVS location service. In this example, there are two PowerVS location services, one in London and one in Toronto.

8	3 BMTeam 😻 faad - Dropbox 🛅 deerreplant 🛅 AnsibleTower 🖉	(1) ISA	Jinsurance 🔣 My account - Hyper 🛅 IBMCIsuid					
IBM	Cloud Search resources and offering			Q, Catalo	g Docs Support Manage			
1	Resource list						Great	re resource
	V Name	Ŷ	Group	Location	Offering	Status	Tags	
4	Q. Filter by name of IP address		Filter by group or org	Filter	Q Filter	Q Filter		~
	Devices (3)							
	Labservice-scenario1-rhel-fg.IBM.cloud		Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
	alabservice-scenario2-rhel-ab2.IBM.cloud		Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
	labservice-scenaro1-rhel-fg2.IBM.cloud PLOS: 159.45.5.242 / Private: 10.166.312.159		Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
^	VPC infrastructure (2)							
	Iabservices-vpc-private		Default	Dallas	Virtual Private Cloud	Available	-	
	Shabby-obituary-handgrip-aspect-eldest-cover		Default	Dallas	Security Group for VPC	-	-	
^	Clusters (0)							
-	 Cloud Foundry apps (0) 							
	 Cloud Foundry services (0) 							
-	 Services (2) 							
	Power Systems Virtual Server-Ok		Default	London 06	Power Systems Virtual Server	C Provision in progress	-	
	Dower Systems Virtual Server-Toronot01		Default	Toronto 01	Power Systems Virtual Server	 Active 	-	
^	Sto Power Systems Virtual Server- Toronot01		Default	Global	Cloud Object Storage	Undated		
	C. and address of the M		Denaut	Giobai	croco copect arc	· opulated		

Next you will need to click on the PowerVS location Service you created and provision a subnet to be used by your Power VSI servers.

the View by the View of the View of Vi	C û	A 10 https://cloud.ibm.com/si	ervices/power-laas/crn%	3Av1%3Abluemb%3Apublic1	63Apower-laas%3Alon06%3Aa%2F06d2a1ecba2446	322a0fb88efb484 🔊 🚥	♥ ☆		± ₩\	•
and Search resources and efferings Catalog Doc Segret Name v 2015/04-1301 I	oo 🛅 IBMTeam 💠 faad - Drop	itox 🛅 deerreplant 🛗 AnsibleTower 🛅 I	BMinsurance 🔢 My account	t - Hyper 🛅 IBMClouid 💍 \	PC CLI reference DL C VyattaVPN-VPC					
Systems Virtual Server- LONDONO6 © Active Addrage & Details Retermine the server of the ser	IBM Cloud	Search resources and offerings			Catalog Docs Support					
Details Active	source list /									
Suborts Learn more about <u>confinience and addre a private retrieve's suborts</u> C C	ower Systems	Virtual Server- LONI	DON06 🛛 Activ	e Add tags 🖉			Deta	nils	Actions	~
Subjects Subjects Subjects C Current role solution C C Current role solution C C Current role solution C <thc< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thc<>										
Names Source Forth Control Con	rtual server instances	Subnets Learn more about configuring	and adding a private net	twork subnet.						
Instruments Type Lacation IP ranges VLNN ID IP	H keys									
Object Type Lacation IP ranges VLANTD Index colorationation Involo 192.146.50.3192.166.50.254 2.34 dt It Inters per page: 10 1-1d-11 mm Involo 192.146.50.3192.166.50.254 2.34 It It	rage volumes						Q	G	Create subne	t +
Intelligence Private Incode 102148.50.3192.168.50.254 2.34 ℓ ↓ Inters per page: 10 ∨ 11-dd 1 kmm 1 ∨ d1 √ 4 ↓	bnets	Subnets	Туре	Location	IP ranges	VLAN ID				
Terms per page: 10 × 1-1 of 1 items 1 × of 1 4 >		london-colo-subnet1	Private	lon06	192.168.50.3-192.168.50.254	234			e.	Ĥ
		Items per page: 10 ~	1-1 of 1 items					1 ~	of 1 🚽	•
Screenbut					Screenshot					

Choose "Subnets" from the menu on the left.

IBM Cloud	Search resources and offe	rings	Catalog Docs Support Manage	✓ 2085896 - IBM		5 6	4
Power Systems	Virtual Server- l	ONDONO6 • Active Add tags 2			Details	Actions	
Virtual server instances SSH keys Storage volumes Boot images	Subnets Learn more about <u>cor</u>	New subnet Name your subnet and enter your gateway and IP informa	tion. When specifying IP ranges the values must be within the		Q 8	Create subne	
Subnets	Subnets Iondon-colo-subnet1 Items per page: 10	Nume new-kon06-subnet Otteway 192.168.60.1 19 ranges @ 192.168.60.2 - 192.168.60.254	CDD 0 192.188.60.0/24 DMS server 127.0.0.1	AN ID	1 .	e of1 ∢	8
		Cancel	Create subnet				

Provide the following information:

- 1. name for your subnet
- 2. CIDR range. This can be any private IP subnet ranges. For example, 192.168.5.0/24. You may choose /21 to /30 based on how many IPs you will require. You may use your own private CIDR if you wish.
- *3.* The rest of the fields will be automatically populated based on the CIDR you provided.

Press "Create Subnet"

IBM Cloud	Search resources and offerings			Catalog Docs Suppo	rt Manage ∨ 2085896 - IB	м		с С
Power Systems	■ Virtual Server-Dall	las 🛛 Active Add	i tags 🖉			Details	Actions	
rtual server instances iH keys	Subnets Learn more about <u>configur</u>	ing and adding a private	network subnet.					
orage volumes						۹. ۲	Create sub	net
ot images	Subnets	Туре	Location	IP ranges	VLAN ID			
Aleta	subnet1	Private	us-south	192.168.4.2-192.168.4.254	732		2	Û
	Items per page: 10 V	1-1 of 1 items				1	∨ of 1	-
	Items per page: 10 $$	1-1 of 1 items				1	∨ of1	(

There should be a VLAN ID associated with the subnet.

At this point, you will need to open a Support Ticket with Power System to request that the subnet be configured to allow local communication between any Power VSI you create in this PowerVS location service. Provide your PowerVS location service location, and your subnet in the ticket.

Without this step, the Power VSI you create will not be able to ping between each other even if they are on same subnet in the same PowerVS location.

Provision AIX or IBM i VSIs in each PowerVS location

The procedure is similar for both AIX and IBM i VSI provisioning. Here is a procedure to create an AIX 7.2 VSI. The cost shown are monthly costs, but you are being charged hourly.

Go to the IBM Cloud Catalog and press the "IBM Cloud" on top left side of the UI.

← →	C' 🟠 💿 🖨 地 https://cloud.ibm.co	m Em unutur management	- Photosoft - Charles		landar (Örentli	··· 🗟 🕁	± ₩	•	≡
	IBM Cloud Search resources and offering	S		Q Catalog Docs Support	Manage ~	2085896 - IBM	• •	4	8
88 三	Dashboard					Customize 🖉	Create resourc	• +	
8 @ Ø ⊕ ⊖ v 12 +	Resource summary 14 Resources Devices VPC-infractructure Services Storage VMeare		6 1 € 3 € 2 € 1 € 1 € 1	Classic Infrastructure Device list Support cases User list Subunits Network monotoring Black Storage Compliance reports Learn about the transition to IBM Cloud		For you VPN access enables us remotely and securely private network.	ers to manage all : over the IBM Clour uses Aspera high rites to the Cloud.	© iervers j speed	FEEDBACK
	Yens Device State	Planed maintenance	View at	EM Cloud status	View all	Recent support cases 2 case(i) waiting on customer imported by AVK 53. The Waiting on customer (6 days Severity 4: Cannot ping be same subbur Vaiting on customer (2 days Severity 4: Error waiting to locat C) (enror-unable to locat C) (enror-unable to locat Resolution provided (5 days)	ng file to COS - Error reason code is 556. ago tween two Power V: ago ating a new VM in Ti a storago provider- ago	View all 51 on pronto with	

Choose "Services" from the list shown.

$\overleftarrow{\bullet}$ \rightarrow	C" û	(🙂 🚔 😂 http	is://cloud.ibm.co	m/res	ources						⊌ ☆		<u>⊀</u> III\		8) =
Yahoo	🗎 IBMTeam	👯 faad - Dropbox	deerreplant	AnsibleTower	E IBN	Insurance H My account - Hyper	BMClouid 2	VPC CLI reference	e 🗎 DL 🕇	🖱 VyattaVPN-VPC 🏼 🇔 vyatta-L	ondon 🍳 vyatta-Toronto					
≡ 1	BM Cloud															
88 III	Reso	urce list											Creat	e resoure	:o 4	
B	∨ Name				\uparrow	Group		Location		Offering	Status		Tags			
æ	Q Filter	by name or IP a	ddress			Filter by group or org	~	Filter	~	Q Filter	Q Filte	96	Filter		~	
B	~ Device	rs (6)														
Θ	✓ VPC in	frastructure (4)														
9	√ Cluste	rs (0)														
vm	~ Cloud	Foundry apps (0))													
12	 ✓ Cloud 	Foundry service	s (0)													
+	∧ Servic	es (2)														ACK
	(i) Pi	ower Systems Vi	irtual Server- LC	NDON06		Default		London 06		Power Systems Virtual !	Server 🥥 Active		-		1	FDR
	(3) Pi	ower Systems Vi	irtual Server-Tor	ronot01		Default		Toronto 01		Power Systems Virtual	Server 🥥 Active		-		1	
	∨ Storag	je (1)														
	~ Netwo	rk (0)														
	✓ Cloud	Foundry enterpr	rise environmen	ts (0)												
	✓ Functi	ons namespaces	s (0)													
	✓ Apps	(0)														
	✓ Developed	oper tools (0)														
	∨ VMwa	re (1)														
	√ Schen	natics workspace	es (0)						Sc	reenshot						

Click on the service for datacenter in which you have created a PowerVS location power service. In this case we will choose Toronot01 PowerVS location service.

← → ♂ ☆	⑦ ≜ ≌ https://cloud.ibm.com/services/p	oower-iaas/crn%3Av1%3Abluemix%3Apublic%3Apo	wer-iaas%3Ator01%3Aa%2F	06d2a1ecba2446	22a0fb88efb484	▣ … ☺ ☆	⊻ ⊪\ ⊡ ⊜	Ξ
🌠 Yahoo 🛅 IBMTeam 👯 faad - Dropbox	🗁 deerreplant 📋 AnsibleTower 📋 IBMInsurar	nce 🔢 My account - Hyper 🛅 IBMClouid 🖄 VPC CLI	reference 🛅 DL 👛 VyattaVP?	N-VPC 🏼 Ó vyatta-Li	ondon 🧔 vyatta-To	ronto		
IBM Cloud	Search resources and offerings		Catalog Doo	s Support	Manage 🗸	2085896 - IBM		Å
Resource list / Power Systems Vi	irtual Server-Toronot0	1 🛛 Active Add tags 🖉				Deta	ilts Actions ~	
Virtual server instances	Virtual server instances	Creating a virtual converting tance						
SSH keys	Learn more about <u>Getting started</u> and	wearing a virtual server instance.					_	
Storage volumes						Q	Create instance +	
Boot images Subnets	Name	IPs	Image	CPUs	RAM	Status		
	labservices-scenario1-private-aix-fg2	192.168.6.136	7200-04-01	0.5 cores	2 GB	Active	o :	
	pc-tor01-glvm-02a	192.168.6.167	7200-04-01	1 cores	4 GB	Active	o :	
	i922brmc-ibmi-cs			0.5 cores	4 GB	Active	o :	
	INTARGET	192.168.6.151, 192.168.142.78	IBMi-73-07-001	0.5 cores	4 GB	Active	o :	
	IBMiHADR-kb	192.168.6.219, 192.168.142.77	IBMi-74-01-001	1 cores	4 GB	Active	o :	
	labservices-scenario1-private-aix-fg	192.168.6.190	7200-04-01	0.5 cores	2 GB	Active	o :	
	labservices-scenario2-aix72-ab3	192.168.6.186, 192.168.142.75	7200-04-01	1 cores	2 GB	Warning	<mark>0</mark> i	
	labservice-scenario2-aix72-ab2	192.168.6.112	7200-04-01	1 cores	2 GB	Active	o :	
	pc-tor01-glvm-01a	192.168.6.163	7200-04-01	1 cores	4 GB	Active	o :	
	IBMiProd-kb	192.168.6.118, 192.168.142.74	IBMi-74 Screensho	1 cores	4 GB	Active	o :	
	Items per page: 10 V 1-10 o	f 10 items					1 ∨ of1 4 >	

Since we have already provisioned several VSIs, we see the list shown above. If you are creating VSIs for the first time, your list will be empty.

