



# Using Skytap to Migrate and backup IBM Power and IBM i to Azure

Richard Cronheim  
Marlon Johnson

Azure Core Engineering Team  
Microsoft  
August 2022

# Using Skytap to Migrate and backup IBM Power and IBM i to Azure

## Contents

- Abstract ..... 3
  - Decide upon team configuration (Who will do what?) ..... 3
  - Determine network topology / configuration ..... 3
  - Determine LPARS to be migrated ..... 4
  - Select products to be used ..... 6
  - Provision network..... 7
  - Verify network accessibility and performance ..... 8
  - Backup LPAR ..... 8
  - Migrate backup file to Skytap on Azure..... 8
  - Restore backup file to Skytap ..... 8
  - Verify success ..... 8

---

© 2022 Microsoft Corporation. All rights reserved.  
Microsoft, Azure, and SQL Server are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.  
No part of this document may be reproduced without written permission of Microsoft Corporation.

# Using Skytap to Migrate and backup IBM Power and IBM i to Azure

## Abstract

Skytap on Azure provides a solution for running IBM Power workloads directly in Azure. For many companies this provides a very attractive alternative to hosting IBM Power workloads on dedicated hardware. Skytap supports several different Operating Systems including IBM AIX, IBM i, Linux and Windows.

This guide will step you through the process of backing up an IBM Power i LPAR and moving it to Skytap on Azure.

1. Decide upon team configuration (Who will do what?)
2. Determine network topology / configuration
3. Determine LPARS to be migrated
4. Select products to be used
5. Provision network
6. Verify network accessibility and performance
7. Backup LPAR
8. Migrate backup file to Skytap on Azure
9. Restore backup file to Skytap
10. Verify success

## Decide upon team configuration (Who will do what?)

Many IBM i or AS/400 shops have platforms that were put in place years ago. Over time, skills erode, and little expertise may exist in how to manage these platforms in new ways. Examples can include networking, backup and recovery procedures and general systems administration. A determination is needed to assess an organization's ability to execute this project on its own or if a service provider is needed.

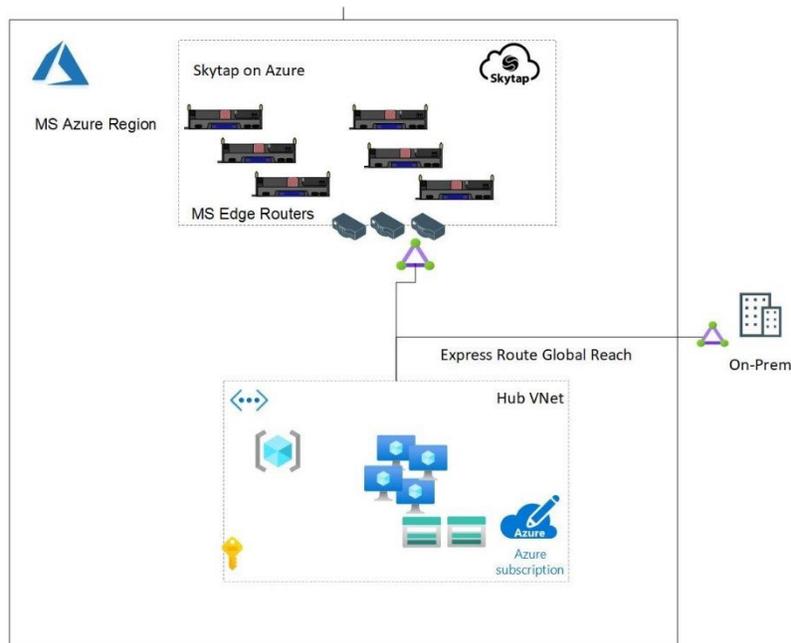
Role	Involvement	
Systems Administrator	Critical	
DBA	Varies	
Operations	Critical	
Application Development	Varies	
QA / Test lead	Varies	
CIO / IT Leadership	Very important	
Networking	Critical	

## Determine network topology / configuration

Configuring networking for Skytap requires some thought and planning. We suggest that your network team collaborate with Skytap and Microsoft network engineers. For the sake of discussion, here are a few things to know about Skytap networking when planning your backups.

