System i

Networking
OptiConnect

Version 5 Release 4

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OptiConnect

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Note

Before using this information and the product it supports, read the information in “Notices,” on page 51.

First Edition (February 2006)

This edition applies to version 5, release 4, modification 0 of IBM i5/OS (product number 5722-SS1) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

Contents

OptiConnect

OptiConnect is an IBM® System i™ system area network (SNA) that provides high-speed connectivity between multiple systems in a local environment with wide area network (WAN) and local area network (LAN) technologies.

What's new for V5R4

This topic highlights the changes made to this topic collection for V5R4.

The OptiConnect for OS/400® manual, SC41-5414, is no longer available, and the content has been moved into this information center topic.

A new topic "OptiConnect and IP forwarding" on page 35 has been added to this topic collection. IP forwarding and routing allow systems or partitions that are not connected to the same OptiConnect loop to communicate using TCP/IP.

What's new as of April 2007

A new topic "Activating logical partitions for OptiConnect" on page 14, which includes "Activating logical partitions for HSL OptiConnect" on page 15 and "Activating logical partitions for HSL OptiConnect" on page 15, has been added to this topic collection.

How to see what's new or changed

To help you see where technical changes have been made, this information uses:

- The » image to mark where new or changed information begins.
- The « image to mark where new or changed information ends.

To find other information about what's new or changed this release, see the Memo to users.

Printable PDF

Use this to view and print a PDF of this information.

To view or download the PDF version of this document, select OptiConnect (about 850 KB).

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Concepts

OptiConnect refers to both software and hardware functions.

OptiConnect software is a priced, optional feature of the i5/OS® operating system (5722-SS1 option 23). OptiConnect software is required for OptiConnect communications between systems.

OptiConnect also refers to the hardware configuration over which OptiConnect software communicates. Not all OptiConnect hardware functions require a license for the OptiConnect software.

OptiConnect connectivity advantages

OptiConnect provides several advantages through shared database clustering, such as horizontal growth and high availability.

Planning and managing a computing system involves many decisions, such as where to place files, where to attach communications lines, and where to locate the most critical applications. Each system involved limits the decisions. Here are some of the limits:

- Processing capacity limits
- Distribution of users and applications across systems
- Maximum amount of storage, or maximum number of communications lines that are attached to the systems

OptiConnect provides solutions to many of these problems by enabling capacity growth through shared database clustering. The OptiConnect cluster not only achieves horizontal growth and high availability, but also helps data warehousing and database parallelism architectures.

Horizontal growth

By separating database operations from application workload, multiple systems can operate as a cluster to grow computing power beyond what a single system can provide. Not all applications are favorable to this type of workload distribution. The horizontal growth scalability depends on the database input/output (I/O) intensity. The best implementation is to separate the interactive application from the corresponding data while maintaining the batch application on the same system as the batch data. Techniques are available to transparently manage the batch job submission to the database system.

High availability

OptiConnect can be used to provide high availability solutions. Single-system high availability has an upper limit at the point of failure of that system. However, multiple systems connected together can provide continuous availability. OptiConnect includes a set of application programming interfaces (APIs) that allows application programs to access the high-speed bus transport. These APIs are intended for use by IBM Business Partners in the development of high availability solutions. Applications that provide database mirroring using the OptiConnect connections are available from IBM Business Partners.

All OptiConnect technologies allow System i applications to perform intersystem database accesses across a high-performance interface. The ability to efficiently read and update data on connected systems provides the following benefits:

- Multiple clients can easily and efficiently access databases on a server by splitting the processor load for an application across the clients and server.

  The clients run the nondatabase portion of an application, and the server runs the database activity. Multiple systems provide greater total processing capacity for database access than a single system can achieve. OptiConnect allows this increased capacity by decreasing processor load and using high-speed connections.

- Customer environments with multiple databases (or databases that can be partitioned into multiple databases) can extend the client/server database model to have multiple systems. Applications can access all the databases across OptiConnect connections regardless of the database location.

  Ideally, applications and users are assigned to a system that contains the data that they use most heavily. Less heavily used data can reside on any of the other systems. This allows you to spread applications to achieve the best balance and throughput.
- Duplication of databases can be eliminated to decrease response time.

  For example, if you currently maintain copies of data on several systems, you can connect the systems to achieve consistent response time. All applications can access and update one single database.
- OptiConnect functions can be used to duplicate copies of a database and update duplicated data more efficiently.

Related reference

OptiConnect APIs

OptiConnect and System i clustering

OptiConnect supports communication in a System i cluster.

A System i cluster is a collection of one or more systems or logical partitions that work together to provide a single, unified computing solution. Systems in a cluster are called *cluster nodes*. Communication between cluster nodes is based on TCP/IP protocols. OptiConnect software can be used to provide this communication between cluster nodes. The major cluster communication functions supported by OptiConnect include cluster heartbeat, application IP takeover, and device IP takeover.

Related concepts

Cluster

OptiConnect software capabilities

OptiConnect software supports several functions.

- Distributed data management (DDM)

  All DDM operations for supported object types can run across OptiConnect, including data files, data areas, and data queues.
- Distributed Relational Database Architecture™ (DRDA®)

  OptiConnect supports Structured Query Language (SQL) applications by using the relational database directory to control access to databases on remote systems.
- DB2® Multisystem

  DB2 Multisystem with its DB2 Universal Database™ for iSeries™ support for multinode files can run across OptiConnect, providing data warehouse functions of IBM Query for iSeries and two-phase commit.
- ObjectConnect

  ObjectConnect can operate over OptiConnect to provide high-speed, system-to-system save and restore functions.
- Standard Advanced Program-to-Program Communication (APPC) conversations

  Standard APPC conversations are available over OptiConnect with an OptiConnect communication controller.
- Systems Network Architecture distribution services (SNADS)

  SNADS, display station pass-through, network printer pass-through, and other functions can run across OptiConnect.
- Socket support

This function allows applications that use TCP/IP to communicate over OptiConnect when they are running in a System i multiple-node network with HSL OptiConnect, Virtual OptiConnect, or SPD OptiConnect.

- Products that provide efficient database mirroring for OptiConnect networks

  These products are available from IBM Business Partners.

Related concepts

APPC Programming

Backup and recovery

SNA Distribution Services

How OptiConnect works

The OptiConnect network connects multiple unique systems or logical partitions using the System i high-speed bus technologies.

The mechanism used by OptiConnect software to access database files on another system is modeled after the mechanism used by distributed data management (DDM). DDM uses a DDM file and Advanced Program-to-Program Communication (APPC) to redirect file access operations to another system. Similarly, OptiConnect uses DDM files and a special transport service to redirect file access operations to another system in an OptiConnect network. Thus, OptiConnect can achieve transport efficiencies that are not possible with a more general purpose, wide-area communications protocol.

Two things differentiate OptiConnect from traditional communications-based distributed operations. The first is a high-speed connection mechanism that takes advantage of the I/O bus or memory bus structure to connect multiple systems or logical partitions. The second is a device driver that is embedded in the operating system. This device driver streamlines the application access to data on a remote system. After OptiConnect establishes system connections, much of the APPC protocol stack is bypassed. The OptiConnect fast-path connection for database transactions provides DDM access to databases anywhere in the OptiConnect network at a fraction of the standard communications code path. Data warehouse, Distributed Relational Database Architecture (DRDA), and data propagation functions, such as journaling, can use this technology.

OptiConnect hardware

There are several types of OptiConnect hardware.

HSL OptiConnect

High-speed link (HSL) is a hardware connectivity architecture that links system processors to system I/O buses and other systems. HSL OptiConnect is a high-speed physical connection that uses an HSL OptiConnect loop.

HSL OptiConnect can refer to the OptiConnect feature that provides high-speed connectivity between two or three systems through an HSL OptiConnect loop. HSL OptiConnect can also refer to the HSL loop technology that is used to connect two or three systems together in a single loop. Each system can have one or more logical partitions participating in the OptiConnect network.

Although each HSL OptiConnect loop is limited to three systems, OptiConnect software supports multiple HSL OptiConnect loops between systems, providing loop redundancy in addition to the hardware redundancy provided in each HSL loop.

Note: Any logical partition on the system can participate in an HSL OptiConnect loop without additional cost.

The following figure shows two systems that are connected through an HSL OptiConnect loop. When OptiConnect software is installed and running, a high-speed system-to-system connection is maintained. Two systems can have more than one HSL loop that connects them together, provided that the server model supports more than one HSL OptiConnect loop.

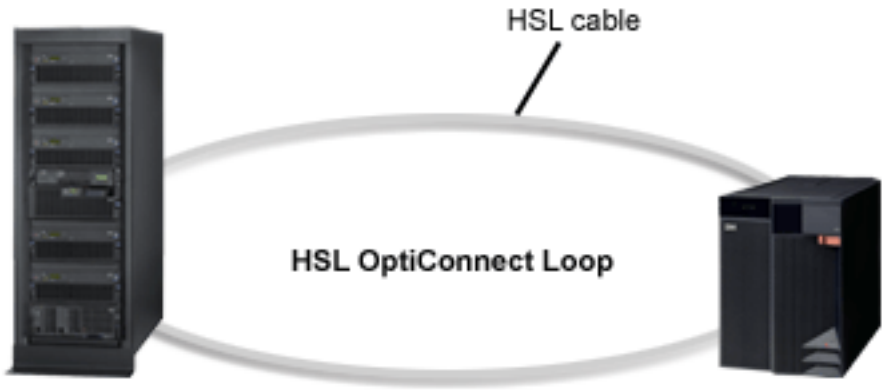

Figure 1. HSL OptiConnect

Systems and expansion units can have HSL or HSL-2 cable ports, depending on the model. Both types of cable ports are supported on an HSL loop or HSL OptiConnect loop by using an HSL to HSL-2 cable.