Press "Create Instance" on upper right-hand side.

(←) → C* @	💿 🔒 🕾 https://cloud.ibm.co	m/services/power-laas/crn%3Av1%3Abluemix%3Apublic%3Apower	-laas%3Ator01%3Aa%2F06d2a1ecba2446	22a0fb88efb484 F 🛛 •••	5 G	<u>⊻</u> II\ ED @ ≡
Yahoo 🛅 IBMTeam 👯 faad - Drop	box 🛅 deerreplant 🛅 AnsibleTower	🛅 IBMInsurance 🔢 My account - Hyper 🛅 IBMClouid 👛 VPC CLI refe	ence 🛅 DL 👛 VyattaVPN-VPC 🧔 vyatta-L	ondon 🧔 vyatta-Toronto		s
	Search resources and offering	has.	Catalog Docs Support			e 🗘 x
Resource list / Power Systems	Virtual Server-Tor	ONOTO1 ◎ Active Add tags 🖉			Details Act	ions ~
Virtual server instances	Virtual serve	r instance creation			Summary	lich M
SSH keys						
Storage volumes Boot images	Virtual servers	Create a new instance for Power Systems Viri	ual Server-Toronot01		IBM POWER9 1 cores 2 GB	\$1,289.98
Subnets	SSH key	your machine configuration, boot image, volumes, and network interfaces.	you can select		Network interface	\$0.00
	O Boot image	Instance name	Number of instances		Storage volume	\$0.00
	0		1	~		
	O Profile	VM pinning ①				
	 Storage volumes 					
	O Network interfaces	SSH key				
		You must add a public SSH key to securely connect to your Power Systems Virtual Server. For more information, see obtaining a public http:/				
		SSH keys				i i
		Choose a SSH Key 🗸	New SSH key +			
		Boot image				
		Select from AIX, IBM i, or Linux boot images. If you are deploying a Linux virtual machine (VM), you must first purchase a subscription, then registe it and register with your Linux vendor after deployment. Learn more abou purchasing and subscripting to Linux.	Screenshot			\$1,289.98 estimated
		Operating system			I agree to the Englishing	dicentitions.

This is where you provision AIX or IBM i VSIs.

Choose a name for your VSI, i.e., AIX-72-Tor01 and select how many VSIs you need to configure. The names of the VSI will be appended with a "-1", "-2" etc. if you select more than one VSI. Note that the IBM i will give the LPAR a system name consisting of the first 8 characters, and it is best to use only alphanumeric characters for IBM i naming.

You may leave VM pruning and SSH key as-is since the VSIs will have no passwords when you create them for the first time. You will need to create a password via the OS command. This is AIX-specific and those two options are not related to IBM i instances. The O/S and DST passwords for user qsecofr will default to QSECOFR and will be changed later (discussed in the section on configuration).

Scroll down to choose other options.

(←) → ♂ ✿	💿 🚔 🖙 https://cloud.ibm.co	m/services/power-laas/crn%3Av1	%3Abluemix%3Apublic%3Apower	-iaas%3Ator01%3Aa%2F06d2a1ecba2446	622a0fb88efb484 🖻 💀	· 🖂 🕁	<u>⊻</u> II\ © ⊛ ≡
Yahoo 🛅 IBMTeam 👯 faad - Drop	pbox 🛅 deerreplant 🛅 AnsibleTower	🛅 IBMInsurance 🔢 My account - Hy	per 🛅 IBMClouid 💍 VPC CLI refer	rence 🛅 DL 👛 VyattaVPN-VPC 🧔 vyatta-L	endon 🧔 vyatta-Toronto		
IBM Cloud	Search resources and offering	s		Catalog Docs Support			
Resource list / Power Systems	Virtual Server-Tor	onot01 oActive A	id tags 🖉			Details	Actions Y
Virtual server instances	Virtual serve	r instance crea	tion			Summary	
SSH keys							
Storage volumes	Virtual servers	Boot image				I IBM POWER9	\$1,365.10
Boot images		Select from AIX, IBM i, or Linux bo	ot images. If you are deploying a Linux			1 cores 2 GB	
Subnets	O SSH key	virtual machine (VM), you must fin it and register with your Linux ven	t purchase a subscription, then registe lor after deployment. Learn more about	r t		XIA	
	O Root imade	purchasing and subscribing to Lin	X			Network interfac	e \$0.00
	O boot image	Operating system	1	Image		Storage volume	\$0.00
	O Profile	IBM i Linux - Client supplied sub	cription	Select an image	~		
	Storage volumes Network interfaces	Profile Choose your machine type, process	or, memory and cores.				
		Machine type	Processor				
		Choose a type 🛛 🗸	Dedicated O Shared un	ncapped 🔘 Shared capped			
		Cores (CPUs)		Memory (GB)			
		Storage volumes Please select an image before creat existing volumes after you provision	ing and attaching a new storage volume, the instance.	Screenshot You can attach		Total monthly cost*	\$1,365.10 estimated
		-	-			I agree to the imm	a and conditions

Here you will choose the following options:

- Operating System AIX or IBM i or any other image you may have imported via the "Boot Image" menu on the left.
- Image type: AIX 7.1 or 7.2, IBM i 7.3 or 7.4, for example.
- Software license: Be sure to include "IBM i PowerHA" and any others as necessary.
- Disk types: Type 1 or 3. Type 3 is a less expensive option which we selected.
- *Machine type: S922 or E980. S922 is the cheaper of the two which we selected.*
- Processor: Dedicated or Shared or Shared Capped. We chose "shared" as its less expensive.
- Choose the number of cores and RAM you will need. The minimum core is "0.25". IBM i partitions have typically required at least 4 GB of memory, just to boot, so this should be your minimum value as well.
- You can also attach additional volume to the VSI is you wish. We did not do that here and only used the root volume which is included. As discussed later, it is HIGHLY recommended to add the disks one at a time, after creating the initial Load Source (LS) volume. It makes it much easier to keep track of which disk unit ID matches the volume name in the IBM Cloud UI.
- This solution requires that IBM PowerHA SystemMirror for i (Enterprise Edition) is installed on both the production and DR nodes in the solution. This product is 5770HAS *BASE and Option 1
- No matter what O/S version/release, it is always recommended to have the latest PTFs, which can be found here:
- <u>https://www.ibm.com/support/pages/ibm-i-support-</u> <u>recommended-fixes</u>
- Since PowerHA for IBM i is owned by HelpSystems, the following link is useful as well, to ensure the latest HA group PTFs are installed:
- <u>https://helpsystemswiki.atlassian.net/wiki/spaces/IWT/pages/16</u> 2627587/PowerHA+PTF+Groups

Next you will scroll down to choose your subnet on which these VSIs will be provisioned. It is assumed you have already created one or more subnets prior to this step.

Click on the "Attached Existing" under networks.



Choose the subnet you wish to attach, and the press "Attach"

÷	→ C' û	A = = https://cloud.ibm.com	services/power-iaas/crn%3Av1%3Ablue	emix%3Apublic%3Apowe	er-iaas%3Ator01%3Aa%2F06d2a1ecb	a244622a0fb88efb484	▽ ☆	∭\ ⊡ \$ ≡
💅 Ya	hoo 🛅 IBMTeam 👯 faad - Dropbox	deerreplant AnsibleTower	BMinsurance 📙 My account - Hyper 🗎	BMClouid 🛛 VPC CLI ref	erence 🛅 DL 👛 VyattaVPN-VPC 🔘 v	yatta-London 🔱 vyatta-Toronto		
≡	IBM Cloud	Search resources and offerings			Catalog Docs Supp			e 🗘 x
	esource list /							
1	Power Systems Vi	rtual Server-Toro	not01 🛛 Active Add tags	l.			Details Actions	. ×
Ň	firtual server instances	Virtual serve	instance creation	1			Summary	
ş	SH keys							
S	torage volumes	Virtual servers	1	:	2	•	1 IBM POWER9 s922	\$137.97
E	loot images						1 cores 2 GB	
5	ubnets	O SSH key	Chara de velumes				AIX Maturadi interfere	to 00
		 Boot image 	Create and attach new storage volumes. You	can attach existing volumes a	after you		Storade volume	\$0.00
			provision the instance.				20 GB	\$2.00
		 Profile 	New storage volume +					
		 Storage volumes 						
		 Network interfaces 	Network interfaces A public network uses a public VLAN to come	ect to your virtual server insta	ance. Under			
			private networks, you can connect to existing the Cloud. To create a new subnet you must	subnets to move on-premise go to the subnet tab, your pr	es workloads to rogress here will			
		·	be saved.					
			Public networks					
			Off Off					
			Private networks					
			Attach existing +					
			Attached private networks		Screenshot		Total monthly cost*	\$139.97
			Name IP a	ddress IP range	CI	DP		estimated
			1.5				I agree to the Terms and conc	Stions

Now check the box "I agree to the" And press "create Instance" in lower right-hand side.

Your VSI is now being provisioned.

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 in the PowerVS location to communication with Linux/Window VSIs in IBM Cloud and also with all other IBM Cloud services such as Cloud Object Storage and VMware services. This process may take 1-2 weeks to complete.

There are several steps involved in completing DL ordering:

 Order Direct link connect classic service on IBM Cloud UI – see steps below

- Next a support ticket will be created, and Support will send you a word document with questionnaires to be completed concerning various DL settings.
- Complete the questionnaires and upload it to support in the ticket.
- Support will then request that you create a new support ticket with the Power System so they can complete their side of the DL provisioning. Attach information about the DL in the original ticket to this ticket.
- The DL will be provisioned, and you will be notified when complete.
- You can now test connection to any Linux/Windows VSI you may have in IBM Cloud and other IBM Cloud services.

To start the DL order process, go to IBM Cloud UI and log in.

Choose "Catalog" from upper right-hand side, and search for "direct".

