



IBM i – Migration to Skytap using Commvault

06-September-2021



Table of Contents

Introduction	4
Disclaimer	4
Solution Overview	5
Solution Architecture	5
Systems	5
High Level Process.....	6
Commvault IBM i Data Protection	7
Commvault Configuration	7
Subclient to IBM i Mapping.....	7
Data Subclients	7
DR Subclient	8
Job Steps	8
DR Backup.....	8
1-Touch Restore	8
Procedure	9
Machines.....	9
Install CommServe Server, On-Prem MediaAgent, and configure deduplicated Storage Pool	9
Install IBM i File System Agent on Media Agent	10
Create a plan for migration	11
Configure on-prem IBM i as an IBM i Client.....	12
Perform DR backup prerequisites on IBM i.....	13
Run IBM i Disk Space Report.....	14
Review and apply appropriate additional settings	15
Run IBM i Client Backups	16
Create and deploy MediaAgent (with appropriate storage) on Skytap.....	17
Create a deduplicated storage pool on Skytap MediaAgent	19
Create a secondary copy pointing to the Skytap storage pool	20
Copy jobs to Skytap MediaAgent.....	21
Create IBM i virtual machine in Skytap.....	22
Configure Skytap IBM i as an IBM i Client	23
Start 1-Touch Restore process	24
1-Touch restore job is suspended at this point.....	25

Upload DR Backup ISO to Skytap	26
Restore the OS on the Skytap IBM i	28
Recover System Data and Commvault Libraries from the DR Backup	46
Resume the 1-Touch Restore job	53
Result	53



Introduction

Today 60% of enterprises are running Power/iSeries for their mission critical application and database. It is renowned for its reliability and stability and is deemed irreplaceable by many. There are however some issues:

- The veteran admins for Power/iSeries have been retiring and this has been an ongoing concern for IT departments.
- Older generations of Power hardware are becoming EOL and losing support
- IBM withdrew support for Power6 and Power7 in 2019.
- IBM i backs-up locally to tape creating silos of data requiring on-site expertise

Customers are trying to get out of the datacenter business and move to cloud, and with Power hardware becoming EOL now it the perfect time to think about migrating these workloads to cloud.

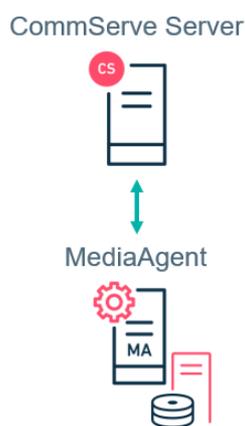
This is where Commvault and Skytap come in, Skytap is the front end for Microsoft's Power offering.

- Skytap claims to provide a 40% TCO savings for Power servers moving to the Azure cloud (compute, storage, labor)

Commvault is the perfect method to migrate these workloads, provide data protection, enable multi-site replication and disaster recovery, automation, and above all simplicity.

This guide will cover the full process of migrating on-prem IBM i to Skytap. It includes best practices and optional steps to make the process smoother. Many of the steps must be performed by an IBM iSeries expert so do not attempt this process without the correct resources available.

This guide will assume an on-prem CommServe Server and MediaAgent (with a deduplicated storage pool) are already configured with Commvault 11.24 or later per the diagram below.



Everything else will be deployed and configured using this guide.

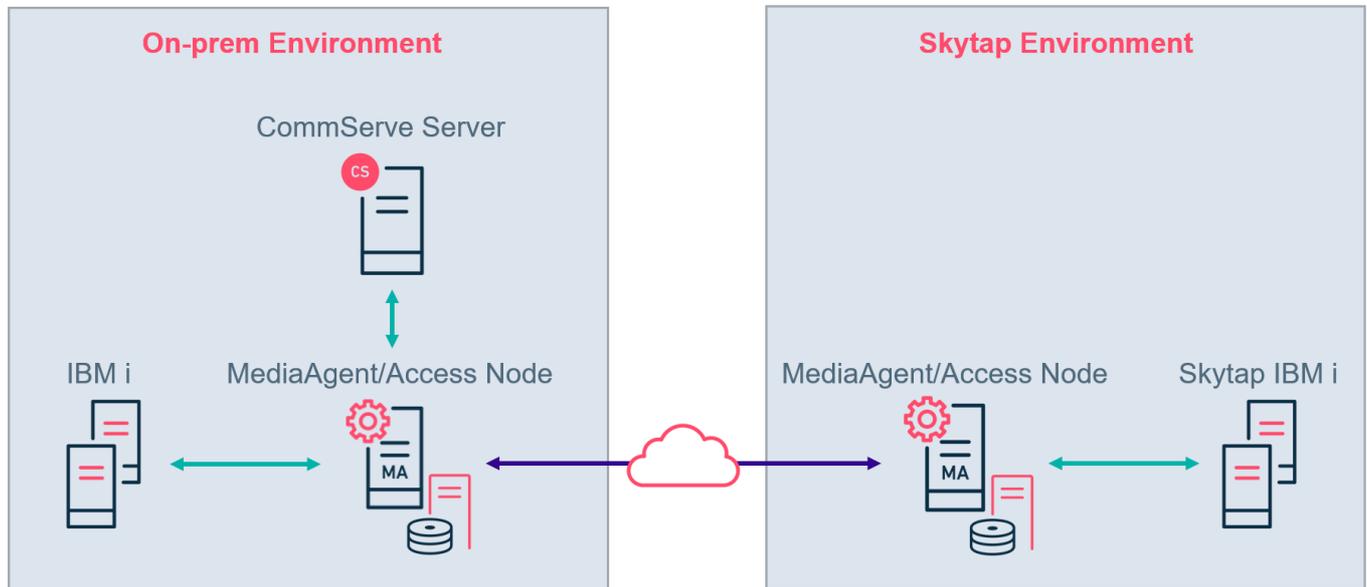
Disclaimer

This guide is accurate for the current release at the time of writing, FR11.24. It is to be used as a guideline, please ensure you fully understand the process and everything that is associated before usage. This process should not be attempted without an IBM i expert.

Solution Overview

Solution Architecture

This guide will use the architecture depicted below. This is just an example and Commvault can support any configuration provided an Access Node has direct communication with both source and destination IBM i Systems.



Systems

- CommServe Server
 - Orchestrates and monitors all jobs in this guide
 - Used to upload ISO image to Skytap
- On-prem MediaAgent/Access Node
 - Supported Linux Operating System (see documented system requirements on documentation.commvault.com)
 - Direct network (TCP/IP) communication with on-prem IBM i
 - Backup target for on-prem IBM i
 - DASH Copy Source
 - Network Gateway
 - Storage Accelerator (if Storage Pool is cloud based)
- On-prem IBM i
 - Migration Source
- Skytap MediaAgent/Access Node
 - Supported Linux Operating System (see documented system requirements on documentation.commvault.com)
 - Direct communication with Skytap IBM i
 - DASH Copy destination
 - Network Gateway
- Skytap IBM i
 - Migration Target

High Level Process

Pre-requisite: Install CommServe Server, MediaAgent, configure deduplicated Storage Pool following documentation best practices.

https://documentation.commvault.com/v11/essential/145241_migrating_on_premises_ibm_i_to_skytap.html

1. Install IBM i File System Agent on Media Agent
2. Optional: Create a plan for migration
3. Configure on-prem IBM i as an IBM i Client
4. Perform DR backup prerequisites on IBM i
5. Run IBM i Disk Space Report
6. Apply additional setting (SingleDVDImage)
7. Perform an IBM i backup of the DR Subclient.
8. Perform an IBM i backup of all non-DR subclients.
9. Create and deploy MediaAgent (with appropriate storage) on Skytap
10. Create a deduplicated storage pool on Skytap MediaAgent
11. Create a secondary copy for the non-DR Backup subclients pointing to the Skytap storage pool
12. DASH copy subclient backups to Skytap MediaAgent
13. Create IBM i virtual machine in Skytap
14. Configure Skytap IBM i as an IBM i Client
15. Start 1-Touch Restore process from CommServe Server
 - a. Restore the DR Backup ISO to the Skytap MediaAgent
1-Touch restore job is suspended at this point
 - b. Upload the DR Backup ISO to Skytap (temporarily disabling the Skytap session timeout is required if the upload will take longer than 15min)
 - c. Change the VM hardware configuration to boot in *D Mode side – Manual*
 - d. Start the VM
 - e. As soon as the media icon is available on the VM, mount the ISO image
 - f. Restore the minimal operating system from the DVD image
 - g. Recover System Data and Commvault Libraries from the DR Backup
 - h. Power down the system
 - i. Change the VM hardware configuration to boot in *B Mode side – Normal*.
 - j. Power on the system and wait for it to boot.
 - k. Resume the 1-Touch restore job.

Commvault IBM I Data Protection

Commvault Configuration

Once configured an IBM i client will by automatically have seven data subclients and one DR subclient:

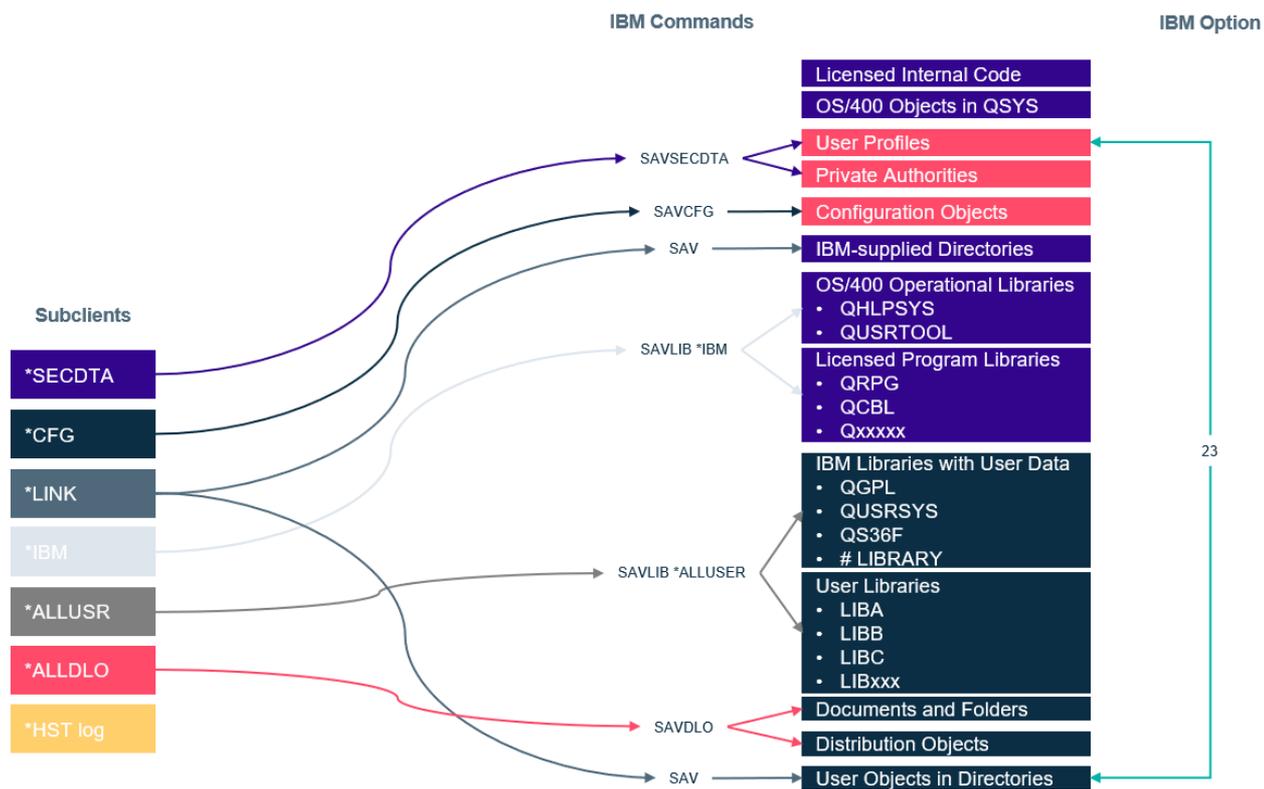
Subclient Name	Contents
*ALLDLO	All documents and folders
*ALLUSR	All user libraries
*CFG	The configuration objects
*HST log	The history logs
*IBM	All IBM supplied libraries
*LINK	The system directories, user directories, and the objects that the directories contain
*SECDTA	The security data
DR Subclient	Creates a bootable ISO with the contents mapped below

Anything not protected by these subclients will need to be added to a new custom subclient, so it can be migrated.