HSL OptiConnect loops also support HSL fiber-optic cables. This technology is offered on some models. The entire HSL OptiConnect loop must use fiber-optic cables.

The following figure shows a three-system HSL OptiConnect loop. All systems in a three-system HSL OptiConnect loop must be at the minimum operating system release level of the most current hardware.

Figure 2. Three-system HSL OptiConnect loop

Related tasks

"Activating logical partitions for HSL OptiConnect" on page 15
You need to configure and activate logical partitions such that they can participate in an HSL OptiConnect loop.

Related information

High Availability and Clusters Web site

Virtual OptiConnect

Virtual OptiConnect is a virtual connection between logical partitions running on the same system.

Virtual OptiConnect can refer to the OptiConnect feature that provides high-speed connectivity between two or more logical partitions on a single system using the memory-to-memory bus technology. There is no additional hardware required to support Virtual OptiConnect.

To activate the Virtual OptiConnect communication between logical partitions, see "Activating logical partitions for Virtual OptiConnect" on page 15.

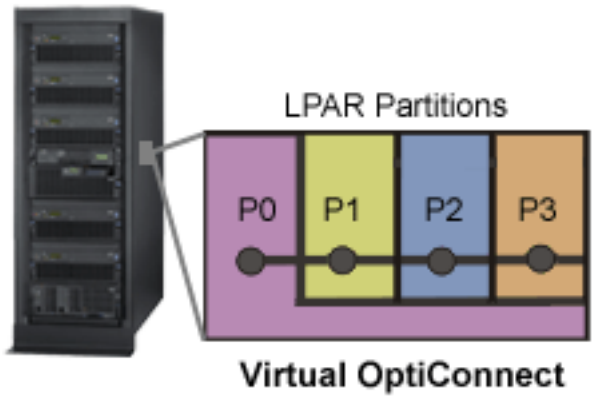

Figure 3. Virtual (inter-partition) OptiConnect

SPD OptiConnect

System product division (SPD) is a bus architecture that allows I/O to communicate to the processor. SPD OptiConnect is a high-speed physical OptiConnect connection that uses the SPD bus technology.

SPD OptiConnect can refer to the OptiConnect feature that provides high-speed system-to-system connectivity through the SPD bus technology. SPD OptiConnect requires an SPD bus that is available on earlier System i models and through the 5077 SPD migration unit supported on some iSeries 8*xx* models. Models with HSL-2 ports do not support SPD OptiConnect.

The systems in an SPD OptiConnect network share a common external optical system bus that is located in a dedicated expansion unit or frame (also called an SPD OptiConnect hub unit). The system that provides this system bus is called the *hub* system. The hardware used to create the hub system for an SPD OptiConnect network consists of a dedicated system I/O expansion unit or frame. Each system that plugs into this bus with an OptiConnect receiver card is called a *satellite* system. Each satellite system dedicates one of its external system buses to connect to the receiver card in the hub system's expansion unit or frame.

Redundancy is supported in SPD OptiConnect networks through SPD bus redundancy. Redundancy requires a second SPD OptiConnect hub, an extra set of OptiConnect receiver cards, and an extra I/O expansion unit or frame, along with another set of cables.

Note: Systems attached to the hub system do not use the hub system's CPU resources.

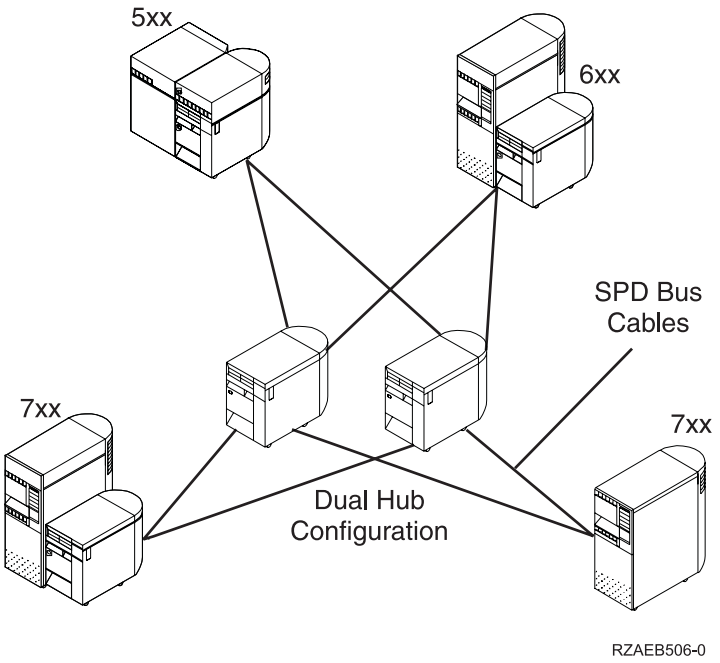

Figure 4. SPD OptiConnect

Figure 4 shows a dual bus configuration, providing full redundancy in the SPD OptiConnect system area network. If one of the hub systems fails, the SPD OptiConnect network remains in service and all communications activity is run through the other hub. When both hubs are operating, the communications traffic is shared between both. This increases the bandwidth with two paths available for use.

An SPD OptiConnect network can consist of up to 14 systems (one hub and 13 satellites) with full system-to-system connectivity. A satellite system can communicate with both hub systems and all the other satellite systems on the same shared bus. Interoperability between operating system versions is maintained so that systems at different release levels can be connected in the same SPD OptiConnect network. With additional hubs, up to 32 systems can be supported.

iSeries 840, 830, and 270 can participate in an SPD OptiConnect network by using a migration unit.

Related reference

High Availability and Clusters

Mixed technology environments

OptiConnect supports HSL OptiConnect, Virtual OptiConnect, and SPD OptiConnect in a single network.

OptiConnect always configures Virtual OptiConnect when possible. If there is more than one possible connection between any two systems, OptiConnect configures both HSL OptiConnect and SPD OptiConnect and alternates between them.

Figure 5 on page 8 shows an example of a mixed technology environment. In this figure, iSeries 830 and 840 can participate as nodes in both SPD and HSL OptiConnect environments. A migration unit is required for some 8*xx* models to participate in an SPD OptiConnect network. Systems with the current HSL-2 port technology do not support the attachment of migration units. There is no seamless upgrade path for an SPD-based model 7*xx* in an SPD OptiConnect network to a current model in an HSL

OptiConnect network.

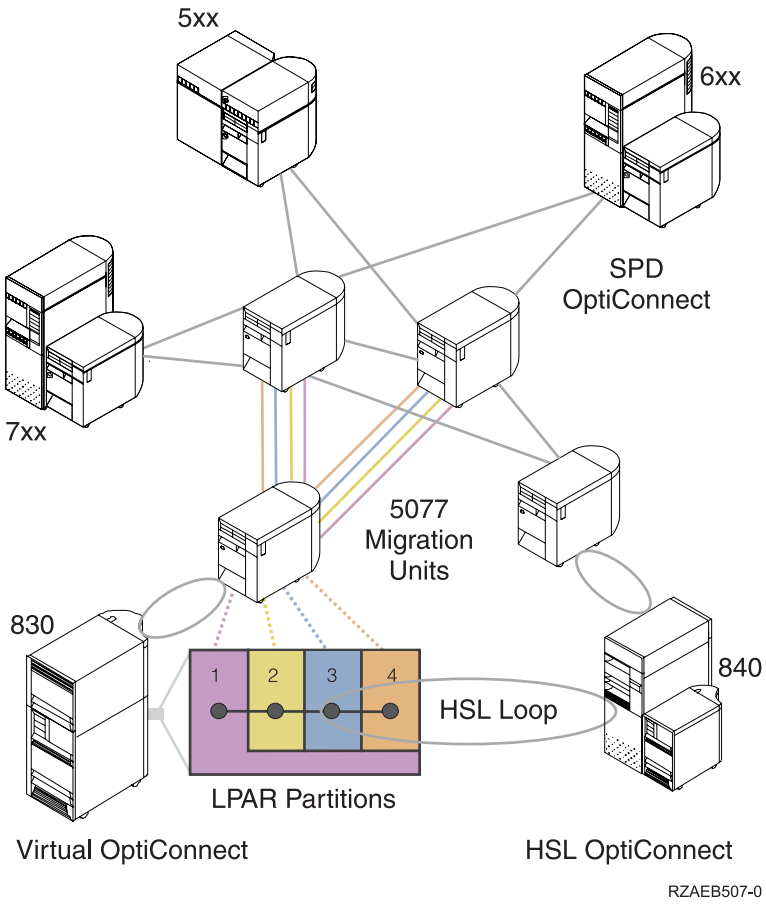

Figure 5. OptiConnect interoperability

OptiConnect software

OptiConnect software is a priced, optional feature of the i5/OS operating system.

