IBM i Agent 6.2
User's Guide

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Software Version: 6.2 (March 2011)

Acknowledgements: Two encryption methods, DES and TripleDES, include cryptographic software written by Eric Young. The Windows versions of these algorithms also include software written by Tim Hudson. Bruce Schneier designed Blowfish encryption.

The Agent, Agent Console, and Vault applications have the added encryption option of 128/256 bit AES (Advanced Encryption Standard). Advanced Encryption Standard algorithm (named Rijndael, pronounced “Rain Doll”) was developed by cryptographers Dr. Joan Daemen and Dr. Vincent Rijmen. This algorithm was chosen by the National Institute of Standards and Technology (NIST) of the U.S. Department of Commerce to be the new Federal Information Processing Standard (FIPS). See:http://csrc.nist.gov/encryption/aes/round2/r2report.pdf for details.

The Agent and Vault applications have the added security feature of an over the wire encryption method.

Contents

1 Introduction

This Guide is intended for Administrators who use the IBM i Agent to back up IBM i computers. This Guide provides information and procedures for selecting backup data, configuring the IBM i Agent, and scheduling backups. This Guide assumes an intermediate knowledge of IBM i computer operation and administration.

You use the IBM i Agent to automatically backup IBM i data, across a local network, or the Internet, to a secure server called a Data Protection Vault. Tape devices or other backup media are not required.

You can configure the backup to run automatically on a defined schedule. You use a 3270 or 5250 screen or a terminal emulator to schedule, configure, and monitor backups. You cannot control the IBM i Agent using Microsoft Windows or Web Agent Console. The Agent license is provided by your service provider.

1.1 Additional Resources

Press **F1** to open general or specific (field-level) help. Field-level help is available in screens that show or request information. To display field-level help, place your cursor in the field and press F1.

2 Installing the IBM i Agent

Use one of these methods to install the IBM i Agent:

- From a CD
- From an FTP site

2.1 Configuring the Network Connection

A known issue is that the performance of the IBM 100MB Network Interface Card can degrade to 0.4 Mbps. To correct this issue, use *AUTO on the DUPLEX parameter on the CHGLINETH command.

For optimal network performance, it is recommended that you set these values:

- On the Ethernet line desc (description):
  - GENTSTFRM(*NO)
  - LINKSPEED(100M)
  - LINESPEED(100M)
  - DUPLEX(*AUTO)
- On TCP/IP interface: TOS(*MAXTHRPUT)
- On TCP/IP Route: TOS(*MAXTHRPUT)

You should also install the current cumulative, hyper, and group program temporary fixes (PTFs) from IBM.

To verify that your network is running optimally, run an FTP transfer test from the IBM i computer to a local computer.

2.2 Installing the IBM i Agent from a CD

1. Download the CD image files from your service provider's website to your computer.
2. Extract the files to a temporary folder. The extracted zip file is IBMi_AGENT.iso.
3. Create an installation CD from the IBMi_AGENT.iso file. For instructions on creating an installation CD, refer to your CD writing software documentation.
4. Insert the installation CD into the IBM i computer.
5. Open a command prompt and run the `LODRUN DEV<Optical device name>` command.
6. Install the IBM i Agent. See Installing the IBM i Agent.

2.3 Installing the IBM i Agent from an FTP

To install the IBM i Agent from your service provider's website:

Downloading the Files

1. Open your Internet browser and enter the URL for your service provider's web site.
2. Locate and then download these IBM i Agent files to a temporary location on your computer:
   - IBMi_Agent.zip
   - Agent_IBM_i.pdf
   - Agent_IBM_i.txt
3. Extract the IBMi_AGENT.zip file to a temporary location on your computer. The extracted file does not have a file extension because it contains the IBM i binary save file data.

Creating a Temporary Installation Library

1. Log on to the IBM i computer 5250 terminal session with the user ID QSECOFR or equivalent.
2. Run the `CRTLIB EVSAVE` command. You can enter a maximum of 10 characters for the library name.

Sending the Files by FTP

1. Click **Start** and then **Run** on the computer where you extracted the IBM i Agent files.
2. Enter **FTP <IBM i computer IP address>** in the **Open** field. Click **OK**.
3. Enter your IBM i computer user ID. Press **Enter**.
4. Enter your IBM i password. Press **Enter**.
5. Enter **BIN.** Press **Enter**.
6. Enter **LCD C:\<IBMi_AGENT file location>**. Press **Enter**.
7. Enter **put AS400AGENT /QSYS.LIB/EVSAVE.LIB/IBMIAGENT.SAVF**. Press **Enter**.

   Note:

   If you created a library with a different name, replace LIB with the name of the library.
8. Enter **quit**. Press **Enter**.

Restoring Objects

1. On the IBM i computer run this command:

   ```
   RSTOBJ OBJ(*ALL) SAVLIB(TESETUP) DEV(*SAVF) SAVF(EVSAVE/IBMIAGENT)
   MBROPT(*ALL) ALWOBJDIF(*ALL) RSTLIB(EVSAVE)
   ```

   If you created a library with a different name, replace EVSAVE with the name of the library.

2. Press **Enter**.
3. Move your cursor to the message at the bottom of the terminal screen.
4. Press **F1** and then **F10** to open the **Display All Messages** screen. If the command executed successfully, the message **XX objects restored. 0 not restored to EVSAVE** appears below the RSTOBJ command.
5. On the IBM i computer run this command:

   ```
   CALL EVSAVE/ISSETUP
   ```

   If you created a library with a different name, replace EVSAVE with the name of the library.

6. Install the Agent. See Installing the IBM i Agent.

2.4 Installing the IBM i Agent

To install an IBM i Agent:

1. On the IBM i computer run this command:

   ```
   CALL EVSAVE/ISSETUP
   ```

   If you created a library with a different name, replace EVSAVE with the name of the library.

2. Press **F6** on the **IBM i Agent Setup Main Screen**.

   Note:

   The **F6** command is not available when an IBM i Agent is already installed on the computer.

3. Complete the fields on the **Install IBM i Agent** screen. The default library is BUAGENT and the default directory is /buagent.

2.5 Upgrading an Existing IBM i Agent

To upgrade an existing IBM i Agent:

1. Log on to the IBM i computer with the user ID QSECOFR or equivalent.
2. Run a `CALL LIBRARY/ISSETUP` command (where LIBRARY is the library name where the Agent is installed).
3. Enter **6** to the left of an IBM i Agent. Press **Enter**.
4. Enter **Yes** in the **Are you sure you want to upgrade** field.

2.6 Verifying the Installation

After installing the IBM i Agent, complete these verification tasks:

- Run the `WRKOBJ *ALL/BUAGENT` command (where `BUAGENT` is the library name) to verify the product library exists. The library is listed on the **Work with Objects** screen.
- Run the `WRKLNK '/BUAGENT'` (where `BUAGENT` is the product directory name) command to verify the product directory exists. The product directory is listed on the **Work with Object Links** screen.
- Verify the Global.vvc file is in the product directory. Enter **5** on the **Work with Object Links** screen to confirm the Global.vcc file is in the product directory.
- Run the `WRKUSRPRF AGENT` command to verify the user profile AGENT exists. The AGENT user profile is listed on the **Work with User Profiles** screen.
- Run the `WRKSBS` command to verify the subsystem AGENT is available. The subsystem AGENT is listed on the **Work with Subsystems** screen.
- Run the `WRKACTJOB` to verify the subsystem AGENT is active. If it appears on the list, it is active.

2.7 Obtaining a License

When you install the IBM i Agent, it is installed with a 30-day trial license. The expiry date for the license is displayed in the **Expiry Date** field of the **Work with License** screen. With a trial license you can configure the Vault, and create retention schemes, jobs, and schedules. However, you cannot do backups or restores without a full license.

To obtain a full license, contact your service provider. To create a license key, you must provide your service provider with the model, processor feature, IBM i computer serial number, and software group of the computer on which the IBM i Agent is installed. This information is displayed on the **Work with License** screen. See Working with Agent Licenses.

3 Working with the IBM i Agent

You must install the Agent software on every IBM i computer that you want to back up and the IBM i computer must have a network connection. In addition, you must create an account on the Vault to receive the backup data. You use the IBM i Agent Command Line Interface (CLI) to setup Agents, jobs, scheduling, and monitoring.

Backup data is sent by the IBM i Agent directly to the Vault, over the network or the Internet. When you execute a backup or restore command, backup data is immediately sent to the Vault.

On an IBM i computer the Agent software is responsible for these tasks:

- Saving and restoring DBFiles, Objects and CommonFiles to and from the Vault, using Delta processing.
- Synchronizing catalog files between the local system and the Vault.

3.1 Prerequisites

Every IBM i computer must be configured with:

- An IBM i Agent IBM i Agent.
- The Vault name and IP address.
- A user name and password.
- *ALLOBJ rights to open and read libraries and objects.

After you configure the IBM i Agent, you must register every IBM i computer on the Vault. Registering the IBM i computer on the Vault allows the Agent to logon to the Vault, establish a connection, and backup data. Your system configuration may allow the Agent to connect to multiple Vaults.

When you create a job, it is registered and provides this information during a backup:

- The profile (Vault) used.
- The data to be backed up.
- The type of logs to create.
- The encryption type (if any).
- The backup schedule.

Note: The first backup is a seed, or complete backup. Subsequent backups are deltas that contain only the changes made to the data since the last backup. A delta backup is equivalent to a full backup and you can use it to access and recover data in single or multiple files, libraries, or objects.

During a Disaster Recovery operation, when you recover your system to a new computer, you must re-register the new computer to recover and restore the Agent information from the Vault.

It is recommended that you review your email notifications (if enabled) and log files to verify that your scheduled backups have completed properly.

3.2 Accessing the IBM i Agent Main Menu

After you log on to the IBM i computer, the ISAGENT screen appears if your user profile for the Initial Menu parameter is set to ISAGENT.

If your user profile for the Initial Menu parameter is not set to ISAGENT:

- Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the name of the library where the Agent is installed).
- Press **Enter**. The **ISAGENT** screen appears.