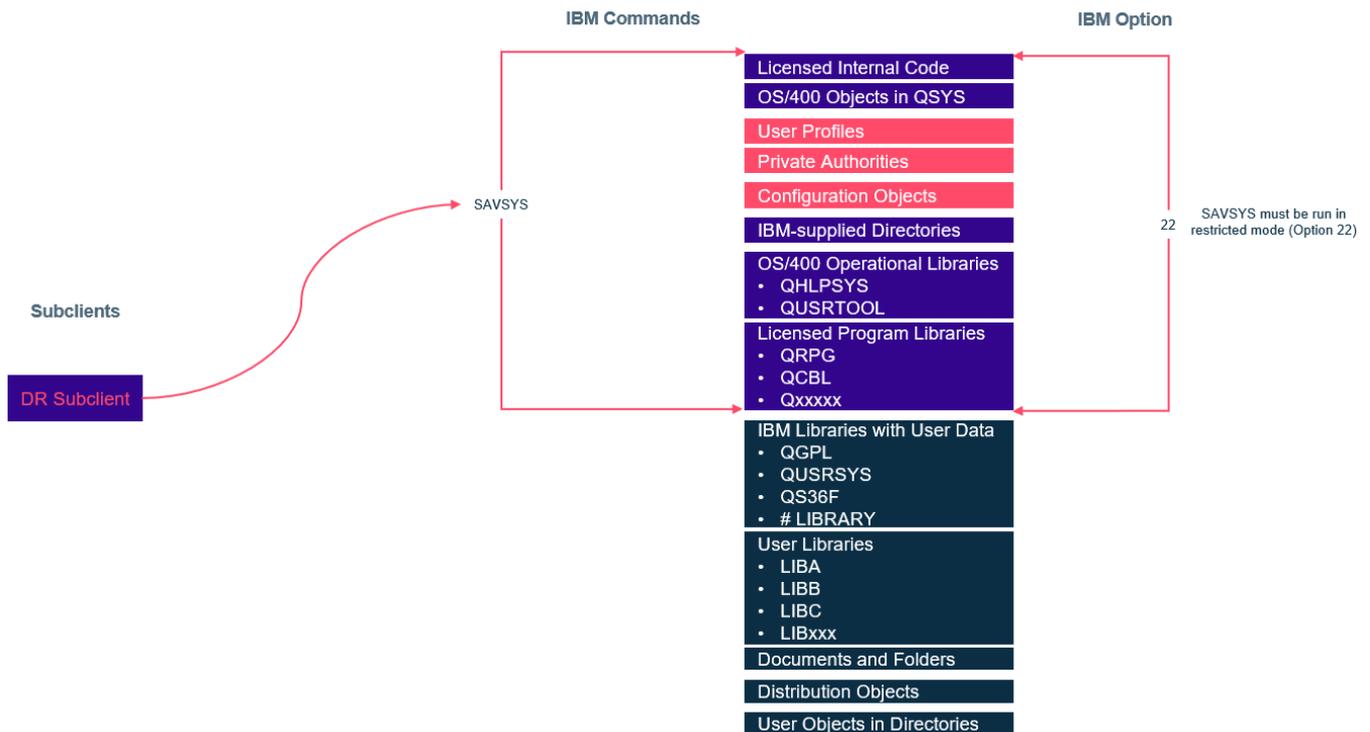
Subclient to IBM i Mapping

These diagrams show the data protected by each of the subclients, the IBM Command that is run to protect then, and the IBM option that is required. All subclients are pre-configured, these diagrams are just for awareness.

Data Subclients



DR Subclient

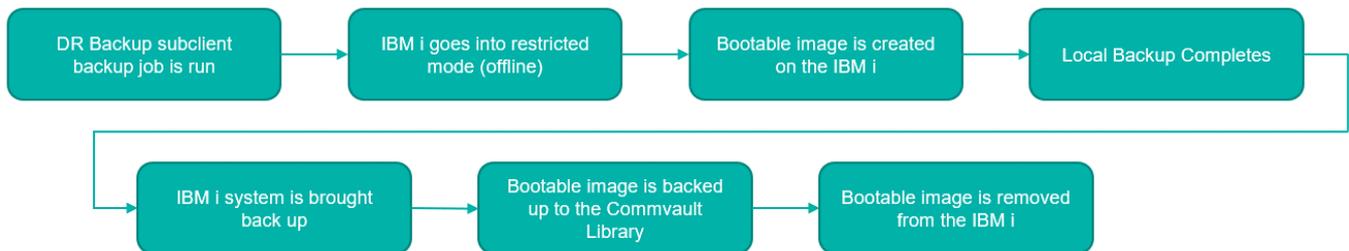


Job Steps

The following steps are automated

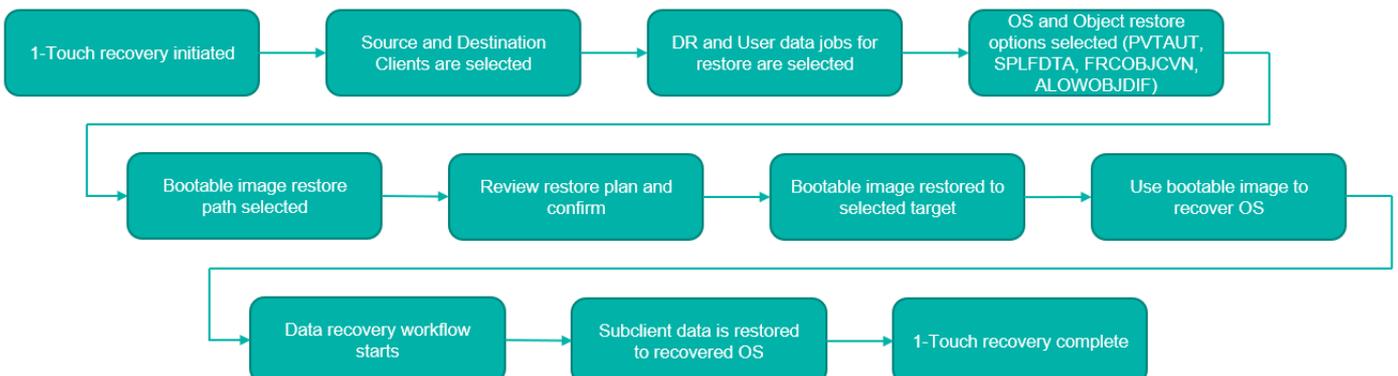
DR Backup

These steps happen in the background when the DR Subclient job runs



1-Touch Restore

Most of these steps are automated, anything requiring interactions is detailed in the guide.



Procedure

Machines

This guide will use the following machines (machine names are for illustration purpose only, actual machine/client name may be different)

Function	Client Name	Client Hostname
CommServe Server	dpr-cs11	dpr-cs11.lab.local
On-prem MA/Access Node	dpr-uxma01	dpr-uxma01.lab.local
On-prem IBM i	lpar6	lpar6.lab.local
Skytap MA/Access Node	st-uxma01	generated by Skytap on boot
Skytap IBM i	st-lpar6	10.0.0.2
IBM i User	CVBKP	

Install CommServe Server, On-Prem MediaAgent, and configure deduplicated Storage Pool

- This guide assumes the CommServe Server, and Linux MediaAgent have been pre-installed. We also assume, that a deduplicated storage pool has been created on the MediaAgent.
- This guide requires the Commserve, MediaAgents, Access Nodes all to be running Commvault FR 11.24+.
- The deduplicated storage pool should have sufficient free space to backup the whole IBM i that is being migrated.

Install IBM i File System Agent on Media Agent

1. Manage > Servers > Click the Actions button next to the MediaAgent > Add Software
2. Select the File System for IBM i package

Add software ⓘ ✕

Select package(s) for UMA File System for IBM i ▾

Reboot if required

When the job completes, notify me via email

[Equivalent API](#) Cancel Install

3. Complete the installation
 - a. A download job will automatically be started if the software cache is missing the required packages

Create a plan for migration

1. Manage > Plans > Create plan > Server backup
2. Give it a name: *IBM i Data Subclients*

Plans

Create server backup plan

General

Create a new plan
New backup plan from scratch

Use existing base plan
Create plan by inheriting setting from base plan

Plan name *
IBM i Data Subclients

CANCEL NEXT

3. Add storage pool from the on-prem MediaAgent
4. Set other options as desired

Configure on-prem IBM i as an IBM i Client

Pre-requisite: SSH and SFTP is required between the access node and the IBM i client, if this is not possible please see documentation for [manual steps](#) to deploy the CVINSTPKG.savf package after the client has been configured.

1. Protect > File Servers > Add Server > IBM i
2. Enter details of the IBM i we are going to protect

Add IBM i server ⓘ ✕

Server name	LPAR6
Host name	lpar6.lab.local
Commvault data path	/var/commvault
CVD port	9401
Plan <small>Optional</small>	IBM i Data Subclients ▼ <small>Does not associate schedules from plan for DR subclient</small>
IBMi user credentials	
User name	CVBKP
Password 👁
Confirm password 👁
Access node client	drp-uxma01 ▼
Subsystem description	QSYS/QSERVER
Job queue	QSYS/QPWFSERVER
	<input type="checkbox"/> Create job queue
Job priority	5
Run priority	50

3. Click Save

Perform DR backup prerequisites on IBM i

- These steps should be carried out by the IBM administrator
 - The goal of the prerequisites is to make the created ISO as small as possible by removing items unnecessary for restore, details can be found here:
https://documentation.commvault.com/v11/essential/108621_performing_ibm_i_file_system_dr_backups.html
 - After the backup succeeds, the following data is backed up in the format of bootable optical volumes:
 - SAVSYS
 - LIC - License internal code.
 - OS/400 Objects in QSYS
 - SAVSECDTA
 - User profiles
 - Private authorities
 - SAVCFG (configuration objects)
 - *IBM Libraries (system libraries)
 - System libraries with user data: QSYS2, QGPL, QUSRSYS
 - Commvault Libraries: CVLIB, CVLIBOBJ
 - System files and Commvault files with logs
 - /QIBM/ProdData
 - /QOpenSys/QIBM/ProdData
1. Do not create, or include the following under QGPL, QSYS2, and QUSRSYS libraries, if they are present and can be removed safely, please remove them:
 - a. Applied PTFs
 - b. Compiled programs
 - c. Image catalog
 - d. Journal or Journal receivers
 - e. OS related image catalog files
 - f. SAVF files
 - g. Spool output files
 2. Do not create any library starting with the letter 'Q'.

Run IBM i Disk Space Report

If there is an available Disk Space Report on the IBM i system, that was run within the last 3 days, this will be used to predict the size of the 1-Touch recovery DVD.

The Disk Space Report should be run/scheduled by an IBM i administrator and can take some time to run.

The backup job will verify if there is sufficient free disk space to run the 1-Touch backup. The job will fail if the free space is less than double the estimated DVD size.

Apply additional setting

This additional setting will create a single ISO image, instead of spanning the image over multiple ISOs.

Note: This is default behavior in FR11.26, so the additional setting is only needed in FR1124 and FR11.25 environments.

Additional Setting	SingleDVDImage
Description	Use this additional setting to create a single DVD image during an IBM i DR backup.
Category Type Value	ProxyClients Boolean TRUE
Where to apply	Source Access Node
URL	SingleDVDImage

Run IBM i Client Backups

1. Click Protect > File servers > LPAR6
2. Click Actions next to DR Subclient > Back up
3. Select Resume (*STSSBS) > OK
4. Once the backup is complete run Full backups for all other subclients

Recommendations:

- You can run *ALLDLO, *CFG, *HST Log, and *SECDTA simultaneously
- *IBM and *LINK should be run individually
- If *ALLUSR has very large libraries separate them into smaller subclients

Create and deploy MediaAgent (with appropriate storage) on Skytap

1. Login to Skytap
2. Environments > New environment
3. Select a template, for this guide we will use *CentOS 7.5 Server Firstboot*
4. Create Environment

Create a new environment

Select a template below to create a new environment.

My Company Skytap All

Sort by date created

CentOS 7.5 Server Firstboot

Project

Owner

Region: US-Virginia-M-1

CentOS 7.5 Server Firstboot

Last deployed: 6 days ago (created: 2 years ago) | Owner: Skytap | Region: US-Virginia-M-1

Storage: 30 GB | Metered RAM: 1 GB | Networks: 1 | Container hosts: No | Labels: 0

Attached licenses: N/A

VM	Status	Type	Storage	Metered RAM	Licenses	Endpoints
<input checked="" type="checkbox"/>	Powered off	x86	30 GB	1 GB	--	

5. Optional: Name your environment, and MediaAgent
6. Select VM settings
 - a. Network Adapters: Configure appropriate network interfaces
 - b. Hardware: Configure appropriate CPU, RAM, Disks (be sure to have enough free space for the backups and the ISO to be restored)In this guide we are using local disk on the Skytap MA, you can also use cloud storage but be aware of additional costs that may be incurred.