Application structure

An OptiConnect cluster usually has a database system and one or more application systems.

The system where the database resides is the *database system*, and the systems that contain the applications are the *application systems*.

The OptiConnect software allows a program on the application system to make database changes or database queries on the database system. Central Processing Unit (CPU) workload ratios of under 30% database and 70% application benefit the most by distributing workloads between systems in the OptiConnect network. Figure 6 on page 9 shows this type of setup.

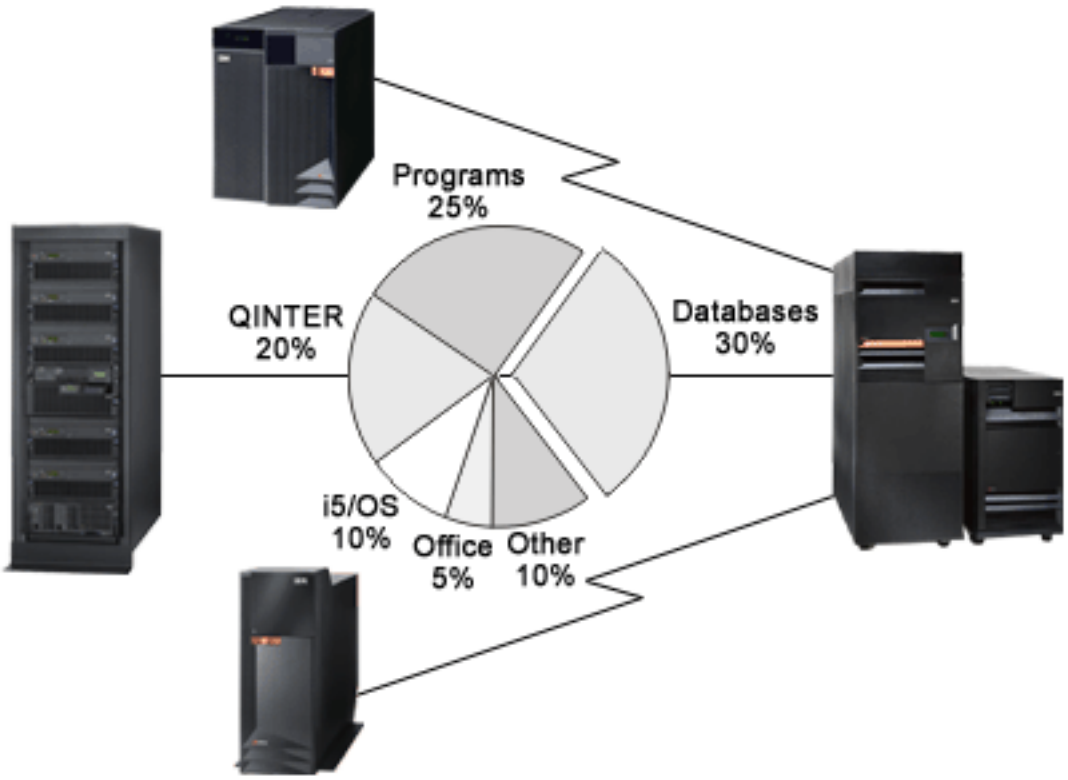

Figure 6. CPU utilization by OptiConnect

Another important consideration is whether the application is batch or interactive. This clustering technology is optimal for interactive workloads. Batch workloads require special considerations and might not be appropriate for use in an OptiConnect environment. However, solutions can be designed to effectively handle a mixture of batch and interactive workloads, as well as multiple database and application methods. Applications with heavy database activity and large numbers of file open and close operations might not realize the full potential of the OptiConnect technology.

When a program opens a database file, the associated distributed database management (DDM) file or relational database (RDB) entry identifies the database system name. The OptiConnect connection manager on the application system sends the database request to the database system by using a fast *device driver*. The OptiConnect communications link provides access at a fraction of the DDM system overhead because its communications protocol operates only in a specific shared bus environment. The OptiConnect connection manager connects the request with an agent job on the database system. Agent jobs work with the database code to issue the request and route the result back to the application system.

OptiConnect components

OptiConnect has several basic required components. These components must not be deleted for any reason.

Library

The QSOC library holds all the objects that are used by OptiConnect:

- Programs
- Files
- Classes
- Commands
- Data areas

- Panel groups
- Subsystem descriptions
- Product loads
- Job queues
- Job descriptions

Subsystem
The OptiConnect connection manager job and agent jobs run in the QSOC subsystem unless a mode table has been configured to run under a different subsystem.

Jobs OptiConnect has two kinds of jobs: the OptiConnect connection manager job (SOCMGR) and the agent jobs (SOCA*nnnnnn*). The SOCMGR job manages OptiConnect resources. There is one SOCMGR job per system. The SOCA*nnnnnn* agent jobs interface with the database on behalf of the application system. Each of the agent jobs is a data access job that works to get data to and from the remote system.

Job descriptions
There are three job descriptions for OptiConnect: QYYCMGR, QYYCDTSU, and QYYCSRA. QYYCMGR is the job description for the SOCMGR job. QYYCDTSU is the job description for all SOCA*nnnnnn* jobs. QYYCSRA is the job description for the ObjectConnect save and restore agent jobs. These job descriptions are included as part of OptiConnect.

Job queue
The QSOC job queue is used to submit OptiConnect jobs to the QSOC subsystem.

Autostart job
The SOCMGR job is automatically started when the QSOC subsystem is started.

User profile
The OptiConnect connection manager job runs under the QSOC user profile. The OptiConnect agent jobs run under the QUSER user profile, which can be changed through the QYYCDTSU job description. The authority and library list of the agent jobs can also be changed through the QYYCDTSU job description.

Routing entries
The routing entries used in starting subsystem jobs have compare values of QYYCDTSU, QYYCMGR, QYYCSRA, and QZDMAGNT. The compare value is matched against the routing data field in the job description that is placed in the job queue for this subsystem. When the job is pulled off the job queue, the routing data is compared to all of the routing entries in the subsystem. When a match is found, the program that is listed for the routing entry is run. The program is run by using the class that is specified for that job.

Commands
These are OptiConnect commands:

- Work with OptiConnect Activity (WRKOPCACT): This command displays information about the number of transactions and number of bytes that are read and written for both application and database systems. It also provides information about the status of system connections.
- Display OptiConnect Link Status (DSPOPCLNK): This command shows pertinent link information about multiple systems that are connected through the fiber-optic bus or HSL.
- Verify OptiConnect Connection (VFYOPCCNN): This command runs the OptiConnect installation verification process.

Related concepts

"Customizing OptiConnect" on page 20
Depending on your needs, you can route Systems Network Architecture distribution services (SNADS) over OptiConnect or change the job description for the agent jobs.

"OptiConnect job descriptions"
The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCA*nnnnnn*) are defined in the QSOC library when you install OptiConnect.

"QSOC subsystem"
The OptiConnect system jobs, as delivered by IBM, are set up to run in the QSOC subsystem.

"Using the mode table" on page 27
Modes describe session characteristics between the local and remote locations. The use of modes over OptiConnect provides greater flexibility than standard mode support over Advanced Program-to-Program Communication (APPC). You start modes over OptiConnect through a mode table.

Related tasks

"Verifying OptiConnect software installation" on page 14
After you install OptiConnect software, follow this procedure to verify that the installation is successful.

Related reference

Display OptiConnect Link Status (DSPOPCLNK) command

Verify OptiConnect Connections (VFYOPCCNN) command

Work with OptiConnect Activity (WRKOPCACT) command

QSOC subsystem

The OptiConnect system jobs, as delivered by IBM, are set up to run in the QSOC subsystem.

You can find a description of the QSOC subsystem in the QSOC library. To view the description, enter `DSPSBSD (QSOC/QSOC)`.

The subsystem description contains the following information that pertains specifically to the OptiConnect operating environment:

- **Autostart job entries**

  Autostart job entries list jobs that are initiated when the subsystem is started. An autostart job is defined for the QSOC subsystem and runs when the subsystem is started. This job initiates the OptiConnect connection manager job, SOCMGR.

  When you select option 3 (Autostart job entries) on the Display Subsystem Description display, you can see a list of autostart entries.

- **Job queue entries**

  You can display the job queue entries by selecting option 6 (Job queue entries) on the Subsystem Description display. The Display Job Queue Entries display shows the queues from which jobs are taken when a given subsystem is run.

- **Routing entries**

  You can display the routing entries detail by selecting option 7 (Routing entries) on the Subsystem Description display. For more information about routing entries, see Work management.

Related concepts

"OptiConnect components" on page 9
OptiConnect has several basic required components. These components must not be deleted for any reason.

Related reference

Display Subsystem Description (DSPSBSD) command

OptiConnect job descriptions

The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCA*nnnnnn*) are defined in the QSOC library when you install OptiConnect.

The SOCMGR job uses the QYYCMGR job description, and the SOCA*nnnnnn* jobs use the QYYCDTSU job description. These job descriptions can be changed to fit the customer environment.