The user profile AGENT is the default user profile when you install the IBM i Agent. After you install the IBM i Agent, you can continue to use AGENT as your user ID and password. When you log on with the default user ID and password, you are automatically directed to the IBM i Agent main menu.

It is recommended that you change the default user ID and password to protect against unauthorized access to the IBM i Agent. If you keep AGENT as your user ID, it is recommended that you change your password.

3.3 IBM i Agent Main Menu Commands

These are the IBM i Agent main menu commands:

Select this command…	**To…**
Agent Configuration	Configure Agent settings
Work with Jobs	Create, change, and delete jobs and display safeset and log information. **Note:** You must configure an Agent before you can create a job.
Work with Schedules	Create, change, delete, enable, and disable backup schedules. **Note:** You must create a job before you can create a schedule.
Backup	Create an immediate backup. **Note:** You must configure an Agent and create a job before you can backup data.
Restore	Restore backup data. **Note:** You must complete a valid backup before you can restore data.
Synchronize	Synchronize the Agent and the Vault backup data.
Auto Job Creation	Create multiple jobs for backing up all libraries. Creating multiple jobs makes better use of CPU cycles and can result in faster backup processing.
Signoff	Exit the ISAGENT CLI program. You do not need to keep the ISAGENT CLI program running after you have configured and scheduled a job.

4 Configuring the Vault

Before you can back up data, you must configure these settings on the Agent:

- The Vault name and password.
- The data to backup.
- Email notifications.
- Licensing information.

When you complete the Agent configuration, the scheduled backups run automatically, through the IBM i Scheduler.

4.1 Accessing the Work with Vault Screen

You use the **Work with Vault** screen to configure the Vaults that receive backup data from IBM i Agents. A valid Vault connection is required to complete a remote (network) backup.

To access the Work with Vault screen:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where `LIBRARY` is the name of the library where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **1** in the **Selection or Command** field. Press **Enter**.

4.2 Add Vault Configuration Screen Fields

These are the Work with Vault screen fields:

Field	Description
Vault Name	The name of the Vault where the Agent data is backed up. The name must be unique for each Agent backup you configure. Vault names can be a maximum of 15 characters. You can use all of the letters of the alphabet and the numbers 0 to 9. Special characters #, @, _, and $ are allowed. The Vault name cannot begin with a number. There is a maximum of 10 connections for each Agent.
Account Name	The account number or name (maximum of 40 characters) provided by your Vault supplier. More than one Agent may use this account.
User Name	The user name provided by your Vault supplier.
Password	The password provided by your Vault supplier.
Verify Password	The password provided by your Vault supplier.
Network Address	The network address (IP or DNS name) for the Vault, provided by your Vault supplier.
Port Number	The port that the IBM i Agent uses to communicate with the Vault. The port is set up by your Vault supplier. The default is 2546.
Reconnect delay	The time, in seconds, that the Agent waits to reconnect to the Vault after a communication or session failure. The default is 30 seconds. The maximum value is 1800 seconds. If a reconnection is successful, the backup will continue without a loss of data. If the reconnection is unsuccessful, the backup fails, an error message is added to the log file, and an email notification is sent (if email notifications are configured).
Retry Timeout	The time, in seconds, the Agent tries to reconnect to the Vault. The default is 3600 seconds. The maximum value is 43200 seconds. When the retry timeout is reached, the backup fails, an error message is added to the log file, and an email notification is sent (if email notifications are configured). Note: The Retry Timeout value must be greater than the Reconnect delay value.
Over the wire Encryption	Select **YES** to encrypt your backup data as it goes from the IBM i computer to the Vault. This is recommended when you are using an insecure network, such as the Internet.

4.3 Creating a New Vault

To create a new Vault:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **1** in the **Selection or Command** field. Press **Enter**.
5. Press **F6**.
6. Complete the fields on the **Add Vault Configuration** screen. For field descriptions, see Add Vault Configuration Screen Fields.

4.4 Changing a Vault Configuration

To change an existing Vault configuration:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **1** in the **Selection or Command** field. Press **Enter**.
5. Select a Vault configuration and press **4**.
6. Edit the fields on the **Add Vault Configuration** screen. For field descriptions, see Add Vault Configuration Screen Fields

4.5 Testing a Vault Configuration

To test an existing Vault configuration:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **1** in the **Selection or Command** field. Press **Enter**.
5. Select a Vault configuration and press **8**.

   When the verification is successful, the message **Vault was verified successfully** appears. If the Vault verification is unsuccessful, recheck the Vault configuration information and the hardware and network connections.

4.6 Re-Registering a Vault

Re-registration allows you to recover and restore job configuration information from a Vault to an Agent. To move the global and job files to a new disk on the Agent, you must re-register the new disk on the Vault. You use the **Re-register with Vault** screen to update the account, user name, and password information on the Vault.

For security reasons, any passwords or system information that might compromise the security of the system are not restored during re-registration. For this reason, some configuration files might be incomplete.

An IFS file, named **Register.log** is created in the IBM i Agent system log directory. Messages similar to the following appear in the log:

```
May12 10:44 PARS-W-0002 Due to a computer registration, configuration file
"A" is missing the following information:
```

To re-register a Vault:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **1** in the **Selection or Command** field. Press **Enter**.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Press **F8.**
5. Complete the fields on the **Re-Register with Vault** screen.

   Note:

   Enter *YES in the **Is This a DR Test** field to perform a disaster recovery test on the target system.

4.7 Deleting a Vault Configuration

Deleting a Vault does not affect any user data. To delete an existing Vault configuration:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **1** in the **Selection or Command** field. Press **Enter**.
5. Select a Vault configuration and press **4**.

5 Working with Retention Schemes

You create a retention scheme to define how many copies of a backup are stored on the Vault, how many days a backup is kept online, and how many days it is held in the archive.

There are always a minimum number of online copies and online days available, even if one is less than the other. For example, if you specify 7 online copies for 7 online days, there will always be 7 copies even if they are more than 7 days old. In addition, there will always be 7 online days, even if more days have passed.

The oldest retentions are deleted first. You cannot delete all backups. The most recent copy is always kept.

5.1 Create a Retention Scheme Screen Fields

These fields appear on the **Create a Retention Scheme** screen:

Field	Description
Retention Name	The retention scheme name. Retention scheme names can be a maximum of 32 characters. You can use all of the letters of the alphabet and the numbers 0 to 9. Special characters #, @, _, and $ are allowed. The retention scheme name cannot begin with a number. You can create a maximum of 10 retention schemes for each Agent.
Online days (1-9999)	The number of days a safeset is stored on the Vault before it expires. When the expiry date is reached, the safeset is automatically deleted. There will always be at least the number of online copies (below), regardless of the setting for online days.
Online copies (1-999)	The minimum number of copies of a safeset to maintain online. When the number of copies is exceeded, the oldest copy is deleted. The safeset is kept for the number of days specified by the **Online days** field.
Archive Backup YES/NO	Enter **YES**, to archive your backup for a specific number of days. You can choose a value from 365 to 9999.

5.2 Creating a Retention Scheme

To create a retention scheme:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **2** in the **Selection or Command** field. Press **Enter**.
5. Press **F6**.
6. Complete the fields on the **Create a Retention Scheme** screen. For field descriptions, see Create a Retention Scheme Screen Fields.

5.3 Changing a Retention Scheme

To change the settings of an existing retention scheme:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **2** in the **Selection or Command** field. Press **Enter**.
5. Enter **2** to the left of a retention scheme. Press **Enter**.
6. Edit the fields on the **Create a Retention Scheme** screen. For field descriptions, see Create a Retention Scheme Screen Fields.

5.4 Deleting a Retention Scheme

You delete a retention scheme when it is no longer associated a job. To delete a retention scheme:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Enter **2** in the **Selection or Command** field. Press **Enter**.
5. Enter **4** to the left of a retention scheme. Press **Enter**.

6 Throttling Bandwidth

IBM i Agent 6.0 and later support bandwidth throttling.

You can choose to use all the available network bandwidth for backups and restores, or you can restrict the amount of bandwidth to a specific value.

6.1 Accessing the Bandwidth Throttling Screen

To access the **Bandwidth Throttling** screen:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or command** field. Press **Enter**.
4. Enter **6** in the Selection or command field. Press **Enter**.

6.2 Bandwidth Throttling Screen Fields

These fields appear on the **Bandwidth Throttling** screens:

Field	Description
Backup/Restore Priority	The backup or restore priority. Available values are 1 to 9. The higher the number the greater the priority.
Use all available Bandwidth	Select **YES** to use all available network bandwidth when creating a backup. Select **NO** to customize the bandwidth used during a backup.
Limit Bandwidth usage to	The amount of bandwidth in kilobytes per second (kb/s) allocated to the backup.
All Day	Select **YES** to apply the bandwidth settings to an entire day. Select **NO** to specify the bandwidth settings to a specific day of the week.
Start Hours	The hour the backup starts.
Start Minutes	The minutes the backup starts.
End Hours	The hour the backup ends.
End Minutes	The minutes the backup ends.
On the following Days	The days to which backup throttling applies.

6.3 Disabling Bandwidth Throttling

To disable bandwidth throttling:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or command** field. Press **Enter**.
4. Enter **6** in the **Selection or command** field. Press **Enter**.
5. Enter a number from 1 to 9 to indicate the backup priority in the **Backup/Restore Priority** field. The higher the number the greater the priority.
6. Enter **YES** in the **Use all available Bandwidth** field.

6.4 Configuring Bandwidth Throttling

To restrict the bandwidth used during a backup:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or command** field. Press **Enter**.
4. Enter **6** in the **Selection or command** field. Press **Enter**.
5. Enter a priority number for the backup in the **Backup/Restore Priority** field.
6. Enter **NO** in the **Use all available Bandwidth** field.
7. Complete the fields on the second **Bandwidth Throttling** screen. For field descriptions, see Bandwidth Throttling Screen Fields.