🖄 Catalog - IBM Cloud 🛛 🗙	🖄 Configuring and adding a p: X 🛛 🖄 Importing a boot image 🛛 X	🗴 os_server - Create/Delete 🗆 🗙 🚺 87 AIX & IBM i in IBM	t (Publi 🗙 🧧 (1) PowerVS Networking Tur 🗙 🙆 Getting	g started with the IBN X 🖄 Direct Link Connect for Poin X 🕂
(←) → ♂ ŵ	💿 🔒 https://cloud.ibm.com/catalog?search=direct#s	earch_results		
Yahoo 🛅 IBMTeam 👯 faad -	Dropbox 🛅 deerreplant 🗎 AnsibleTower 🛅 IBMInsurance 🔢 My a	ccount - Hyper 🛅 IBMClouid		
■ IBM Cloud				
습 Catalog	Q direct	×		
	Search results for 'direct' 7 results			88 :=
Featured				
Services				
Software		4		
Category	Direct Link Connect on Classic IBM - Services - Networking	Direct Link Dedicated 2.0 IBM • Services • Networking	Direct Link Dedicated Hosting on Classic IBM • Services • Networking	Direct Link Dedicated on Classic IBM • Services • Networking
	IBM Cloud Direct Link Connect offers private	This is the 2.0 version of this service. Connect	Establish unparalleled network performance	Connect directly to IBM Cloud through a
Analytics Web and Application	access to your time clouds linked to your Network	connection, using a dedicated circuit or cross	resources, with customized support for your	circuit or cross-connect, for unparalleled
Product	~			
	5 C		M	
Provider	Direct Link Exchange on Classic IBM - Services - Networking	IBM Cognos Dashboard Embedded IBM - Services - Analytics	Voice Agent with Watson IBM • Services • Web and Application	
	IBM Cloud Direct Link Exchange offers multi- tenant connections to your IBM Cloud infrastructure, through your local IBM Cloud	Bring data to life directly from your application with this powerful and easy-to-use visualization service.	Create a cognitive voice agent that uses Watson services to speak directly with customers using natural language over the	
Pricing plan	^	Lite • Free • IAM-enabled	Lite • Free • IAM-enabled	
Lite				
Free				
Compliance	^			
				e
	<			

Select "Direct Link Connect on Classic".



Press "Create". There are no options to select.

IBM Cloud = IBM Cloud	i Dire X	3 Configuring and adding a pr 🗙 👛 Impe	orting a bost image X A os_server - Create/Delete C	X 87 AIX & IBM I In IBM (Public X	🔚 🖬 (1) PowerVS Networking Turi 🗙 👛	Getting started with the IBV 🗙 👛 Dire	act Link Connect for Point X +
€ → ሮ ŵ		🛛 🗎 https://cloud.ibm.com/cl	lassic/network/directlink/connect			🖾 🕁	⊪\⊡ ≇ 🖞
Yahoo 🛅 IBMTeam	😍 faad - Dr	spbox 🛅 deerreplant 🛅 AnsibieTower 🚦	🛅 IBMInsurance 🔢 My account - Hyper 🛅 IBMClouid				
■ IBM Cloud		Search resources and offerings	k	Q Catalog	Docs Support Manage V 2	2085896 - IBM	D & 4 8
🗮 Classic		IBM Cloud Direct	Link Connect			Order Di	rect Link Connect 🛨
Overview							
Devices	~	The table below shows the sta	atus of IBM Cloud Direct Link Connect connection	ns provisioned for this accour	t. Details of the connection can be	displayed by clicking on the con	nection name. The
Storage	~	connections can be cancelled	or deleted depending on the connection status.				
Network	~	NAME	LINK SPEED	LOCATION	NETWORK PROVIDER	CONNECTION STATUS	Actions
Security	×						
Services	×		There are no Direct Links. To	create one, use the 'Order Di	rect Link Connect' button in the top	o right.	
				Screen	shot		
合 🍘 💶	尾 💋	ڬ 📲 🍿 🕹	. 🗂 👝 💽 🚳 💶 💐			🚳 🛄 📝 🔚 🔇) 🔊 Q 🛛

Now choose "Order Direct Link Connect" from top right-hand side.

IBM Cloud	Search resources and offerings	Q Cata	log Docs Support	Manage ~ 2085896 - IBM	⊡ (8 <mark>0</mark> 8
Classic	Catalog / Offering Details /					
Overview	🖆 Create a IBM Cloud Direct Link Conr	lect Connection				
Devices ~	Direct Link Instance Name:				Order Summary	USD 🔻
Storage 🗸	labservices-directlinkconnect				1 Gbps Direct Link Connect	\$895.00/mo
Network ~	Location 1					
Security ~	Teronto 1				Total due per mont	h: \$895.00 tax not included
	Network Provider: Concerta Infraçonal Sol Mayos 200		Strangelickt		Total due now > Apply promo c - I have need the M - I have need the M - Bayesteriest and ag - Bayesteriest and ag - Need Help? Contact	S0.00 tax not included wide ster Service ree to the terms IBM Cloud Sales
			Screensing			

- Choose a "name" for the DL.
- Choose a location for the DL. This should be the same location as where you created your PowerVS location Service.
- Choose "link speed" under network provider menu.
- Choose "Local Routing (free)"

Global routing will require additional charges and will allow for easier PowerVS location-to-PowerVS location communication. You will also need to order a Vyatta Gateway Router to complete your Global routing option via use of a GRE tunnel. Support can help you with this further.

In our case, we decided to use Local Routing and then order a Vyatta Gateway in each PowerVS location and provision a GRE tunnel end-toend.

IBM Cloud	Search resources and offerings	Q Catalog Docs Support Manage V 20858	96-1BM 🗉 🗹 🗳 A
Classic	Catalog / Offering Details /		
Overview	🛂 Create a IBM Cloud Direct Link Connect Co	nnection	
Devices ~	Direct Link Instance Name:		Order Summary USD 🔻
Storage 🗸	labservices-directlinkconnect		1 Gbps Direct Link \$395.00/mo
Network ~			Connect
Security ~	Location:		Total due per month: \$895.00
Services ~	Toronto 1		tax not included
	Network Devider		IBM CLOUD DIRECT LINK CONNECT
	IBM POWER VS		Prorated initial charge \$491.00
			Total due now \$491.00
	Link Speed:		tax not included
	1000 Mbps ~		> Apply promo code
			I have read the Master Service
	Routing Option:		Agreement and agree to the terms therein.
	BGP ASN IBM ASN		Create
	64999		Need Help? Contact IBM Cloud Sales
		Screenshot	

• Check the box to accept the offer and press "Create"

A support case will be opened with the information required.

🖄 Suppor	t - IBM Cloud	×	🛎 Configuring and adding a pr 🗙	Importing a boot image X	A os_server - Create/Delete C >	× 87 AIX & IB	i in IBM (Public X	📑 (1) Pov	werVS Networ	king Tu: X	🛎 Getting	g started with the IDV $ imes$	🛎 Direct Lin	k Connect I	lor Pow X	+
	C" 🟠		💿 🔒 https://cloud.ii	bm.com/unifiedsupport/cases?nu	mber=CS1808755							⊡ ☆		101		-9
<mark> Ya</mark> hoo	🛅 IBMTeam	👯 faad -	Dropbox 🗎 deerreplant 🗎 Ansi	bleTower 🗎 IBMinsurance 🔢 My ac	ccount - Hyper 🛅 IBMClouid		_									
= 1	BM Cloud															
S	and Contor	. /														
50	port center															
P	anage	case	25													
													_		_	
(्र numbe	er:CS180	8755			×	Filter by sta	atus	~	$\overline{\gamma}$	C Vie	w archived cases	Create n			
	Nun	nber		Subject		Offering			Status			Updated				
	CS180	08755		Sales Request	1	Infrastructure			New		20	20-05-15				
	Descr	intion					2020-05-15 10)-41-53	Watch	list				6	,	
	00001	.priori					2020 00 20 20		Tractori					~	·	
									Attach	ments	D			8		×
	Comm	nents							Select u	p to 10 file:	s not exceedin	ng the 20 MB limit. Each	file must be 8	MB or		DBAG
	Faad Gh	horaishi					3 2020-05-15 1	.0:41:55	smaller.							FEE
	-><-															
	Plea	ase initiate	an Direct Link Connect in Torc	onto 1					Resou	rces						
	Inte	rconnect I	ID: 19346 Chos Direct Link Connect						These ca	annot be re	moved after th	hey're added				
	Link	Speed pri ting: Local	ce: 895.35 Routing						Select re	sources						
	Rout	ting price:	Free rices-directlinkconnect						Limit	5 resourc	:e(s)					
	BGP	ASN: 649	99						There a	re no reso	ources availa	able				
	Tern	n & Condit	ions: Agreed.						Add r	esources	+					
							Screensh	hot								
	Add cor	mments her	0					3000	Case n	esolutior	n					
	To m	naintain de	evice security, please do not in	clude any personal information, s	sensitive data or device cre	ls, v			0		í)					
🐣 🗧	0 📰	S	🌶 🍅 🌞 🎁 🚺	5 🔂 🚺 🔁	🍋 💶 💶 🍳			- C		ĊĻ.	9 🚳	⁵¹ /		() (2	A

After this is complete, you will then be contacted by support and requested to complete and answer some questions in an attached document and send it back as attachment to the same ticket. After this step is complete, support will request that you open a new IBM support ticket and address it to the Power System. Include the information in the original DL ticket. This new ticket will be sent to the PowerVS location support to configure their side of the DL connection.

This should be the last step before DL communication works. You can test your connection by pinging IBM Cloud Linux/Windows VSI from your Power VSIs and in reverse.

Order two Vyatta Gateways, one in each datacenter

In our scenarios we used two Vyatta Gateways, one in each PowerVS location to provide end-to-end PowerVS location-to-PowerVS location communication using GRE tunnels.

Login to IBM Cloud and click on the "Catalog", then search for Vyatta.

(←) → @ @	0 🖨 🕾 https://cloud.ibm.com/catalog?search=vyatta	#search_results	2	···· 🖾 🕁 🕺 🛨 🔟 🕲 🗉
Yahoo 🛅 IBMTeam 😻 faad - Dropbox	🖌 🚞 deerreplant 📋 AnsibleTower 📋 IBMinsurance 🔢 My acc	ount - Hyper 🛅 IBMClouid 🖄 VPC CLI reference 🛅 DL	🖄 VyattaVPN-VPC 🍳 vyatta-London 🖞 vyatta-Toronto	
IBM Cloud				
습 Catalog	Q vyatta	×		
IBM Cloud catalog Featured Services	Search results for 'vyatta' 95 result			20 ::
Software	<u>م</u>	Rd	Pø	Et
Consulting	Gateway Appliance IBM • Services • Networking	Databases for Redis IBM • Services • Databases	Databases for PostgreSQL IBM - Services - Databases	Databases for etcd IBM • Services • Databases
Category ^ Containers Networking	Protect your cloud infrastructure and optimize its performance with a gateway appliance.	Redis is a blazingly fast, in-memory data structure store.	PostgreSQL is a powerful, open source object- relational database that is highly customizable.	etcd is a distributed reliable key-value store for the most critical data of a distributed system IAM-enabled
Storage				
AI / Machine Learning Analytics Databases Developer Tools Logging and Monitoring Integration Integration Integrated Thinase	VI Database Community - Software - Databases Configure a classic virtual server with Postgre®QL to provide scabability and performance for your data workbads. Terratorm	Es Datases for Elasticearch 18M + Services + Datases Elasticearch combines the power of a full text search engine with the indexing strengths of a 5004 documents	Mg Databases for MongoDB IBM - Services - Databases MongoDB is a JSON document store with a rich query and aggregation framework.	Knowledge Cathlog IBM + Services + A1 Machine Learning Discover, catalog, and securely share enterprise data. Une + Free + IAM-enabled
Security	2 Master Data Management	📦 Mass Data Migration	vyene Sorsonschen farket Data APIs	🛞 Cloud Pak for Data
Services Software	IBM • Services • Analytics IBM • Master Data Management (MDM) on Cloud helps businesses gain a trusted view of data in a hybrid computing environment.	IBM - Services - Storage A fast, simple, secure way to physically transfer terabytes to petabytes of IBM Cloud	Boot time and cot to co market data	IBM • Software • Analytics An all-in-one cloud-native Data and AI platform in a box, providing a preconfigured, governed, and secure environment to collect,

Select "Gateway Appliance" and click on it.

