DISASTER RECOVERY

PROBLEM DEFINITION:-

The project involves creating a disaster recovery plan using IBM Cloud Virtual Servers. The objective is to safeguard business operations by developing a plan that ensures continuity for an on-premises virtual machine in unforeseen events. This plan will include setting up backup strategies, configuring replication, testing the recovery process, and guaranteeing minimal downtime. The project encompasses defining the disaster recovery strategy, implementing backup and replication, validating recovery procedures, and ensuring business continuity.

INTRODUCTION:-

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

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

This document 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:-

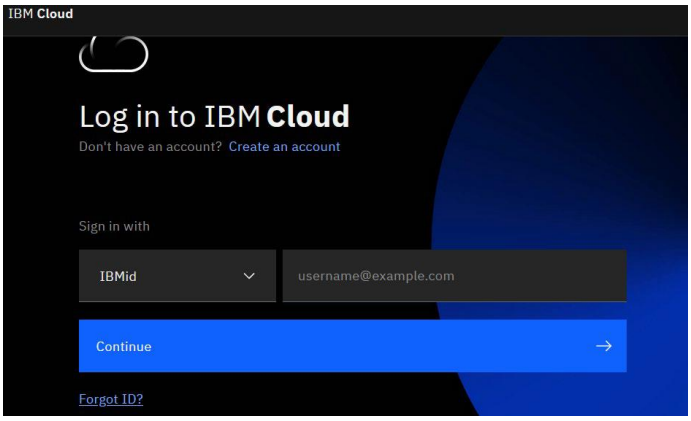
In this case we will demonstrate how to implement PowerHA Geographic Mirroring in IBM i, which provides DR by using operating system (OS) clustering and replication. This solution requires that the IBM i VSI and client application(s) use Independent Auxiliary Storage Pools (IASPs). If the IBM i VSI and application(s) use only *SYSBAS, this DR option will not work

CREATING DB2 AND COGNO SERVICE ON OUR IBM CLOUD ACCOUNT:-

After we creating a Lite account (Trail Free account) as a student. Login to IBM cloud.

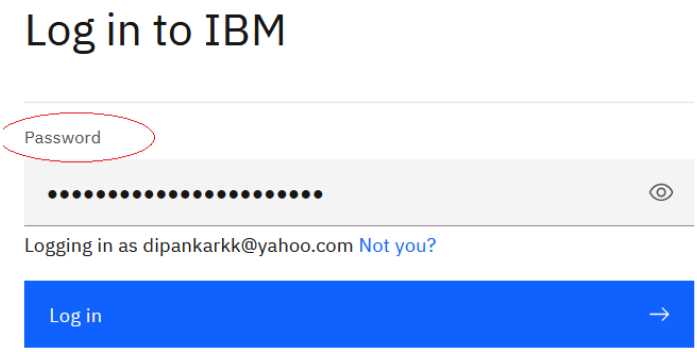
https://cloud.ibm.com/login

Enter your registered mail id.