7 Encrypting Backup Data

Encryption prevents unauthorized access to backup data on the Vault. You can select these encryption types:

- *NONE
- *DES56
- *BLOWFISH65
- *BLOWFISH128
- *TRIPLEDES112
- *AES128 - Advanced Encryption Standard
- *AES256 - Advanced Encryption Standard (strongest)

Note: You must remember your encryption password if you choose to encrypt your data. You cannot recover data without your encryption password.

7.1 IFS Wildcard Exclusions

These are the valid exclusion formats:

- 'FOLDER*'
- '*FOLDER'
- '*FOLDER*

Only the last path element of the selection can contain a wildcard:

* Supported: '/Projects/A*'

* NOT Supported: '/Projects*/Active'

A path element of a selection can only contain a wildcard:

* Supported: '/Projects*'

* NOT Supported: '/P*j*'

The Wildcard can appear anywhere in the path element:

* Supported: '/Projects*'

* Supported: '/*rojects'

The Agent supports one path element with a wildcard per selection:

* Supported: '/Projects/User*'

* NOT Supported: '/P*/U*'

When a file appears on an exclusion list, the file is not backed up even if it appears in a folder that is backed up. The wildcard exclusion patterns allowed are 'FILE*', '*FILE' and '*FILE*.

7.2 OBJ Backup Exclusions

When an object appears on an exclusion list, the object is not backed up even if it exists in the library that is backed up. The allowed wildcard exclusion patterns are: 'OBJECT*', '*OBJECT' and '*OBJECT*'.

7.3 Improving Performance with Multi-Threading

When the Agent is installed on a computer with multiple CPUs, you can use multi-threading to improve the performance of backups and restores of files larger than 32KB.

These threading models are available:

- Single threading. All the data processing is handled by a single thread.
- Combined threading. Data processing is divided between two threads.
- Block Processor threading. Data processing is divided between four or more threads.

7.4 Threading Model Options

You can select these threading model options in the **Threading Model** field:

- **Default**

  On a single CPU system, the Single threading model will be used.

  On a multi-CPU system the backup settings determine what threading model is used. If compression or encryption is turned ON, the Block Processor threading model is used. If compression or encryption is turned OFF, the Combined threading model is used.

- **Single**

  A single threading model is used.

- **Combined**

  The combined threading model is used.

- **Block Processor**

  The block processor threading model is used with up to four processing threads.

- **Maximum Block Processor**

  The block processor threading model is used with up to five processing threads.

7.5 Disabling CRC

You can disable CRC to improve the performance of backups and restores. If CRC is disabled, it remains disabled during a restore irrespective of the option selected in the **Disable CRC** field on the **Restore** screen.

7.6 Setting Compression and Decompression Algorithms

To reduce the size of the data transmitted and the size of the data stored on the Vault, select one of these compression types:

- *NONE
- *DEFAULT
- *STANDARD
- *NORMAL
- *MINIMUM
- *BETTER (Default)
- *MAXIMUM
- *FASTERRST (IBM LZ1)

The IBM LZ1 algorithm for compression and decompression improves the performance of restores, but slows backup performance. To use the IBM LZ1 compression and decompression algorithm, enter FASTERRST in the **Compression Type** field.

7.7 Creating an Email Notification

You can configure the Agent to send an email notification to one or more recipients, when a job fails or succeeds. You can only create an email notification for all Agent jobs. An email notification cannot be created for a specific job.

To create an email notification:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or command** field. Press **Enter**.
4. Enter **4** in the **Selection or command** field. Press **Enter.**
5. Enter one of these options in the **Email Notification** field:
    - ***NONE** - if you do not want to receive notifications.
    - ***ALL** - to receive a notification when a job is successful or fails.
    - ***SUCCESS** – to receive a notification when a job is successful.
    - ***FAIL** - to receive a notification when a job is unsuccessful
6. Enter an email address in the **From Email Address** field.
7. Enter the email addresses of the recipients in the **Recipients** field.
8. Enter the address of the Simple Messaging Transport Protocol Server for sending the emails in the **SMTP** field.

8 Working with Agent Licenses

When you install the IBM i Agent, it is installed with a 30-day trial license. The expiry date for the license is displayed in the **Expiry Date** field of the **Work with License** screen. With a trial license you can configure the Vault, and create retention schemes, jobs, and schedules. However, you cannot do backups or restores without a full license.

To obtain a full license, contact your service provider. To create a license key, you must provide your service provider with the model, processor feature, IBM i computer serial number, and software group of the computer on which the IBM i Agent is installed.

8.1 Entering an IBM i Agent License Key

You cannot change the information on the top of the **Work with License** screen. To enter an IBM I Agent license key:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **1** in the **Selection or command** field. Press **Enter**.
4. Enter **5** in the **Selection or command** field. Press **Enter**.
5. Enter the license key supplied to you by your service provider in the **License Key** field.

   The format of the license key is thirty (including hyphens) upper-case characters in the format XXX-XXXXXXXX-XXXXXXXX-XXXXXXXX.

9 Working with Jobs

You must create a job to backup data. There is no limit on the number of jobs you can create. You can select one of these types of data backup:

- OBJ – Backs up libraries and objects in native system.
- IFS – Backs up folders and stream files in Integrated File System.
- SYS – Backs up system state data that contains system security data (SAVSECDTA), configuration objects (by SAVCFG command), and system values.
- ALLUSR – Backs up all user libraries, including some libraries supplied by IBM.
- IBM – Backs up all system (IBM) libraries.

A System State Backup includes the following IBM i System items:

- System Values (WRKSYSVAL *ALL) with system API
- User Profiles, Authorities List (SAVSECDTA)
    - User Profiles
    - Authorization Lists
    - Authority Holders
- Configuration Objects (SAVCFG)
    - Line descriptions
    - Controller descriptions
    - Device descriptions
    - Mode descriptions
    - Class-of-service descriptions
    - Network interface descriptions
    - Network server descriptions
    - NetBIOS descriptions
    - Connection lists Configuration lists
    - Hardware resource data
    - Token-ring adaptor data

9.1 Add New Job Screen Object Backup Fields

These are the fields that appear on the **Add New Job – Object Backup** screen:

Field	Description
Job Name	The job name. Job names can be a maximum of 30 characters. You can use all of the letters of the alphabet and the numbers 0 to 9. Special characters #, @, _, and $ are allowed.
Vault Name	The name of the Vault where the Agent data is backed up. The name must be unique for each Agent backup you configure. Vault names can be a maximum of 15 characters. You can use all of the letters of the alphabet and the numbers 0 to 9. Special characters #, @, _, and $ are allowed. The Vault name cannot begin with a number.
ASP Device	The name of the auxiliary storage pool (ASP) device where the Agent data is backed up. These are the available options: • Name – The name of the ASP device to which you want to back up data. • SYSBAS – Data is backed up to the system ASP.
Include Objects	The objects to include in the backup. The list can include a maximum of 128 items. You can choose one of these options: • *ALL - Saves all objects in the specified library. • *ALLUSR - Saves all objects in the user libraries. QSYS becomes the only legal library name. If you include *ALLUSR more than once, all the other entries are removed. • *IBM - Saves all objects in system (IBM) libraries. QSYS becomes the only legal library name. If you *IBM include more than once, all the other entries are removed. • generic* - A character string with one or more valid characters followed by an asterisk (*). Saves a group of objects in the specified library. • Library – Saves all objects in the library you specify. Enter **QSYS** to save all objects in all libraries. • Type – Saves objects of a specific type. Enter ***ALL** to save all types.
Exclude Objects	The objects to exclude from the backup. The list can include a maximum of 128 items. You can choose one of these options: • *ALL • *ALLUSR • *IBM • generic name - Generic names start with one or more valid characters, followed by the wildcard. • Library – Excludes all objects in the library you specify. Enter **QSYS** to exclude all objects in all libraries. • Type – Excludes objects of a specific type. Enter ***ALL** to exclude all types.
Recursive	Specifies whether sub-directories are included in the backup.
Small object size (KB)	The size limit for backed up objects. Objects bigger than the user-defined values are backed up with an IBM API. Backing up small objects can improve restore times.

Field	Description
Save savefile data	Save file or header information.
Save active	Specifies if backup triggers are added to PF-DTA objects contained in the job include list. During the creation or edit of an *OBJ Job with the *TRIGGER setting, a confirm screen is displayed. These options are available: • NONE • SYSDFN • TRIGGER
Save active/trigger wait time	The time in seconds that the trigger waits for database activity to stop, before starting the backup. You can enter a maximum value of 99999, or **NOMAX** (wait forever). The default is 120 seconds.
Trigger retry period	The time in seconds that the trigger waits up to retry starting the backup. You can enter a maximum value of 99999, or **NOMAX** (wait forever). If the retry is unsuccessful, the backup does not start, and an error message is added to the log file. The default is 3600 seconds.
Threading Model	On a multi-CPU computer, you can use multi-threading to improve backup and restore performance. Choose one of these options: • DEFAULT • SINGLE • COMBINED • BLOCK PROCESSOR • MAXIMUM BLOCK PROCESSOR

9.2 Add New Job Screen IFS Backup Fields

These are the screens that appear on the **Add New Job – IFS Backup** screen:

Field	Description
Include IFS stream files	The objects to include in the IFS backup. The list can include a maximum of 128 items.
Exclude IFS stream files	The objects to exclude from the IFS backup. The list can include a maximum of 128 items.
Threading Model	On a multi-CPU computer, you can use multi-threading to improve backup and restore performance. Choose one of these options: • DEFAULT • SINGLE • COMBINED • BLOCK PROCESSOR • MAXIMUM BLOCK PROCESSOR
Encryption	The type of encryption standard to use to protect Agent data. These options are available: • NONE • DES56 • BLOWFISH56,

Field	Description
	• BLOWFISH128 • TRIPLEDES112 • AES128 • AES256
Compression	The compression type. Choose one of these options: • NONE • DEFAULT • STANDARD • NORMAL • MINIMUM • BETTER • MAXIMUM • FASTERRST
Deferring	The time to wait in minutes before starting the next backup job. You can enter a value 15 to 2880. Enter **NODEFER** to keep the backup going until it is finished.
Quick File Scanning	Backup any objects that have not changed since the last backup.
Update History	Update the backup history. Enter **YES** to update the time and date of the backup data.
Log Detail	The amount and type of backup information to include in the log files. Choose from these options: • FILE • NONE • SUMMARY (default) • DIRECTORY
Disable CRC	Disable CRC can improve the performance of backups and restores.