Compute

Type

x86

RAM

8 GB

vCPUs

4 - (4 sockets x 1 core per socket)

Storage

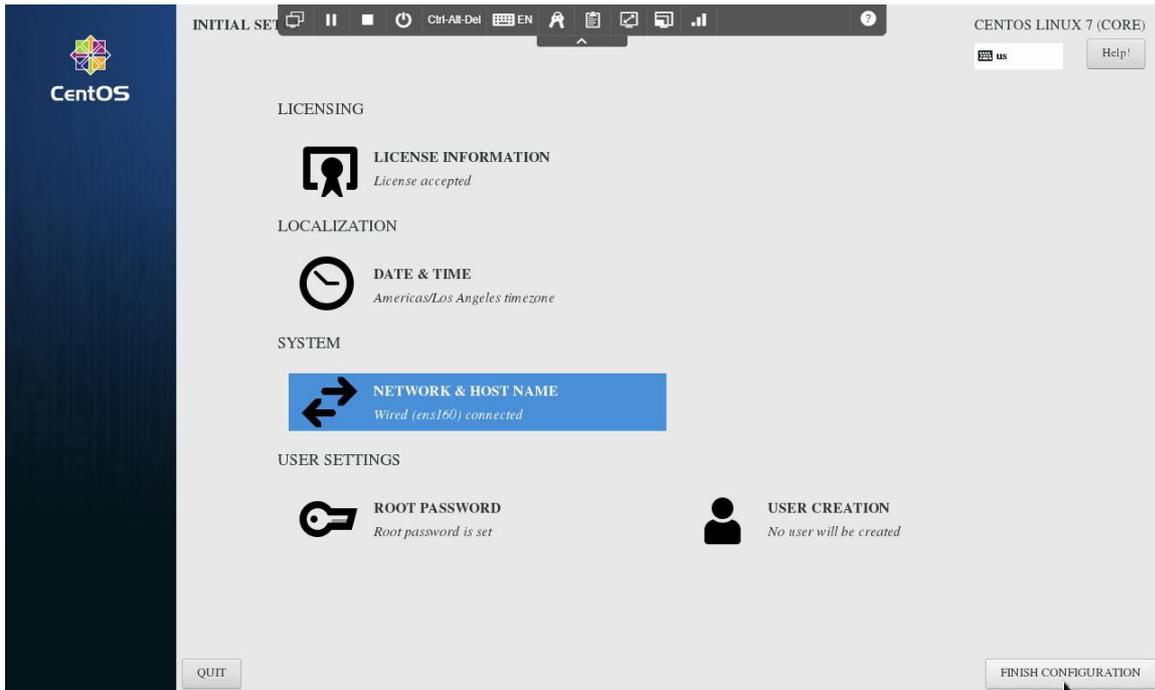
Disk size	Disk ID
250 GB	SCSI Controller: 0, LUN: 0
100 GB	SCSI Controller: 0, LUN: 1
1024 GB	SCSI Controller: 0, LUN: 2

4,096 GB limit - 1,374 GB used, 2,722 GB available

3 of 15 in use

7. Power on the MediaAgent
8. Accept the License
9. Set a root password
10. Optional: Set time zone, configure users, etc

11. Finish Configuration



12. Login and update the MediaAgent
 - a. For CentOS: `yum update -y`

13. Configure storage

```
[root@st-uxma01 ~]# df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
devtmpfs	3.9G	0	3.9G	0%	/dev
tmpfs	3.9G	0	3.9G	0%	/dev/shm
tmpfs	3.9G	17M	3.9G	1%	/run
tmpfs	3.9G	0	3.9G	0%	/sys/fs/cgroup
/dev/mapper/centos_centos7sx64-root	27G	6.1G	21G	23%	/
/dev/mapper/store_vg-store_lv	1.0T	33M	1.0T	1%	/store
/dev/mapper/ddb_vg-ddb_lv	70G	33M	70G	1%	/ddb
/dev/sda1	1014M	241M	774M	24%	/boot
//gw/shared	10G	1.5G	8.6G	15%	/media/shared_drive
tmpfs	783M	0	783M	0%	/run/user/0

14. Create appropriate network topologies to allow communication between on-premise and Skytap components
15. Deploy the MediaAgent to the CommCell using best practices for your environment installing the *MediaAgent* and *File System for IBM i* packages at minimum.

Create a deduplicated storage pool on Skytap MediaAgent

1. Storage > Disk > Add
2. Give the Storage Pool a Name: *Skytap Migration Pool*
3. Add the storage and deduplication DB based on the previously configured mountpoints.

Add storage ×

MediaAgent	st-uxma01	+
Backup location	/store	+
<input checked="" type="checkbox"/> Use deduplication		
Deduplication DB location	/ddb	+

4. Save

Create a secondary copy pointing to the Skytap storage pool

1. Manage > Plans > *IBM i Data Subclients*
2. Under Backup Destinations > Click Add > Copy
3. Enter copy details

Add copy ✕

Name	Skytap Copy
Storage	Skytap Migration Pool ▼
Source	Primary ▼
Backups to copy	All Jobs ▼

Retention rules

Retention period	1 Month(s) ▼
------------------	--

Extended Retention rules

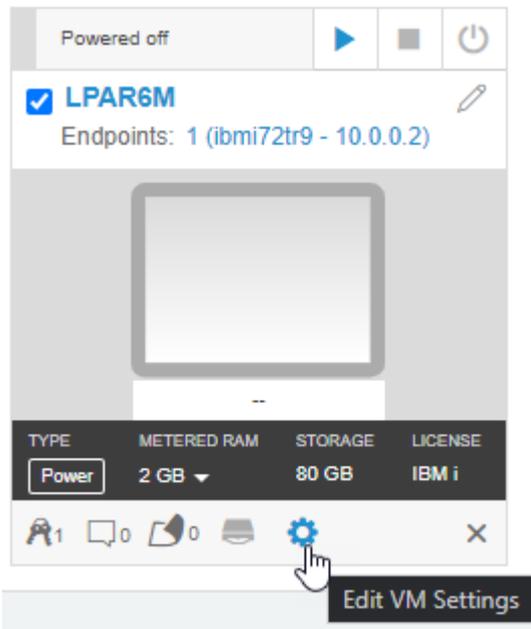
4. Save

Copy jobs to Skytap MediaAgent

1. Plans will have an automatic schedule for Secondary copies
2. Click Jobs
3. After 5 min there should be an Auxiliary Copy running.
4. The Auxiliary copy can run while the next steps are being completed

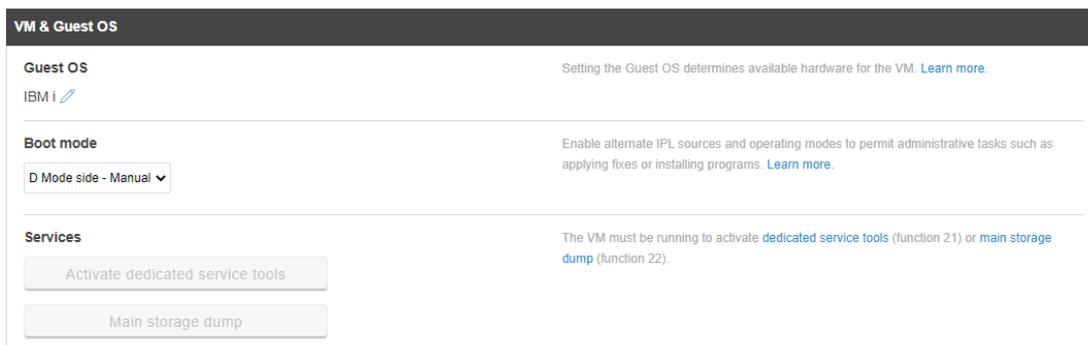
Create IBM i virtual machine in Skytap

1. In the Skytap environment > Click Add VMs
2. Select an appropriate IBM i template
3. Add VM(s)
4. Once created give it a name: *LPAR6M*
5. Edit the VM Settings



6. Hardware
7. Set the required RAM, CPU, Disks
8. Under VM & Guest OS
9. Set Boot mode to *D Mode side – Manual*

This will allow us to boot from the DVD



Configure Skytap IBM i as an IBM i Client

1. Protect > File Servers > Add Server > IBM i
2. Enter details of the IBM i we are going to restore to

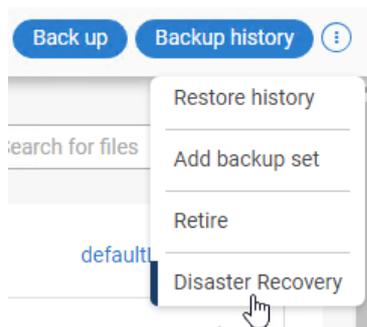
Add IBM i server ⓘ ✕

Server name	LPAR6M
Host name	10.0.0.2
Commvault data path	/var/commvault
CVD port	9401
Plan <small>Optional</small>	Click to select ▼
IBMi user credentials	
User name	CVBKP
Password
Confirm password
Access node client	st-uxma01 ▼
Subsystem description	QSYS/QSERVER
Job queue	QSYS/QPWFSEVER
	<input type="checkbox"/> Create job queue
Job priority	5
Run priority	50

3. Click Save

Start 1-Touch Restore process

1. Protect > File Servers > LPAR6 > Actions > Disaster Recovery



2. Fill in:

- a. Destination Client
- b. BackupSet to restore from
- c. DR backup job to recover
- d. Restore the DVD image to the Skytap MediaAgent
- e. Select the Copy Precedence to restore from, we want to restore this data from the Skytap MediaAgent:
 - i. If using plans (as in this guide):
 1. Copy precedence 1 will be the default created snap copy on the local MediaAgent
 2. Copy precedence 2 will be on the local MediaAgent.
 3. Copy Precedence 3 will be on the Skytap MediaAgent

Disaster Recovery

Destination client	LPAR6M
User data backupset	defaultBackupSet
DR backup job to recover	1047233
Client to restore DVD images	st-uxma01
Destination path to store DVD images	/iso
Copy precedence for restore jobs	3
Log output destination <small>Optional</small>	

Restore SPLFTDA

- ii. If using storage policies choose the appropriate copy precedence pointing to your Skytap copy.

3. Press Submit

1-Touch restore job is suspended at this point

At this point the IBM i DR Recovery Job will be suspended waiting on the restore of the ISO on the Skytap IBM i

1047985 - [IBM i DR Recovery] ✕

[View job details](#) [Resume](#) [Kill](#) [More actions](#) ▾

Job summary

Type	Current phase
IBM i DR Recovery	SuspendWorkflow
Status	Progress
Suspended	<div style="width: 100%;"><div style="width: 100%; background-color: #FFC000;">100%</div></div>
Elapsed time	Source client computer
27 min 27 sec	DPR-CS11
Last update time	Start time
Sep 22, 2021 7:01:31 AM	Sep 22, 2021 6:51:28 AM
Job started by	Workflow name
DPR\rfowler (Third Party)	IBM i DR Recovery
Number of files transferred	
0	

Error summary

19:857 Waiting for user to confirm when IBM i OS recovery is completed.
Source: DPR-CS11, Process: Workflow

Events

Severity... ↑	Event ID	Description
i Info	4282658	Workflow [IBM i DR Recovery] started.

4282658

Upload DR Backup ISO to Skytap

To upload the ISO we need a GUI and a browser, as the ISO resides on the Skytap MediaAgent, there is two options. The first being to install a GUI on the MediaAgent and upload directly, the second is to configure another VM with a GUI. This time we are going to

1. Create a new Windows server 2019 VM in the Skytap environment (any VM with a GUI/browser and SCP would work)

VM	Status	Type	Storage	Metered RAM	Licenses	Endpoints
<input checked="" type="checkbox"/> Windows Server 2019 Standard	Powered off	x86	30 GB	4 GB	--	⌵

2. Configure it with a big enough disk to hold the ISO and complete the basic setup
3. Copy the ISO from the Skytap MediaAgent to the Windows server
 - a. Open PowerShell and use the SCP command
`scp user@Skytap MediaAgent IP:/path/isofile x:\DestinationPath\DestinationFile.iso`