BM Cloud Sear						Ĺ
Catalog / Gateway appliance way Appliances protect and optimize your	e	rs, firewalls, and private network devices, all wit	h the custom parameters that you need	View ATT VRA docs View Juniper vSRX docs View Bring Your Own Appliance docs	Summary I Intel Xeon 5120 \$7 28 Cores, 2:20 GHz 22 CB RAM	40.:
Create About Gateway Vendor					Virtual Router Appliance 12 × (c Gbps) Subscription Edition (64 I LON06 - London (pod01) Add-ons	p to sit)
AT&T vRouter 18.x (64 Bit) (up to 20	Juniper 18.4 (up to 1Gbps) ~	Other IGbps - Bring Your Own Appliance			 1 - Disk controller - Non-RAID Individual 2.00 TE SATA x 1 Network interface 	5
Gateway appliance	Domain	0			1 Gbps Redundant Private Netw Uplinks	
vyatta-labservices-LON	IBM	.cloud			Add-ons	
High availability					Apply promo code	
NA West SJC03 - San Jose ~	NA South DAL10 - Dallas ~	NA East WDC04 - Washington V	South America SA001 - Sao Paulo	LOND6 - London V	Total due per month*	\$7 esti Mico
Asia-Pacific TOK02 - Tokyo ~					✓ I read and agree to the followi Party Service Agreements:	ng T
Pod					3rd Party Software Terms	
lon06.pod01 ~				Screenshot	Create	

Select "AT&T vRouter". This is the Vyatta Gateway. You have other choices of Gateways, but we will use Vyatta.

Provide a name for the Gateway and include the PowerVS location name in it so you can distinguish them later.

Select Location to match your PowerVS location.

C 0	BINC Open A F	AQ5 🕝 prefail 🗖 About	Back: States account=06d2a	IBM 0 8800 188 188 2 19 Usin;	Count=2085896	C Use # C Using C 18M W C 18M C 18M	+
BMTeam 👯 faad - Dropbox 🛅	deerreplant 🛅 AnsibleTower 🛅	IBMinsurance 🔣 My account - Hy	per 🛅 IBMClouid 👛 VPC C	Li reference 🛅 DL			-
IBM Cloud Se	arch resources and offerings	đ		Q Catalog Docs Supp	port Manage 🗸 :	2085896 - IBM 🗖 🗹	۵
The following list contains all fixed and	d configurable servers.					Summary	
Single processor			Dual processor			Intel Xeon 5120	\$740.3
CPU Model	Cores	Speed	RAM	Storage	Features	28 Cores, 2.20 GHz 32 GB RAM Virtual Router Appliance 18.x Gbps) Subscription Edition (6	(up to 2 4 Bit)
 Intel Xeon 5120 	28 Cores	2.20 GHz	Up to 192 GB	Up to 4 Drives		LON06 - London (pod01)	
RAM	SSH keys (recommende	an O				Autoris	
32 GB [\$183.08]	2 × labservice	-ab-key, labservi	Add key			- 1 - Disk controller - Non-RA	10
	_					2.00 TB SATA x 1	
Add-ons ✓						L Network interface	
						Hethork interface	•
						1 Gbps Redundant Private Ne Uplinks	twork
Storage disks 1of4d	isks used				Add new O	1 Gbps Redundant Private Ne Uplinks Add-ons	twork
Storage disks 1 of 4 di Here you can add, remove, and co	isks used Infigure storage disks. You can	n also configure RAID storage v	volumes and disk partitions.		Add new O	1 Göps Redundant Private Ne Uplinks Add-ons	twork
Storage disks 1 of 4 di Here you can add, remove, and co Type	isks used Infigure storage disks. You can Disks Ho	n also configure RAID storage v ot Spares Disk Media	volumes and disk partitions.	Disk Size	Add new 오	Add-ons Apply promo code	twork
Storage disks 1 of 4 di Here you can add, remove, and co Type Individual	isks used Infigure storage disks. You can Disks He V 1 0	n also configure RAID storage ot Spares Disk Media C SATA HDD	volumes and disk partitions.	Disk Size 2.00 TB [\$27.15]	Add new •	Copa Recurster Frivata No Uplinis Add-ons Apply promo code Total due per month*	twork \$7 esti
Storage disks 1 of 4 di Here you can add, remove, and co Type Individual Add-ons ~	isks used Infigure storage disks. You can Disks Ho 1 0	n also configure RAID storage v ot Spares Disk Media SATA HDD	volumes and disk partitions.	Disk Size 2.00 TB [527.15]	Add new 오	Lispa Neckalana Privata Ne Add-ons Add-ons Add-ons Apply promo code Total due per month* "Mole hanks of a color and makes of the one of mole	etwork \$7 esti de tee, or
Storage disks 2 of 4 d Here you can add, remove, and co Type Individual Add-ons ~ Network interface	isks used Infigure storage disks. You can Disks Ht	n also configure RAID storage v ot Spares Disk Media	volumes and disk partitions.	Disk Size 2.00 T8 [\$27,15]	Add new •	Lisps header Private He Lisps header Private He Add-ons Add-ons Apply promo code Total due per month* "Into Amore a company, dans not not add on the company of the follow Party Service Agreements: Lidd Party Service Agreements:	stwork sta esti tetes, or billing o wing T
Storage disks 2 of 4 d Here you can add, remove, and co Type Individual Add-ons ~ Network interface Interface ©	isks used Infigure storage disks. You can Disks He V 1 C	h also configure RAID storage v ot Spares Disk Media C SATA HDD Part speed	volumes and disk partitions.	Disk Size 2.00 TB (\$27.15) yess - Bandwidth	Add new •	Apply promo code Apply promo code Total due per month*	stwork stwork stets, on billing of wwing Ti st Wolf
Storage disks 2 of 4 d Here you can add, remove, and co Type Individual Add-one ~ Network interface Interface © Pituate ~	Isks used Infigure storage disks. You can Disks He Y 1 0 Port redundancy Automatic (recommend	Also configure RAID storage v ot Spares Disk Media C SATA HDD Port speed I Gbps [\$31.03	Public Eg	Disk Size 2.00 TB (\$27.15) yess - Bandwidth (\$0.00) Screensthot	Add new •	Add-ons Add-ons Add-ons Add-ons Add-ons Total due per month* Total due per month* Total due per month* Total due per month* Create Create	stwork st esti billing to billing to the total to the total
Storage disks 3 of 4 d Here you can add, remove, and co Type Individual Add-ons ~ Network interface Private ~ Add-ons ~	Isks used Infigure storage disks. You can Disks He V 1 0 Pert redundancy Automatic (recommend	h also configure RAID storage v ot Spares Disk Media C SATA HDD Port speed ted) V 1 Gbps (\$31.03	volumes and disk partitions.	Disk Size 2.00 TB [527.15] yres - Banfwrdth [50.00] Screenshot	Add new C	Age normalized Provide Net Add-ons Add-ons Add-ons Apply promo code Total due per month* Total due per month* Total due per month* I read and agree to the follow Party Service Agreements: Agreements Create Save as quote	\$77 estir de tee, and h billing case wwing Th

Choose the following options:

- Uncheck the High Availability option unless you wish to order one which means you will order two Vyatta Gateways in each PowerVS location. We unchecked this option.
- Select the location by pressing on the arrow key in each location to find the exact datacenter where you PowerVS location are located.
- You may need to choose the POD if there are several PODs in the selected datacenter location.
- Select the CPU single or dual processor. We chose Single Processor.
- Select the amount of RAM you wish and add ssh keys if you like to login without password. This can be done later too.
- Choose Private network interface unless you wish to use the default which is public/private interface. We chose private network interface only.

୯ ଜ 🔍	iii iii iii iii iii iii iii iii iii ii	infrastructure/provision/gate	eway?bss_account=06d2a1e	ecba244622a0fb88efb4843fb4&im:	s_account=2085896	··· 🛛 🖓	III ()
🛅 IBMTeam 👯 faad - Dropbox 🛅	deerreplant 🛅 AnsibleTower 🛅 IBMIr	isurance 🔣 My account - Hyper	er 🛅 IBMClouid 👛 VPC CLI	reference 🛅 DL 👛 VyattaVPN-VPC 🔇	🗴 vyatta-London 💿 vyatta-Tor	onto	
IBM Cloud Se	arch resources and offerings			Q Catalog Docs S	iupport Manage ~ :	2085896 - IBM 🕞	6 2
The following list contains all fixed and	d configurable servers.						
Single processor			Dual processor			Summary	4840
CPU Model	Cores	Speed	RAM	Storage	Features	28 Cores, 2.20 GHz	\$710.
Intel Xeon 5120	28 Cores	2.20 GHz	Up to 192 GB	Up to 4 Drives		32 GB RAM Virtual Router Appliance Gbps) Subscription Editio DAL10 - Dallas (pod01)	18.x (up to n (64 Bit)
RAM	SSH kave (racommanded)	0				Add-ons	
32 GB [\$171.10]	 None 	~	Add key			- 1 - Disk controller - Non	-RAID
			, -			- Individual	:
Add-ons∨						2.00 TB SATA x 1	
Storage disks 1 of 4 di	isks used	configure PAID storage vol	lumas and disk partitions		Add new O	L Network interface 10 Gbps Redundant Priva Uplinks Add-ons	\$ te Networl
Storage disks 1 of 4 di Here you can add, remove, and co	lsks used xnfigure storage disks. You can also) configure RAID storage vol	lumes and disk partitions.		Add new O	L Network interface 10 Gbps Redundant Priva Uplinks Add-ons	\$ te Networl
Storage disks 1of4 di Here you can add, remove, and co Type	isks used Infigure storage disks. You can also Disks Hot Sp	o configure RAID storage vol ares Disk Media	lumes and disk partitions.	Disk Size	Add new O	L Network interface 30 Obps Redundant Priva Uplinks Add-ons Apply promo code	\$: te Network
Storage disks 1 of 4 di Here you can add, remove, and co Type Individual	Hsks used unfigure storage disks. You can also Disks Hot Sp V 1 0	o configure RAID storage vol arres Disk Media	lumes and disk partitions.	Disk Size 2.00 TB (\$25.38)	Add new •	L Network interface 10 Objes Redundant Priva Uplinks Add-ons Apply promo code Total due per menth*	S: te Network
Storage disks 1 of 4 di Here you can add, remove, and co Type Individual Add-ons ~	lisks used vrifigure storage disks. You can also Disks Hot Sp v 1 0	ares Disk Media	lumes and disk partitions.	Disk Size 2.00 TB (\$25.38)	Add new •	Activer's Interface So Capa Meduatant Priva Solucias Add-ons Apply promo code Total due per month*	\$: te Network \$8 est
Storage disks 1 of 4 di Here you can add, remove, and co Type Individual Add-ons ~	lisks used Infigure storage disks. You can also Disks Hot Sp V 1 C 0	o configure RAID storage vol ares Disk Media 0 SATA HDD	lumes and disk partitions.	Disk Size 2.00 TB [\$25.38]	Add new •	Activerk interface 10 Copy Redundant Priva 10 Copy Redundant Priva 10 Copy Add-ons Apply promo code Total due per month* ***********************************	\$: te Network st est reclude tax, or é each billing c
Storage disks 2 of 4 di Here you can add, remove, and co Type Individual Add-ons ~ Network interface	lisks used Infigure storage disks. You can also Disks Hot Sp V 1 2 0	ares Disk Media	lumes and disk partitions.	Disk Size 2.00 TB [\$25.38]	Add new •	Activerk interface St Copy Redundant Privac St Copy Redundant Privac Add-ons Apply promo code Total due per month* "*his basel on example areas, down and build agree to the fe	\$2 te Network \$8 est. include tax, or ' each billing c billowing T
Storage disks 2 of 4 di Here you can add, remove, and co Type Individual Add-ons ~ Network interface Interfece ©	Isks used Infigure storage disks. You can also Disks Hot Sp V 1 0 Port redundancy	ares Disk Media	turnes and disk partitions.	Disk Size 2.00 TB [\$25.38]	Add new 오	Network interface S0 Gaps Redundant Privac Jophina Add-ons Add-ons Apply promo code Total due per month* "*has based an asymptotic adjustments Total and angree to the fn Party Service Agreement Srd Party Service Agreements	\$: te Network est include tax, or each billing c billowing T is: rms Vya
Storage disks 1 of 4 di Here you can add, remove, and co Type Individual Add-ons ~ Network interface Interface Private ~	Isks used Isks used Disks Hot Sp IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	ares Disk Media SATA HDD Port speed V 10 Gbps [\$145.00	Public Egre	Disk Size 2.00 TB [\$25.38] ss - Bandwidth 10.00] ~	Add new O	Network Interface S0 Gips Redundant Privac Job Construction Add-ons Add-ons Apply promo code Total due per month* "*has haved an argent angle, data "Privac Angemennt Sard Party, Sortivaro To Sard Party Sortiva Softwaro To	\$: te Network est include tax, or each billing c billowing T is: rms Vya
Storage disks 104 ad Here you can add, remove, and co Type Individual Add-ons ~ Network interface Interface @ Private ~	Isks used Disks Hot Sp Usks Ho	Configure RAID storage vol ares Disk Media SATA HDD Port speed Y 10 Gbps (\$145.00	tumes and disk partitions. v public Egre 0] v	Disk Size 2.00 TB (\$25.38) ss - Bandwidth 0.00]	Add new O	Network Interface 30 Gbps Redundant Privac joints Add-ons Add-ons Apply promo code Total due per menth* "Inter hand and agree to the fr Party Service Agreement 3rd Party Service Agreement Greate Create	\$ te Network est reclude tax, or ' each billing c billowing T is: rms. Vya
Storage disks 2014 dl Here you can add, remove, and co Type Individual Add-ons ~ Network interface Interface @ Private ~ Add-ons ~	Isks used Offgure storage disks. You can also Disks Hot Sp U 1 0 Port redundancy Automatic (recommended)	Occonfigure RAID storage vol ares Disk Media 2 SATA HDD 2 SATA HDD 4 Ort speed V 10 Gbps [\$145.00]	Numes and disk partitions.	Disk Size 2.00 T8 (\$25.38) ss - Bandwidth 10.00] Screenshot	Add new O	Network Interface So Copy Medium And Privac So Copy Medium And Privac So Copy Medium And Privac So Copy Privace Add-ons Add-ons Add-ons Add-ons Add-ons Total due per month* Total due per month* Privac and agree to the full Pract Software Te Software Te Create Save as quote	\$: te Network \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$