## Using Skytap to Migrate and backup IBM Power and IBM i to Azure

1. The Skytap infrastructure resides in the Azure Region
2. Skytap is not natively in an Azure VNET
3. The Skytap infrastructure connectivity is facilitated using ExpressRoute
4. Azure uses Dedicated MS Edge Routers (D-MSEE) for connectivity
5. From the VNET, Skytap appears to be an On-Prem location, but is in the same Azure region
6. At this point, the customers' on-prem cannot connect to Skytap
7. Enter ExpressRoute GlobalReach, allows the on-prem ExpressRoute and Skytap ExpressRoute to exchange routes, thus the two can connect.
8. Security must be provided via x86 NVA on Skytap (limited support) application, existing firewalls at edge of on-prem network
9. Traffic between on-prem and Skytap remains on the Microsoft backbone



There are many ways that networks may be configured to support connectivity between on prem and Azure. VPN and Express Routes are two of the most common. VPN is generally fine for PoCs and relatively small transfers of LPAR images under 1 TB in size. If the LPAR is large (> 1 TB in size) or if transfers occur on a regular basis, a more robust connectivity option such as Express Route with Global Reach may be called for. If it is not envisioned that transfers will need to occur on a regular basis an option, such as Azure Data Box may be more appropriate ([Azure Data Box Disk overview | Microsoft Docs](#)). A very good overview of Networking options can be found here: [Skytap on Azure Network Considerations - YouTube](#)

## Determine LPARS to be migrated

## Using Skytap to Migrate and backup IBM Power and IBM i to Azure

Skytap provides a high availability IBM I environment with an SLA of 99.95%  
<https://www.skytap.com/terms/service-level-agreement/> .

This is certainly sufficient for running many production workloads. However, customers may adopt a crawl, walk, run approach and start with less critical workloads than production while they gain experience and familiarity with the Skytap on Azure environment. Application Development and Test environments are common ways of getting started.

Environment	Comment
App Dev	Generally a good place to start. May benefit from usage based pricing.
QA / Test	Usual next target after Dev.
Production	Usually final workload to be migrated.

Determine size of LPAR to be migrated

Disk, How much storage is used?

CPU How many CPUs or VCPUs are allocated to each LPAR? What is their clock speed?

Memory, How much RAM is allocated to each LPAR?

Below are the relevant commands to produce the system info required:

## Using Skytap to Migrate and backup IBM Power and IBM i to Azure

### IBM i (AS/400)

For IBM i please run the following commands and share the output:

Area	Command	Detail/Notes
<b>System overview</b>	DSPSYSSTS ASTLVL (*ADVANCED) OUTPUT (*PRINT)	Collect the spool file
<b>Disk overview</b>	WRKDSKSTS OUTPUT (*PRINT)	This gives information on disks assignment to ASPs as well. Collect the spool file Note: for best information, user should go into WRKSYSSTS and press <F10> to reset statistics, then wait 5 minutes before running this command to collect meaningful stats
<b>Security overview</b>	PRTSYSSECA	Collect the spool file
<b>Show PTFs</b>	WRKPTFGRP PTFGRPLVL (*LATEST)	Press <F6> once in the display to generate a report showing all columns. Collect the spool file
<b>Network Interfaces</b>	NETSTAT *IFC	Press <F6> once in the display to generate a report showing all columns. Collect the spool file
<b>Network Routes</b>	NETSTAT *RTE	Press <F6> once in the display to generate a report showing all columns. Collect the spool file
<b>Software overview</b>	DSPSFWRSC OUTPUT (*PRINT)	Collect the spool file
<b>System Settings</b>	WRKSYSVAL *ALL OUTPUT (*PRINT)	Collect the spool file
<b>vCPU Count</b>	CALL QCMD	Then move cursor to message at the bottom of the screen, press <F1> and copy/paste
	CALL QSYS/QLZARCAPI	