```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\Administrator> scp root@10.0.0.1:/store/iso/LPAR6_210921_0001 C:\Users\Administrator\Desktop\LPAR6.iso
```

4. From the Skytap Windows VM > login to Skytap > Manage > Security Policies

PROJECTS SCHEDULES **MANAGE** ▾ HELP

USAGE & DATA	PEOPLE	CONNECTIVITY
Usage & Limits	Users	Public IPs
Reporting	Groups	WANs
Auditing	Departments	INTEGRATIONS
Labels	ADMINISTRATION	Container Registries
	Settings	
	<u>Security Policies</u>	
	Account Notifications	

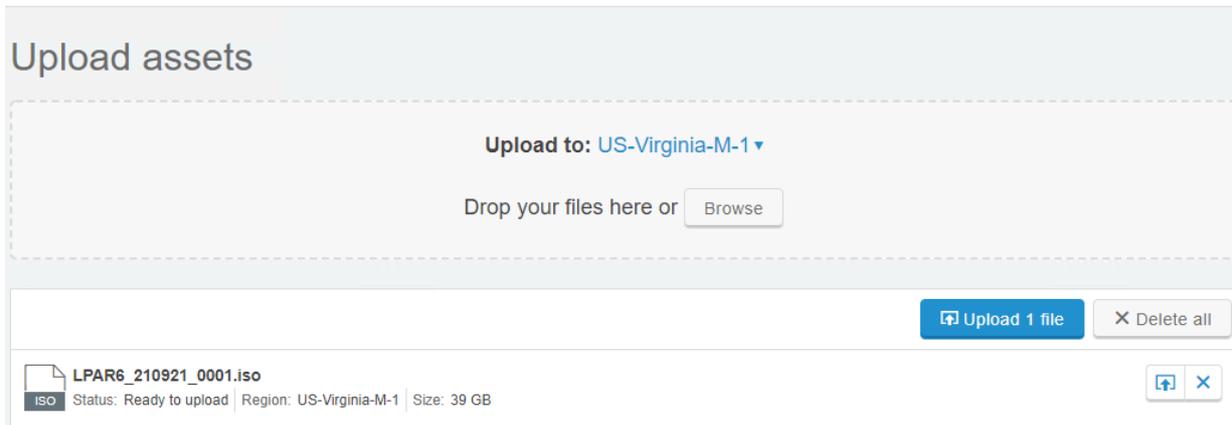
5. Set the Session Expiration Time to Never Expire

6. Press Save



7. Click Assets > Upload assets

8. Select the iso to upload



9. Press Upload 1 file and keep this window open until the upload is complete



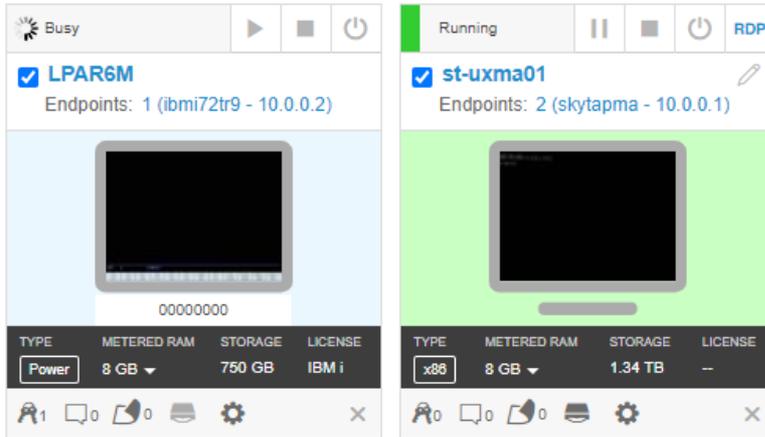
10. This VM is no longer required

Restore the OS on the Skytap IBM i

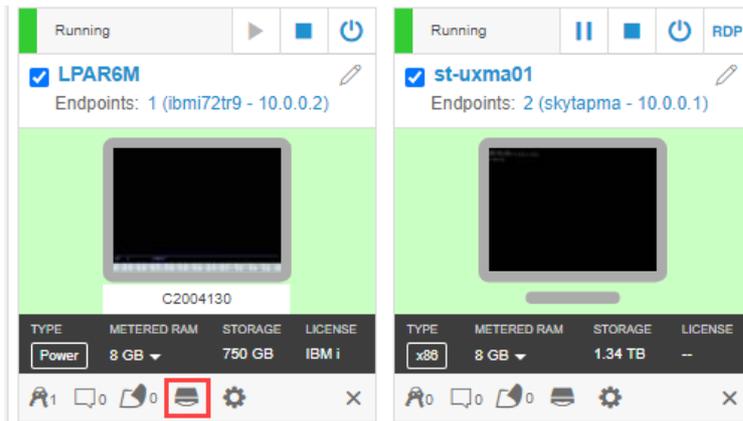
Documentation used for these steps can be found here:

https://documentation.commvault.com/v11/expert/16271_restoring_minimal_operating_system_os_for_ibm_i_file_system_agent_client.html

1. Power on the Skytap IBM i VM



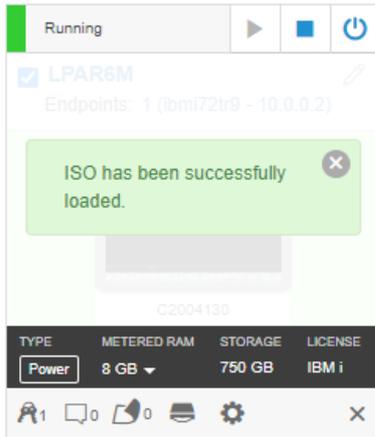
2. As soon as the Load ISO icon is available click on it.



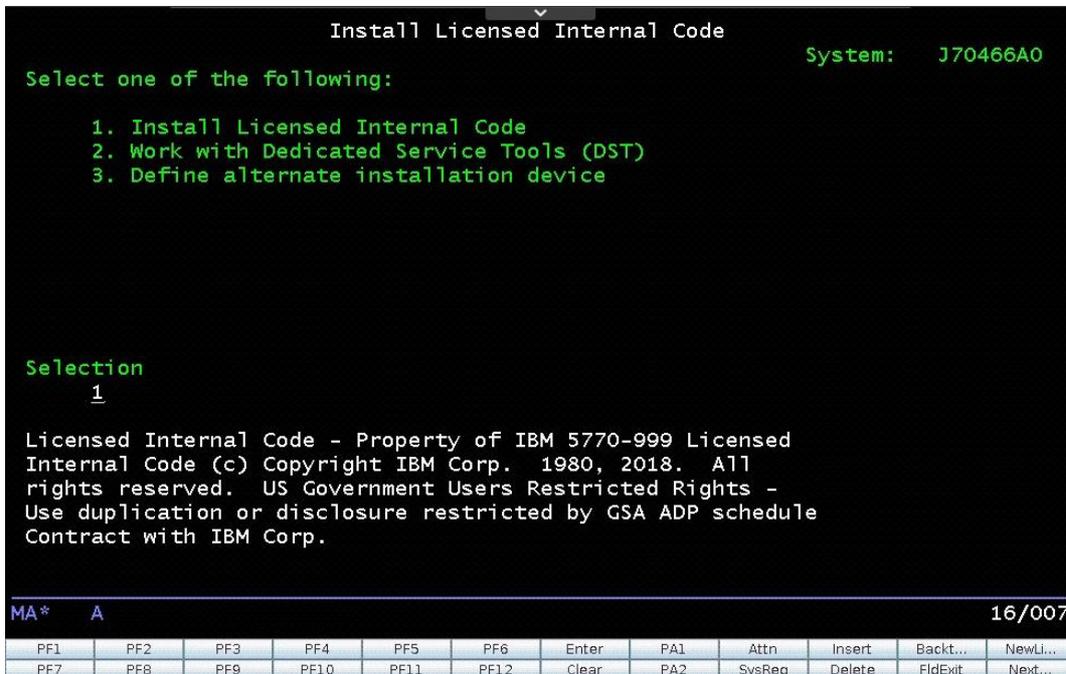
3. Select the uploaded ISO and press Load ISO



4. There will be a confirmation message on the VM



5. Install the Licensed Internal Code (LIC). On the Install Licensed Internal Code screen, select 1 to install the code and then press Enter.



6. Install the Licensed Internal Code (LIC) and initialize the system. On the Install Licensed Internal Code screen, select 2 to install the code and initialize the system and then press Enter.

```

Install Licensed Internal Code (LIC)

Disk selected to write the Licensed Internal Code to:
  Serial Number  Type  Model  I/O Bus  Controller  Device
  Y39HG5HWBA24  6B22  050   0       0           1

Select one of the following:

  1. Restore Licensed Internal Code
  2. Install Licensed Internal Code and Initialize system
  3. Install Licensed Internal Code and Recover Configuration
  4. Install Licensed Internal Code and Restore Disk Unit Data
  5. Install Licensed Internal Code and Upgrade Load Source

Selection
  2

F3=Exit      F12=Cancel

MA*  A                                           21/007
PF1  PF2  PF3  PF4  PF5  PF6  Enter  PA1  Attn  Insert  Backt...  NewLi...
PF7  PF8  PF9  PF10 PF11 PF12  Clear  PA2  SysReq  Delete  FldExit  Next...

```

7. Confirm the install and initialization. On the Install LIC an Initialize System - Confirmation screen, press F10.

```

Install LIC and Initialize System - Confirmation

Warning:
  All data on this system will be destroyed and the Licensed
  Internal Code will be written to the selected disk if you
  choose to continue the initialize and install.

  Return to the install selection screen and choose one of the
  other options if you want to perform some type of recovery
  after the install of the Licensed Internal Code is complete.

  Press F10 to continue the install.
  Press F12 (Cancel) to return to the previous screen.
  Press F3 (Exit) to return to the install selection screen.