9.3 Add New Job Screen SYS Backup Fields

These are the screens that appear on the **Add New Job – SYS Backup** screen:

Field	Description
Threading Model	On a multi-CPU computer, you can use multi-threading to improve backup and restore performance. Choose one of these options: • DEFAULT • SINGLE • COMBINED • BLOCK PROCESSOR • MAXIMUM BLOCK PROCESSOR
Encryption	The type of encryption standard to use to protect Agent data. These options are available: • NONE

Field	Description
	• DES56 • BLOWFISH56, • BLOWFISH128 • TRIPLEDES112 • AES128 • AES256
Deferring	The time to wait in minutes before starting the next backup job. You can enter a value 15 to 2880. Enter **NODEFER** to keep the backup going until it is finished.
Compression	The compression type. Choose one of these options: • NONE • DEFAULT • STANDARD • NORMAL • MINIMUM • BETTER • MAXIMUM • FASTERRST
Log Detail	The amount and type of backup information to include in the log files. Choose from these options: • FILE • NONE • SUMMARY (default) • DIRECTORY
Disable CRC	Disable CRC can improve the performance of backups and restores.

9.4 Creating a Backup Job

To create a backup job:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **2** in the **Selection or Command** field. Press **Enter**.
4. Press **F6**.
5. Enter a job name in the **Job name** field.
6. Enter a Vault name in the **Vault name** field.
7. Enter one of these values in the **Data type** field:
   - ***OBJ** to backup libraries and objects in the native system.
   - ***IFS** to backup folders and stream files in the Integrated File System.

- ***SYS** to backup system state data containing system security data (SAVSECDTA), configuration objects, and system values.

8. Press **Enter**.
9. Complete the fields on the **Add New Job** screen. For field descriptions, see Add New Job Screen Object Backup Fields, Add New Job Screen IFS Backup Fields, or Add New Job Screen SYS Backup Fields.
10. Press **F10** to display more options. For field descriptions, see Add New Job Screen Fields.

9.5 Creating Custom Commands

To create a custom command before or after a backup job:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **2** in the **Selection or Command** field. Press **Enter**.
4. Press **3** in the **OPT** column of the job that you want to add the custom command. Press **Enter**.
5. Enter a job name in the **Job name** field.
6. Enter one of these values in the **Command class** field:
   - ***PRE** to run the custom command before the backup runs.
   - ***POST** to run the custom command after the backup runs.
7. Enter a valid command in the **Command** field. You can specify a batch file (script).

9.6 Changing Job Settings

To change the settings of an existing job:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **2** in the **Selection or Command** field. Press **Enter**.
4. Enter **2** in the **OPT** column of the job you want to edit. Press **Enter**.
5. Edit the fields on the **Change Job** screen. For field descriptions, see Add New Job Screen Fields.

   Note:

   You cannot edit the **Job name**, **Job ID**, or **Vault name** fields.

6. Press **F10** to edit more fields. For field descriptions, see Add New Job Screen Fields

   Note:

   If you modify the suppress archive bit processing setting, the Agent turns off QFS (Quick File Scanning) for the next backup. For *OBJ backups, this parameter is shown as Update History. When QFS is turned off, the backup can run longer than expected.

9.7 Deleting a Job

When you delete a job, the job information is deleted from your local Agent. Existing backup data is not deleted. To delete a job:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **2** in the **Selection or Command** field. Press **Enter**.
4. Enter **2** in the **OPT** column of the job you want to delete. Press **Enter**.
5. Press **Enter**.

10 Working with Safesets

When a job is executed and a backup is created, the backup data is held in a safeset that is stored in the Vault. A sequential number is assigned to each safeset after every backup. The date and time the safeset is created is also recorded, and you can use this information to select a safeset created on a specific date.

The **Status** column on the **Display Safeset** screen displays these values:

- Online – You can use the safeset for a restore.
- Work Area – The data is in transition to Online status. You can either wait for the system to change the status, or you can execute a Synchronize command
- Archived – The safeset is stored off-line from the vault.

You cannot edit the fields on the **Display Safeset Detail** screen.

10.1 Display Safeset Detail Screen Fields

These are the fields that appear on the Display Safeset Detail screen:

Field	Description
Job Name	The name of the job that created the safeset.
Catalog Number	The sequential number assigned to this safeset.
Location	The name and address of the Vault where this safeset is kept.
Status	The safeset status. These options are available: • Online – You can use the safeset for a restore. • Work Area - The data is in transition to Online status. You can either wait for the system to change the status, or you can execute a Synchronize command • Archived - The safeset is stored off-line from the vault.
Backup Time	The date and time the safeset was created.
Backup Type	The type of backup. These options are available: • Full • Full-Delta
Storage Size	The size of the backup. These fields are available: • Original – The size of the original backed up data. • Deltized – The amount of deltized data (zero for the initial seed). • Compressed – The size of the data stored on the Vault.
Retention	The retention plan for the safeset. These fields are available: • Days – The number of days this safeset is kept. • Copies – The number of backup copies kept.

	• Archived Days – The number of days an archive copy is kept.
Encrypted	Indicates if the backup data was encrypted.
Compressed	Indicates if the backup data was compressed.
Media Type	The type of media used to store the backup data.
Expiry	The date the safeset will be deleted.

10.2 Viewing a Safeset

To view a safeset:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **2** in the **Selection or Command** field. Press **Enter**.
4. Enter **5** in the **OPT** column to display the safeset for the job. Press **Enter**.
5. Select a safeset and press **5**.
6. Press **F3** to exit the **Display Safeset Detail** screen.

11 Working with Log Files

A log file is created for every backup, synchronize, or restore. You can view the log file to determine if the backup, synchronize, or restore was successful, the date and time the event completed, and what objects were backed up or restored. The amount of detail included in the log file depends on your choice of log detail when you created the job.

You specify the amount and type of backup information to include in the log files when you create a job. To view the options available for the **Log Detail** field, see Add New Job Screen Fields.

The safeset number is used to name the backup logs. For example, 00000001.LOG. Restore logs are named RSTYYYYMMDD-HHMMSS. The SYNCH.LOG is the most current log file.

11.1 Viewing a Log File

To view a log file:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **2** in the **Selection or Command** field. Press **Enter**.
4. Enter **6** in the **OPT** column to display the log files for the job. Press **Enter**.
5. Select a log file and press **5**.
6. Select one of these options to navigate through the log file:
   - Page Up
   - Page Down
   - Press **B** to move to the bottom of the log file
   - Press **T** to move to the top of the log file

11.2 Converting an .XLOG File to a .LOG File

You use the XLOGMAIN utility to convert an .XLOG file to a .LOG file. Open a command prompt and execute this command:

```
CALL PGM(XLOGMAIN) PARM('/file.XLOG' '/file.LOG')
```

The .XLOG file must be in the specified location and you must provide the complete path for the .LOG file generated by the XLOGMAIN tool.

12 Working with Schedules

You can create a schedule to run a backup or synchronize job at a pre-determined time. You can also run jobs manually (ad-hoc, or unscheduled).

To complete a backup, the IBM i Agent needs a minimum of *ALLOBJ rights. That is, the Agent needs enough rights to be able to open/read all libraries and objects.

Note:

Do not use the IBM Advanced Scheduler to submit Agent jobs. The Agent job scheduler requires multi-threading. The IBM Advanced Scheduler uses the RCLRSC command, which is not compatible with multi-threaded applications.

12.1 Work with Scheduler Screen Fields

These are the fields that appear on the Work with Scheduler screen:

Field	Description
Command	The type of job to run. These options are available: • Backup • Synchronize • Custom
Custom Command	The IBM i command to run.
Job Name	The name of an existing job.
Retention Name	The name of an existing retention plan.
Command Cycle	The frequency that the schedule runs. These options are available: • Weekly • Monthly
Minutes/Hours	The time the schedule starts.
Day of week	The day of the week that the schedule starts.
Quick File Scanning	Backup any objects that have not changed since the last backup.
Deferring	The time to wait in minutes before starting the next backup job. These fields are available: • Disable – Disables or enables backup deferring • Times – The time to defer the backup job. You can enter a value from 15 to 2880. If the backup job does not complete in the specified time, the backup pauses and continues at the next scheduled Backup time. To stop the backup, the operating system must abnormally stop the backup job (the Backup API). This creates errors in the Backup.log, but they are expected. The log will also have a message similar to: "BKUP-W-0363 Backup window expired, intra-file defer." You can ignore all object related errors that appear after this line because the deferred object will be backed up during the following Backup.

12.2 Creating a Schedule

To create a schedule:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **3** in the **Selection or Command** field. Press **Enter**.
4. Press **F6**.
5. Complete the fields on the **Work with Scheduler** screen. For field descriptions, see Work with Scheduler Screen Fields.

12.3 Changing a Schedule

To change the settings of an existing schedule:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **3** in the **Selection or Command** field. Press **Enter**.
4. Select a schedule.
5. Press **2** and then **Enter**.
6. Edit the fields on the **Work with Scheduler** screen. For field descriptions, see Work with Scheduler Screen Fields.

12.4 Deleting a Schedule

To delete an existing schedule:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **3** in the **Selection or Command** field. Press **Enter**.
4. Select a schedule.
5. Press **4** and then **Enter**.

12.5 Enabling or Releasing a Schedule

You use the enable or release option to make a job active in the IBM i job queue. To enable or release a schedule:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **3** in the **Selection or Command** field. Press **Enter**.
4. Select a schedule.
5. Press **6** and then **Enter**.