The SOCMGR job maintains the agent jobs through the request data in the QYYCMGR job description.

By default, the SOCA*nnnnnn* jobs run under the QUSER user profile.

Related concepts

"OptiConnect components" on page 9
OptiConnect has several basic required components. These components must not be deleted for any reason.

Related tasks

"Changing QUSER access authority" on page 21
By default, the OptiConnect agent jobs run under the QUSER user profile if you use the fast path method. You can change the user profile for these agent jobs to give them appropriate access authority to files on the database system.

Related reference

"QYYCMGR job description" on page 23
The OptiConnect connection manager job, SOCMGR, maintains the agent jobs through the request data in the QYYCMGR job description.

Installing OptiConnect

The first step for establishing OptiConnect connections is to install the OptiConnect hardware and software.

Note: You can install either the hardware or the software first, depending on what is more convenient for you.

Related information

High Availability and Clusters Web site

Software requirements

You need to install OptiConnect software (5722–SS1 option 23) on your system. OptiConnect software is a priced, optional feature of the i5/OS operating system.

Note: If you have a three-system HSL OptiConnect loop, all systems in the loop must be at V5R2 or later.

Related tasks

"Installing OptiConnect software" on page 13
To install OptiConnect software on your system, follow these steps.

Hardware requirements

OptiConnect hardware requirements are dependent on the specific hardware used.

- **HSL OptiConnect**

  On models that support the high-speed link, there is no additional hardware required other than standard HSL or HSL-2 cables to connect the systems into an HSL loop.

- **Virtual OptiConnect**

  In a logical partitioning environment, there is no additional hardware required because the connectivity between logical partitions is internal to the system. The hardware communication option HSL OptiConnect must be activated for each logical partition that uses the HSL OptiConnect function. The hardware communication option Virtual OptiConnect must be activated for each logical partition that uses the Virtual OptiConnect function.

- **SPD OptiConnect**

  On models that support the SPD system bus, OptiConnect receiver cards are installed in a dedicated I/O expansion unit. Each receiver card is connected to a satellite system through standard SPD fibre-optic cables.

  The following table shows SPD OptiConnect hardware and feature codes.

Table 1. Hardware required for SPD OptiConnect

Type	Feature code	Description
1063 Mbps OptiConnect receiver card	2685	This card is placed in the hub's dedicated I/O expansion unit and is connected to a satellite system.
266 Mbps OptiConnect receiver card	2683	This card is placed in the hub's dedicated I/O expansion unit and is connected to a satellite system.
1063 Mbps Optical link card	2688	This card connects a satellite system to a 1063 Mbps OptiConnect receiver card, type 2685.
266 Mbps Optical link card	2686	This card connects a satellite system to a 266 Mbps OptiConnect receiver card, type 2683.

Related concepts

"OptiConnect hardware" on page 4
There are several types of OptiConnect hardware.

Related reference

High Availability and Clusters

Installing OptiConnect software

To install OptiConnect software on your system, follow these steps.

1. Sign on to the system as the security officer (QSECOFR).
2. Enter `GO LICPGM` and press Enter.
3. Select option 11 (Install licensed programs) from the Work with Licensed Programs display and press Enter. The Install Licensed Programs display is shown.
4. Enter 1 next to product option 23 for OptiConnect and press Enter.

When you install OptiConnect, library QSOC is installed on your system.

The optional features of the i5/OS operating system that you can install are considered to be additional licensed programs.

If you want to remove OptiConnect software from your system, use the Delete Licensed Program (DLTLICPGM) command. You can back up the licensed program by using the Save Licensed Program (SAVLICPGM) command.

Related concepts

Backup and recovery

"Hardware requirements" on page 12
OptiConnect hardware requirements are dependent on the specific hardware used.

"QSOC subsystem" on page 11
The OptiConnect system jobs, as delivered by IBM, are set up to run in the QSOC subsystem.

"Software requirements" on page 12
You need to install OptiConnect software (5722–SS1 option 23) on your system. OptiConnect software is a priced, optional feature of the i5/OS operating system.

Related tasks

Installing, upgrading, or deleting i5/OS and related software

"Verifying OptiConnect software installation"
After you install OptiConnect software, follow this procedure to verify that the installation is successful.

Related reference

Delete Licensed Program (DLTLICPGM) command

Save Licensed Program (SAVLICPGM) command

Verifying OptiConnect software installation

After you install OptiConnect software, follow this procedure to verify that the installation is successful.

1. Run the Check Product Option (CHKPRDOPT) command to ensure that the OptiConnect code and objects have been installed correctly.
2. Enter `STRSBS QSOC/QSOC` on all systems to start the OptiConnect QSOC subsystem.
3. Enter `DSPMSG *SYSOPR` on all systems to display the messages that were issued when the QSOC subsystem was started. The following messages are displayed after a successful initiation of the OptiConnect connection manager:

   ```
   Subsystem QSOC in library QSOC starting.
   Subsystem QSOC started.
   OptiConnect connection manager started at mm/dd/yy hh:mm:ss.
   OptiConnect connected to SYSTEMA using SOC01 at mm/dd/yy hh:mm:ss.
   OptiConnect connected to SYSTEMB using SOC02 at mm/dd/yy hh:mm:ss.
   ```

   The number of messages (and adapter types within the messages) that you see depend on the following factors:

   - Your hardware configuration
   - The systems to which you are connected
   - The systems that have started the OptiConnect subsystem
4. Enter `VFYOPCCNN` to begin the installation verification. This ensures system-to-system connection in the cluster. Check your job log for the completion message `OptiConnect verification test completed with no errors`.
5. Enter `QSOC/WRKOPCACT` to check the OptiConnect activity on the systems in the cluster. You should see activity as a result of the Verify OptiConnect Connection (VFYOPCCNN) procedure. VFYOPCCNN causes the system to act as a client to each of the other systems in the network.
6. Enter `WRKHDWRSC TYPE(*CSA)` to confirm that the hardware connections are operational and to show the operational status of the bus receiver cards. TYPE(*CSA) displays a resource for each remote system that had, at some point, an operational connection to the system on which you are entering the command.

Related tasks

"Installing OptiConnect software" on page 13
To install OptiConnect software on your system, follow these steps.

Related reference

Check Product Option (CHKPRDOPT) command

Display Messages (DSPMSG) command

Start Subsystem (STRSBS) command

Verify OptiConnect Connections (VFYOPCCNN) command

Work with Hardware Resources (WRKHDWRSC) command

Work with OptiConnect Activity (WRKOPCACT) command

Activating logical partitions for OptiConnect

You need to activate logical partitions for Virtual OptiConnect, for HSL OptiConnect, or for both types of OptiConnect.

Activating logical partitions for Virtual OptiConnect

You need to configure and activate logical partitions such that they can communicate using Virtual OptiConnect.

You must install the OptiConnect feature on all the logical partitions that use Virtual OptiConnect. You must start the QSOC subsystem on each of these logical partitions.

To activate the Virtual OptiConnect communications between logical partitions, follow these steps based on your System i model:

- **On model 5*xx***
  1. From the Hardware Management Console (HMC), select **Server Management** and select the local partition profile properties.
  2. Under the **OptiConnect** tab, select **Use Virtual OptiConnect**.
  3. For the change to take effect, activate each logical partition from HMC.
- **On model 8*xx***
  1. Use the dedicated service tools (DST) or system service tools (SST) to configure each logical partition into the OptiConnect network.
  2. From the primary partition, set the communication option **Connect to Virtual OptiConnect** to **Yes** for each logical partition (in addition to the primary partition) that uses the OptiConnect function.

Related concepts

"Virtual OptiConnect" on page 6
Virtual OptiConnect is a virtual connection between logical partitions running on the same system.

"Starting OptiConnect" on page 38
You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Related tasks

"Installing OptiConnect software" on page 13
To install OptiConnect software on your system, follow these steps.

Activating logical partitions for HSL OptiConnect

You need to configure and activate logical partitions such that they can participate in an HSL OptiConnect loop.

You must install the OptiConnect feature on all the logical partitions that use HSL OptiConnect. You must start the QSOC subsystem on each of these logical partitions.

To activate logical partitions for HSL OptiConnect, follow these steps based on your System i model:

- **On model 5*xx***
  1. From the Hardware Management Console (HMC), select **Server Management** and select the local partition profile properties.
  2. Under the **OptiConnect** tab, select **Use High Speed Link (HSL) OptiConnect**.
  3. For the change to take effect, activate each logical partition from HMC.
- **On model 8*xx***
  1. Use the dedicated service tools (DST) or system service tools (SST) to configure each logical partition into the OptiConnect network.
  2. From the primary partition, set the communication option **Connect to HSL OptiConnect** to **Yes** for each logical partition (in addition to the primary partition) that uses the OptiConnect function.

Related concepts

| "HSL OptiConnect" on page 4
| High-speed link (HSL) is a hardware connectivity architecture that links system processors to system I/O buses and other systems. HSL OptiConnect is a high-speed physical connection that uses an HSL OptiConnect loop.
| "Starting OptiConnect" on page 38
| You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.
| **Related tasks**
| "Installing OptiConnect software" on page 13
| To install OptiConnect software on your system, follow these steps.