F3=Exit      F10=Continue      F12=Cancel

MA*  A                                           01/001
PF1  PF2  PF3  PF4  PF5  PF6  Enter  PA1  Attn  Insert  Backt...  NewLi...
PF7  PF8  PF9  PF10 PF11 PF12  Clear  PA2  SysReq  Delete  FldExit  Next...

```

8. Wait for the status screens to complete. The Initialize the Disk - Status screen displays followed by the Install Licensed Internal Code - Status screen. You do not need to press anything on these screens.

Initialize the Disk - Status

The load source disk is being initialized.

Elapsed time in minutes : 26.5

Please wait.

Wait for next display or press F16 for DST main menu

MA* A 01/001

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

Install Licensed Internal Code - Status

Install of the Licensed Internal Code in progress.

Percent complete

 95%

Elapsed time in minutes : 4.0

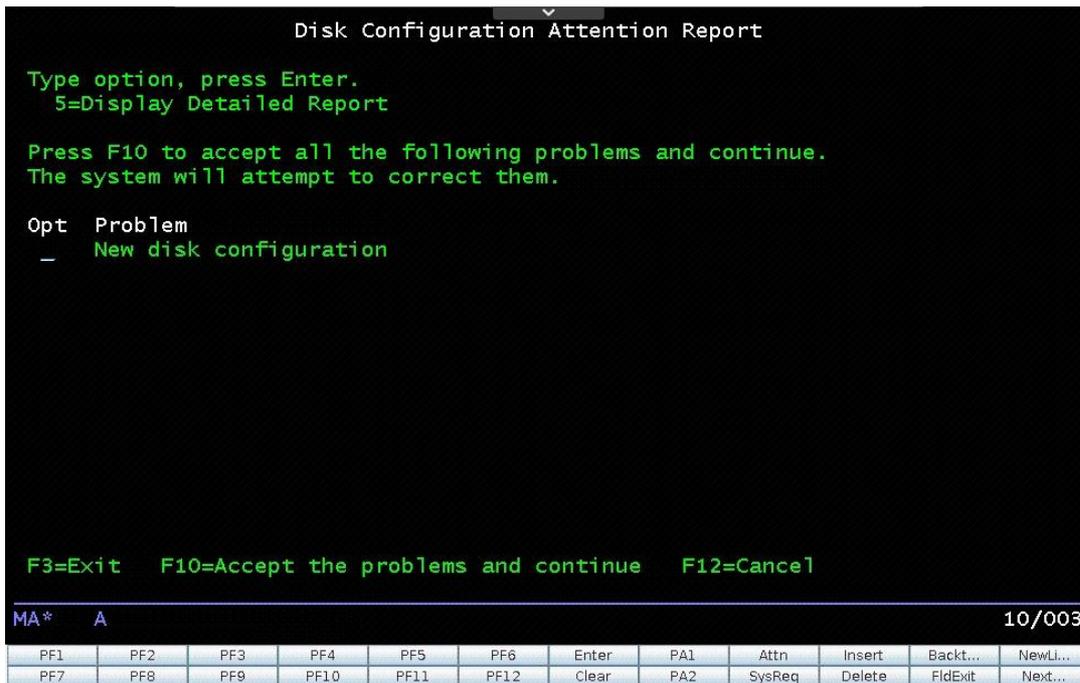
Please wait.

Wait for next display or press F16 for DST main menu

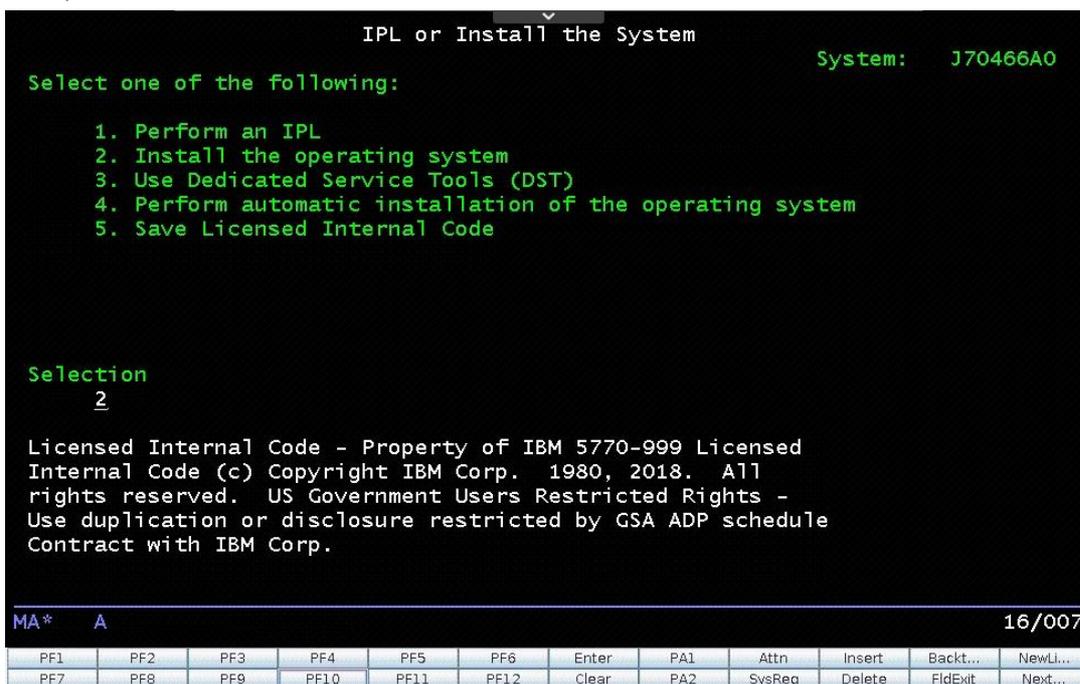
MA* A 01/001

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

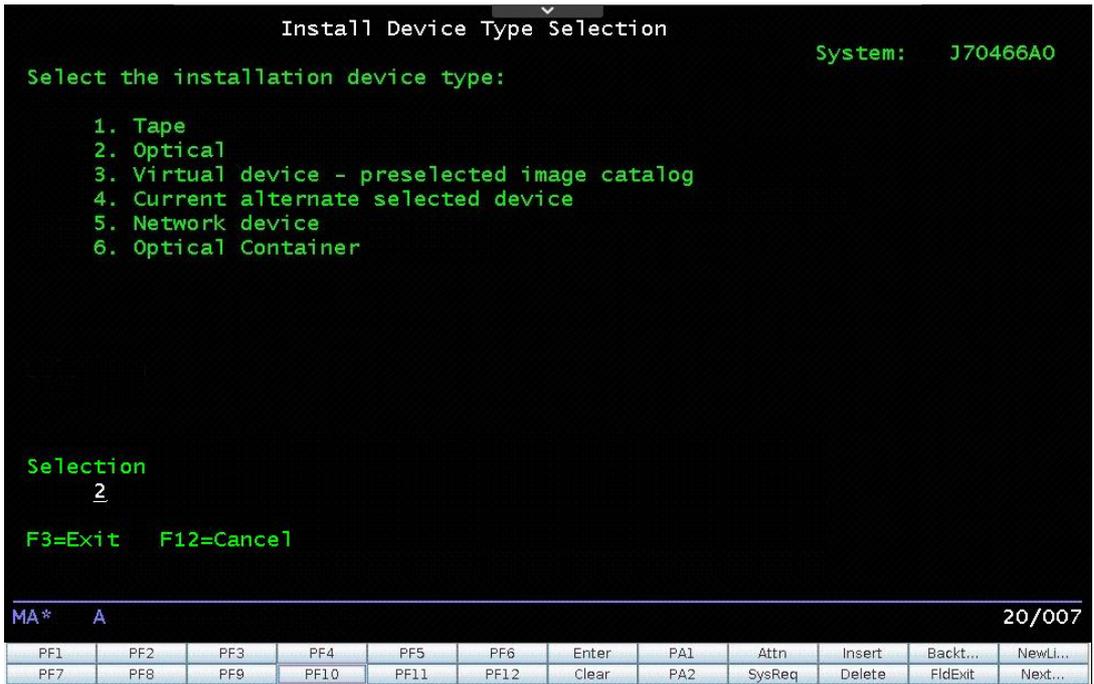
9. Accept the warnings on the report. Press F10 on the Disk Configuration Problem Report screen.



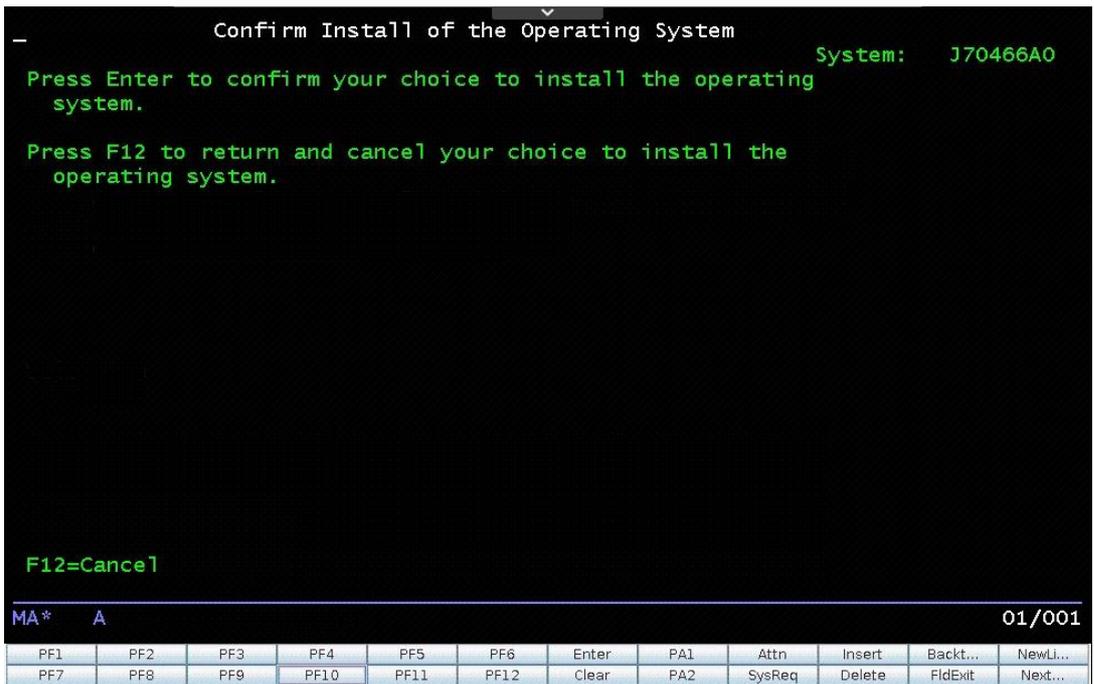
10. On the IPL or Install the System screen, select 2 to install the operating system and initialize the system and then press Enter.



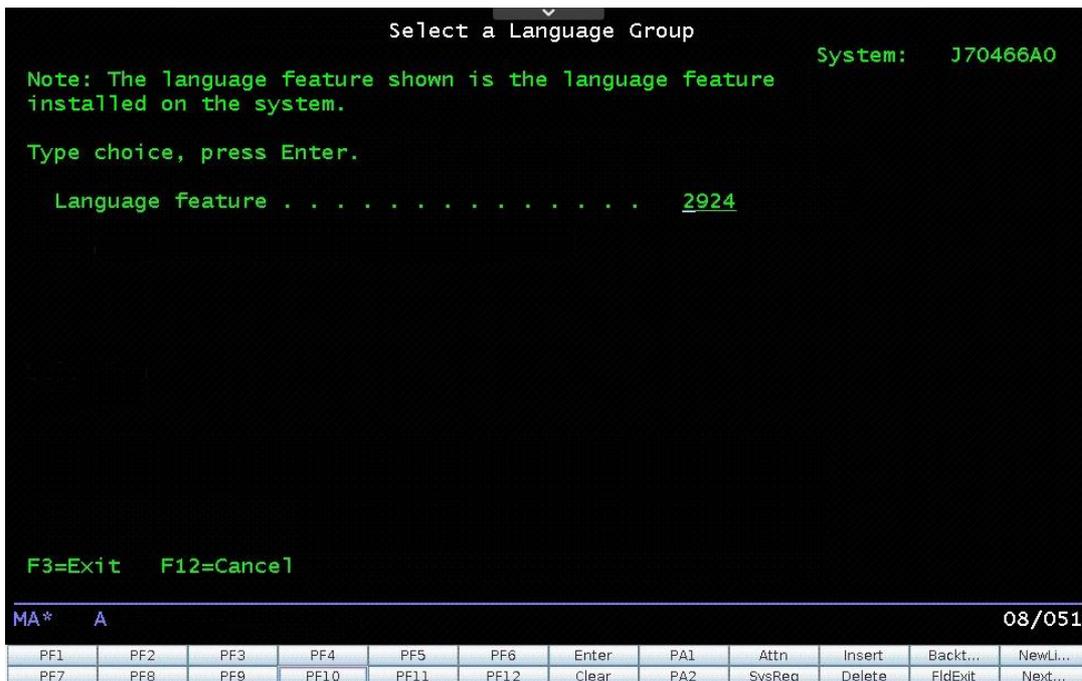
11. Select 2 to use the optical device for the installation



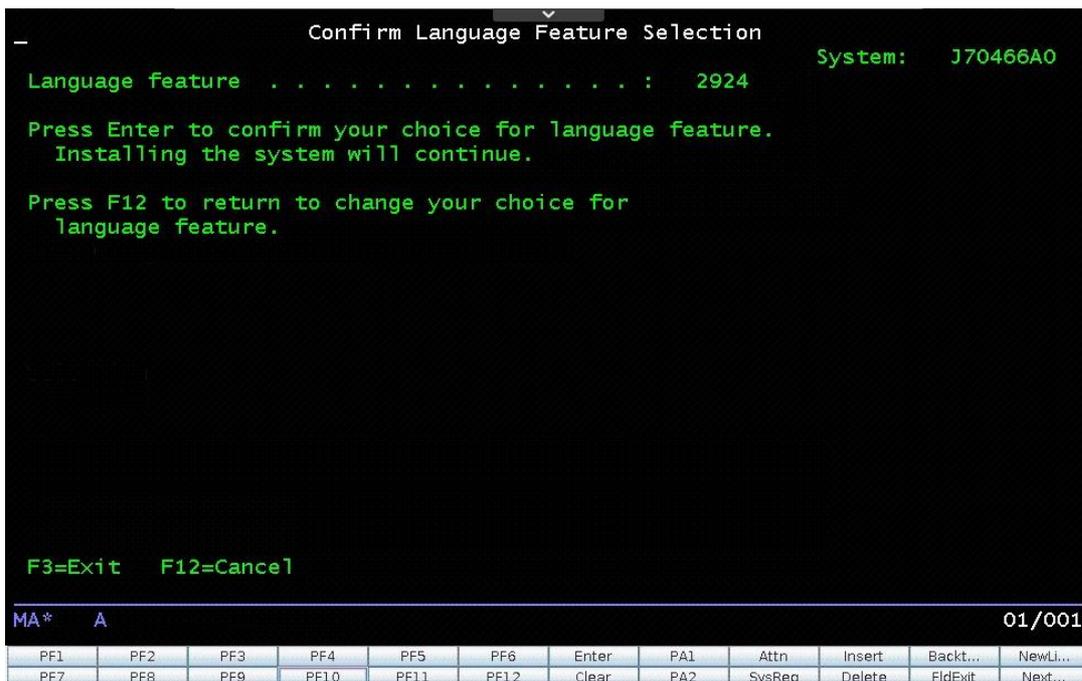
12. Confirm your selection of the operating system installation, press Enter.



13. To use English as the language, on the Select a Language Group screen, enter 2924 and then press Enter. In case your IBM i system uses a different language feature, please choose the correct language number.



14. Confirm your language selection, press Enter.



15. Select the DASD option.

- a. If you have completed the DASD configuration, select the Keep the current disk configuration option (1).
- b. If you need to configure DASD, select one of the following:
 - i. Add all disk units to the system auxiliary pool
 Select this option to add all non-configured disk units to the system auxiliary pool (ASP 1). Use this option when the system ASP has a few units and you have many non-configured units. All data stored on the units that are added will be deleted before adding units to the

system.

Note: This option will not balance data in the system ASP.

A series of screens display the status and any problems. If you see a problem screen, press F10. The process is complete when the "IPL step.....: Start the operating system" message appears.

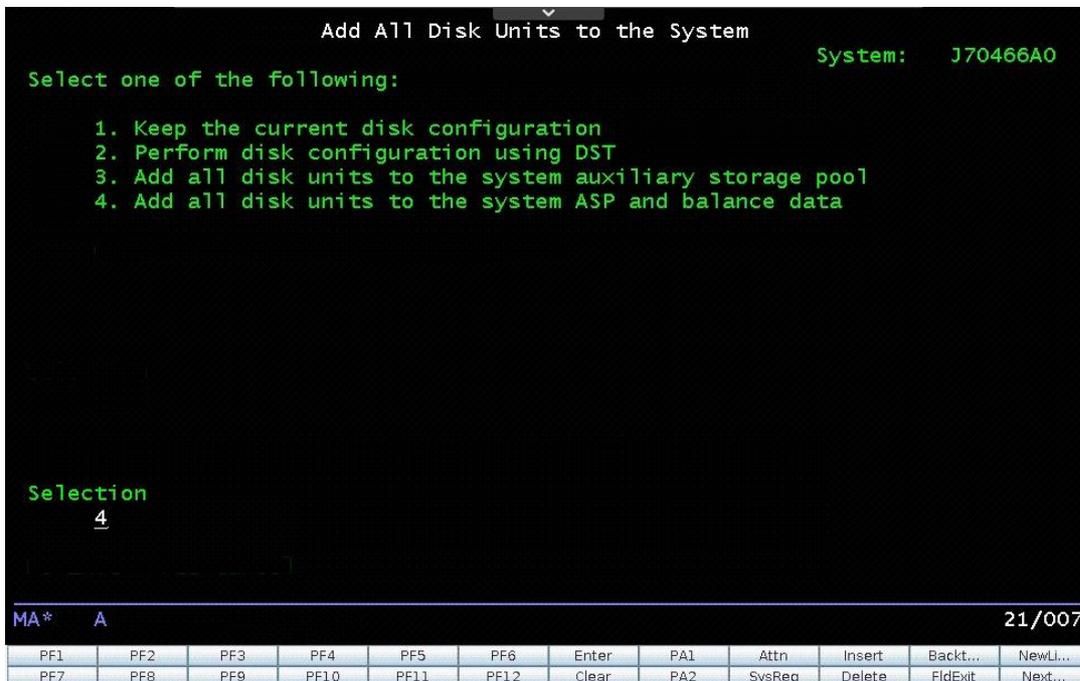
- ii. Add all disks to the system ASP and balance data

This option adds all the non-configured disk units to the system ASP and then balances the data in the system ASP. Use this option when there are a few non-configured disk units, or when the system ASP contains many disk units. All data stored on the added units are deleted before they are added to the system ASP.

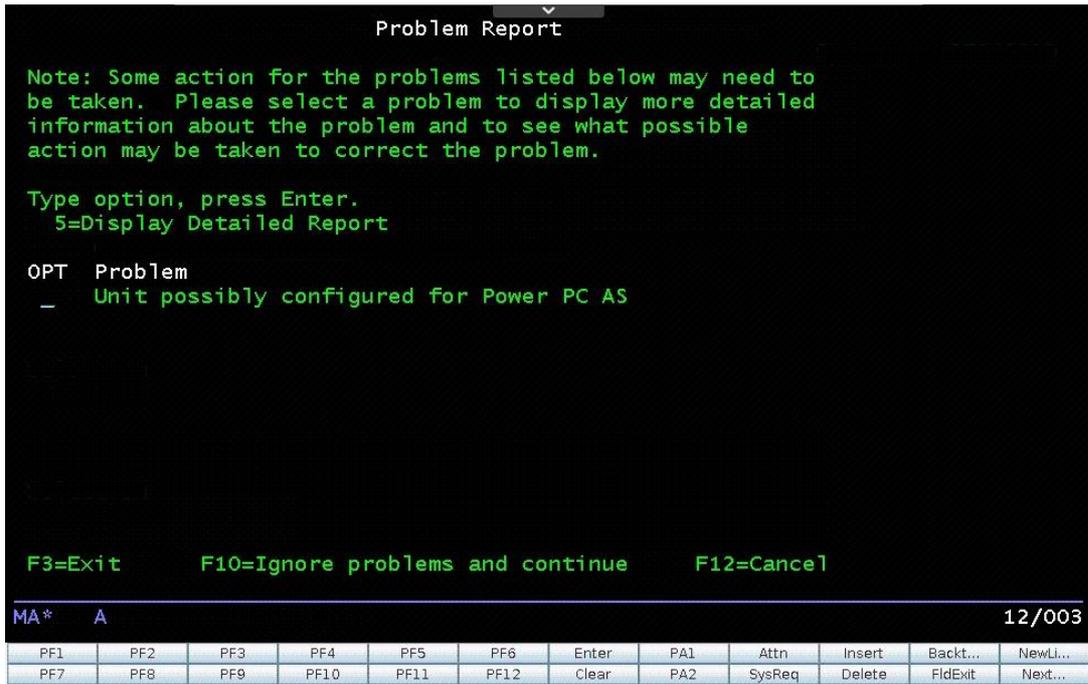
Note: You may have to wait for a few minutes with this option.

A series of screens display the status and any problems. If you see a problem screen, press F10. The process is complete when the "IPL step.....: Start the operating system" message appears.

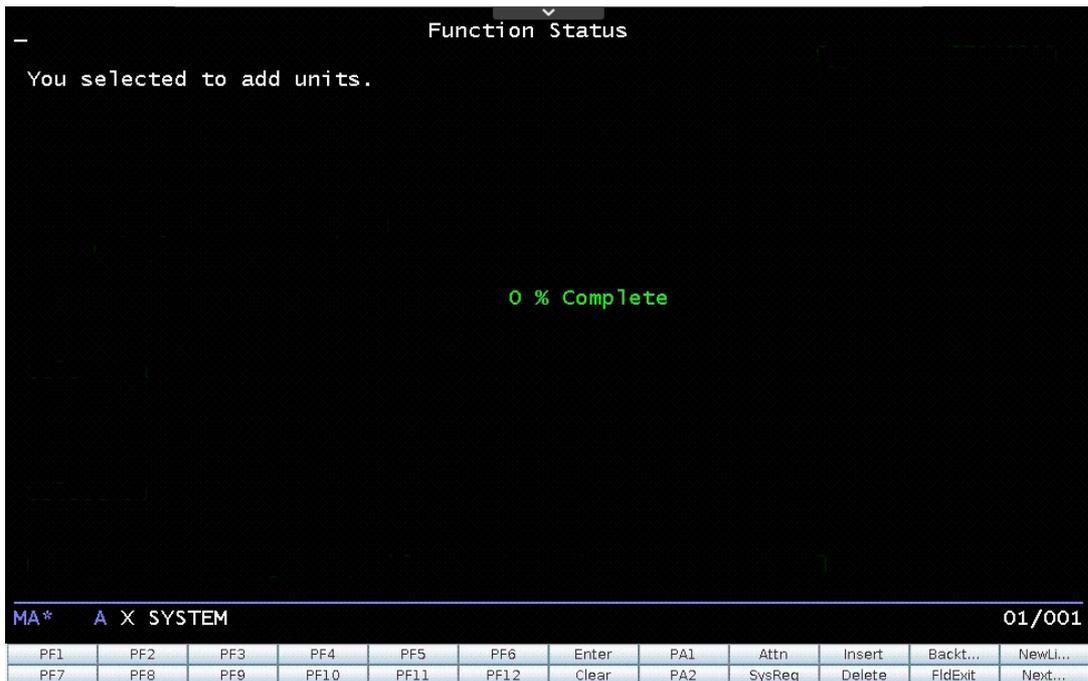
This guide will add all disks to the system ASP and balance data (option 4)



16. Press F10 to continue



17. Disks will be added/configured