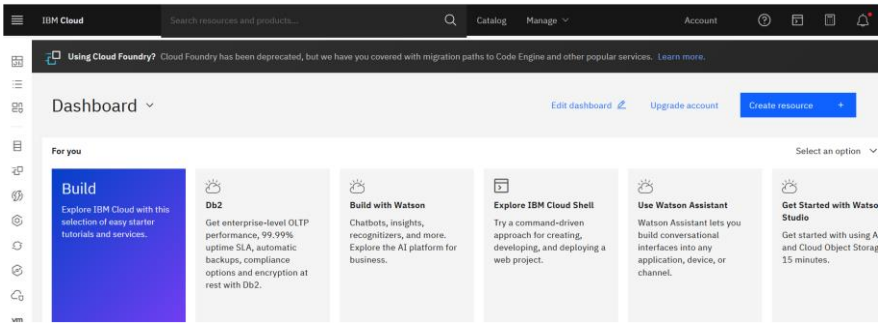


Then Enter **Password**

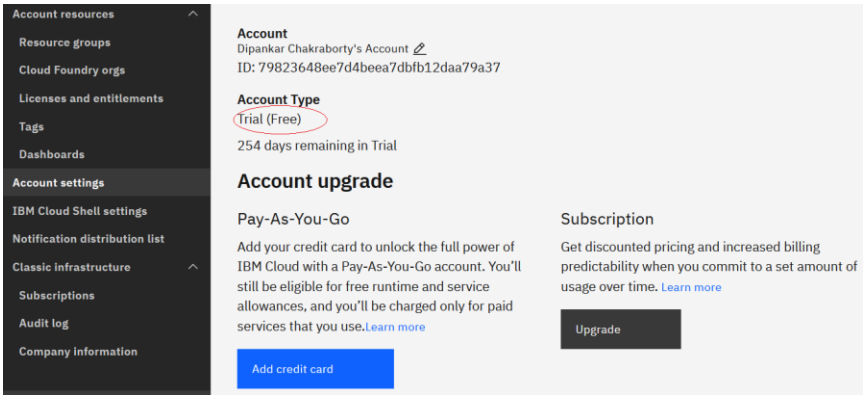
LOGIN TO IBM:-



Aftser successfully login, user will be redirected to account Dashboard page.

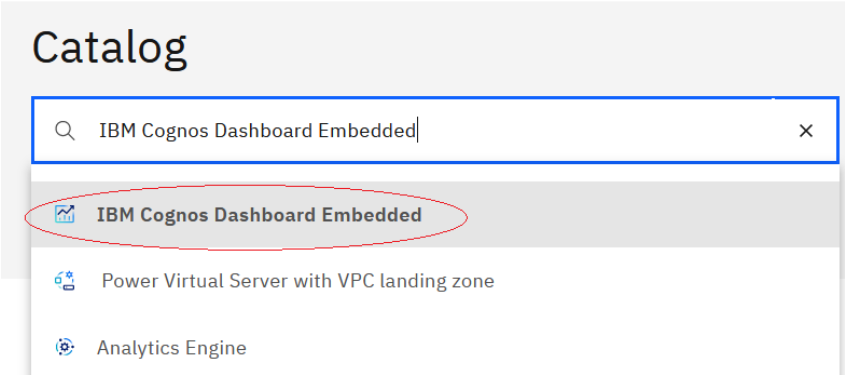


ACCOUNT SETTING:-

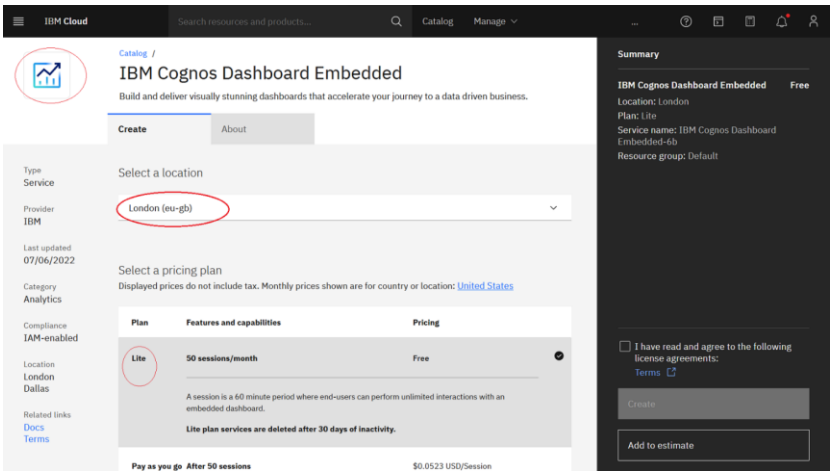


Add IBM Cognos Dashboard Embedded service in your account:-

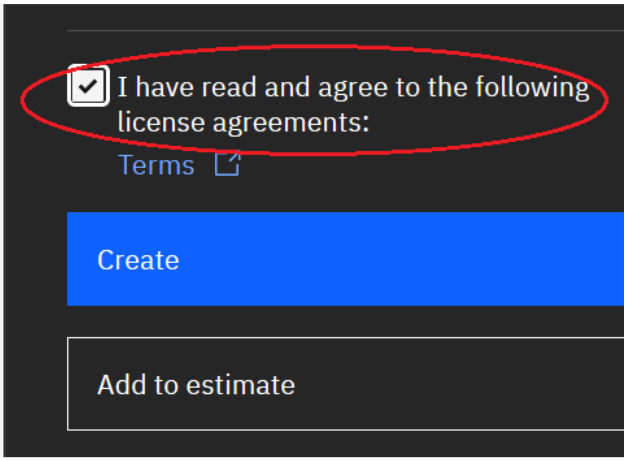
Click on **Catalog** menu on top page. Then enter Cognos in search box.