Configuring OptiConnect

You can use either the fast path method or the extended function path method to route data requests through OptiConnect. The fast path method provides faster communication, but it does not support two-phase commit as the extended function path method does.

Any i5/OS applications that are written to use distributed data management (DDM) can use OptiConnect. This applies to both new and existing applications. Many applications that use an i5/OS database can transparently use DDM without changes to the applications. OptiConnect uses the same mechanism as traditional DDM, where the DDM file controls access to a database. Applications that use OptiConnect DDM to access a database can also use traditional Advanced Program-to-Program Communication (APPC) DDM to access another database at the same time.

The fast path method for routing data requests through OptiConnect involves specifying a special keyword in the DDM file. If you use the fast path method, OptiConnect agent jobs start in the OptiConnect connection manager and run in the QSOC subsystem. These jobs follow the OptiConnect job naming convention. The fast path method is the faster means of communications because of a shorter code path, but it does not support two-phase commit protocols.

If you use the extended function path method, OptiConnect agent jobs are started by the APPC attach manager and run in the QCMN subsystem. These jobs follow the standard DDM naming conventions for communication jobs. The extended function path method supports two-phase commit protocols.

Related concepts

Distributed data management

Related tasks

"Basic troubleshooting procedure" on page 45
If you have a problem with OptiConnect, follow this procedure to determine the cause.

Configuring fast path routing

If you want fast communication, you can configure OptiConnect fast path routing. However, the fast path method does not support two-phase commit.

The fast path method uses a special device description of QYCTSOC. When an Advanced Program-to-Program Communication (APPC) conversation is directed at this device, the device driver redirects the conversation through the OptiConnect bus, bypassing most of the standard distributed database management (DDM), Distributed Relational Database Architecture (DRDA), and APPC code.

Note: The QYCTSOC device description is created during the OptiConnect software installation, but it always remains varied off. This device description is necessary and must not be deleted.

To route data requests over OptiConnect by using the fast path method, you must specify the QYCTSOC keyword in the device description parameter of a DDM file. You can use either the Create Distributed Data Management File (CRTDDMF) command or the Change Distributed Data Management File (CHGDDMF) command to add this information.

To create a new DDM file, follow these steps:

1. For the remote location (RMTLOCNAME) parameter, specify the name of the target system where the request will be performed. You can use the Display Network Attributes (DSPNETA) command to display the system name.
2. After you enter the rest of the information, press F10 (Additional parameters) and enter `QYCTSOC` for the device description.

   OptiConnect does not specifically use the other parameters on the CRTDDMF command. However, make sure that you have specified either *YES or *NO for the share open data path (SHARE) parameter.

   Note: When you specify QYCTSOC for the device, the RMTLOCNAME parameter is limited to a valid system name.

To change an existing DDM file, follow these steps:

1. Enter the name of the DDM file and the library, and then press Enter.
2. For the RMTLOCNAME parameter, specify the name of the target system where the request will be performed, and then press F10.
3. On the Additional Parameters display, enter `QYCTSOC` for the device description.

   OptiConnect does not specifically use the other parameters on the CHGDDMF command. However, make sure that you have specified either *YES or *NO for the SHARE parameter.

OptiConnect, by default, accepts any values in the mode (MODE) parameter of a DDM file. However, if you want OptiConnect agent jobs to start with the user profile specified in the QYYCDTSU job description, you must use QYCTSOC in the MODE parameter. Any other value in the MODE parameter causes the OptiConnect agent jobs to start with the user profile and the job description that initiated the DDM conversation.

Related concepts

Distributed data management

"Using the mode table" on page 27
Modes describe session characteristics between the local and remote locations. The use of modes over OptiConnect provides greater flexibility than standard mode support over Advanced Program-to-Program Communication (APPC). You start modes over OptiConnect through a mode table.

Related tasks

"Configuring extended function path routing"
You configure OptiConnect extended function path routing for two-phase commit and some Lotus® Domino® applications.

Related reference

Change Distributed Data Management File (CHGDDMF) command

Create Distributed Data Management File (CRTDDMF) command

Display Network Attributes (DSPNETA) command

Configuring extended function path routing

You configure OptiConnect extended function path routing for two-phase commit and some Lotus Domino applications.

The extended function path method requires the configuration of Advanced Program-to-Program Communication (APPC) controllers and devices. The controller description needs to have a link type of *OPC, which indicates to the device driver layer that the controller is attached to the optical bus (OptiConnect). The extended function path method cannot bypass some of the communication layers as the fast path method. However, this method is necessary for certain functions, such as two-phase commit, and for some Lotus Domino applications (LS:DO) that use LS:DO to access remote data.

To route data requests through OptiConnect without using the special device keyword, you create OptiConnect controllers and devices of link type *OPC. The remote system name must be the name of the target system.

To configure *OPC controllers and devices, follow these steps:

1. Create a controller description: `CRTCTLAPPC CTLD(name) LINKTYPE(*OPC) RMTSYSNAME(sysname) ROLE(*PRI or *SEC) DSAP(##)`. You must create a pair of *OPC controllers (one on each of the two systems that use OptiConnect to communicate). The data link role of one system must be *PRI (primary) and the data link role of the other system must be *SEC (secondary). The destination service access point (DSAP) value must match the source service access point (SSAP) value assigned to the remote controller. Valid DSAP values are 04, 08, 0C, 10, 14, ...78, 7C.

   The following job log shows an example of creating an *OPC controller on one system SYSTEMA to connect to the other system SYSTEMB:

   ```
   > CRTCTLAPPC CTLD(SYSBCTL) LINKTYPE(*OPC) RMTSYSNAME(SYSTEMB)
                         ROLE(*PRI) DSAP(44)
      Description for controller SYSBCTL created.
   ```

2. Create a device description for a device attached to the controller: `CRTDEVAPPC DEVD(SYSBDEV) RMTLOCNAME(SYSB) ONLINE(*NO) LCLLOCNAME(SYSA) CTL(SYSBCTL) APPN(*NO)`.

   The *OPC controller only accepts devices that are created with APPN(*NO). The remote location (RMTLOCNAME) and local location (LCLLOCNAME) values specified for one system must match the LCLLOCNAME and RMTLOCNAME values specified for the other system in the pair. The Online at IPL (ONLINE) parameter must be set to *NO because you cannot vary on OptiConnect controllers and attached devices until the QSOC subsystem has started.

   The following job log shows an example of creating a device description on SYSTEMA for a device attached to controller SYSBCTL:

   ```
   > CRTDEVAPPC DEVD(SYSBDEV) RMTLOCNAME(SYSB) ONLINE(*NO)
      LCLLOCNAME(SYSA) CTL(SYSBCTL) APPN(*NO)
      Description for device SYSBDEV created.
   ```

3. On the other system in the pair, create a controller description that points to the description created in Step 1. The following job log shows an example of creating a controller description on SYSTEMB to connect to SYSTEMA:

   ```
   > CRTCTLAPPC CTLD(SYSACTL) LINKTYPE(*OPC)
                    RMTSYSNAME(SYSTEMA) ROLE(*SEC) DSAP(44)
        Description for controller SYSACTL created.
   ```

4. Create a device description on SYSTEMB for a device attached to controller SYSACTL:

   ```
   > CRTDEVAPPC DEVD(SYSADEV) RMTLOCNAME(SYSA) ONLINE(*NO)
             LCLLOCNAME(SYSB) CTL(SYSACTL) APPN(*NO)
        Description for device SYSADEV created.
   ```

5. Repeat steps 1 and 2 for all the system pairs in the OptiConnect network.
6. Vary on all *OPC controllers and devices to enable requests over OptiConnect.

   When one *OPC controller in the pair is varied on, the status of the controller changes to `ACTIVE/CNN PENDING` or `VARYON/CNN PENDING`. This indicates that the OptiConnect path is not completely established. After the other *OPC controller is varied on, the status of both controllers changes to `ACTIVE`, and the OptiConnect connection is available for data transfer.

   Note: You must start the QSOC subsystem on both systems before varying on the *OPC controllers and their attached devices. If the QSOC subsystem is ended on either of the systems, the

controllers on that system and all connected systems change to the status ACTIVE/CNN PENDING or VARYON/CNN PENDING. After the QSOC subsystem is restarted, there cannot be any activity through these controllers until they are varied off and then back on.

Use the Vary Configuration (VRYCFG) command to vary on controllers and devices. The following job log shows an example of varying on controller SYSBCTL on SYSTEMA:

```
> VRYCFG CFGOBJ(SYSBCTL) CFGTYPE(*CTL) STATUS(*ON)
     Vary on completed for controller SYSBCTL.
     Vary on completed for device SYSBDEV.
```

The following job log shows an example of varying on controller SYSACTL on SYSTEMB:

```
> VRYCFG CFGOBJ(SYSACTL) CFGTYPE(*CTL) STATUS(*ON)
     Vary on completed for controller SYSACTL.
     Vary on completed for device SYSADEV.
```

7. Set up DDM files.

   Use the same remote and local locations that are specified in the APPC device description. Use *LOC for the device description parameter. The remote and local locations that are defined for the devices attached to the *OPC controllers can also be used in Structured Query Language (SQL) relational database directories.