12.6 Disabling or Holding a Schedule

You can pause a backup by holding it in the queue. To make the backup active, you must enable it. To disable or hold a schedule:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **3** in the **Selection or Command** field. Press **Enter**.
4. Select a schedule.
5. Press **3** and then **Enter**.

13 Working with Backup Jobs

After you set up the Agent and create a schedule, the backups run automatically. The first backup that is run is a seed. This first time the backup runs, the backup copies everything you specify in a compressed format to the Vault. The next time the backup runs, only the data that has changed is copied to the Vault. This methodology reduces the time and resources required to backup data. When you review a backup log file, the size of the data that is copied to the Vault is less than the data in the files

The Vault constantly monitors the backups and identifies what data is new, and what data is unchanged. This ensures that the backup data is always current when you do a restore.

To run a one-time backup, you can modify an existing Agent and job or create a new one.

13.1 Run Backup Screen Fields

These are the fields that appear on the Run Backup screen:

Field	Description
Job Name	The name of an existing job.
Retention Scheme	The name of an existing retention plan.
Quick File Scanning	Backup any objects that have not changed since the last backup. *YES is the default.
Disable Deferring	Two options are available: • **NO** - The backup runs until the time specified by the Defer after field is reached. The backup is paused until the next scheduled backup. You might select this option for a large backup that takes several scheduled periods, and you want the backup to run after hours when the computer is not busy. • **YES** - The Backup runs until it is finished, even if it overlaps the time of the next scheduled backup. When you select **Yes**, the **Defer after** field is not visible.
Defer after	The time in minutes to defer the backup. You can enter a value from 15 to 2880. The default is 480. If this time is reached and the backup is not finished, the backup pauses until the next scheduled backup time.

13.2 Running a Backup

To run a backup:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **4** in the **Selection or Command** field. Press **Enter**.
4. Complete the fields on the **Run Backup** screen. For field descriptions, see Run Backup Screen Fields.

14 Working with Hot Backups

You can select two backup methods to backup open files on an IBM i computer: Journaling or Database Triggers. Backing up open files is known as a dynamic or hot backup.

When you select a trigger-based backup, a snapshot of the native data physical files (PF-DTA) is taken. The Agent saves any database changes made during the backup. The Agent can revert the changes to the time the backup started.

Trigger-based backups only support physical database files. Physical source files, logical files, save files, and device files are not supported. In addition, supported database files cannot contain these columns: CLOB, BLOB, DBCLOB, ROWID, Data link.

14.1 Journaling

If the database is not currently configured for journaling, refer to the IBM i user guide for instructions on setting up journaling on the database.

It is recommended that you create a single journal for each library to be backed up. This simplifies administration and adds the journal and receivers in the correct library.

Create the main job to backup all user objects and data and specify two exclusions for *JRN and *JRNRCV object types. Specify *SYSDFN in the save active parameter.

Create a job for *JRN and a job for *JRNRCV object types.

The proper sequence for running the jobs is very important. Jobs should be submitted to a job queue that allows only one active job.

The backup sequence is:

- Run the main Backup Job
- Run the *JRN Job
- Run the *JRNRCV Job

If the backup sequence is not run correctly, and data is updated while the backup is running, some journal receivers might not contain all the required data for point in time recovery.

The restore sequence is:

- Run the *JRN Job
- Run the *JRNRCV Job
- Run the main Restore Job (other objects)

If the restore sequence is not run correctly, some objects might not be journalled after the restore.

14.2 Triggering

When you select a trigger-based backup, a snapshot of the native data physical files (PF-DTA) is taken. The Agent saves any database changes made during the backup. The Agent can revert the changes to the time the backup started.

Trigger-based backups only support physical database files. Physical source files, logical files, save files, and device files are not supported. In addition, supported database files cannot contain these columns: CLOB, BLOB, DBCLOB, ROWID, Data link.

When you create a new job and specify *TRIGGER in the **Save active** field, backup triggers are added to PF-DTA objects contained in the job include list. When you create or change an *OBJ job with the *TRIGGER setting, a confirmation screen appears.

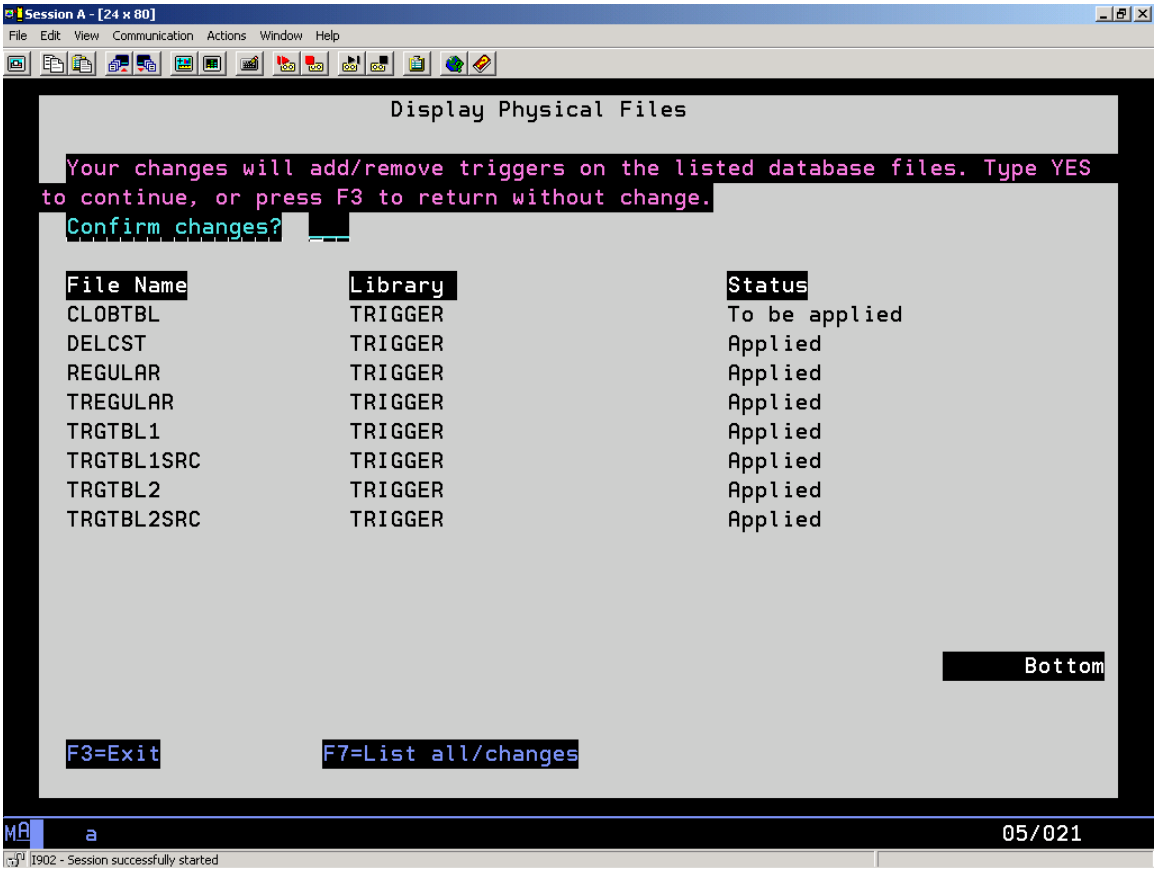

Figure 1. - Triggering

The confirmation screen lists objects and their trigger status. These are the trigger statuses:

- To be applied – A trigger is applied to the object.
- Applied – Indicates that a trigger has already been applied.
- To be removed – The trigger is removed from the object.
- Removed - Attempts to remove a trigger applied in a previous operation.

Only physical database files are supported. Physical source files, logical files, save files, and device files are excluded.

Supported database files cannot contain the following columns:

- CLOB
- BLOB
- DBCLOB
- ROWID
- Data link

15 Synchronizing Data

You run the Synchronize command to ensure that the latest backup is available for an immediate restore.

When you run the Synchronize option, the IBM i Agent compares and updates the remote Vault files with the local safeset catalog files. You can configure the IBM i Agent to delete catalog files that are no longer required.

The Synchronize Job is submitted to the Agent System with the message: "Synchronize Job <name> has been submitted to the AGENT system.

To synchronize the IBM i Agent data with the Vault:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **9** in the **Selection or Command** field. Press **Enter**.
4. Enter the name of the job you want synchronize in the **Job name** field. Press Enter.

16 Automatic Job Creation

You use automatic job creation to backup an entire IBM i computer. With automatic job creation, you can create multiple jobs to back up all libraries. Creating multiple jobs better utilizes computer resources and can reduce the time needed to complete a backup. You can only use automatic job creation once.

16.1 Viewing the AUTOJOB Main Menu

To view the AUTOJOB main menu:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **10** in the **Selection or Command** field. Press **Enter**.
4. Select one of these options:
   - **Create Database** - Create the Job Creation Database. The Job Creation Database contains information about all the libraries and objects inside the libraries in the system, and the size and count of the objects that reside in each library.
   - **Library/Job Selection** - Exclude, select, or assign libraries to jobs.
   - **Retention Schedule** - Configure retention schedules. You can also set up deferring and quick file scanning.
   - **Create Job(s)** - Assign multiple retention schemes to jobs and create auto scheduler entries for the backup.
   - **Schedule Jobs** - Create jobs with default parameters.

16.2 Select Libraries Screen Fields

These fields appear on the **Select Libraries** screen:

Field	Description
Total Object Size	The size of all the libraries and the objects inside the libraries selected for the job.
Total Object Count	The number of objects in multiples of 1000 selected for jobs.
Job Limit	The number of jobs to create. By default, this value is the number of CPUs (including LPAR CPUs) multiplied by 4. If the number of CPUs cannot be determined, the default is 1.
Obj Size/Job	The optimal object size per job. The size of the job can be more or less than the calculated value of object size/job.
Obj Count/Job	The optimal object count in multiples of 1000. The count of the objects can be more or less than the calculated value of object count/job.
Lib/Job	The name of the library or the job. Enter **X** to include the library in the backup. By default, all libraries except QSYS, QGPL, and QUSRSYS are selected.