Now check the box to agree with service agreement on the bottomright side and press "Create"

The Vyatta gateway is now being provisioned. This may take several hours.

You will need to do this process in each of the two PowerVS locations.

After the Vyatta Gateway is provisioned, you can see it listed under "Devices" where you can find your "Vyatta" and "root" user passwords.

Cisco AnyConnect Se	ecure Mobility Client Edit	prefai: 🦚 About	🛎 Backu 🖄 Using	S IBM P. S Back.	I IBM E Southo	A G 😽 🕛 C Bi C Ø 🖵) 🌩 100% 🐲 Wed	8:36 AM Q i≣ ai > + ∨
\leftrightarrow \rightarrow \bigcirc \textcircled{a}	0 🚔 📽 https://cloud.ibm.com/classic/ne	twork/gatewayapplia	nces?slAccountId=2085	5896		🖂 t	2 4	II\ □ ④ Ξ
Yahoo 🛅 IBMTeam 👯 faad	d - Dropbox 🛅 deerreplant 🗎 AnsibleTower 🗎 IBMinsurar	nce 🔣 My account - Hy	per, 🗎 IBMClouid 💍 V	IPC CLI reference 🗎 DL	4			
IBM Cloud				Q Ca	talog Docs Suppor	t Manage ~ 2085896 - IBM		
Classic	Gateway Appliances						Crea	e a Gateway 오
Overview	Gateway *	Vendor	Location	Pod	Configuration	Associated VLANs	Status	
Devices ~	> Provisioning						Updating	
Network V	> vyatta-labservices-1	ATT	Toronto 1	tor01.01a	Standalone	0.VLANs	Updating	
Security ~	Items per page 20 💌 1-2 of 2 items						1 of 1 pages <	1 • >
Services ~								
					Screenshot			
					6		c	ookie Preferences
🐣 🍘 🎫 🕵	🧭 🔮 🤁 📆 📁	😞 🄜 🔞	X 🐨 🦉		C 100)) 😲 🛞 🗉	1 🚺 🔾 🛙	1 😋 🔕

To log into the Vyatta gateway, use a browser and access it via the link:

https://<ip_address_of_the_vyatta_gateway>

user: Vyatta

password: as show under "devices" in IBM Cloud UI and password tab on the left.

areas a second s	investigation in wy account	t - нурег Ш ізмсі	ould C VPC	CLI reference DL	VyattaVPN-VPC					
1				Hostnam	e: vyatta-labservices-lon	Logged in as	:vystta Help	logout		
() V								No.		
× .)							1			
Bunning 1801	a 09052048 en Intel 64bit			Dashboard	Untime: 26m	System Tir	operation 2020 0	LIGH COT		
			_			-,		_		
Resource Usage		Interfaces *						8		
CPU *:	0% »	Name	Description	IP Address		Status	In	Out		
Memory *:	0% of 30.38 GB	dp0bond0 *		10.72.74.203/2	6	IG FD	9.1 kbps	28.45 kbps		
Disk:	1% of 1.66 TB	dp0bond1 *				•	0 kbps	0 kbps		
System Informatic	n •	dp0s0 *					1.33 kbps	28.23 kbps		
Domain name *	; ibm.cloud	do0s1 *				IG PU	0 kbps	0 kbps		
DNS servers *	: 10.0.80.11 via system »									
Images	: mage	aposz -								
		dp0s3 *				•	0 kbps	0 kbps		
Routing *				Security *						
Name	Status			Na	ne Status					
MSDP *	Peers: 0, Groups: 0, Mesh groups:	0	30	Firew	all * State-Policy: none,	Rule-sets: 0/1	in use	39		
Static Houte *	Routes configured: 4, Routes in de	6.9	10	Management *						
Services *				Name	Status					
Name	Status			Config management	Last commit: 17 Jun 202	0 02:27 by con	tigd	20		
				Login *	CLI users: 0/2 connected	1, Root Login: (enabled	39		
High Availability			8	SSH*	Connected sessions: 0, 0	isten-aopresse	St BIC			
Name	Status			aysoy .	Group including interest pro-	acception of a	in the second			
VRRP *	Groups confid: 0, Master: 0, Back	p: 0, Fault: 0	39	Traffic Policy *						
				Name	Status					
				QoS *	1 configured			39		
					Screenshot					

Typically, you will use a command line to ssh to the Vyatta for further configuration. You will use the "Vyatta" user id to do the configurations.

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

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

Power Support team will send you the following information for your GRE tunnels after they complete their end of the GRE tunnel:

TOR01:

In Tor01 to POWERVS LOCATION GRE: Your destination should be 10.254.0.30 Your tunnel ip 172.20.8.1 Power-PowerVS location-Side: Tor01: interface Tunnel5 description IBM5-GRE vrf forwarding IBM5 ip address 172.20.8.2 255.255.255.252 keepalive 5 3 tunnel source 10.254.0.30 tunnel destination 10.114.118.34 tunnel vrf IBM5

LON06:

In Lon06 to POWERVS LOCATION GRE: Your destination should be 10.254.0.26 Your tunnel ip 172.20.2.1 Power-PowerVS location-Side: Lon06: interface Tunnel4 description IBM3-GRE vrf forwarding IBM3 ip address 172.20.2.2 255.255.255.252 keepalive 5 3 tunnel source 10.254.0.26 tunnel destination 10.72.74.203 tunnel vrf IBM3

The items shown in Red is what you will need to configure your end of the GRE tunnel in each Vyatta Gateways.

- Note that your tunnel IP address is 172.20.2.1/30 where 255.255.255.252 translate to /30
- > Your tunnel destination IP is their tunnel source IP.
- > Your tunnel source IP is the IP address of the Vyatta gateway

Verify your Vyatta Gateway access.

The Vyatta Gateway address can be find in the IBM Cloud UI under Devices.

Login to IBM Cloud UI and press "IBM Cloud" on top left-hand side.



Click on "Devices"

M Cloud Search resources and of	fferings		Q C	atalog Docs Support №	fanage ∨ 2085896 - IBM		Ľ
Resource list						Creater	esource
∨ Name	Ŷ	Group	Location	Offering	Status	Tags	
Q Filter by name or IP address		Filter by group or org	← Filter	✓ Q Filter	Q Filter		~
Devices (7)							
abservices-reverseproxy-ab.IBM.cloud		Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
🤮 labservices-scenario1-centos-private-fg.IE	IM.cl	Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
labservices-spectrumprotect-rhel-ab.IBM.e Public: 169.48.5.242 / Private: 10.166.112.144	toud	Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
🔒 labservices-spectrumprotect-rhel-ab2.IBN	l.cloud	Classic Infrastructure	Toronto 01	Virtual Server	View status	-	
🚑 vyatta-labservices-lon.ibm.cloud		Classic Infrastructure	London 06	Gateway Appliance	View status	-	
🚔 vyatta-labservices-tor.ibm.cloud		Classic Infrastructure	Toronto 01	Gateway Appliance	View status	-	
🔒 windows-fg.IBM.cloud		Classic Infrastructure	Dallas 05	Virtual Server	View status	-	
 VPC infrastructure (4+) (Error retrieving data) 							
 Clusters (0) 							
 Cloud Foundry apps (0) 							
 Cloud Foundry services (0) 							
 Services (2) 							
 Storage (1) 							
 Network (0) 							

Choose the Vyatta system you like to configure:

- <u>vyatta-labservices-lon.ibm.cloud</u>
- <u>vyatta-labservices-tor.ibm.cloud</u>

LON06:

Click on the London Vyatta: vyatta-labservices-lon.ibm.cloud

oo 🛅 IBMTeam 😻 faad - Dropb IBM Cloud	Search resources and offerings	BMInsurance 🔢 My account - Hyper 🛅 IBN	AClouid 🛎 VPC CLI reference 🗎 🕻 Q C	NL 💍 VyattaVPN-VPC 🧔 vyatta-London atalog Docs Support Mai	© vyatta-Toronto nage ∼ 2085896 - IBM	5 ¢ 4
assic infrastructure / Devices / vyatta-labser	vices-lon.ibm.cloud	Add tags 🖉 🔎 Powered on	Connected			Actions -
erview ses	Server details			System details		
iago ienote management currity ier access orage isswords	Name Type Gateway appliance Status ID Started Reloaded MFR Serial # Notes Location Serial # Billing Tranactions	vyatta-labservices-lon.lbm.cloud & Gateway member vyatta-labservices-lon ACTIVE 1374067 6/17/2020, 10:39:19 AM N/A C819/UA356BA0194 N/A & London 6 SL01F6AN Monthly Service Setup	2	OS Security Device Remole Mgmt Card RAM Processor Power Supply Network Card Motherboard Drive Controller Backplane	ATT Virtual Router Appliance (Rout SuperMicro ADM-TPM-9673H Aspeed AST3500 - Onbard 2x 1.008 Hynk: 1.068 DDM 27x6 J 2x 2.2041; Intel Xeon Skylake (522 2x SuperMicro AVE-751P-1R SuperMicro X12PU-LR-LTO View Mainboard Onboard Hodiy SuperMicro BPM-SAS3-815TQ-N4	er 5600) 1801q lodify JocalD) Modify JocalS
	Network details Status	Redundancy	Interface	ID Addrocq	VLAN	Order IPs O
	 Active (1000Mbps) 	Active	private (eth0,eth2)	Screenshot 10.72.74.203/26 ①	lon06.bcr01a.1227	I

Under the "Network Details" you will see your Vyatta Gateway IP address:

Your credentials are under the "password" menu on the left-hand side. Click on the icon next to the password to see it unencrypted.