Click "IBM Cognos Dashboard Embedded", it will redirect you to Cognos page. Once you are on Cognos page.



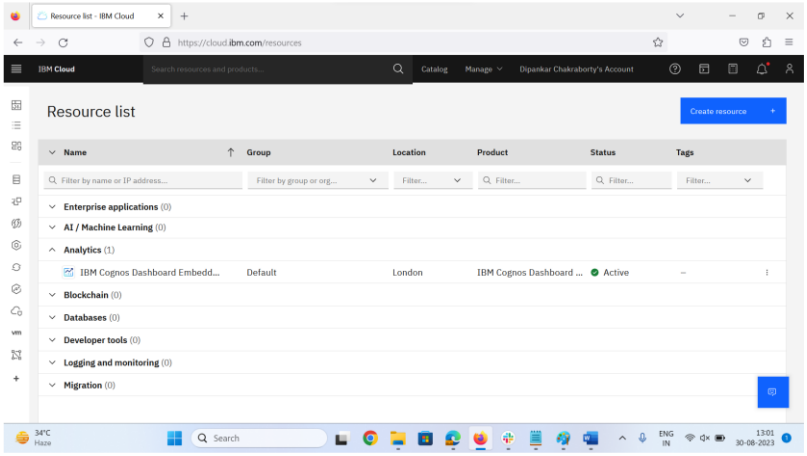
Select a Loca□on: **London**
Select a pricing plan: **Lite**.
Select terms & condi□on (license agreements)



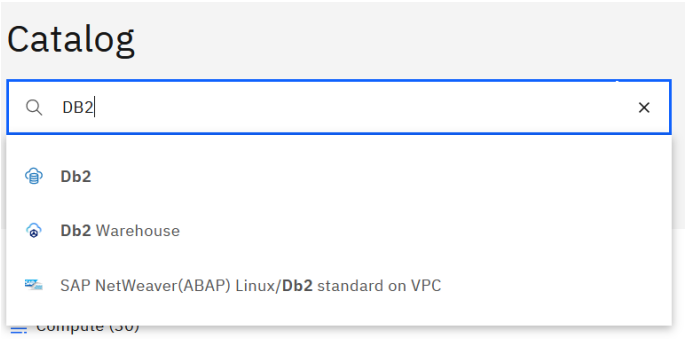
Then click on **Create** buton.
A□er you click on create, it will take some □me to create the service.

user will be redirect to Cognos tutorial page.

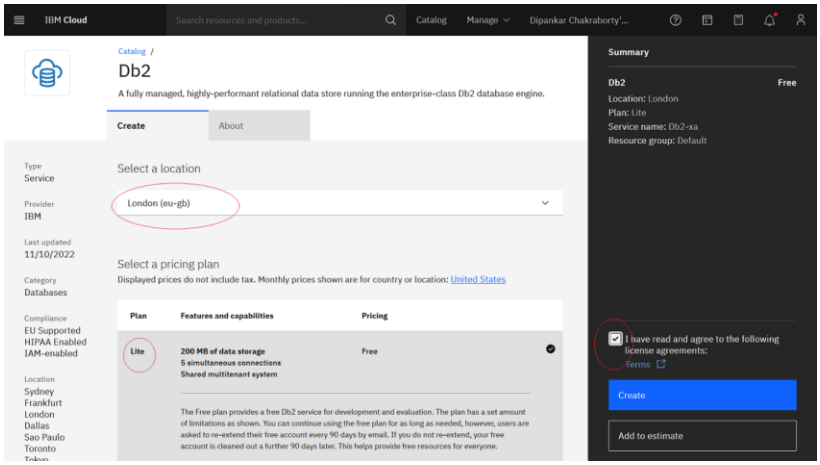
It takes few minutes to service created at cloud account. A□er few minutes you can check resource list.