```

Specify Restore Options
Type options, press Enter.
Restore from the installation media:
System information . . . . 1 1=Restore, 2=Do not restore
Edit descriptions . . . . 1 1=Restore, 2=Do not restore
Message reply list . . . . 1 1=Restore, 2=Do not restore
Job descriptions . . . . . 1 1=Restore, 3=Keep customization
Subsystem descriptions . . 1 1=Restore, 3=Keep customization

```

MA*	A											09/035
PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...	
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...	

22. The install will proceed

```

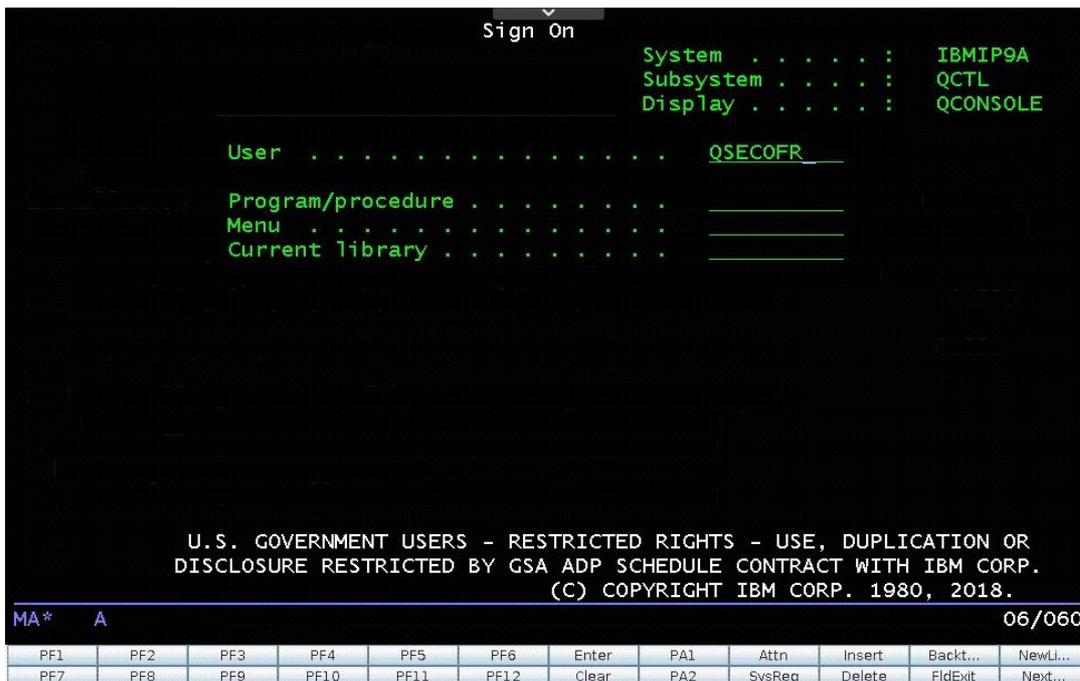
_Message ID . . : CPI2070
IBM i Installation Status
Stage 6 | ██████████ 25%

```

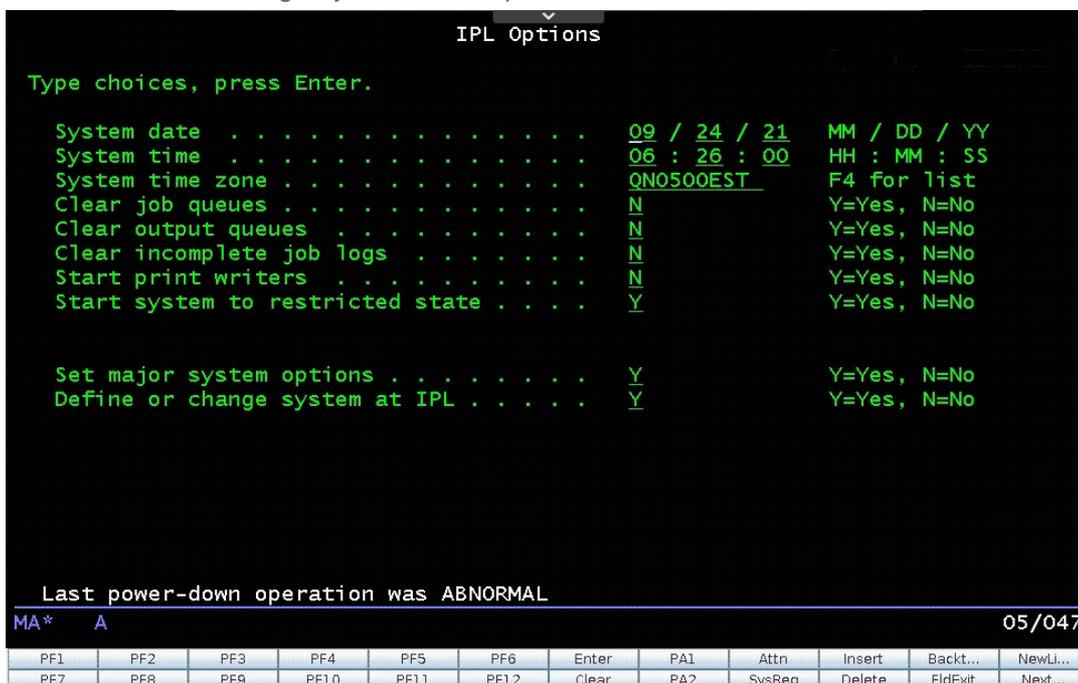
Installation Stage	Completed	Objects Restored
2 Restoring programs to library QSYS	X	15840
3 Restoring language objects to library QSYS . .	X	01558
4 Updating program table	X	
5 Installing database files	X	
>> 6 Installing base directory objects		
7 Completing installation		

MA*	A											01/001
PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...	
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...	

23. Sign into the system. On the SIGN ON screen, enter QSECOFR and then press Enter.
 You do not need to enter a password.



24. Set the system options. On the IPL Options screen, set the following options:
- Set the date and time.
 - Set the Start system to restricted state option to Y.
 - Set the Set Major System Options option to Y.
 - Set the Define or Change System at IPL option to Y.



25. Press Enter.
26. Set the automatic configuration. On the Set Major System Options screen:
- Set Enable automatic configuration to Y
 - Set Device configuration naming to *NORMAL

```

Set Major System Options

Type choices, press Enter.

Enable automatic configuration . . . . . Y
Device configuration naming . . . . . *NORMAL
Default special environment . . . . . *NONE

Y=Yes, N=No
*NORMAL, *S36
*DEVADR
*NONE, *S36

MA* A 05/047
PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backt... NewLi...
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit Next...

```

27. Set the system values. On the Define or Change the System at IPL screen, select 3 and then press Enter.

```

Define or Change the System at IPL System: IBMIP9A

Select one of the following:

1. Configuration commands
2. Change user profile
3. System value commands
4. Network attribute commands
5. General object commands
6. Work with shared pools
7. Change IPL attributes

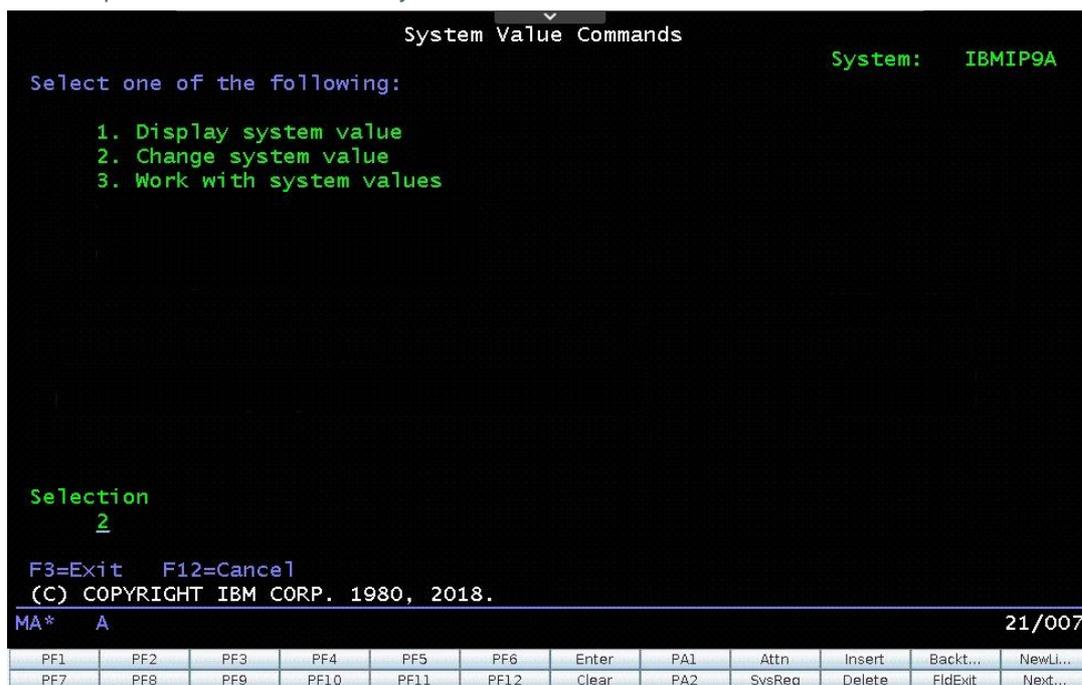
Selection
3

F3=Exit and continue IPL
(C) COPYRIGHT IBM CORP. 1980, 2013.