16.3 Select Libraries Screen Commands

These commands are available on the **Select Libraries** screen:

Command	Description
F2	Save your changes.
F3	Exit without saving your changes.
F4	Recalculate the parameters and arrangement of libraries and jobs.
F5	Replaces the current screen with the original list of libraries and values.
F6	Create an Include and Exclude list for the job. When the Include/Exclude count of one or more jobs exceeds 128, you must choose one of these options: • **Yes** - automatically reshuffle the libraries and reduce the include/exclude list. In some circumstances the list cannot be automatically reduced and you must reduce the list manually • **No** - Return to the Select Libraries screen and increase or decrease the number of jobs manually.
F7	View the previous job.
F8	View the next job.
F9	Sort the jobs alphabetically.
F10	Sort the jobs by size in descending order.
F11	Display the list of job names with their include or exclude count. The job names are formed with the first character of the include/exclude library names. Libraries starting with "A" are included where the maximum number of libraries starting with an "A" are found and so is the case for all other libraries except "Q". Libraries starting with "Q" are not be included as generic Q*. The exclude list does not support the use of generic library names like A*. Special characters ", @, #, $, / are replaced by $ in job names. If all libraries are removed from the job, the job name list is empty. When the include/exclude list is finished, press **F3** three times to view the **Auto Job** menu. Considering the backup of future libraries the generic include for A* to Z*, @*, #*, $* and /* except Q* are added in different jobs.

16.4 Selecting a Library and a Job

To select a library and a job:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **10** in the **Selection or Command** field. Press **Enter**.
4. Enter **2** in the **Selection or command** field. Press **Enter**.
5. Enter the libraries you want to exclude. You cannot use wild card characters in the library names.

   - or –

   Press **F6** to view and edit fields on the **Select Libraries** screen. For field descriptions, see Select Libraries Screen Fields.
6. Press **F2**.

   - or –

   Select a command on the Select Libraries screen. See Select Libraries Screen Commands.

16.5 Retention Schedule Screen Fields

These fields appear on the **Retention Schedule** screen:

Field	Description
Retention	The retention schedule name from the Agent repository (Global.vvc) file. If a retention schedule is deleted from the Agent, it still appears on the **Retention Schedule** screen.
Period	The frequency that the job runs. These options are available: • *WEEKLY • *MONTHLY
Days/Month (MTWTFSS/1-31):	The day of the month that the job runs. You can enter a value from Monday to Sunday, the dates from 1 to 31, or *First, *Last. For example, you enter **_T_T__S** to run a job on Tuesday, Thursday and Sunday. You must include spaces for days that will not be scheduled.
Time	The time the job runs in hours and minutes. The hour is in 24 hours format.
Quick Scan	Backup any objects that have not changed since the last backup. Two options are available: • *YES – To not backup file streams or objects that are unchanged since the last backup. • *NO – To backup all objects.

Defer Disable	Two options are available: • NO - The backup runs until the time specified by the Defer time column is reached. The backup is paused until the next scheduled backup. • YES - The Backup runs until it is finished, even if it overlaps the time of the next scheduled backup.
Defer Time	The time in minutes to defer the backup. You can enter a value from 15 to 2880. The default is 480. If this time is reached and the backup is not finished, the backup pauses until the next scheduled backup time.

16.6 Creating a Retention Schedule

To create a retention schedule:

Note:

You cannot create a retention schedule when creating a database.

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **10** in the **Selection or Command** field. Press **Enter**.
4. Enter **3** in the **Selection or command** field. Press **Enter**.
5. Complete the fields on the **Retention Schedule** screen. For field descriptions, see Retention Schedule Screen Fields.
6. Press **F2**.

16.7 Assigning Retention Schedules to Jobs

To assign a retention schedule to a job:

Note:

Retention schedules deleted after the database is created are displayed in the **Retention Selection** screen.

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **10** in the **Selection or Command** field. Press **Enter**.
4. Enter **4** in the **Selection or command** field. Press **Enter**.
5. Enter **X** in a job column to apply the retention schedule to the job.
6. Press **F2**.

16.8 Create All Jobs Screen Fields

These fields appear on the **Create All Jobs** screen:

Field	Description
Vault name	The name of the Vault where the Agent data is backed up. Press **F4** to enter a Vault name. Press **F4** twice to view a list of existing Vault names. Vault names can be a maximum of 15 characters. You can use all of the letters of the alphabet and the numbers 0 to 9. Special characters #, @, _, and $ are allowed. The Vault name cannot begin with a number.
Recursive	Specifies whether all libraries and their contents (objects) are included in the backup.
Save savefile data	Specifies whether the contents of the save file or only header information is backed up.
Save active	Specifies if backup triggers are added to PF-DTA objects contained in the Job include list. During the creation or edit of an *OBJ Job with the *TRIGGER setting, a confirm screen is displayed. These options are available: • NONE • SYSDFN • TRIGGER
Save active /trigger wait time (120)	The time in seconds that the trigger waits for database activity to stop, before starting the backup. You can enter a maximum value of 99999, or **NOMAX** (wait forever). The default is 120 seconds.
Trigger retry period	The time in seconds that the trigger waits up to retry starting the backup. You can enter a maximum value of 99999, or **NOMAX** (wait forever). If the retry is unsuccessful, the backup does not start, and an error message is added to the log file. The default is 3600 seconds.
Encryption type	The type of encryption standard to use to protect Agent data. These options are available: • NONE • DES56 • BLOWFISH56, • BLOWFISH128 • TRIPLEDES112 • AES128 • AES256
New password	The password used to access encryption settings
New password (to verify)	The password used to access encryption settings
Quick File Scanning	Backup any objects that have not changed since the last backup.
Update history	Update the backup history. Enter **YES** to update the time and date of the backup data.
Log detail	The amount and type of backup information to include in the log files. Choose from these options: • FILE • NONE • SUMMARY (default) • DIRECTORY

16.9 Creating a Job

To create a job:

Note:

You must create a database before you can create a job.

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Press **Enter**. The **ISAGENT** screen appears.
3. Enter **10** in the **Selection or Command** field. Press **Enter**.
4. Enter **5** in the **Selection or command** field. Press **Enter**.
5. Complete the fields on the **Create All Jobs** screen. For field descriptions, see Create All Jobs Screen Fields.

   To edit the Job name before you submit the Job, press **F11**. Press **F2** to save your changes.
6. Press **F6** to create the job with the current settings. This process can take several minutes.

17 Restoring Jobs

When a backup fails, you can use the **Run Restore** screen to restore backup data.

You can use a terminal session to run an OBJ or IFS restore. However, a SYS restore must be run on the console in a restricted state. When you run the IBM i Agent from the server console, the server is placed into a restricted state automatically.

After you complete the SYS restore, you need to re-start all subsystems manually. A system state restore generates a special log file. To view the log, open a command prompt and enter `WRKSPLF`.

17.1 Run Restore Screen Fields

These fields appear on the **Run Restore** screens:

Field	Description
Job name	The job name.
Safeset No	A sequential number from 1 - 99999999 that identifies the safeset. Enter *LASTONLINE to retrieve the most current backup.
Data type	The type of data to include in the restore. These are the available options: • *OBJ - to restore libraries and objects in the native system. • *IFS - to restore folders and stream files in the Integrated File System. • *SYS - to restore system state data containing system security data (SAVSECDTA), configuration objects, and system values.
Include objects	The objects to include in the restore. The list can include a maximum of 128 items. You can configure these options: • Name – The name of the object to restore. Select generic* and enter a character string with one or more valid characters followed by an asterisk (*) to restore a group of objects in the specified library. Enter *ALL to restore all objects. • Library – The name of the library to restore. Enter QSYS to restore all objects in all libraries. • Type – The object type to restore. Enter *ALL to restore all types. • File member - The database file members to restore. Select generic* and enter a character string with one or more valid characters followed by an asterisk (*) to restore a group of objects in the specified library. Select *NONE to restore only the file object. Enter *ALL to restore all file members.
Include IFS stream files	The IFS stream files to restore. The list can include a maximum of 128 items. You can configure these options: • Absolute path - the absolute path for the stream files saved on the Vault. • File - The files in a specific directory to restore. • Recursive – Includes sub-directories in the restore.

Exclude objects	The objects to exclude from the restore. The list can include a maximum of 128 items. You can configure these options: • Name – The name of the object to exclude from the restore. Select generic* and enter a character string with one or more valid characters followed by an asterisk (*) to exclude a group of objects in a specific library. Enter *ALL to exclude all objects. • Library – The name of the library to exclude from the restore. Enter QSYS to exclude all objects in all libraries. • Type – The object type to exclude from the restore. Enter *ALL to exclude all types. • File member - The database file members to exclude from the restore. Select generic* and enter a character string with one or more valid characters followed by an asterisk (*) to exclude a group of objects in a specific library. Select *NONE to exclude only the file object. Enter *ALL to exclude all file members.
Exclude IFS stream files	The IFS stream files to exclude from the restore. The list can include a maximum of 128 items. You can configure these options: • Absolute path - the absolute path for the stream files saved on the Vault. • File - The files in a specific directory to exclude from the restore. • Recursive – Excludes sub-directories in the restore.
Data base member option	The database member to include in the restore. These are the available options: • *ALL • *MATCH • *NEW • *OLD If an object is deleted and restored to the same system, it is automatically linked to the authorization list. When an object is restored to a different system, the authorization list is not linked, unless you specify ALWOBJDIF(*ALL) on the restore command.
Spool file data	Restores spooled file data and attributes. These are the available options: • *NEW – Select this option to restore spooled file data saved with the output queue if it does not currently exist. • *NONE
Allow object differences	These are the available options: • *NONE • *ALL • *AUTL • *COMPATIBLE When the operating system is recovered from a SAVE tape during a restore, it is recognized as the original operating system, even when the hardware might be different. In such cases, the AUTL re-links without issue.