IBM Cloud	Search resources and offerings	٥	Catalog Docs S	upport Manage ~ 20	85896 - IBM	
vyatta-labse	rvices-lon.ibm.cloud Add tags & • Po	wered on Connected				Actions *
erview	Password manager This tool helps track users and their passwords. It does not modify users and passwords on their devices.					Add credentials
ige note management	Software	Username	Password	Last Modified	Notes	Actions
urity	Virtual Router Appliance (vRouter 5600)	vyatta	lzsKnsD5 Ø	6/17/2020	Click to edit	I
nitoring	Virtual Router Appliance (vRouter 5600)	root	©	6/17/2020	Click to edit	E
r access rage						
iswords						

Open a browser and login to the Vyatta Gateway using:

userID: Vyatta

Password: as show in the GUI

https://10.72.74.203

ssh vyatta@10.72.74.203

Note: Prior to login to a 10.x.x.x private IPs in IBM Cloud you will need to start your MotionPro Plus VPN access. This will give you access to IBM Cloud private IPs.

<u>ф</u> уу/	ATTA.			Нир
	You have been I	ogged out due to inactivity. Please log	gin again:	
	Password	LOGN		
Contectual Goost Attact in				
		Se	creenshot	

Login with the userID and password.

1				Hostnam	e: vyatta-labservices-li	on Logged in as	: vyatta Help	legeut
$\langle 0 \rangle$	γλττλ.							
				Dashboard	Statistics	Configuration	Operat	tion
Running: 18	11q.09052048 on Intel 64bit				Uptime: 16d 22h 3	6m System Ti	me: 04 Jul 2020 0	1:11 CDT
Recourse Usage		 Tetraferra T 						
Resource usage		Name	Description	IP Address		Status	In	01
CPU *:	0% of 30.38 GB	so dp0bond0 *		10.72.74.203/2	5	IG ED	8.45 kbps	27.16 kbps
Disk:	1% of 1.66 TB	dp0bond1 *				•	0 kbps	0 kbps
System Informat	ion *	n dp0s0 *				16.50	1.88 kbps	15.99 kbps
Domain name	: Ibm.cloud	dp0s1 *				•	0 kbps	0 kbps
Boot via	: image	dp0s2 *				•		-
Images	:1	dp0s3 *				•	0 kbps	0 kbps
Routing *				Security *				
Name	Status			Nar	ne Status			
MSDP *	Peers: 0, Groups: 0, Mesh gro	Nps: 0	39	Firewa	I * State-Policy: no	ne, Rule-sets: 0/1	in use	39
Static Route *	Routes configured: 6, Routes	in use: 6	33					
				Management *				8
Services *			*	Name	Status			
Name	Status			Config management	Last commit: 30 Jun	2020 06:51 by vys	ita	30
				Login *	CLI users: 0/2 conne	cted, Moot Login: (enabled	30
Migh Auglightliby	•			SSH *	Connected sessions:	u, Listen-addresse	s: an:	30
Name	Status			Syslog *	Global facility/level:	at/notice, protocol	s/debug	30
VREP *	Groups conf'd: 0, Master: 0, 8	Sackup: 0, Fault: 0	39	Traffic Policy *				8
				Name	Status			
				QoS *	1 configured			30
Contact Us @2017.					Screenshot			

Now that you have verified you access to the Vyatta Gateways, you will need to now access it via ssh to continue your GRE tunnel provisioning.

Setup PowerVS location GRE tunnels in the Vyatta Gateways

The following references may help in configuring GRE tunnels:

https://cloud.ibm.com/docs/virtual-router-appliance?topic=solutiontutorials-configuring-IPSEC-VPN

https://docs.huihoo.com/vyatta/6.5/Vyatta-Tunnels 6.5R1 v01.pdf

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

Open a command window on your Mac/Window.

Note: Prior to login to a 10.x.x.x private IPs in IBM Cloud you will need to start your MotionPro Plus VPN access.

Setup GRE PowerVS location Tunnel in LON06:

userID: Vyatta

Password: as show in the GUI

ssh vyatta@10.72.74.203

ssh to LON06 Vyatta Gateway.



We are using the information provided by support for LON06 GRE.

In Lon06 to POWERVS LOCATION GRE: Your destination should be 10.254.0.26 Your tunnel ip 172.20.2.1 Power-PowerVS location-Side: Lon06: interface Tunnel4 description IBM3-GRE vrf forwarding IBM3 ip address 172.20.2.2 255.255.255.252 (172.20.2.2/30) keepalive 5 3 tunnel source 10.254.0.26 tunnel destination 10.72.74.203 tunnel vrf IBM3

Run the following commands:

We have chosen to call our tunnel "tun0" on the Vyatta Gateway.

\succ	coni	figure			
	set	interfaces	tunnel	tun0	address 172.20.2.1/30
\triangleright	set	interfaces	tunnel	tun0	local-ip 10.72.74.203
\triangleright	set	interfaces	tunnel	tun0	remote-ip 10.254.0.26
\succ	set	interfaces	tunnel	tun0	encapsulation gre
\succ	set	interfaces	tunnel	tun0	mtu 1300
\succ	com	nit			
\triangleright	exit	-			

vyatta@vyatta-labservices-lon:~\$ configure
[edit]
vyatta@vyatta-labservices-lon# set interfaces tunnel tun0 address 172.20.2.1/30
[edit]
vyatta@vyatta-labservices-lon# set interfaces tunnel tun0 encapsulation gre
[edit]
vyatta@vyatta-labservices-lon# set interfaces tunnel tun0 mtu 1300
[edit]
vyatta@vyatta-labservices-lon# set interfaces tunnel tun0 local-ip 10.72.74.203
[edit]
<pre>vyatta@vyatta-labservices-lon# set interfaces tunnel tun0 remote-ip 10.254.0.26</pre>
[edit]
vyatta@vyatta-labservices-lon# commit
[edit]
vyatta@vyatta-labservices-lon# show interfaces tunnel
tunnel tun0 {
aaaress 172.20.2.1/30
encapsulation gre
Local-1p 10.72.74.203
neroto in 10 254 0 26
1 remote=tp 10.234.0.20
J Fedi+1
watta@watta_labservices_lon# show interfaces tunnel tun0
tunnel tuno {
address 172 20 2 1/30
encapsulation are
local-in 10 72 74 203
mtu 1300
remote-ip 10.254.0.26

You can verify that your GRE tunnel is setup by running the following commands:

configure
show interfaces tunnel
Or to get more info:
Show interface tunnel tun0
exit

Setup GRE PowerVS location Tunnel in TOR01:

userID: Vyatta

Password: as show in the GUI

ssh vyatta@10.114.118.34

ssh to Tor01 Vyatta Gateway.

aads-MacBook-Pro:~ faadghoraishi\$ ssh vyatta@10.114.118.34 Welcome to AT&T vRouter 5600

Welcome to AT&T vRouter Version: 1801q Description: AT&T vRouter 5600 1801q Linux vyatta-labservices-1 4.9.0-trunk-vyatta-amd64 #1 SMP Debian 4.9.124-0vyatta2+2.1 (2018-09-05) x86_64 Last login: Tue Jun 30 07:58:37 2020 from 10.1.232.20

vyatta@vyatta-labservices-1:~\$

In Tor01 to POWERVS LOCATION GRE: Your destination should be 10.254.0.30 Your tunnel ip 172.20.8.1 Power-PowerVS location-Side: Tor01: interface Tunnel5 description IBM5-GRE vrf forwarding IBM5 ip address 172.20.8.2 255.255.255.252 keepalive 5 3 tunnel source 10.254.0.30 tunnel destination 10.114.118.34 tunnel vrf IBM5

Run the following commands:

We have chosen to call our tunnel "tun0" in the Vyatta Gateway same as the other Vyatta Gateway.

\triangleright	configure
\succ	set interfaces tunnel tun0 address 172.20.8.1/30
\triangleright	set interfaces tunnel tun0 local-ip 10.114.118.34
\triangleright	set interfaces tunnel tun0 remote-ip 10.254.0.30
\triangleright	set interfaces tunnel tun0 encapsulation gre
\triangleright	set interfaces tunnel tun0 mtu 1300
\triangleright	commit
\succ	exit

36

vyatta@vyatta-labservices-1# configure vbash: configure: command not found [edit] vyatta@vyatta-labservices-1# set interfaces tunnel tun0 address 172.20.8.1/30 [edit] vyatta@vyatta-labservices-1# set interfaces tunnel tun0 encapsulation gre [edit] vyatta@vyatta-labservices-1# set interfaces tunnel tun0 mtu 1300 [edit] vyatta@vyatta-labservices-1# set interfaces tunnel tun0 local-ip 10.114.118.34 [edit] vyatta@vyatta-labservices-1# set interfaces tunnel tun0 remote-ip 10.254.0.30 [edit] vyatta@vyatta-labservices-1# commit [edit]

To show the status:

\triangleright	configure
\succ	show interfaces tunnel
\triangleright	Or to get more info:
\triangleright	Show interface tunnel tun0
\triangleright	exit
<pre>vyatta@vy [edit] vyatta@vy tunnel t</pre>	atta-labservices-1:~\$ configure atta-labservices-1# show interfaces tunnel un0 { iddress 172.20.8.1/30 ncapsulation gre ocal-ip 10.114.118.34 tu 1300 emote-ip 10.254.0.30

Setup GRE tunnel between Two Vyatta Gateways

In this section you will setup a new tunnel in each of the two Vyatta gateways to allow for cross Vyatta connection via a GRE tunnel.

In this case we chose the tunnel address and tunnel source and destination IPs. The tunnel address can be any IP subnet you choose. We named our tunnel "tun1" in both Vyatta Gateways. We have selected a similar IP as the ones used in the PowerVS location GRE tunnels. We choose a CIDR of /30 since we only need two IP address, one in Tor01 and one in Lon06.

- In Lon06 Vyatta the GRE Vyatta-to-Vyatta tunnel address is 172.20.4.1/30
- In Tor01 Vyatta the GRE Vyatta-to-Vyatta tunnel address is 172.20.4.2/30
- Your tunnel destination IP is the IP address of the Vyatta gateway in each location
- Your tunnel source IP is the IP address of the Vyatta gateway in each location
- > We call the tunnels tun1 in both locations

TOR01 GRE Configuration:





LON06 GRE Configuration:





The final step needed is to setup static routes in each Vyatta to point the subnets for our PowerVS location to the right tunnels.