Now again search DB2 on catalog



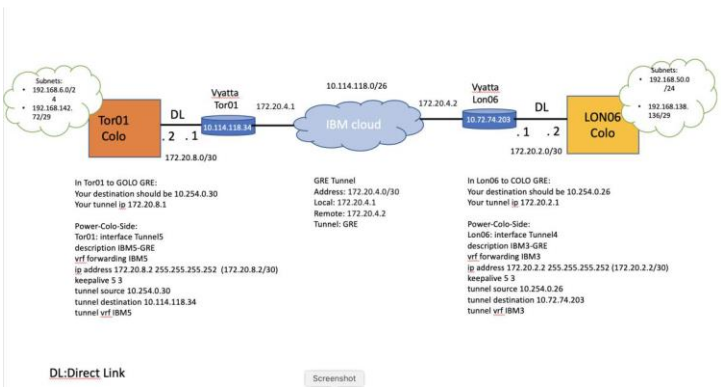
Click on Db2, you will be redirect to DB2 service page.



Select a Loca□on: **London**
Select a pricing plan: **Lite**.
Select terms & condi□on (license agreements)
Then click on **Create** buton.
A□er you click on create, it will take some □me to create the service.

DIAGRAMS:-

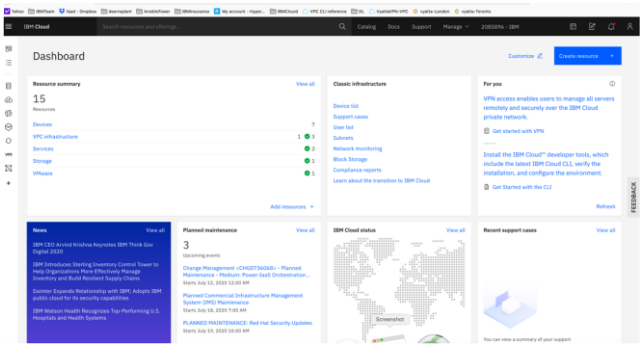
The overall architecture of our deployment is shown below:-



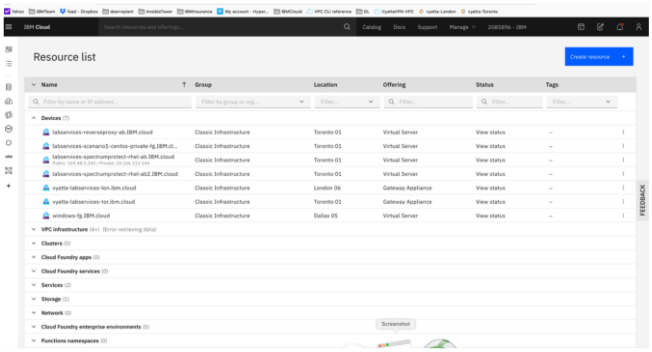
Verify your Vyatta Gateway access:-

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”

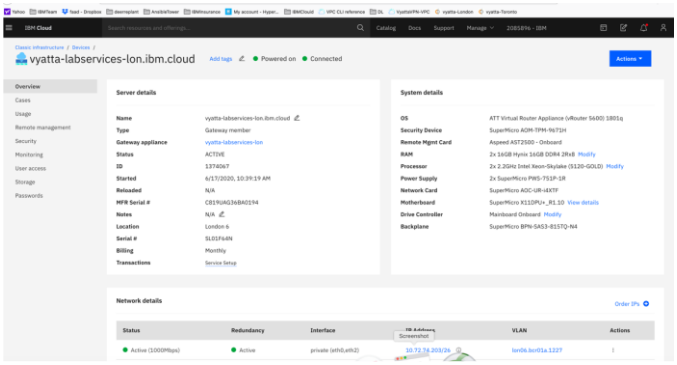


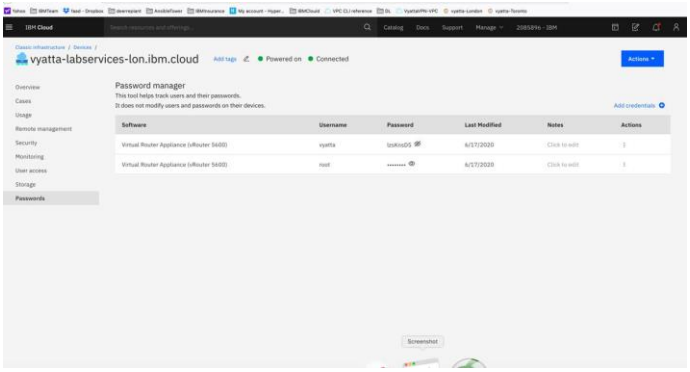
The Vyatta system we like to configure:-