Although varying on the *OPC controllers and devices enables traffic over OptiConnect, varying off these devices and controllers does not necessarily block the traffic. To ensure that OptiConnect activity is stopped, use the vary option of the Work with OptiConnect Activity (WRKOPCACT) command, or end the QSOC subsystem.

The *OPC controllers can be used to provide APPC capabilities across the OptiConnect bus. An application program that uses the intersystem communications function (ICF) file interface, the Common Programming Interface for Communications (CPI-C), or the CICS® file interface can communicate with an application on a remote system through OptiConnect. Previously, only a DDM or an SQL application could use OptiConnect to communicate with a remote application.

The default QYCTSOC APPC device description has *PUBLIC authority *CHANGE, so any users can use OptiConnect. To keep the public from using OptiConnect, use the Revoke Object Authority (RVKOBJAUT) command, and then use the Grant Object Authority (GRTOBJAUT) command to grant *DEVD access to specific users.

Note: The APPC device description does not describe a device. It is used to control authority and access to the OptiConnect path.

Related concepts

"Routing SQL over OptiConnect" on page 26
You can route static and dynamic Structured Query Language (SQL) over OptiConnect through Distributed Relational Database Architecture (DRDA).

Related tasks

"Configuring fast path routing" on page 16
If you want fast communication, you can configure OptiConnect fast path routing. However, the fast path method does not support two-phase commit.

Related reference

Create Controller Description (APPC) (CRTCTLAPPC) command

Create Device Description (APPC) (CRTDEVAPPC) command

Create Distributed Data Management File (CRTDDMF) command

Grant Object Authority (GRTOBJAUT) command

Revoke Object Authority (RVKOBJAUT) command

Vary Configuration (VRYCFG) command

Work with OptiConnect Activity (WRKOPCACT) command

Customizing OptiConnect

Depending on your needs, you can route Systems Network Architecture distribution services (SNADS) over OptiConnect or change the job description for the agent jobs.

Routing SNADS over OptiConnect

Systems Network Architecture distribution services (SNADS) can use the OptiConnect link to distribute data between systems through the fiber-optic cable.

When you configure SNADS over OptiConnect, the system uses the APPC controllers and device descriptions previously created in "Configuring extended function path routing" on page 17. To configure a directory entry, a routing table entry, and a distribution queue, follow these steps:

1. Add a directory entry to point a user or several users (*ANY) to the remote system:

```
ADDDIRE USRID(xxx/*ANY)   (xxx is the address of remote system)
        USRD(xxx)         (xxx is the description
        SYSNAME(xxx)      (xxx is the name of the remote system)
```

2. Create a distribution queue:

```
ADDDSTQ DSTQ(xxx)         (xxx is the name of the queue)
        RMTLOCNAME(xxx)    (same as specified in the APPC DEVD)
        DSTQTYPE(*SNADS)
        MODE(*NETATR)      (or specify a mode)
        RMTNETID(*NETATR)
        LCLLOCNAME(xxx)    (same as specified in the APPC DEVD)
```

   The values in the distribution queue for the remote location (RMTLOCNAME) and local location (LCLLOCNAME) parameters allow SNADS to select the correct APPC device description that points to the target system.

3. Create a routing table that points to the distribution queue:

```
ADDDSTRTE SYSNAME(xxx)    (xxx is the name of the remote system)
          FAST(xxx)       (xxx is the name of the remote system)
          STATUS(xxx)     (xxx is the name of the remote system)
          DATAHIGH(xxx)   (xxx is the name of the remote system)
          DATALOW(xxx)    (xxx is the name of the remote system)
```

4. Verify that the QSOC and QSNADS subsystems are active on both systems.

Related concepts

SNA Distribution Services

Related reference

Add Directory Entry (ADDDIRE) command

Add Distribution Queue (ADDDSTQ) command

Add Distribution Route (ADDDSTRTE) command

Initial library list

By default, the library list of an OptiConnect agent job contains the system values of the system and user library lists.

The default library list of an OptiConnect agent job is sufficient to run standard distributed data management (DDM) functions because DDM objects, such as DDM files, DDM data areas, and DDM data queues, require you to specify a library at creation time.

The following functions, however, do not require you to specify the library for an object at creation time:

- Distributed Relational Database Architecture (DRDA)
- Lotus Domino scripts with LS:DO and @Commands
- DB2 triggers

Note: Changing the system value of the system or user library list can also enable DDM functions.

You can control the library list of the remote jobs by changing the SOCA*nnnnnn* job description, QYYCDTSU, to include the necessary libraries. For DRDA and Domino, you can either add the necessary library into the initial library list or library qualify your Structured Query Language (SQL) or Open Database Connectivity (ODBC) statements. For triggers, you must include the library in the initial library list.

Note: If the SOCA*nnnnnn* jobs were started, you need to use the End Subsystem (ENDSBS) command to end the QSOC subsystem and restart it so that the agent jobs can start with the new initial library list.

Related reference

End Subsystem (ENDSBS) command

"QYYCDTSU job description"
The OptiConnect agent jobs, SOCA*nnnnnn*, use the QYYCDTSU job description.

Changing QUSER access authority

By default, the OptiConnect agent jobs run under the QUSER user profile if you use the fast path method. You can change the user profile for these agent jobs to give them appropriate access authority to files on the database system.

To change the QUSER access authority, follow these steps:

1. Enter `CHGJOBD QSOC/QYYCDTSU`, press F4 (Prompt), and press F10 (Additional parameters).
2. For the User parameter, change the default value QUSER to an appropriate user profile name, specifically, the user profile name that controls the agent job authority.

Related concepts

"OptiConnect job descriptions" on page 11
The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCA*nnnnnn*) are defined in the QSOC library when you install OptiConnect.

Related reference

Change Job Description (CHGJOBD) command

QYYCDTSU job description

The OptiConnect agent jobs, SOCA*nnnnnn*, use the QYYCDTSU job description.

The following figures show the QYYCDTSU job description for the SOCA*nnnnnn* jobs.

```
                          Display Job Description
                                                              System:   SYSTEMA
Job description:   QYYCDTSU       Library:   QSOC

User profile . . . . . . . . . . . . . . . . . . . :   QUSER
CL syntax check  . . . . . . . . . . . . . . . . . :   *NOCHK
Hold on job queue  . . . . . . . . . . . . . . . . :   *NO
End severity . . . . . . . . . . . . . . . . . . . :   30
Job date . . . . . . . . . . . . . . . . . . . . . :   *SYSVAL
Job switches . . . . . . . . . . . . . . . . . . . :   00000000
Inquiry message reply  . . . . . . . . . . . . . . :   *RQD
Job Priority (on job queue)  . . . . . . . . . . . :   5
Job queue  . . . . . . . . . . . . . . . . . . . . :   QSOC
  Library  . . . . . . . . . . . . . . . . . . . . :     QSOC
Output priority (on output queue)  . . . . . . . . :   5
Printer device . . . . . . . . . . . . . . . . . . :   *USRPRF
Output queue . . . . . . . . . . . . . . . . . . . :   *USRPRF
  Library  . . . . . . . . . . . . . . . . . . . . :

                                                                       More...
Press Enter to continue.

F3=Exit   F12=Cancel
```

```
                          Display Job Description
                                                              System:   SYSTEMA
Job description:   QYYCDTSU       Library:   QSOC

Message logging:
  Level  . . . . . . . . . . . . . . . . . . . . . :   4
  Severity . . . . . . . . . . . . . . . . . . . . :   0
  Text . . . . . . . . . . . . . . . . . . . . . . :   *NOLIST
Log CL program commands  . . . . . . . . . . . . . :   *NO
Accounting code  . . . . . . . . . . . . . . . . . :   *USRPRF
Print text . . . . . . . . . . . . . . . . . . . . :   *SYSVAL

Routing data . . . . . . . . . . . . . . . . . . . :   QYYCDTSU

Request data . . . . . . . . . . . . . . . . . . . :   *NONE


Device recovery action . . . . . . . . . . . . . . :   *SYSVAL
                                                                       More...
Press Enter to continue.

F3=Exit   F12=Cancel
```

Figure 7. Display Job Description display - QYYCDTSU

```
                          Display Job Description
                                                              System:   SYSTEMA

Job description:   QYYCDTSU       Library:   QSOC

Time slice end pool  . . . . . . . . . . . . . . . :   *SYSVAL
Job message queue maximum size . . . . . . . . . . :   *SYSVAL
Job message queue full action  . . . . . . . . . . :   *SYSVAL
Allow multiple threads . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . . . . :   SOC Agent Job Description

Initial library list:
  *SYSVAL









                                                                        Bottom
Press Enter to continue.

F3=Exit   F12=Cancel
```

Figure 8. Display Job Description display - QYYCDTSU (continued)

Related concepts

"Initial library list" on page 20
By default, the library list of an OptiConnect agent job contains the system values of the system and user library lists.

QYYCMGR job description

The OptiConnect connection manager job, SOCMGR, maintains the agent jobs through the request data in the QYYCMGR job description.