MA* A 21/007
PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backt... NewLi...
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit Next...

```

28. Select option 3 to work with the system values



29. Set the values per the table:

Screenshots below the table show how to set the value of 1 for the system value QVfyOjRST
 Press tab until you find the desired value and set the option to 2 > press enter to change
 Enter a new value > press enter to set

System Value	New Setting
QALWObjRST	*ALL
QFRCCVNRST	0
QINACTIV	*NONE
QIPLTYPE	2
QJOBMSGQFL	*PRTWRAP
QJOBMSGQMX	30 (minimum, 64 recommended)
QLMTDEVSSN	0
QLMTSECOFR	0
QMAXSIGN	*NOMAX
QPFRAJ	2
QPWDEXPITV	*NOMAX
QSCANFCTL	*NOPOSTRST
QVfyOjRST	1

e.g.

Work with System Values

System: IBMIP9A

Position to Starting characters of system value
 Subset by Type *ALL F4 for list

Type options, press Enter.
 2=Change 5=Display

Option	System Value	Type	Description
-	QTSEPOOL	*STG	Time slice end pool
-	QUPSDLYTIM	*SYSCTL	Uninterruptible power supply delay time
-	QUPMSGQ	*SYSCTL	Uninterruptible power supply message queue
-	QUSEADPAUT	*SEC	Use adopted authority
-	QUSRLIBL	*LIBL	User part of the library list
-	QUTCFFSET	*DATTIM	Coordinated universal time offset
<u>2</u>	QVfyOBJRST	*SEC	Verify object on restore
-	QYEAR	*DATTIM	Year

Bottom

F3=Exit F4=Prompt F5=Refresh F11=Display names only F12=Cancel

System value QVfyOBJRST changed from 3 to 1.

MA* A 18/004

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

Change System Value

System value : QVfyOBJRST
 Description : Verify object on restore

Type choice, press Enter.

Verify object on
 restore 1 1-5

- 1 Do not verify signatures on restore. Restore user-state objects regardless of their signature.
- 2 Verify signatures on restore. Restore unsigned user-state objects. Restore signed user-state objects, even if the signatures are not valid.
- 3 Verify signatures on restore. Restore unsigned user-state objects. Restore signed user-state objects only if the signatures are valid.

More...

F3=Exit F5=Refresh F12=Cancel

MA* A 10/029

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

```

Work with System Values
System:  IBMIP9A
Position to . . . . . Starting characters of system value
Subset by Type . . . . . *ALL F4 for list

Type options, press Enter.
2=Change 5=Display

Option System Value Type Description
- QTSEPOOL *STG Time slice end pool
- QUPSDLYTIM *SYSCTL Uninterruptible power supply delay time
- QUPMSGQ *SYSCTL Uninterruptible power supply message queue
- QUSEADPAUT *SEC Use adopted authority
- QUSRLIBL *LIBL User part of the library list
- QUTCFFSET *DATTIM Coordinated universal time offset
- QVFYOBJRST *SEC Verify object on restore
- QYEAR *DATTIM Year

Bottom
F3=Exit F4=Prompt F5=Refresh F11=Display names only F12=Cancel

System value QVFYOBJRST changed from 3 to 1.
MA* A 17/004

```

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

- 30. Press F3 twice to return to the Define or Change the System at IPL screen
- 31. Select 4 for Network attributes commands

```

Define or Change the System at IPL
System:  IBMIP9A

Select one of the following:

1. Configuration commands
2. Change user profile
3. System value commands
4. Network attribute commands
5. General object commands
6. Work with shared pools
7. Change IPL attributes

Selection
  4

F3=Exit and continue IPL

MA* A 21/007

```

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

32. Select 2 to Change network attributes

```

Network Attribute Commands
System:  IBMIP9A

Select one of the following:

1. Display network attribute
2. Change network attribute

Selection
  2

F3=Exit  F12=Cancel
(C) COPYRIGHT IBM CORP. 1980, 2018.
MA*  A
21/007
PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backt... NewLi...
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit Next...

```

33. Set the Local control point name and Default local location to match your configuration

```

Change Network Attributes (CHGNETA)

Type choices, press Enter.

System name . . . . . *SAME      Name, *SAME
Local network ID . . . . . *SAME      Name, *SAME
Local control point name . . . . . U209746W  Name, *SAME
Default local location name . . . . . U209746W  Name, *SAME
Default mode . . . . . *SAME      Name, *SAME
Node type . . . . . *SAME      *SAME, *ENDNODE, *NETNODE...
Data compression . . . . . *SAME      1-2147483647, *SAME, *NONE...
Intermediate data compression . . . . . *SAME      1-2147483647, *SAME, *NONE...
Maximum intermediate sessions . . . . . *SAME      0-9999, *SAME
Route addition resistance . . . . . *SAME      0-255, *SAME

Network node servers:
  Server network ID . . . . . *SAME      Name, *SAME, *NONE, *LCLNETID
  Control point name . . . . .          Name, *ANY
  + for more values

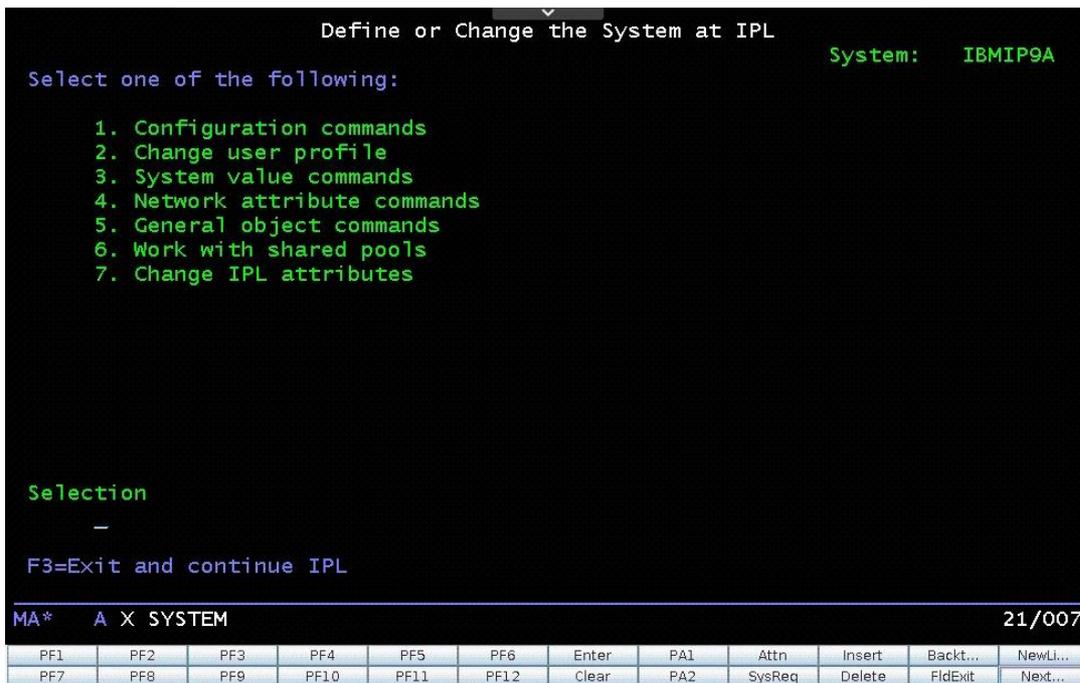
Alert status . . . . . *SAME      *SAME, *ON, *OFF, *UNATTEND
Alert logging status . . . . . *SAME      *SAME, *NONE, *LOCAL, *RCV...
More...

F3=Exit  F4=Prompt  F5=Refresh  F12=Cancel  F13=How to use this display
F24=More keys

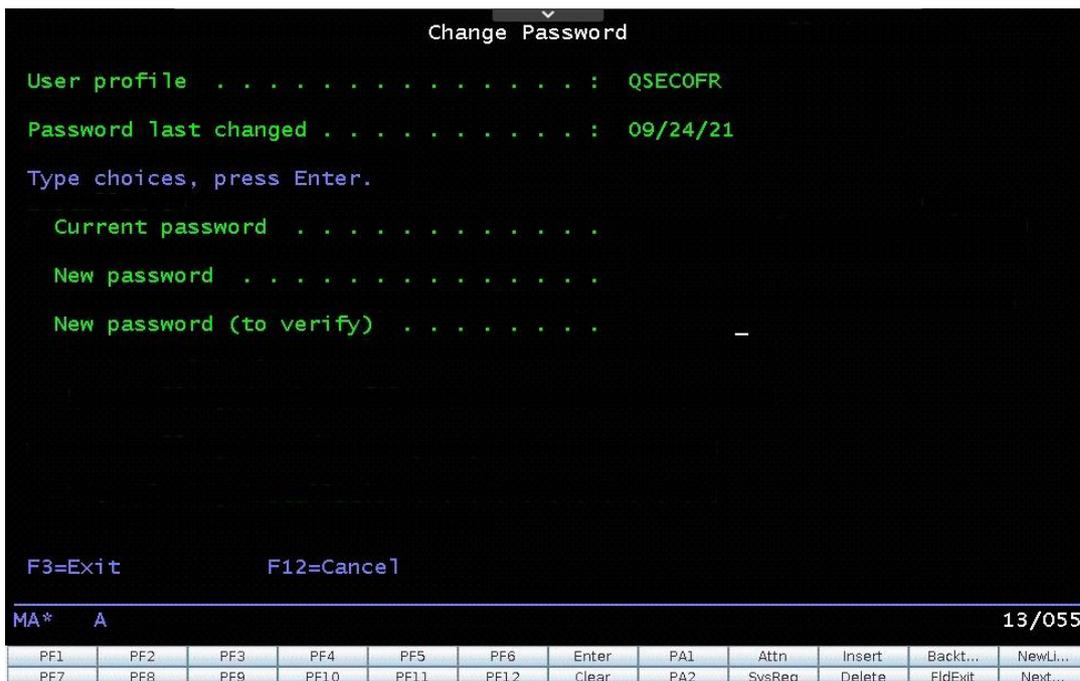
MA*  A
09/037
PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backt... NewLi...
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit Next...

```

34. A message appears indicating the network attributes have changes. Press F12 and then F3. To continue the IPL



- 35. Wait for the Sign On information screen to appear.
- 36. Change the password for QSECOFR and press enter



- 37. The basic OS is restored

Recover System Data and Commvault Libraries from the DR Backup

1. Clear the system messages.
 - a. On the command line, type the following command, and then press Enter.
CHGMSGQ MSGQ(QSYSOPR) DLVRY(*BREAK) SEV(60)

```
MAIN                                IBM i Main Menu                                System:  IBMIP9A
Select one of the following:
1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
11. IBM i Access tasks
90. Sign off
Selection or command
====> CHGMSGQ MSGQ(QSYSOPR) DLVRY(*BREAK) SEV(60)
F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel  F23=Set initial menu
MA*  A                                                                20/050
PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backt... NewLi...
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit Next...
```

- b. On the command line, type the following command, and then press Enter.
ENDSBS SBS(*ALL) OPTION(*IMMED)

```
MAIN                                IBM i Main Menu                                System:  IBMIP9A
Select one of the following:
1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
11. IBM i Access tasks
90. Sign off
Selection or command
====> ENDSBS SBS(*ALL) OPTION(*IMMED)
F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel  F23=Set initial menu
MA*  A                                                                20/038
PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backt... NewLi...
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit Next...
```

- c. After the message appears that states the system is in a restricted state, press Enter.

```

Display Messages
System:  IBMIP9A
Queue . . . . . :  QSYSOPR      Program . . . . . :  *DSPMSG
Library . . . . . :  QSYS        Library . . . . . :
Severity . . . . . :  60         Delivery . . . . . :  *BREAK

Type reply (if required), press Enter.
- ENDSBS SBS(*ALL) command being processed.
  System ended to restricted condition.

F3=Exit      F11=Remove a message      F12=Cancel
F13=Remove all  F16=Remove all except unanswered  F24=More keys

Bottom
MA*  A 08/001

```

PF1	PF2	PF3	PF4	PF5	PF6	Enter	PA1	Attn	Insert	Backt...	NewLi...
PF7	PF8	PF9	PF10	PF11	PF12	Clear	PA2	SysReq	Delete	FldExit	Next...

2. Verify that the DVD image is loaded in the optical drive. On the command line, type the following command, substituting OPTXX with the optical device name.
 CHKOPTVOL VOL(*MOUNTED) DEV(OPTXX)

```

MAIN          IBM i Main Menu          System:  IBMIP9A

Select one of the following:

1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu

11. IBM i Access tasks

90. Sign off

Selection or command
====> CHKOPTVOL VOL(*MOUNTED) DEV(OPT06)

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel  F23=Set initial menu

Operation in progress, please wait.
MA*  A X SYSTEM 20/007

```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	ErInp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

Operation in progress message will display, followed by a progress percentage, then a completion message

3. Restore the CVLIB. On the command line, type the following command, substituting OPTXX with the optical device name.

RSTLIB SAVLIB(CVLIB CVLIBOBJ) DEV(OPTXX)

```

MAIN                               IBM i Main Menu                               System:  IBMIP9A
Select one of the following:

  1. User tasks
  2. Office tasks
  3. General system tasks
  4. Files, libraries, and folders
  5. Programming
  6. Communications
  7. Define or change the system
  8. Problem handling
  9. Display a menu

 11. IBM i Access tasks

 90. Sign off

Selection or command
====> RSTLIB SAVLIB(CVLIB CVLIBOBJ) DEV(OPT06)

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel  F23=Set initial menu

Check Optical Volume completed. 0 damaged files were found.
MA*  A 20/047

```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	ErInp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

There will be some file not found warnings press page down until at the end of the output to confirm the completion of the restore.

- Restore the system backup data. On the command line, type the following command, substituting OPTXX with the optical device name.

CVLIB/CVSYSRST DEV(OPTXX) VOL(*MOUNTED)

```

MAIN                               IBM i Main Menu                               System:  IBMIP9A
Select one of the following:

  1. User tasks
  2. Office tasks
  3. General system tasks
  4. Files, libraries, and folders
  5. Programming
  6. Communications
  7. Define or change the system
  8. Problem handling
  9. Display a menu

 11. IBM i Access tasks

 90. Sign off

Selection or command
====> CVLIB/CVSYSRST DEV(OPT06) VOL(*MOUNTED)

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel  F23=Set initial menu

MA*  A 20/046

```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	ErInp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

5. On the command line, type YES, and then at the next dialog box prompt, press Enter.