Setup GRE tunnel between Two Vyatta Gateways

Find the subnets you created in each PowerVS location in TOR01 and LON06 by accessing the services in the IBM Cloud UI for each PowerVS location.

	Search resources and offerings			Catalog								
Resource list 7 Power Systems	Virtual Server-Toron	ot01 @Activ	e Add tags 🖉							Details		×
Virtual server instances SSH keys	Al server instances Subnets Learn more about configuring and adding a private perservic subnet.									Name lab-service: Location tor01 CIDR 192.168.6.0 IP 192.168.6	-subnet2 //24 .102-192.	168.6.254
Storage volumes					Q	0			+	DNS Servers 127. VLAN ID 234	0.0.1	
Boot images	Subnets	Type	Location	IP randas	VIAN					Type Private		
Subnets	oublicto	1994	Location	ar tunges	ID					Actions		
	public-192_168_142_72-29- VLAN_2005	Public	tor01	192.168.142.74-192.168.142.78	2005					0		
	lab-services-subnet2	Private	tor01	192.168.6.102-192.168.6.254	234		Ø.	Û				
	Items per page: 10 ~	1-2 of 2 items				1 ~	of 1	<	E.			

← → C* @ 0	thtps://cloud.ibm.com/services deemeolant ETI AnableTower ETI INMInsur	/power-laas/crn%	3Av1%3Abluemix%3	SApublic%3Apower-laas%3Alon06%3Aa	%2F06d2a1	votta-London 🖉 vvatta	184 🖻 🚥 😒	☆ <u>⊀</u> II/ ©	⊛ ≡
IBM Cloud	earch resources and offerings			Catalog	Docs Si	upport Manage V	2085896 - IBM		s 8
Resource list / Power Systems Virt	tual Server- LONDOI	N06 💿 Act	ive Add tags 之					Details	×
Virtual server instances SSH keys	Subnets Learn more about configuring and a	Name london-colo-subnet1 Location lon06 CIDR 192.168.50.0/24 IP 192.168.50.3-192.168.50.254							
Storage volumes					Q	Create subre	e +	DNS Servers 127.0.0.1	
Boot images Subnets	Subnets	Туре	Location	IP ranges	VLAN ID			Type Private Actions	
	public-192_168_138_136-29- VLAN_2013	Public	lon06	192.168.138.138-192.168.138.142	2013			C (1)	
	Iondon-colo-subnet1	Private	lon06	192.168.50.3-192.168.50.254	234	l.	8		
	Items per page: 10 ~ 1-2 c	of 2 items				1 ∨ of 1 4	> -		

The static routes in LON06 will need to point to the subnets in TOR01 and vice versa.

We will configure both GREs to the PowerVS location and between Vyattas.

Run the following commands in each Vyatta Gateway after login in via ssh using the Vyatta userID:

in TOR01 Vyatta:
 configure set protocols static route 192.168.6.0/24 next-hop 172.20.8.2 set protocols static route 192.168.50.0/24 next-hop 172.20.4.2 commit exit
in LON06 Vyatta:
 configure set protocols static route 192.168.50.0/24 next-hop 172.20.2.2 set protocols static route 192.168.6.0/24 next-hop 172.20.4.1 commit exit

At this point you should have end-to-end connectivity and be able to ping between your Power VSIs in each PowerVS location and also from the Power VSI to IBM Cloud services such as Linux/Windows VSI.

If you cannot ping the IBM Cloud VSIs from the PowerVS location VSIs, you will need to open a ticket to address this issue. Support needs to address this from their Cisco Router side.



Solution Diagram

Chapter 2: Implementation

PowerHA Geographic Mirroring

When creating the IBM i instances via IBM Cloud Services, take note of the following recommendations in preparation for building the environments.

Production IBM i Creation:

A general rule of thumb, assuming most production database objects are moved to the IASP, is a 1:3 ratio of SYSBAS volumes to IASP volumes. Much larger environments may see closer to a 1:6 or 1:9 ratio, as the size of SYSBAS does not need to grow at the same rate as the IASP.

When creating the instance, however, the default size for the Load Source (LS) volume will be 80 GB. Start with ONLY the Load Source, and then add each new volume (SYSBAS or IASP) individually (later on in the process), in order to keep track of each disk unit ID as they are added, as this can otherwise be difficult to map later.

The names of the disks (from IBM Cloud Services) across ALL instances within that server must be unique. These names will not present themselves in the IBM i interface, but only be visible from the Cloud interface. This is why it is useful to keep track individually of the disk unit ID (from IBM i interface) and disk name (from Cloud interface) so you can assign your disks to the appropriate ASP. As noted above, these are best created at a later step in the process.

When choosing a name for the instance, keep in mind that the IBM i will use the first 8 characters of that instance name as the system name, so it is best to choose a unique 8-character instance name as well.

You will need to choose IBM PowerHA under "Software Licenses", which will load and enable the PowerHA Enterprise Edition by default. This will allow for asynchronous Geographic Mirroring, which is best for replication between IBM i Cloud instances.

Once the instance is created and Active, open the console and wait for the log-in screen. If the default image was deployed, the qsecofr password (QSECOFR) will be disabled and need to be changed (NOTE: This is the O/S log-in. The DST/SST password will be changed in a later step).

On the "Work with software agreements" screen, use Option 5 (Display) for all, and press Enter. Then press F15 (Accept ALL) on each license. Once all licenses are accepted, press F3 (Exit) to main menu.

During this time, the IP interfaces and line descriptions are still being configured. This process can take up to 5 minutes to complete. If any external IP's were requested, these will not show up in **CFGTCP**, **Option 1** (Work with TCP/IP interfaces).

Note that the line descriptions get created as CLOUDINITx names, and the TCP/IP interfaces are assigned to those automatically. The line descriptions are configured as **ONLINE(*YES)** and TCP/IP interfaces are configured as **AUTOSTART(*YES)** but can be changed to fit the needs of the business.

	5. contrary	TRUTPROD					
Posi	tion to			Starti	system: ers	IBMIPROD	
Type 2= 8=	options, pr Change 3=C Work with st	ess Ent opy atus	ter. 4=Delete 9=Retrieve	5=Display source	6=Print	7=Rename	
Opt 	Line CLOUDINITO CLOUDINIT1 CLOUDINIT2	Type *ELAN *ELAN *ELAN	Te×t				

		Work with TC	P/IP Interface	s System:	IBMIPROD
Туре	options, press	Enter.			
1=	Add 2=Change	4=Remo∨e 5=Dis	play 9=Start	10=End	
	Internet	Subnet	Line	Line	
Opt	Address	Mask	Description	Туре	
	127.0.0.1	255.0.0.0	*LOOPBACK	*NONE	
	192.168.6.118	255.255.255.0	CLOUDINITO	*ELAN	
	192.168.142.74	255.255.255.248	CLOUDINIT1	*ELAN	

Once TCP/IP is configured, the following changes are recommended:

- CHGSYSVAL SYSVAL(QIPLTYPE) VALUE(1) Note: This will be changed back after DST/SST password is changed upon the next IPL.
- CHGSYSVAL SYSVAL(QLMTSECOFR) VALUE(0)
- CHGSYSVAL SYSVAL(QAUTOVRT) VALUE(100) Note: This can be any number desired, above zero.
- CHGTCPSVR SVRSPCVAL(*TELNET) AUTOSTART(*YES)
- CHGTCPSVR SVRSPCVAL(*FTP) AUTOSTART(*YES)
- CHGTCPSVR SVRSPCVAL(*SSHD) AUTOSTART(*YES)
- CHGTCPSVR SVRSPCVAL(*INETD) AUTOSTART(*YES)

At this point, from the IBM Cloud interface, the additional disks for SYSBAS and IASP can be added.

NOTE: It is best-practice to add these disks one at a time, and then record the associated disk unit ID that is presented in the IBM i. This will be useful in determining which disks will be assigned to SYSBAS and which will be assigned to the IASP.

Each new disk will present itself as a non-configured disk. Wait until after the next steps to add/balance any additional SYSBAS disks.

At this point, issue a **PWRDWNSYS OPTION(*IMMED) RESTART(*YES)** to shut down and IPL the IBM i instance in Attended mode with DST (per the CHGSYSVAL QIPLTYPE above).

When the initial menu comes up, use DST to change the DST password for qsecofr (default is QSECOFR). The add/balance of the additional

SYSBAS disks can be done at this time, or as a separate step once the IBM i instance has completed the IPL.

After the IPL and after the add/balance of the additional SYSBAS disks, change the IPL type back to Unattended.

• CHGSYSVAL SYSVAL(QIPLTYPE) VALUE(0)

Be sure all other post-IPL jobs and servers are active as expected.

HA/DR IBM i Creation:

Follow the same recommendations as above for the Production IBM i making sure non-configured disks for the IASP are left alone at this point.

Network Connectivity between Production and HA/DR Instances:

Once both instances are created, it is imperative that both instances are able to communicate, both for intended PowerHA Cluster communication and for PowerHA Geographic Mirroring replication. For better performance, it is recommended to use one set of IP interfaces for inter-LPAR communication, such as FTP, remote journaling, BRMS, etc, and include PowerHA Cluster communication with that. A secondary set of interfaces can be reserved for PowerHA Geographic Mirroring, so that any spikes in replication traffic have less impact on packet delay for other inter-LPAR communication. It may also be useful to use a separate IP interface for user log-in and administration. This can be an internal IP interface, where the user connects to the corporate network, and then accesses the system(s) via the internal IP, or optionally, an external IP interface can be assigned to the instance via the IBM Cloud Services.

IASP Creation:

The IASP should be created on the Production IBM i instance in preparation for IASP-enablement. Keep in mind that these disks are

virtual volumes created from external storage, with RAID protection already pre-assigned. Therefore, there is no need to add protection to the IASP disks upon creation. To create the IASP, do the following:

CFGDEVASP ASPDEV(<IASP Name>) ACTION(*CREATE) TYPE(*PRIMARY) PROTECT(*NO) ENCRYPT(*NO) UNITS(*SELECT)

							Co	on	fi	gu	re	D	evice ASP (CF	GDEVASP)
Type choices, press Enter.														
ASP device												>	IASP	Name, *ALL
Action												٨	*CREATE	*CREATE, *DELETE, *PREPARE
Protection	2							1	1	1			*NO	*NO. *YES
Encryption													*N0	*NO, *YES
Disk units													*SELECT	Name, *SELECT
	+ for more values													

The next screen will prompt with the ability to select from the nonconfigured disks which ones to add to the IASP. Once selected, Press Enter to begin IASP configuration. This process may take several hours, depending on the number and size of the disks. Once completed, the ASP device description can be varied on, and the resource name will show with the same name as the IASP. At any time, a matching device description can be created on the HA/DR node with the following:

CRTDEVASP(<IASP Name>) RSRCNAME(<IASP Name>)

This is ONLY the device description. There is no IASP on the HA/DR node at this time, nor should there be. The non-configured disks for PowerHA Geographic Mirroring will be created later.

	С	rea	ate	e [Dev	/i (ce	Desc (ASP)	(CRTDEVASP)	
Type choices, press	En	te	r.							
Device description .							٨	IASP	Name	
Resource name							٨	IASP	Name	
Relational database								*GEN		
Message queue								*SYSOPR	Name	
Library									Name, *LIBL,	*CURLIB
Text 'description' .								*BLANK		

NOTE: It is HIGHLY-recommended for any customer to use IBM Lab Services for assistance in migrating a non-IASP environment to an IASP-enabled environment, before moving forward with any PowerHAmanaged solution. Only data included in the IASP is being replicated, and switchover/failover activities will not work, if the partitions have not been properly configured to support IASP.