Restore Library	The library to restore to. You select the original source library, or a different one. Restore Database Performance. When restoring a database, performance will be enhanced if the database does not already exist in the destination location, as the replace operation is more time consuming. When restoring database files, you must specify *FILE in the **Type** field and enter the specific object name and not a wildcard name. For example, /QSYS.LIB/SOMELIB.LIB/./SOMEFILE.FILE. The IBM I Agent automatically appends the following line in the vpr file to restore the members: /QSYS.LIB/SOMELIB.LIB/SOMEFILE.FILE/*.MBR. The Vault does not support wildcards at the folder level.
Restore ASP Device	Restores data to an auxiliary storage pool (ASP) device. These are the available options: • Name – The name of the ASP device to which you want to restore data. • SAVASPDEV – Data is restored to the same ASP device from which it was saved.
Restore ASP Number	Objects are restored to the auxiliary storage pool (ASP) from which they were saved or to the system ASP (ASP number 1) or to a basic user ASP (ASP numbers 2 through 32).
File Overwrite/Rename Obj	Overwrite or rename existing objects.
File Overwrite/Rename - IFS Job	Press F4 to display these values for an IFS Job. • Overwrite Existing Files (OVRWRT) The OVRWRT option overwrites all existing file in libraries after a restore. If changes are made to an existing file in the library all changes are lost. • Prompt Before Overwrite Existing Files (PMTOVRT) You must confirm that you want to overwrite the existing file with the restore file. Select No to all if you do not want to overwrite the existing file. Select Yes To All to overwrite all existing files with the restore files. • Do not overwrite Existing Files (NOOVRWRT) Existing files in a library are not overwritten with the restore file. • Rename Incoming (RNMINC) Renames an incoming restore file with a unique number (0001, 0002) appended with the file name if that file exists in the library. • Rename Existing (RNMEXT) Renames an existing library file (with a unique number (0001,0002) appended with the file name if an incoming restore file has the same name as the existing file. The IBM i Agent supports Overwrite/Rename Options for both IFS & OBJ Backups.
File Overwrite/Rename - OBJ Job	Press F4 to display the 3 available values for an OBJ Job. • Overwrite Existing file (OVRWRT) Overwrites all existing files in libraries after a restore. If an existing file in the library is changed, all changes are lost. • Prompt Before Overwrite Existing Files (PMTOVRT) A prompt appears before an existing file is overwritten with a restore file. If you select No to all, the restore option does not overwrite the existing file. If you select Yes To All the restore option overwrites all existing files. • Do not overwrite Existing Files (NOOVRWRT) Existing files in the library are not overwritten with the incoming restore file.

Ignore security data	Turn on or off the granting of private authorities on an object after it is restored. Enter *YES to ignore the security data and stop the GRTOBJAUT command from executing. It is recommend that you enter *YES to improve restore performance. You can later run the RSTAUT command to set private authorities.
No. of Jobs for small objects	The number of jobs to run concurrently when you save restore and backup objects with the save file method. You can enter values from 1-8. The default is 4.
Restore threads	The numbers of threads or jobs to run concurrently when restoring objects that were saved using save files. You can enter values from 1 to 8. A higher value can allow more objects to be restored concurrently and this can improve restore time. This parameter is related to the "Small Object Size" parameter
Log Detail	The amount and type of backup information to include in the log files. Choose from these options: • FILE • NONE • SUMMARY (default) • DIRECTORY
Destination	To directory to restore. You can select the original *SOURCE directory, or a different directory. You must provide an absolute path.
Create sub-file	These are the available options: • *YES - recreates the restored file structure like the Backup structure. • *NO - files are added to the top level, and no sub-files are created.
System states	The type of system data to restore. These are the available options: • *ALL • *CFG • *USRPRF • *SYSVAL • *QUSRSYS • *JOBSCD If you use the RSTUSRPRF and RSTCFG commands to restore *USRPRF and *CFG data, and you restore a non-existing user profile, the new (restored) profile is created without its password or group connection. You must reset them.
Prompt RSTxxx command	These are the available options: • *YES – You must enter individual restore commands. If you enter an incorrect system command, it fails. For example, if you enter an incorrect user name, the RSTUSRPRF command exits and an error message is added to the log file. • *NO - the IBM I Agent completes the without individual restore commands.

18 Completing a Bare Metal Restore

When your computer hardware or software fails and you cannot recover the source (IPL) disk, you must complete a bare metal restore. A bare metal restore is the process of recovering and restoring data to a computer without an operating system.

To complete a bare metal restore, you complete these tasks:

- Re-install the operating system and licensed internal code on the new computer from CDs or SAVSYS tape.
- Load recent PTFs if a recent SAVSYS tape is not available.
- Restore QUSRSYS and QGPL from tape.
- Configure TCP/IP connectivity to the LAN/WAN. Typically, you configure the TCP/IP settings when you install the IBM AS/400 operating system. If you cannot configure the TCP/IP settings when you install the operating system, you must use a separate TCP/IP utility installation.
- Install the IBM i Agent.
- Re-register the IBM i Agent with the Vault to recover and restore the global and job files. You use your user name and password to authorize the recovery and restoration of the configuration files. If you are restoring data to the original computer, a new license is not required. However, if you are restoring data to a new computer, contact your Service Provider for a new license.
- Restore the *SYS backup (System State) if a recent SAVSYS tape is not available.
- Restore *IBM
- Restore *ALLUSR
- Restore user data.
- Run the `RSTAUT` command to apply private authorities.

18.1 Prerequisites

Before completing a bare metal restore, the computer must have:

- An operating system.
- Network access to a Vault.
- An IBM i Agent.

18.2 Preparing the IBM i Agent for Recovery

To prepare the IBM i Agent for recovery:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **1** in the **Selection or Command** field. Press **Enter**.

3. Enter **1** in the **Selection or Command** field. Press **Enter**.
4. Press **F8** and complete these fields:
   - Network Address
   - Account
   - User Name
   - Password
5. Press **Enter**.
6. Enter **1** to the left of the computer you want to use as the source for the recovery. Press **Enter**.
7. Verify the settings are correct. Press **Enter**.

   Note:

   An error message appears if the destination host name does not match the source host name. Correct the host name settings in the Vault registration.
8. Press **F12**.
9. Enter **5** in the in the **Selection or Command** field. Press **Enter**.
10. Enter your original license key in the **License Key** field. Press **Enter**.
11. Press **F12** twice.
12. Enter **2** in the **Selection or Command** field. Press **Enter**.
13. Select a job and press **8**. Repeat until all jobs are synchronized.
14. Open a command prompt and type `WRKCFGSTS *LIN`. Verify all settings except `REMOTE1ET *LIND.`
15. Run the `WRKCFGSTS *CTL` command. Verify all settings except `CTL02 *CTLD` and `ETHERNET *CTLD`.
16. Run the `WRKCFGSTS *DEV` command. Verify all settings except `TAP01 *DEVD`, `QTAPE1 *DEVD`, `OPT01 *DEVD`, `ETHERTCP *DEVD`, and `DSP01 *DEVD`.

18.3 Restoring SYS Objects

You must perform this procedure from the console of the subsystem because the Agent puts the system into a restricted state to restore user profiles and configuration objects. To restore SYS objects:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **2** in the **Selection or Command** field. Press **Enter**.
3. Enter **9** to the left of the SYS job. Press **Enter**.

4. Enter ***CFG** and ***USRPRF** in the **System States** field.
5. Enter ***YES** in the **Prompt RSTxxx** command field. Press **Enter**.
6. Verify that **AGENT** appears in the **User profile to omit** field. Press **Enter**.
7. Verify that ***NONE** appears in the **System Resource Management** field. Press **Enter**.
8. Open and verify the restore logs contain the correct entries for RSTyyyymmdd-hhmmss and SYSyyyymmdd-hhmms. Ignore all configuration restore errors.

18.4 Resetting the System

To reset the system:

1. Open a command prompt and type `STRSBS QSYSWRK` to restart the QSYSWRK subsystem.
2. Run the `ENDJOB JOB(QCSTSRCD) OPTION(*IMMED) LOGLMT(0)` command to end job resource monitoring.
3. Run the `DSPJOB QCSTSRCD` command to list all job logs for the job.
4. Delete all job logs for the QCSTSRCD job.
5. Run the `ENDPFRCOL FRCCOLEND(*YES)` command to end performance data collection.
6. Run the `STRTCP STRSVR(*NO) STRPTPPRF(*NO) STRIP6(*NO)` command to start the TCP/IP protocol.
7. Run the `PING` command to verify the Vault is accessible.

18.5 Restoring IBM Library Objects

To restore all IBM library objects:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **2** in the **Selection or Command** field. Press **Enter**.
3. Enter **9** to the left of the IBM job. Press **Enter**.
4. In the **Name** field, enter ***ALL**.
5. In the **Library** field, enter **QSYS**.
6. In the **Type** field, enter ***LIB**.
7. In the **File member** field, enter ***ALL**.
8. In the **File Overwrite/Rename Obj** field, enter ***NOOVRWRT**.
9. Press **Enter**.

10. Open and verify the IBM restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain errors. If the log contains errors, see Verifying Restores.

18.6 Restoring User Library Objects

To restore user library objects:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **2** in the **Selection or Command** field. Press **Enter**.
3. Enter **9** to the left of the OBJ job. Press **Enter**.
4. In the **Name** field, enter ***ALL**.
5. In the **Library** field, enter **QSYS**.
6. In the **Type** field, enter ***LIB**.
7. In the **File member** field, enter ***ALL**.
8. In the **File Overwrite/Rename Obj** field, enter ***NOOVRWRT**.
9. Press **Enter**.
10. Open and verify the OBJ restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain errors. If the log contains errors, see Verifying Restores.

18.7 Restoring IBM Objects

To restore IBM objects:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **2** in the **Selection or Command** field. Press **Enter**.
3. Enter **9** to the left of the IBM job. Press **Enter**.
4. In the **Name** field, enter ***ALL**.
5. In the **Library** field, enter **QSYS**.
6. In the **Type** field, enter ***ALL**.
7. In the **File member** field, enter ***ALL**.
8. In the **File Overwrite/Rename Obj** field, enter ***NOOVRWRT**.
9. In the **No. of Jobs for small objects** field, enter **8**.
10. Press **Enter**.