```

Display Messages
System:  IBMIP9A
Queue . . . . . :  QSYSOPR      Program . . . . . :  *DSPMSG
Library . . . . . :  QSYS       Library . . . . . :
Severity . . . . . :  90        Delivery . . . . . :  *BREAK

Type reply (if required), press Enter.
System data Restore is about to start. Make sure you are already in
restricted state. Please load the next volume to the device. Reply 'YES'
to proceed with the restore or Reply 'NO' to cancel the restore process.
Reply . . .  YES_

Bottom
F3=Exit      F11=Remove a message      F12=Cancel
F13=Remove all  F16=Remove all except unanswered  F24=More keys

MA*  A 11/023

```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	Erlrp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

This will return to the main menu, recheck the DVD, then perform the restore, progress messages show in the status bar

```

MAIN IBM i Main Menu System:  IBMIP9A
Select one of the following:
1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
11. IBM i Access tasks
90. Sign off
Selection or command
====> CVLIB/CVSYSRST_DEV(OPT06) VOL(*MOUNTED)
F3=Exit F4=Prompt F9=Retrieve F12=Cancel F23=Set initial menu
12 of 89 libraries processed, 1100 objects restored to QBRM.
MA*  A X SYSTEM 20/007

```

```

MAIN IBM i Main Menu System:  IBMIP9A
Select one of the following:
1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
11. IBM i Access tasks
90. Sign off
Selection or command
====> CVLIB/CVSYSRST_DEV(OPT06) VOL(*MOUNTED)
F3=Exit F4=Prompt F9=Retrieve F12=Cancel F23=Set initial menu
Started processing 53007 objects, completed 51500 objects.
MA*  A X SYSTEM 20/007

```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	Erlrp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

6. Once the restore is complete, type OK and press Enter.

```

Display Messages
System:  IBMIP9A
Queue . . . . . :  QSYSOPR      Program . . . . . :  *DSPMSG
Library . . . . . :  QSYS        Library . . . . . :
Severity . . . . . :  90         Delivery . . . . . :  *BREAK

Type reply (if required), press Enter.
Restore is completed from Optical device. You can proceed with Network
configuration and start the TCP servers to restore the remaining data
from Commvault backup
Reply . . .   OK_

Bottom
F3=Exit      F11=Remove a message      F12=Cancel
F13=Remove all  F16=Remove all except unanswered  F24=More keys

MA*  A 11/022

```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	ErInp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

7. Have an IBM i admin configure the TCP/IP configuration from the command line.
8. Perform the initial program load (IPL). On the command line, type the following command:
PWRDWN SYS OPTION(*IMMED) RESTART(*YES)

```

TCPADM TCP/IP Administration System:  IBMIP9A

Select one of the following:

1. Configure TCP/IP
2. Configure TCP/IP applications
3. Start TCP/IP
4. End TCP/IP
5. Start TCP/IP servers
6. End TCP/IP servers
7. Work with TCP/IP network status
8. Verify TCP/IP connection
9. Start TCP/IP FTP session
10. Start TCP/IP TELNET session
11. Send TCP/IP spooled file

20. Work with TCP/IP jobs in QSYSWRK subsystem

Selection or command
====> PWRDWN SYS OPTION(*IMMED) RESTART(*YES)_

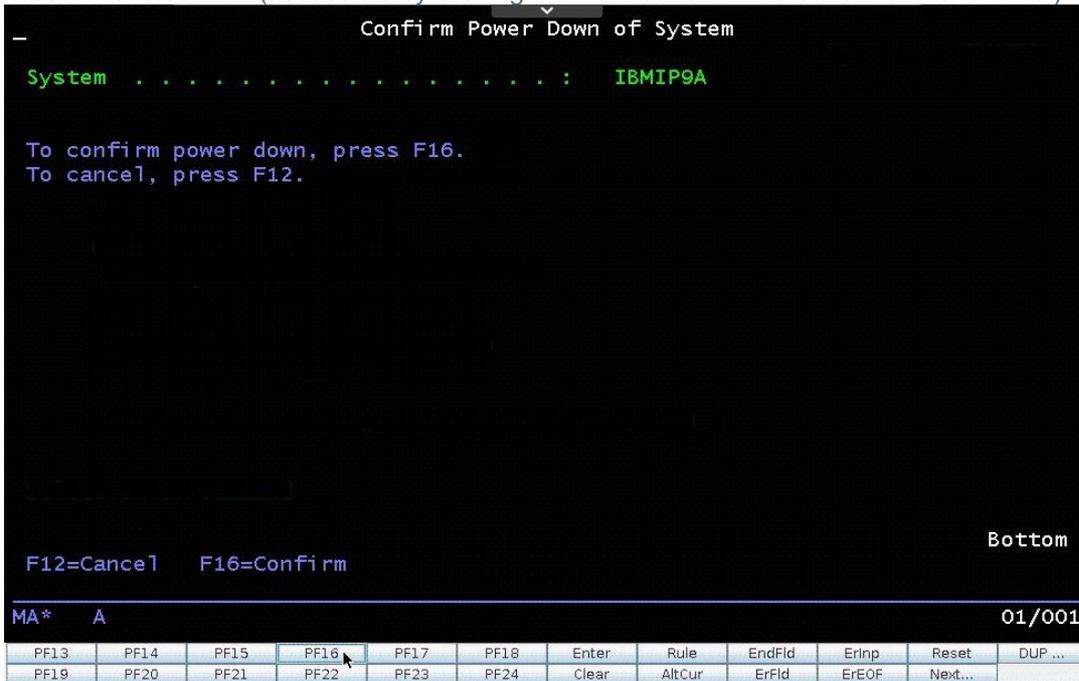
F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel

MA*  A 21/045

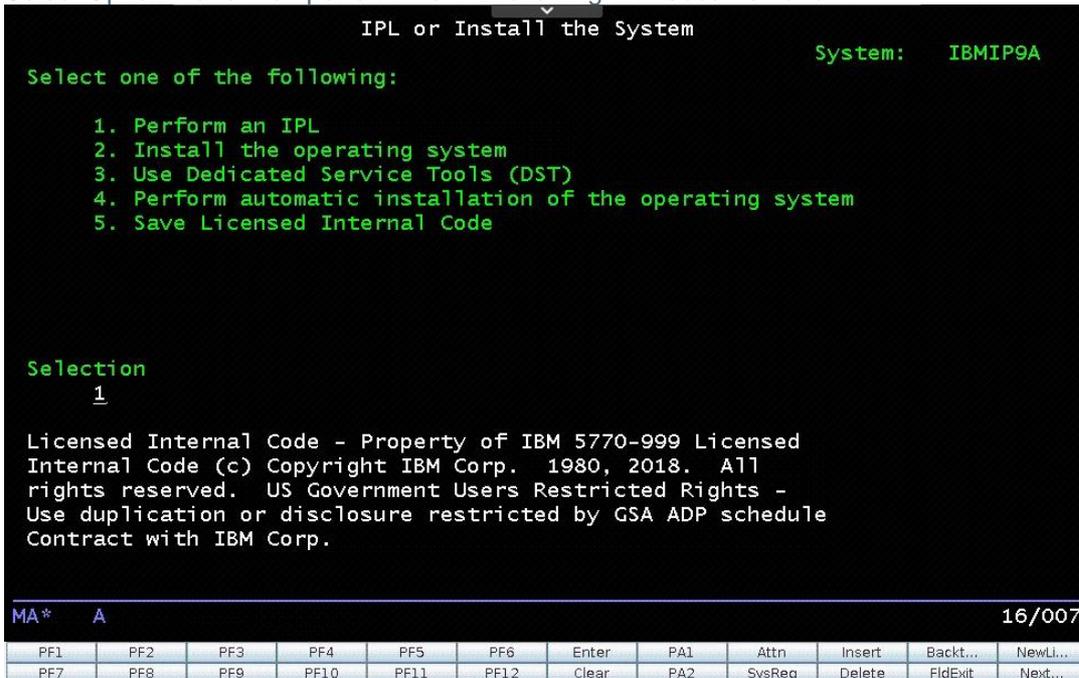
```

PF13	PF14	PF15	PF16	PF17	PF18	Enter	Rule	EndFld	ErInp	Reset	DUP ...
PF19	PF20	PF21	PF22	PF23	PF24	Clear	AltCur	ErFld	ErEOF	Next...	

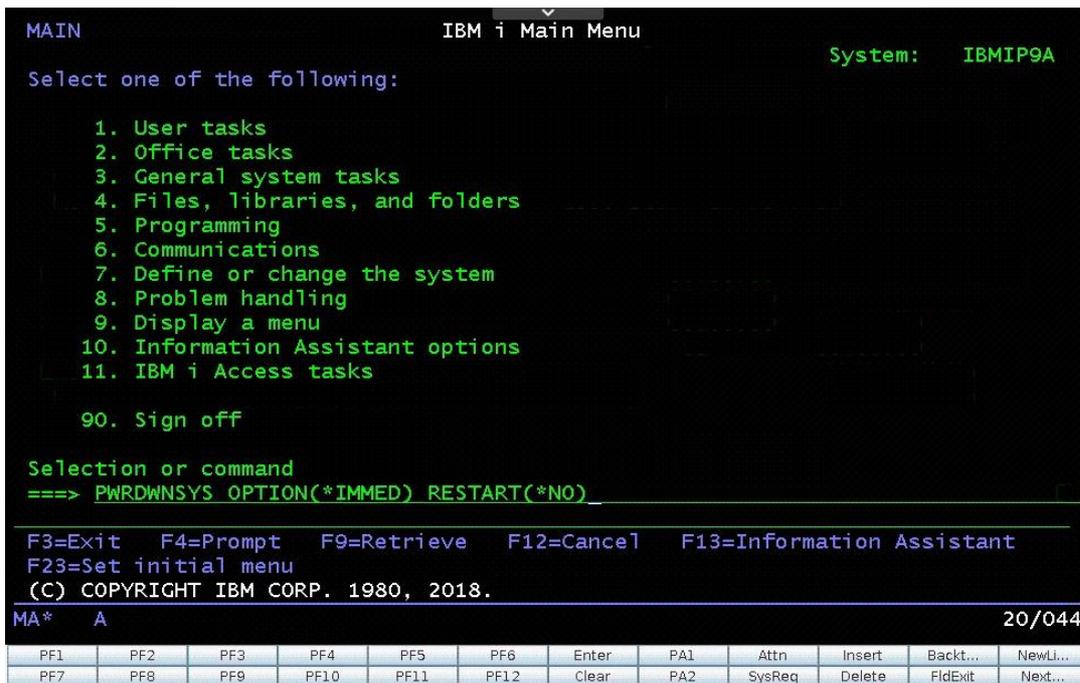
9. Press F16 to confirm (accessible by clicking the Next button at the bottom of the terminal)



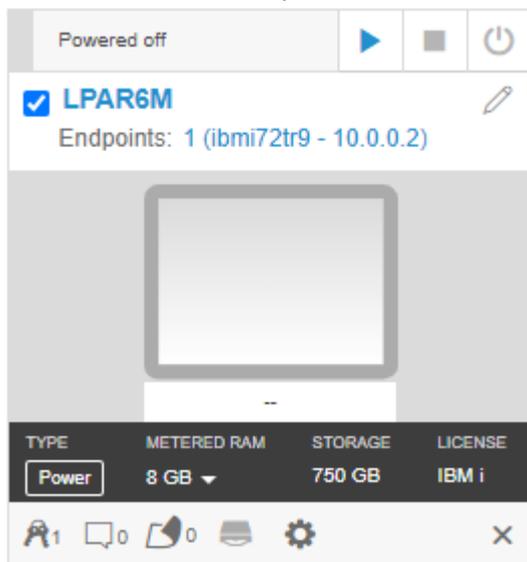
10. Select Option 1 and then perform the IPL following IBM documentation



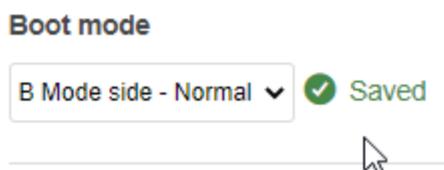
11. After the IPL is complete power down the system
PWRDWN SYS OPTION(*IMMED) RESTART(*NO)



12. Once the VM shows as powered off select the settings cog



13. Change the Boot mode to B Mode side - Normal



14. Power on the VM

15. Wait for the VM to boot and become operational.

Resume the 1-Touch Restore job

1. Click Jobs > press Actions on the IBM i DR Recovery job > Resume



2. This will trigger the restore jobs for the other subclients in order
3. Once the workflow has restored all the subclients, have an IBM admin IPL the system, and the migration is then complete.

Result

The migration process is now complete, you should have a replica of the on-prem IBM i running in Skytap.