vyatta-labservices-lon.ibm.cloud

LON06:-

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





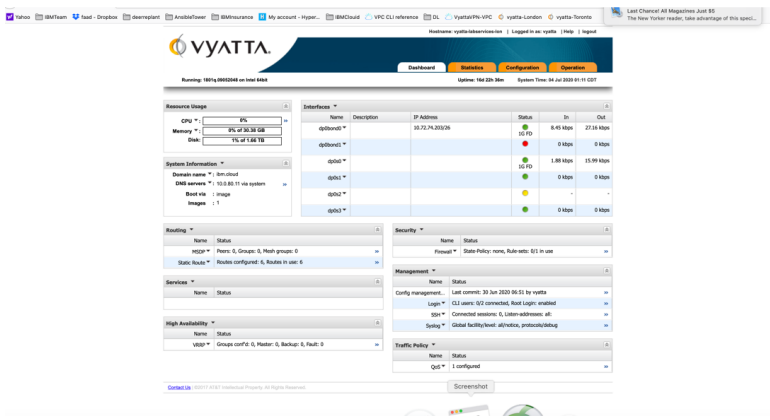
Open a browser and login to the Vyatta Gateway using:-

userID:- Vyatta
Password:- as show in the GUI

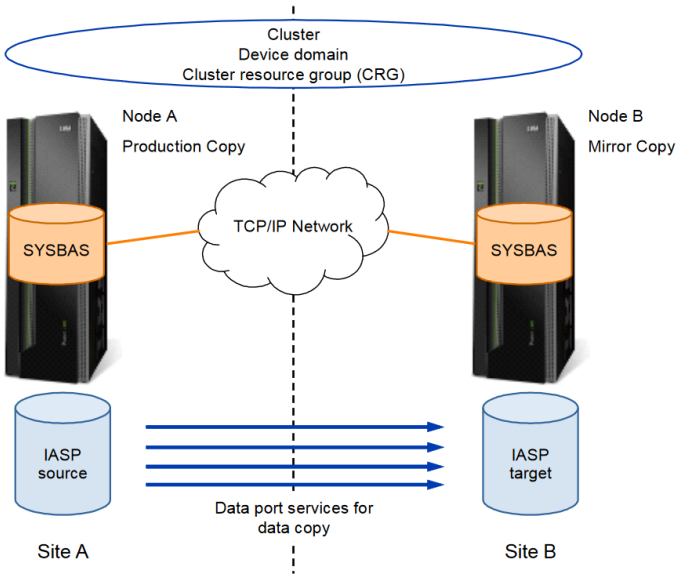
https://10.72.74.203

ssh vyatta@10.72.74.203

Login with the userID and password.