11. Open and verify the IBM restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain errors. If the log contains errors, see Verifying Restores.

18.8 Restoring OBJ Objects

To restore OBJ objects:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **2** in the **Selection or Command** field. Press **Enter**.
3. Enter **9** to the left of the OBJ job. Press **Enter**.
4. Complete these fields in the **Include objects** area:
   - **Name** – Enter ***ALL**
   - **Library** – Enter **QSYS**.
   - **Type** – Enter ***JRN**.
   - **File Member** – Enter ***ALL**.
   - **File Overwrite/Rename Obj** – Enter ***OVRWRT**.
   - **No. of Jobs for small objects** – Enter **4**.
5. Press **Enter**.

   Note:

   To monitor the progress of OBJ_R and OBJ#R restores, open a command prompt and run the `WRKACTJOB` command.
6. Open and verify the OBJ restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain W (warning) or error (E) messages. If the log contains errors, see Verifying Restores.
7. Enter **9** to the left of the OBJ job on the **Work with Job** screen. Press **Enter**.
8. Complete these fields in the **Include objects** area:
   - **Name** – Enter ***ALL**
   - **Library** – Enter **QSYS**.
   - **Type** – Enter ***JRNRCV**.
   - **File Member** – Enter ***ALL**.
   - **File Overwrite/Rename Obj** – Enter ***OVRWRT**.
   - **No. of Jobs for small objects** – Enter **4**.
9. Press **Enter**.

10. Open and verify the OBJ restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain W (warning) or error (E) messages. If the log contains errors, see Verifying Restores.
11. Enter **9** to the left of the OBJ job on the **Work with Job** screen. Press **Enter**.
12. Complete these fields in the **Include objects** area:
    - **Name** – Enter ***ALL**
    - **Library** – Enter **QSYS**.
    - **Type** – Enter ***ALL**.
    - **File Member** – Enter ***ALL**.
13. Complete these fields in the **Exclude objects** area:
    - **Name** – Enter ***ALL**
    - **Library** – Enter **QSYS**.
    - **Type** – Enter ***JRN**.
    - **File Member** – Enter ***ALL**.
    - **Name** – Enter ***ALL**
    - **Library** – Enter **QSYS**.
    - **Type** – Enter ***JRNRCV**.
    - **File Member** – Enter ***ALL**.
    - **File Overwrite/Rename Obj** – Enter ***OVRWRT**.
    - **No. of Jobs for small objects** – Enter **8**.
14. Open and verify the OBJ restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain W (warning) or error (E) messages. If the log contains errors, see Verifying Restores.

18.9 Restoring IFS Objects

To restore IFS objects:

1. Open a command prompt and type `GO LIBRARY/ISAGENT` (where LIBRARY is the library name where the Agent is installed).
2. Enter **2** in the **Selection or Command** field. Press **Enter**.
3. Enter **9** to the left of the IFS job. Press **Enter**.
4. Complete these fields in the **Include objects** area:
    - **Absolute path** – Enter **'/'**
    - **File** – Enter **'*.*'**

- **Recursive** – Enter ***YES**.

5. Complete these fields in the **Exclude objects** area:
   - **Absolute path** – Enter **'/buagent'**.
   - **File** – Enter **'*.*'**
   - **Recursive** – Enter ***YES**.
   - **Absolute path** – Enter **'/QSYS.LIB'**.
   - **File** – Enter **'*.*'**
   - **Recursive** – Enter ***YES**.
   - **Absolute path** – Enter **'/QDLS'**.
   - **File** – Enter **'*.*'**
   - **Recursive** – Enter ***YES**.
   - **Absolute path** – Enter **'*.jar'**.
   - **File** – Enter **'*.*'**
   - **Recursive** – Enter ***YES**.
   - **Absolute path** – Enter **'/'**.
   - **File** – Enter **'*.class'**
   - **Recursive** – Enter ***YES**
   - **File Overwrite/Rename Options (OVREXTIFS)** – Enter ***OVRWRT**.
6. Press **Enter**.
7. Open and verify the IFS restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain W (warning) or error (E) messages. If the log contains errors, see Verifying Restores.
8. Enter **9** to the left of the IFS job on the **Work with Job** screen. Press **Enter**.
9. Complete these fields in the **Include objects** area:
   - **Absolute path** – Enter **'/'**
   - **File** – Enter **'*.jar'**
   - **Recursive** – Enter ***YES**.
   - **Absolute path** – Enter **'/'**
   - **File** – Enter **'*.class'**
   - **Recursive** – Enter ***YES**.
10. Complete these fields in the **Exclude objects** area:
    - **Absolute path** – Enter **'/QIBM/ProdData'**.

- **File** – Enter **'*.*'**
- **Recursive** – Enter ***YES**.
- **Absolute path** – Enter **'/QOpenSys/QIBM/ProdData'**.
- **File** – Enter **'*.*'**
- **Recursive** – Enter ***YES**.
- **File Overwrite/Rename Options (OVREXTIFS)** – Enter ***OVRWRT**.

11. Press **Enter**.
12. Open and verify the IFS restore log contains the correct entry for RSTyyyymmdd-hhmmss. The log should not contain W (warning) or error (E) messages. If the log contains errors, see Verifying Restores.

18.10 Verifying Restores

If the SYS, IBM, OBJ, and IFS log files display errors, you might need to specify the *NOOVRWRT option to restore individual objects or libraries. In addition, it might be necessary to delete and restore the library.

18.11 Restoring Authority

1. Open a command prompt and run the `ENDSYS *IMMED` command.
2. Run the `DSPMSG QSYSOPR` to verify the server is in restricted state.
3. Run the `RSTAUT` command.

18.12 Restarting the Computer

1. Open a command prompt and run the `CHGIPLA` command to place the computer into *NORMAL mode.
2. Run the `PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)` to restart the computer.

19 Uninstalling the IBM i Agent

Use one of these methods to uninstall the IBM i Agent:

- From an FTP site
- From a CD

The uninstall operation removes these components:

- Product library (BUAGENT or other name from client).
- Product directory (/BUAgent or other name from client).
- Scheduled Jobs (Agent associated scheduled Jobs if it's the only Agent).
- Applied triggers (Agent associated triggers).
- AGENT subsystem
- AGENT user profile (if it is the only Agent).

19.1 Uninstalling an FTP Installation

To uninstall an IBM i Agent installed from an FTP:

1. On the IBM i computer run this command:

   `CALL Restore- EVSAVE/ISSETUP`

   If you created a library with a different name, replace EVSAVE with the name of the library
2. Enter **4** to the left of an IBM i Agent. Press **Enter**.
3. Enter **Yes** in the **Are you sure you want to uninstall** field.

19.2 Uninstalling a CD Installation

To uninstall an IBM i Agent installed from an FTP:

1. Open a command prompt and run the `LODRUN DEV<Optical device name>` command.
2. Enter **4** to the left of an IBM i Agent. Press **Enter**.
3. Enter **Yes** in the **Are you sure you want to uninstall** field.

20 Recreating a Delta File

To recreate the DTA (delta) file, you re-register the IBM i Agent and then run job synchronization. After you recreate the delta file, you can run the backup.

If you cannot recreate the delta file by re-registering the IBM i Agent and running synchronization, you can use reseeding to rebuild the delta file. Reseeding only applies to the CLI; the UI is unaffected.

To use reseeding to rebuild the delta file, open a command prompt and run this command:

```
VV Backup job1 /param=job1.vpb /forcereseed
```

When you run this command and the Vault supports delta recreation, the backup is forced to reseed if the recreated file is unusable.

You can only recreate a delta file if the backup was done from an IBM i Agent version 6 or newer to a Vault version 6 or newer. For example, if you backup a safeset using an IBM i Agent version 6 or newer to a Vault version 5 or later, and then upgrade the Vault to version 6, a delta file cannot be recreated.

When you attempt to recreate a delta file on an unsupported version of the IBM i Agent or the Vault, error messages indicating that the delta file recreation failed are added to the restore log. However, the restore still functions. Use the `forcereseed` command to create new delta files that are compatible with the version 6 Vault.

21 Improving the Performance of your IBM i Computer

Typically, before the installation of the IBM i Agent, a full system save 21 is completed on an IBM i computer once a week or once a month. When a system save 21 is running, the IBM i computer can be unavailable for several hours. When you move to IBM i Agent backup, it is recommended that you complete a system save 22 (system data only). The system save 22 saves the operating system and licensed programs, and consumes less computer resources. The IBM i Agent can save system state information (security data, configuration data, and system values) while the computer is running. You only need to run the save 22 when you load PTFs. If you follow these recommendations, you can significantly reduce the down time of your computer.

The IBM i Agent supports the *IBM special value to backup licensed programs. However, a job to backup *IBM is not required because the necessary files are included with the system save 22.

The IBM i Agent supports the *ALLUSR special value to backup all user libraries. However, the IBM i Agent is not limited to a single device. To improve performance it is recommended that you divide the libraries into multiple jobs.

Here are some additional recommendations for improving the performance of your IBM i computer:

- Create 3 or more jobs for each available CPU.
- For *OBJ jobs, keep the total object count per job to 10,000 or less.
- Create separate Jobs for volatile objects like databases and journal receivers and for non-volatile objects like programs, service programs even if they reside in the same library.
- When using save 22, ensure QUSRSYS and QGPL are saved and restore from tape before you start the Agent.
- Exclude QMPGDATA (Performance Data Library) from the *ALLUSR job in backups and restores.
- Do not run *SYS Backup and *ALLUSR backups at the same time. If *SYS Backup and *ALLUSR backups are running at the same time, you may receive mutex errors in the *ALLUSR backup log because some objects may be locked while the other process times out. *SYS backup only runs for a few minutes and you can run it first.