Figure 1 shows the QYYCMGR job description for the SOCMGR job.

```
                          Display Job Description
                                                              System:   SYSTEMA
Job description:   QYYCMGR        Library:   QSOC

User Profile . . . . . . . . . . . . . . . . . . . :   QSOC
CL syntax check  . . . . . . . . . . . . . . . . . :   *NOCHK
Hold on job queue  . . . . . . . . . . . . . . . . :   *NO
End severity . . . . . . . . . . . . . . . . . . . :   30
Job date . . . . . . . . . . . . . . . . . . . . . :   *SYSVAL
Job switches . . . . . . . . . . . . . . . . . . . :   00000000
Inquiry message reply  . . . . . . . . . . . . . . :   *RQD
Job priority(on job queue) . . . . . . . . . . . . :   3
Job queue  . . . . . . . . . . . . . . . . . . . . :   QSOC
  Library  . . . . . . . . . . . . . . . . . . . . :      QSOC
Output priority (on output queue)  . . . . . . . . :   5
Printer device . . . . . . . . . . . . . . . . . . :   *USRPRF
Output queue . . . . . . . . . . . . . . . . . . . :   *USRPRF
  Library  . . . . . . . . . . . . . . . . . . . . :

                                                                       More...
Press Enter to continue.

F3=Exit   F12=Cancel
```

```
                          Display Job Description
                                                              System:   SYSTEMA
Job description:   QYYCMGR        Library:   QSOC

Message logging:
  Level  . . . . . . . . . . . . . . . . . . . . . :   4
  Severity . . . . . . . . . . . . . . . . . . . . :   0
  Text   . . . . . . . . . . . . . . . . . . . . . :   *NOLIST
Log CL program commands  . . . . . . . . . . . . . :   *NO
Accounting code  . . . . . . . . . . . . . . . . . :   *USRPRF
Print text . . . . . . . . . . . . . . . . . . . . :   *SYSVAL

Routing data . . . . . . . . . . . . . . . . . . . :   QYYCMGR

Request date . . . . . . . . . . . . . . . . . . . :   CALL PGM(QSOC/QYYCMGR)
PARM(0 0 0)

Device recovery action . . . . . . . . . . . . . . :   *SYSVAL
                                                                       More...
Press Enter to continue.

F3=Exit   F12=Cancel
```

Figure 9. Display Job Description display - QYYCMGR

```
                        Display Job Description
                                                              System:   SYSTEMA
Job description:   QYYCMGR        Library:   QSOC

Time slice end pool  . . . . . . . . . . . . . . . :   *SYSVAL
Job message queue maximum size . . . . . . . . . . :   *SYSVAL
Job message queue full action  . . . . . . . . . . :   *SYSVAL
Allow multiple threads . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . . . . :   SOC Connection Manager Job
Description
Initial library list:
  *SYSVAL









                                                                       Bottom
Press Enter to continue.

F3=Exit   F12=Cancel
```

Figure 10. Display Job Description display - QYYCMGR (continued)

The job description shows the routing data for QYYCMGR. This should be listed as one of the routing entries in the QSOC subsystem description. The request data (*CALL PGM(QSOC/QYYCMGR) PARM(0 0 0)*) is the actual program call that initiates OptiConnect. The parameters describe the pool of agents that are maintained on the application system and are passed to the OptiConnect connection manager. You can change these parameters to tune the system performance. The first number is the initial number of agents in the system (0). The second number is the minimum number of agents that are allowed in the pool (0). The third number is ignored (0).

Related concepts

"OptiConnect job descriptions" on page 11
The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCA*nnnnnn*) are defined in the QSOC library when you install OptiConnect.

"OptiConnect performance factors"
Several factors can affect the performance of OptiConnect.

OptiConnect performance factors

Several factors can affect the performance of OptiConnect.

- Storage pool

  OptiConnect is initially installed to use the *BASE storage pool. You must determine if this storage pool and the amount of storage that is allocated to the pool are appropriate for each system in the cluster. Specify at least 16 MB per application system on the database system for OptiConnect.

- Job class and priority

  The OptiConnect agents run under the QYYCAGNT class in the QSOC library. The agent job class is shipped to run at priority 20; however, the job automatically runs at the same priority as its corresponding source job.

- SOCMGR job description QYYCMGR

  As part of the job description for the SOCMGR job, the request data calls the QYYCMGR program in the QSOC library. The following parameters are passed to the program:

  – The first parameter value is the initial number of agent jobs that are started in the agent job pool. This number includes both active and available agent jobs. Active agent jobs are connected to a source DDM user job. Available agent jobs are those that are not currently connected to a user job, but are waiting to be used. When active jobs end, the connection manager submits jobs to maintain

the number of jobs in the agent job pool. This parameter is similar to the prestart jobs parameter that is used when you start a subsystem. When the subsystem starts, jobs are available.

– The second parameter value is the minimum number of available agent jobs that are maintained in the agent job pool. When available agent jobs become active agent jobs, the connection manager submits jobs to maintain the number of available agent jobs. This number must always be less than 50.
– The third parameter value is ignored. Enter 0.

The default parameters are (0 0 0).

You can adjust these values to prestart a predetermined number of agent jobs. When a work request comes in, it is sent directly to an agent job already running or prestarted. The number of agent jobs should be adjusted according to the requirements of individual installations.

To prestart agent jobs, change the defaults for the QYYCMGR job description. To change these values, follow these steps:

1. Enter `CHGJOBD QSOC/QYYCMGR`.
2. Press F4 (Prompt) and then press F10 (Additional parameters).

For the request data, change the default parameter values (0 0 0) to the values that you want.

Note: Prestart agent jobs can only be used by applications whose DDM files have QYCTSOC as the device. If the *OPC controller method is used, DDM prestart jobs must be configured.

Related reference

"QYYCMGR job description" on page 23
The OptiConnect connection manager job, SOCMGR, maintains the agent jobs through the request data in the QYYCMGR job description.

Change Job Description (CHGJOBD) command

Advanced OptiConnect customization

OptiConnect provides several advanced customization functions.

Routing SQL over OptiConnect

You can route static and dynamic Structured Query Language (SQL) over OptiConnect through Distributed Relational Database Architecture (DRDA).

You can use either the fast path method or the extended function path method to route SQL over OptiConnect. The fast path method is easier to use, but you cannot use commitment control or distributed unit of work (*DUW) for this method. If commitment control or *DUW is needed, you need to use the extended function path method.

OptiConnect supports the use of static SQL with both dynamic and extended dynamic SQL. You can also use the Extended Dynamic Remote SQL (EDRS) APIs to route extended dynamic SQL over OptiConnect.

Routing SQL using the fast path method

To route SQL requests over OptiConnect using the fast path method, you need to specify special keywords in the relational database (RDB) directory.

The database system must have an RDB entry that matches the relational database name specified on the application systems with *LOCAL for the remote location (RMTLOCNAME) parameter. On the application systems, the RMTLOCNAME parameter must point to the system where the database resides. Each relational database name must be unique within the distributed network. Each entry identifies the method of accessing the relational database as well as other parameters.

To add an entry to the RDB directory, follow these steps:

1. Enter the Add Relational Database Directory Entry (ADDRDBDIRE) command.

2. Press F4 (Prompt) and then F9 (Show all parameters).
   a. Enter a name for the RDB parameter. The name on the application system must match the name on the database system.
   b. Enter the RMTLOCNAME parameter. On each application system, specify the name of the target system. On the database system, specify *LOCAL.
   c. Enter `QYCTSOC` for the APPC device description (DEV) parameter.
   d. Enter `*LOC` for the local location (LCLLOCNAME) parameter.

After creating the RDB directory entry, you need to recompile the SQL program to point to the RDB entry. When you recompile the SQL program, specify commitment control as *NONE and RDB connect method as *RUW.

Note: The RDB parameter must match the RDB parameter in the RDB entry.

Routing SQL using the extended function path method

To route SQL requests over OptiConnect using the extended function path method, you need to specify the RMTLOCNAME and LCLLOCNAME parameters in the RDB directory. Ensure that these parameter values match the extended function path descriptions previously created in "Configuring extended function path routing" on page 17.

Recompiling the SQL program pulls the target system name from the RDB entry, creates an SQL package, and runs the program on the target system.

Related tasks

"Configuring fast path routing" on page 16
If you want fast communication, you can configure OptiConnect fast path routing. However, the fast path method does not support two-phase commit.

Related reference

Extended Dynamic Remote SQL (EDRS) APIs

Add Relational Database Directory Entry (ADDRDBDIRE) command

Routing remote journals over OptiConnect

You can route remote journals over OptiConnect through the relational database (RDB) directory entry.

You can use either the fast path method or the extended function path method. The configuration requires the remote location name and other necessary information.

Related concepts

Backup and Recovery

Using the mode table

Modes describe session characteristics between the local and remote locations. The use of modes over OptiConnect provides greater flexibility than standard mode support over Advanced Program-to-Program Communication (APPC). You start modes over OptiConnect through a mode table.

The mode table, QMTABLE, is not included with OptiConnect. It must be created if additional customization is required.