SOLUTION DIAGRAM:-



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

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:-

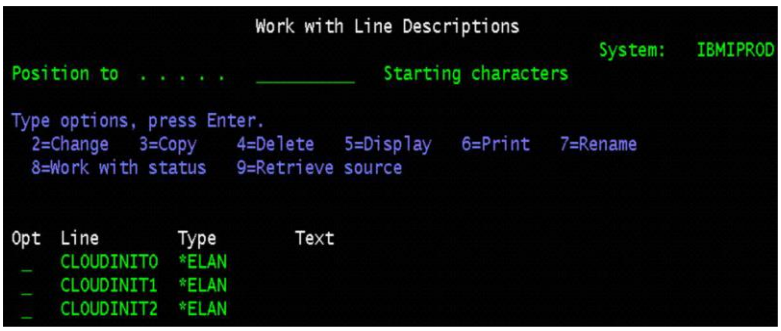
Production IBM i Creation:-

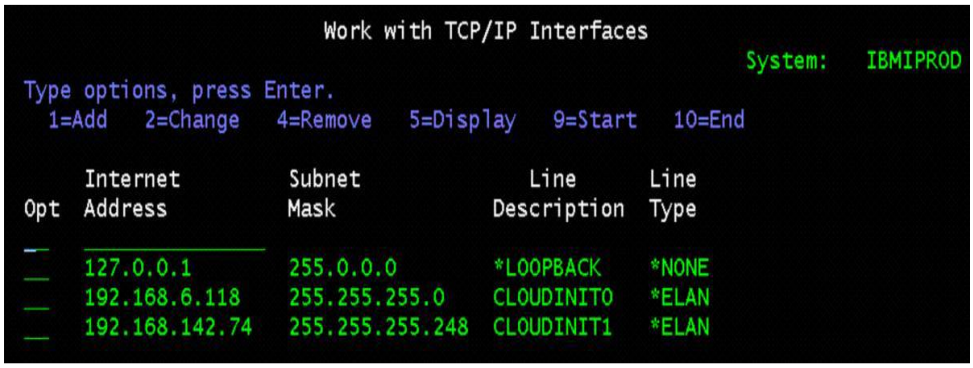
a. A general rule of thumb, assuming most production database objects are moved to the IASP, is a 1:3 ratio of SYSBAS volumes to IASP volumes. Much larger environments may see closer to a 1:6 or 1:9 ratio, as the size of SYSBAS does not need to grow at the same rate as the IASP.

b. 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.

c. 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

d. 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.





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)

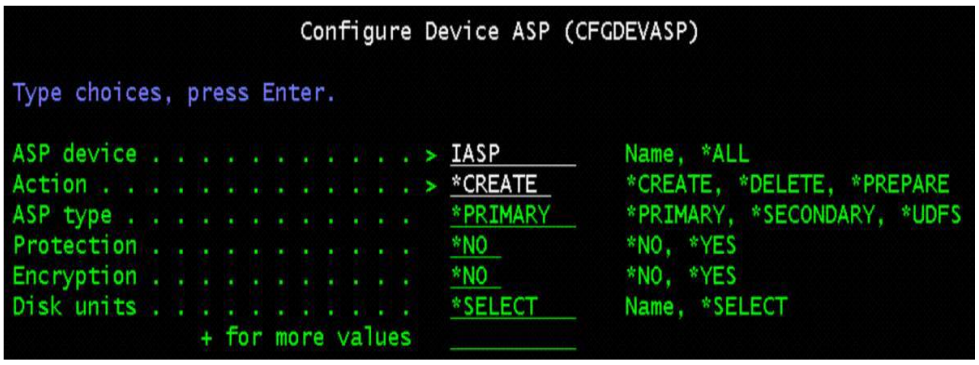
• CHGTCPSVR SVRSPCVAL(*SSHD) AUTOSTART(*YES)