Establish RTO / RPO requirements

Establish other non-functional requirements

- Performance

- Security

- Availability

### Select products to be used

A variety of products and options are available for taking an image of an IBM i LPAR. Standard utilities provided by IBM include BRMS and an Option 24 Save. BRMS provides a graphical UI

## Using Skytap to Migrate and backup IBM Power and IBM i to Azure

and has a robust set of facilities for performing backup operation and managing backup files. In addition to full system image it supports object level backups. Commvault is another popular product, especially in larger enterprises with heterogeneous environments. If Commvault is already in use, then expanding its usage to include IBM i may be appropriate.

Rocket iCluster is another cost effective solution that excels at HA and DR.

<https://www.rocketsoftware.com/products/rocket-icluster>

<https://www.ibm.com/docs/en/i/7.1?topic=management-backup-recovery>

<https://www.ibm.com/docs/en/power-systems-vs?topic=strategies-backup-power-systems-virtual-servers>

The IBM i platform performs journaling which is writing of all system changes to a log. Several high availability products exist that provide the ability to capture these logs and to synchronize another system with these changes thus providing a mechanism for establishing either a warm or hot back up DR site. Skytap on Azure supports journal-based replication and products such as iCluster Robot HA, QuickEDD, Mimix and Maxava HA. Skytap personnel are trained on market leading products including MIMIX and Maxava HA.

All of these products use TCP/IP for transport of data.

Product	Primary Use Case	Bundled (Y / N)	Reference / Customer
BRMS	Backup / Recovery	TBD	TBD
CommVault	Backup / Recovery & DR	N	TBD
Rocket iCluster	DR	N	BP
Robot HA	High Availability	N	TBD
QuickEdd	DR	N	TBD
Mimix	DR	TBD	TBD
Maxava HA	High Availability	TBD	TBD

## Provision network

Network provisioning and configuration is one of the more difficult topics for many IBM i customers to address. After deciding on the Azure regions where Skytap will run, networking needs to be provisioned and configured to provide access. Express Route circuits require up to 30 days of lead time.

It is recommended that an Azure Bastion be included to minimize the exposure of ports to the internet. An introduction to Azure Bastion can be found here: [Introduction to Azure Bastion - Learn | Microsoft Docs](#). Below is a link to a worksheet that can be very useful in producing sizing and pricing information for Skytap on Azure: [Skytap on Azure - Inventory Worksheet.xlsx](#)

## **Using Skytap to Migrate and backup IBM Power and IBM i to Azure**

### **Verify network accessibility and performance**

Testing and tuning of network performance is a critical success factor. Test the network speed by moving large files from on prem to Azure and verify the performance results. It will not be helpful to discover that you only have 10% of the required bandwidth over the weekend that the migration is planned for.

### **Backup LPAR**

Create a backup of the LPAR to be migrated to Skytap. This is typically done using the IBM i System Utility BRMS or Commvault. Commvault has a very intelligent ability to perform incremental backups such that only backups of the actual changes to an object and not the full object making it very proficient. Ensure that adequate disk space is available both on prem and in the Skytap on Azure environments to hold the backup of the LPARS while the migration is being performed.

### **Migrate backup file to Skytap on Azure**

The backup file needs to be moved to Skytap on Azure. This can be done via SFTP, NFS copy, Databox, Commvault or in some cases, tape.

### **Restore backup file to Skytap**

Once the backup file is on Azure and is visible to Skytap a system restore can be executed. The restore is typically done from Azure Blob storage directly to Skytap.

### **Verify success**

It is critical to verify the successful restoration of the backup. Reviewing logs, verifying object counts and performing application smoke tests are frequently used methods of verification.