PowerHA Clustering Configuration:

Once the Production IBM i has been properly IASP-enabled, a DR solution with PowerHA Geographic Mirroring can be implemented.

On both instances, perform the following steps:

- CHGTCPSVR SVRSPCVAL(*INETD) AUTOSTART(*YES)
- STRTCPSVR SERVER(*INETD)
- CHGNETA ALWADDCLU(*ANY)

From the Production IBM i instance do the following to create the PowerHA Cluster:

- 1. CRTCLU CLUSTER(<Cluster Name>) NODE((<Prod Node Name> (<Prod Node IP Address>)) START(*NO)
- 2. WRKCLU, press Enter, to verify cluster was created
- 3. From that **WRKCLU** menu, **Option 6** (Work with cluster nodes) will show the production node with a status of New.
- 4. Use **Option 8** (Start) to start clustering on the production node. The status will change to Active.

- 5. From that same screen, use **Option 1** (Add) to add the DR node to the cluster, providing the IP address, and specifying Start Indicator as *NO. That node will now be listed and show a status of New.
- 6. Use **Option 8** (Start) to start clustering on the DR node. The status will change to Active.

PowerH	Ą	Work	with Cluster Nodes	
Local r Consist	node tent informat	tion in clust	: CLOUDPRD ter: Yes	
Type op 1=Ado 8=Sta	otions, press d 2=Change art 9=End	s Enter. 4=Remo∨e	5=Display more details	6=Work with monitors
Opt	Node	Status	Device Domain	
	CLOUDDR CLOUDPRD	Active Active	CLDDEVDMN CLDDEVDMN	

Adding Cluster Nodes to Device Domain:

From the Production IBM i instance do the following to add the PowerHA cluster nodes to the same device domain:

- 1. From **WRKCLU, Option 7** (Work with device domains), there should be no device domain listed yet.
- 2. Use **Option 1** (Add) to add a device domain to the cluster, and specify the production node name.
- *3.* The **WRKCLU, Option 7** screen will now show the new device domain with one node (the production node) listed to the right.
- 4. Use **Option 6** (Work with nodes) and then select **Option 1** (Add) to add the DR node to the device domain. This screen will now list both nodes as Active in that device domain.
- 5. The **WRKCLU, Option 7** screen will now show the device domain with both nodes listed to the right.



Creating the Device Cluster Resource Group (CRG):

From the Production IBM i instance, do the following to create the device CRG used for switchover/failover of the IASP:

- 1. The **WRKCLU, Option 9** (Work with cluster resource groups) screen should be empty.
- 2. Use **Option 1** (Create) and provide a name for the CRG with 10 characters or less, and press Enter.
- *3.* Select **Option 1** (Cluster resource group) from the pop-up menu (at V7R4) and press Enter.
- 4. Specify Type=*DEV, Exit Program=*NONE, and User Profile=*NONE
- 5. Next to "Recovery domain node list", type a '+' and press Enter.
- 6. For the first entry in the recovery domain, use the name of the production node with a node role of *PRIMARY and a site name that will be unique from the DR node. Specify at least one IP

address to be used by the production node for Geographic Mirroring (replication). Then page down.

- 7. For the next entry in the recovery domain, use the name of the DR node with a node role of *BACKUP, a sequence number of 1, and a site name that is unique from the Production node. Specify at least one IP address to be used by the DR node for Geographic mirroring (replication). Press Enter, then page down.
- 8. (Optional) Provide a text description for the CRG.
- 9. Press Enter to create the CRG. The status will show as Inactive.

PowerHA	PowerHA Work with Cluster Resource Groups									
Consist	Consistent information in cluster : Yes									
Type op 1=Cre 6=Rec 10=Co	tions, press ate 2=Chang overy domain nfigure	Enter. e 3=Chang 7=Confi	e primary guration objects	4=Delete 8=Start	5=Display 9=End					
Opt	Container/ CRG	Туре	Status		Primary Site/Node					
6	CLDGEOMIR	*DEV	Active		CLOUDPRD					
PowerHA		Work v	with Recovery Doma	in						
Cluster Consist	resource gro ent informatio	up on in clust	: CLDG er: Yes	EOMIR						
Type options, press Enter. 1=Add node										
Opt	Node	Status	Current Node Role	Preferred Node Role	Site Name					
	CLOUDDR CLOUDPRD	Active Active	*BACKUP 1 *PRIMARY	*BACKUP 1 *PRIMARY	TORONTO2 TORONTO1					

Add the IASP to the Device CRG:

From the Production IBM i instance, do the following to add the IASP to the device CRG:

- 1. WRKCLU, Option 9 (Work with cluster resource groups) will show the device CRG as Inactive.
- Use **Option 7** (Configuration objects) to show no objects yet added to the CRG.

- Use Option 1 (Add) with the name of the IASP and a type of *DEVD, and press Enter.
- If automatic vary-on of the IASP is desired after switchover/failover (more common) change "Configuration object online" to *ONLINE.
- Specify *NONE for "Server takeover IP address" as managing an automated switch of a primary IP interface is done more efficiently with IASP exit programs. Press Enter to complete the process.
- 6. The IASP will now be listed in **WRKCLU, Option 9, Option 7**.

PowerHA	PowerHA Work with Cluster Resource Groups									
Consiste	Consistent information in cluster : Yes									
Type opt 1=Crea 6=Reco 10=Cor	tions, press Ent ate 2=Change overy domain nfigure	er. 3=Change pri 7=Configurat	mary tion objects	4=Delete 8=Start	5=Display 9=End					
Opt	Container/ CRG	Туре	Status		Primary Site/Node					
7	CLDGEOMIR	*DEV	Active		CLOUDPRD					
PowerHA		Work with Co	nfiguration (Objects						
Cluster Consist	Cluster resource group CLDGEOMIR Consistent information in cluster : Yes									
Type options, press Enter. 1=Add 2=Change 4=Remove 5=Display more details 6=Configuration status										
Opt	Configuration Object Name	Object Type	Device Type	Device Subtype	Vary Online					

Start Geographic Mirroring of the IASP:

IASP01

From the Production IBM i instance, do the following to start Geographic Mirroring on the IASP:

*DEVD

1. CFGGEOMIR ASPDEV(<IASP Name>) ACTION(*CREATE) SSN(<DR Site ASP Copy>/<Prod Site ASP Copy>/<ASP

*ASP

Primary

*ONLINE

Session Name>) **DELIVERY(*ASYNC) UNITS(*SELECT)**. Press Enter.

NOTE: DR Site ASP Copy and Prod Site ASP Copy are unique names assigned to differentiate which copy of the IASP is referenced. Both copies are the same IASP, but exist on two separate sets of disks.

NOTE: ASP Session Name is label for the Geographic Mirroring replication, against which actions can be performed (e.g. Suspend, Resume, Detach, Reattach)

Configure Geogr	raphic Mirror	(CFGGEOMIR)								
Type choices, press Enter.										
ASP device	IASP *CREATE TORONTO1 TORONTO2 CLDGEOMIR CLOUDPRD CLOUDDR *ASYNC *SELECT	Name *CREATE, *DELETE Name, * Name, * Name, *NONE Name Name *SYNC, *ASYNC Name, *SELECT								

- 2. The next screen will show a list of non-configured disk units from the DR node. Select those that are to be included in Geographic Mirroring. Use F9 (Calculate selection) to view the capacity that will result once configuration is complete.
- 3. Press Enter to begin configuration of Geographic Mirroring. This may take up to several hours, depending on the number and size of disks used.
- 4. Once complete, **DSPASPSSN SSN(**<ASP Session Name>**)** will show the status as *RESUMPND
- 5. Vary on the IASP device, and re-check the ASP session status. It will show as *SUSPENDED.
- 6. **WRKCLU, Option 9** (Work with cluster resource groups) and use Option 8 (Start) to start the CRG. The status will change to Active.

7. CHGASPSSN SSN(<ASP Session Name>) OPTION(*RESUME) will restart synchronization of Geographic Mirroring

PowerHA		Work with AS	SP Copy Desci	riptions	07/16/20	IBMIPROD
Device o	domain		: CI	DDEVDMN	07/10/20	09:51:52
Type opt 1=Add 21=Sta	tions, press copy art session	Enter. 2=Change copy 22=Change sess	4=Remo sion 24=End	ove copy 5 d session 2	=Display c 5=Display	opy session
Opt	ASP De∨ice	ASP Copy	ASP Session	Ses T	sion Type	
25	IASP01 IASP01	CLOUDPRD CLOUDDR		२. *GE २. *GE	OMIR OMIR	
PowerHA		Displa	y ASP Sessio	n	07/16/20	IBMIPROD 09:38:08
Session Type .				CLDGEOMIR *GEOMIR		
Source n Target n Transmis	node node ssion Delivery	· · · · · · · · · · · · · · · · · · ·		CLOUDPRD CLOUDDR *ASYNC		
		Сору	Descriptions			More
ASP Device IASP01	ASP Copy CLOUDPRD CLOUDDR	Role PRODUCTION MIRROR	Vary State AVAILABLE VARYON	Replication State ACTIVE	Dat Stat USABL UNUSABL	E E
Press En	nter to conti	nue				Bottom
F3=Exit	F5=Refresh	F11=View 2	F12=Cancel	F19=Automa	tic refresh	1

Chapter 3: Troubleshooting

Of course, with any new set up, errors can occur, and although some may be related to infrastructure issues, others arise simply due to familiarity with new technology and the differences that using the IBM Cloud may present from legacy solutions. The following are some of those changes that may take alternative methods than what may be the norm with non-cloud environments.

- When selecting disk units to assign to the new cloud instance(s), start by assigning only the initial Load Source (LS) volume, and identify that in the IBM Cloud GUI for easy reference. Once the instance is created, make note of the disk unit ID in SST/DST. Add subsequent disks one at a time, providing a naming scheme in the IBM Cloud GUI that easily identifies SYSBAS disks or IASP disks, while at the same time, keeping track of the associated disk unit ID from the IBM i instance. This will be crucial in determining which disk units to add with CFGDEVASP and CFGGEOMIR.
- When selecting a name for the IBM i instances, choose a name that is 8 characters or less, as the IBM i will truncate the instance name to 8 characters when assigning a system name.
- As with any Geographic Mirroring solution, ensuring sufficient throughput on the replication interfaces is key. Separate other traffic onto other subnets, and ideally other adapters, so that the replication traffic is not hindered and subject to auto-suspend issues or lengthy switchover/failover processes.
- Additionally, it is best-practice to keep the PowerHA for IBM i clustering communication on a separate subnet than replication, because it requires the "heartbeat" traffic to respond in a timely manner to prevent cluster suspend ("Partition") status. This

would prevent any desired switchover/failover from being allowed.

For additional troubleshooting with PowerVS Cloud infrastructure, use the "Support" option from the IBM Cloud Services GUI to submit a case summary for the IBM team to investigate. These issues would be specific to the infrastructure, network, images, servers, disk enlistment or pathing issues, ...etc.

For issues specific to PowerHA for IBM i Geographic Mirroring configuration, errors or performance, start with a call to 800-IBM-SERV, and request the High Availability Solutions (HAS) team first. They can then engage development teams or Cloud Support, if necessary.

Chapter 4: Additional Resources

Please be sure to visit the following link for additional FAQ's:

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