• **CHGTCPSVR SVRSPCVAL(*INETD) AUTOSTART(*YES)**

IASP CREATION

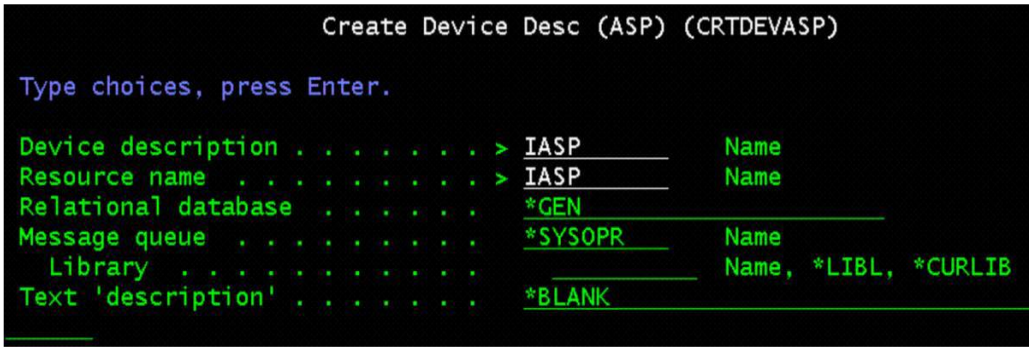
To create the IASP, do the following:-

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

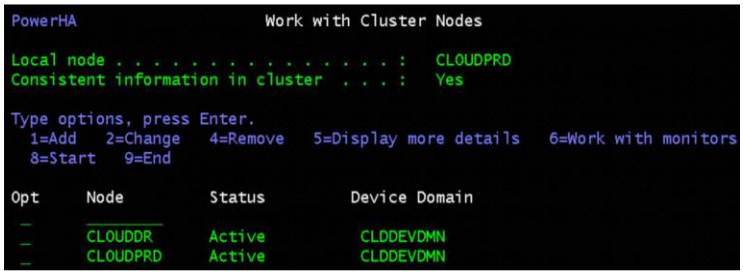


At any time, a matching device description can be created on the HA/DR node with the following:-

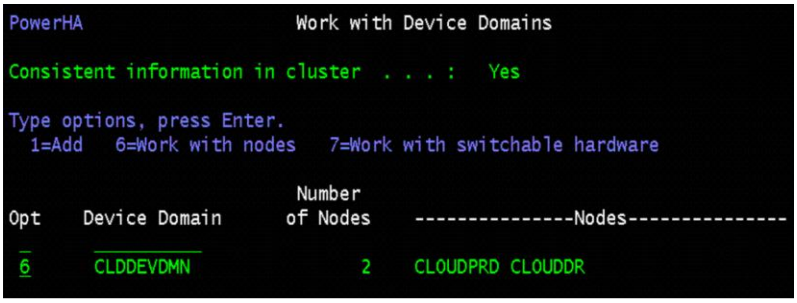
CRTDEVASP(<IASP Name>**) RSRCNAME(**<IASP Name>**)**

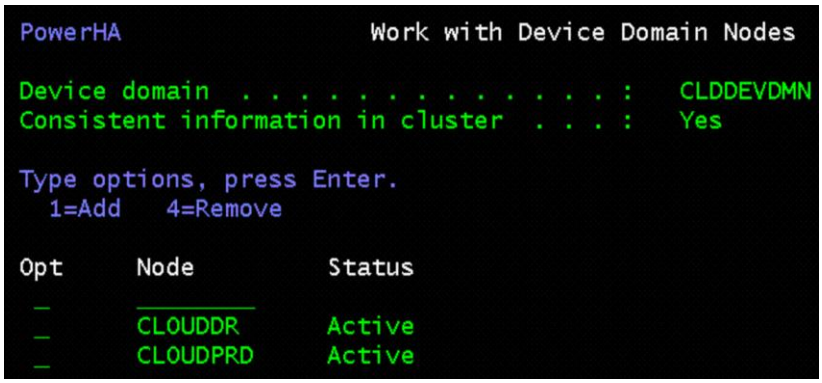


PowerHA Clustering Configuration:-

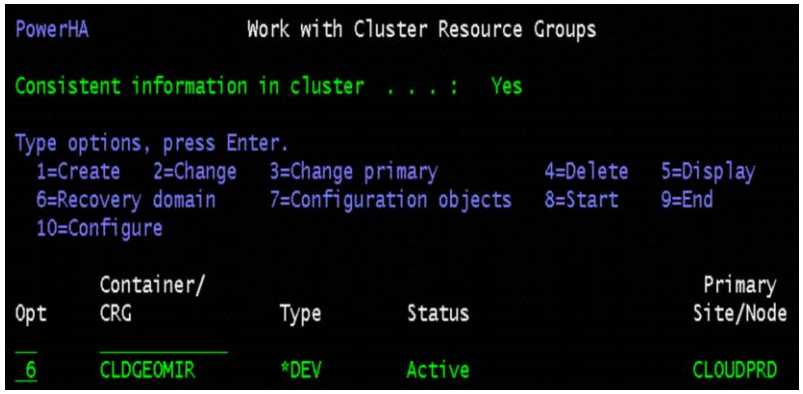


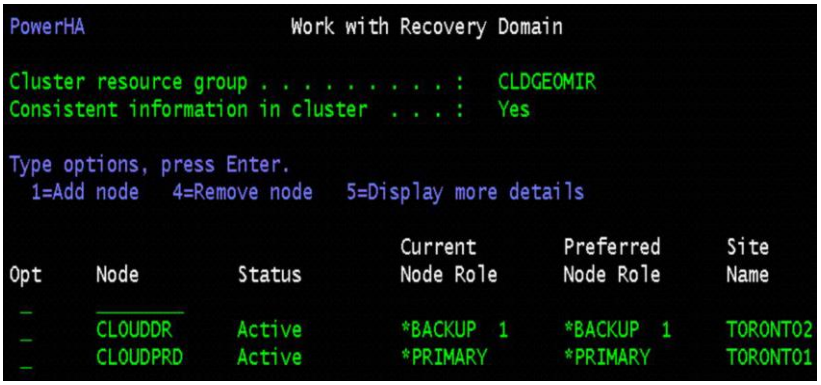
Adding Cluster Nodes to Device Domain:-





Creating the Device Cluster Resource Group (CRG):-





Add the IASP to the Device CRG:-

```
PowerHA                Work with Cluster Resource Groups

Consistent information in cluster  . . . :   Yes

Type options, press Enter.
  1=Create   2=Change   3=Change primary          4=Delete   5=Display
  6=Recovery domain     7=Configuration objects   8=Start    9=End
  10=Configure

       Container/                                              Primary
Opt    CRG              Type        Status                     Site/Node
__     _____________
_7     CLDGEOMIR        *DEV        Active                     CLOUDPRD
```

```
PowerHA                Work with Configuration Objects

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

       Configuration     Object      Device      Device       Vary
Opt     Object Name      Type        Type        Subtype      Online
_      _____________     _____
_      IASP01            *DEVD       *ASP        Primary      *ONLINE
```

START GEOGRAPHIC MIRRORING OF THE IASP:-

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

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

Press Enter.

```
                    Configure Geographic Mirror (CFGGEOMIR)

Type choices, press Enter.

ASP device . . . . . > IASP_____      Name
Action . . . . . > *CREATE_____       *CREATE, *DELETE
Source site  . . . . . TORONTO1_____  Name, *
Target site  . . . . . TORONTO2_____  Name, *
Session  . . . . . CLDGEOMIR_____     Name, *NONE
  Source ASP copy description  .  CLOUDPRD_____  Name
  Target ASP copy description  .  CLOUDDR_____   Name
Transmission delivery  . . . . . *ASYNC_____     *SYNC, *ASYNC
Disk units . . . . . *SELECT_____     Name, *SELECT
             + for more values
```

```
PowerHA                Work with ASP Copy Descriptions              IBMIPROD
                                                          07/16/20  09:31:52
Device domain . . . . . . . . . . . . . :   CLDDEVDMN

Type options, press Enter.
  1=Add copy          2=Change copy       4=Remove copy     5=Display copy
  21=Start session    22=Change session   24=End session    25=Display session

       ASP            ASP             ASP               Session
Opt    Device         Copy            Session             Type

__     _________      _________
25     IASP01         CLOUDPRD        CLDGEOMIR         *GEOMIR
__     IASP01         CLOUDDR         CLDGEOMIR         *GEOMIR
```

```
PowerHA                          Display ASP Session                 IBMIPROD
                                                          07/16/20  09:38:08
Session . . . . . . . . . . . . . . . . . . :   CLDGEOMIR
Type  . . . . . . . . . . . . . . . . . . . :   *GEOMIR

Source node . . . . . . . . . . . . . . . . :   CLOUDPRD
Target node . . . . . . . . . . . . . . . . :   CLOUDDR
Transmission Delivery . . . . . . . . . . . :   *ASYNC
                                                                      More...
                                Copy Descriptions

ASP          ASP                          Vary  Replication         Data
Device       Copy              Role       State      State          State
IASP01       CLOUDPRD     PRODUCTION   AVAILABLE                  USABLE
             CLOUDDR          MIRROR       VARYON       ACTIVE    UNUSABLE



                                                                      Bottom
Press Enter to continue

F3=Exit   F5=Refresh   F11=View 2   F12=Cancel   F19=Automatic refresh
```

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