When the QSOC subsystem is started, the QSOC library is checked to see if QMTABLE exists. If QMTABLE exists, the parameters are used to start any OptiConnect agent jobs. Otherwise, a default set of values are placed in storage.

To create the OptiConnect mode table, enter `CALL QSOC/QYYCMUTL CREATE`. This creates the DDS source file QSOCDDS, with member QSOCDDS and a sample mode table QMSAMPLE in the QSOC library. You can

create QMTABLE by copying this sample table or by using the DDS source file. QMTABLE is a physical file and needs to reside in the QSOC library. You can use the data file utility (DFU) to change this table, adding one entry for each mode or location required.

For the fast path method, add the following entries:

```
WORK WITH DATA IN A FILE       Mode....:  Entry
Format.....:  MODREC           File....:  QMTABLE

MODE:       QYCTSOC            RMTLOC:       *ANY
LCLLOC:     *ANY               JOBD:         QYYCDTSU
JOBDLIB:    QSOC               JOBQ:         QSOC
JOBQLIB:    QSOC               DFTUSER:      *JOBD
RCLRSC:     *RCLRSC            JOBPRIOR:     *DYNAMIC
INIJOB:     0                  MINJOB:       0
USREXIT:    *OBJAUT            USREXITLIB:   *LIBL
CONJRNL:    *NONE              CONJRNLLIB:   *LIBL
ROUTING:    QYYCDTSU           JOBSTDLY:     200
JOBENDDLY:  0
```

Note: The ROUTING entry must always be QYYCDTSU to use the OptiConnect agent jobs that are supplied with the QSOC subsystem. No entry is required in the mode table for ObjectConnect.

The mode table is searched each time an agent job is started (DDM target) for a match against the keyed values. There are three keyed fields in QMTABLE: LCLLOC, RMTLOC, and MODE. The table is searched for the following values:

1. Target system name extracted from network attributes (matched against LCLLOC)
2. Source system name that was sent to the target system (matched against RMTLOC)
3. Mode that was also sent to the target system (matched against MODE)

A specific value for the three fields can be matched in the table or *ANY. A specific value is always taken over *ANY, regardless of the order of the entries in the table. The following priority scheme determines which table entry is used:

1. A specific LCLLOC match is taken over a specific RMTLOC or a specific MODE.
2. A specific RMTLOC match is taken over a specific MODE.

Note: The Fields column in the mode table is case sensitive and all entries need to be in uppercase. Table 2 shows the fields and associated descriptions.

Table 2. Fields in the mode table

Field	Description
RMTLOC	Remote location (from the system point of view)
LCLLOC	Local location (from the system point of view)
MODE	Mode description from the DDM file
JOBD	Job description for the agent job
JOBDLIB	Library for the agent job description
JOBQ	OptiConnect agent job queue (*JOBD for value from job description)
JOBQLIB	Library for the OptiConnect agent job queue
DFTUSER[1, 2]	Default user profile for the OptiConnect agent job • *NONE means that the agent job runs under the same user profile as the client job$_1$. • *JOBD means that the agent job uses the user profile from the job description.

Table 2. Fields in the mode table (continued)

Field	Description
RCLRSC	*RCLRSC for disabling reclaim resources (default) • *DDMCONV for disabling reclaim DDM conversations • *BOTH for disabling reclaim resources and reclaim DDM conversations • *NONE for enabling both reclaim resources and reclaim DDM conversations **Note:** Disabling means that OptiConnect conversations will not be reclaimed.
JOBPRIOR	*DYNAMIC for changing the agent job priority when the client job priority is changed (default) • *STATIC for changing the agent job priority when the agent job is started • *NONE for not changing the agent job priority
INIJOB[3]	This is the minimum number of agent jobs that are maintained in the agent job pool. This number includes both active and available agent jobs.
MINJOB[3]	This is the minimum number of available agent jobs that are maintained in the agent job pool. When available agent jobs become active agent jobs, the connection manager submits jobs to maintain the number of available agent jobs.
USREXIT[4]	Program name - name of exit program if present • *OBJAUT for object authority checking only when the job priority is changed (default) • *REJECT for rejecting all connections when the agent job is started • *NETATR for using the DDM EXIT value from network attributes
USREXITLIB	Library for the user exit program
CONJRNL	Name of journal for connection journaling • *NONE for none.
CONJRNLLIB	Library for connection journaling
ROUTING	Routing data for job
JOBSTDLY	This value controls the rate at which prestart jobs are started in milliseconds.
JOBENDDLY	This value allows the OptiConnect connection manager to shut down before all idle jobs end. This allows the customer to continue with other operations, for example, backups. The remaining idle agent jobs end at a rate of 1 per JOBENDDLY milliseconds.

Notes:

[1]: The QSOC user profile must have *CHANGE authority to the user profile with which the agent job is submitted. If this authority does not exist, the agent job is not submitted and the client job hangs for two minutes until it times out.

[2]: The DFTUSER field replaces the APPC attribute SECURELOC from standard DDM security. This provides greater flexibility than standard DDM because the required security can be set individually for each DDM file.

[3]: If DFTUSER is set to *NONE, prestart agent jobs cannot be started and the minimum number of agent jobs cannot be maintained.

[4]: The USREXIT field overrides the network attribute field DDMACC.

Reloading the mode table

You can change and reload the mode table without ending and restarting the QSOC subsystem.

To do this, run the following command:

```
CALL QSOC/QYYCMUTL RELOAD
```

Restrictions:

- A default user of *NONE cannot be changed to any other value. A default user of any other value cannot be changed to *NONE.
- If a job prestarts or available agent job counts are decreased, available jobs will not be ended. However, the job counts will come down because the jobs are used up by new DDM connections.
- If the new table has an incorrect entry that prevents jobs from starting and INIJOB and MINJOB are both zero, complete these tasks:
  1. Fix the error in the table. Change the INIJOB value to a nonzero value and reload the table.
  2. Change the INIJOB value back to zero and reload the table again (this does not work if the DFTUSER value is *NONE because no prestart jobs can start.).

Journaling OptiConnect transactions

If journaling transactions across the OptiConnect link is required, the connection transactions can be journaled.

The journal name comes from the connection journal field of the OptiConnect mode table. All DDM connections made with remote systems are logged in this journal.

To log connection transactions, specify the journal name in the OptiConnect mode table, and then create the journal. Here are the field names in the journal:

1. Source fully qualified job name
2. Source system name
3. Target fully qualified job name
4. Target system name
5. Mode description
6. Timestamp

The SOCA*nnnnnn* job on the target system logs this information.

Submitting remote jobs

OptiConnect allows jobs to be submitted on the local system and started as a batch job on the target system transparently.

You must create these jobs using the Submit Job (SBMJOB) or Submit Database Jobs (SBMDBJOB) command. The transparency is achieved by replacing the QCMD routing entry in a subsystem description (SBSD) with an entry that will route the submitted job to the remote system.

Here is an example of configuring remote job submission:

1. Create a routing entry that calls QYYCROUT with two input parameters.

   Note: Routing entries do not allow program parameters. You need to create a program to call QYYCROUT and pass the parameters. The program should look like the following CL program example ROUTEPGM:

```
PGM
CALL PGM(QSOC/QYYCROUT) PARM(ddmfile libname)
ENDPGM
```

2. Add a routing entry to a subsystem description (SBSD) and specify ROUTEPGM as the program to call.
3. Create or change a job description to specify the routing data that is to be the compare value for the routing entry just added.

   Note: All jobs submitted with this job description will be run on the remote system by the QYYCROUT program.
4. When the job is submitted, QYYCROUT is started. QYYCROUT then extracts information from the DDM file passed in. This DDM file is not used after this. Here are the parameters for the DDM file:
   - Device = QYCTSOC
   - Mode = BATCHJOB
   - LCLLOCNAME = *LOC
   - REMOTE SYSTEM = *target system name*
5. QYYCROUT creates a data queue and a DDM file in the QTEMP library. It starts a SOCA*nnnnnn* job and creates a data queue on the target system.
6. QYYCROUT retrieves job attributes, cancel severity, and local data area (LDA). The job and LDA information is sent to the remote data queue on the target system. The target system runs a program to receive this information and changes the attributes of the target job to match the source job.
7. QYYCROUT extracts information about inline data files and copies them to QTEMP in the target job.

The job queue on the source system receives request data one command at a time and runs each request on the target system. After each command is run, the target job returns an indication of whether cancel severity has been exceeded. This allows QYYCROUT to decide if the job should be terminated. Because commands are run one at a time, holding the job on the source system ends command execution on the target system until the job is released.

After all the requests have been received and run, and if message logging is set to something other than *NOLIST, the target job log is retrieved and written to QPJOBLOG. The user data field is set to the target system name.

To route the spooled file back to the source system, follow these steps:

1. Create a remote output queue by using the Create Output Queue (CRTOUTQ) command.
2. Specify the system name that you will be routing files to in the remote system (RMTSYS) parameter. This allows you to supply information to the remaining parameters.
3. For the remote printer queue (RMTPRTQ) parameter, specify the output queue to which the remote writer sends the spooled file.
4. Run the Start Remote Writer (STRRMTWTR) command on the target system. See Figure 11 on page 32 and Figure 12 on page 33.

Remote Job Submission Source System

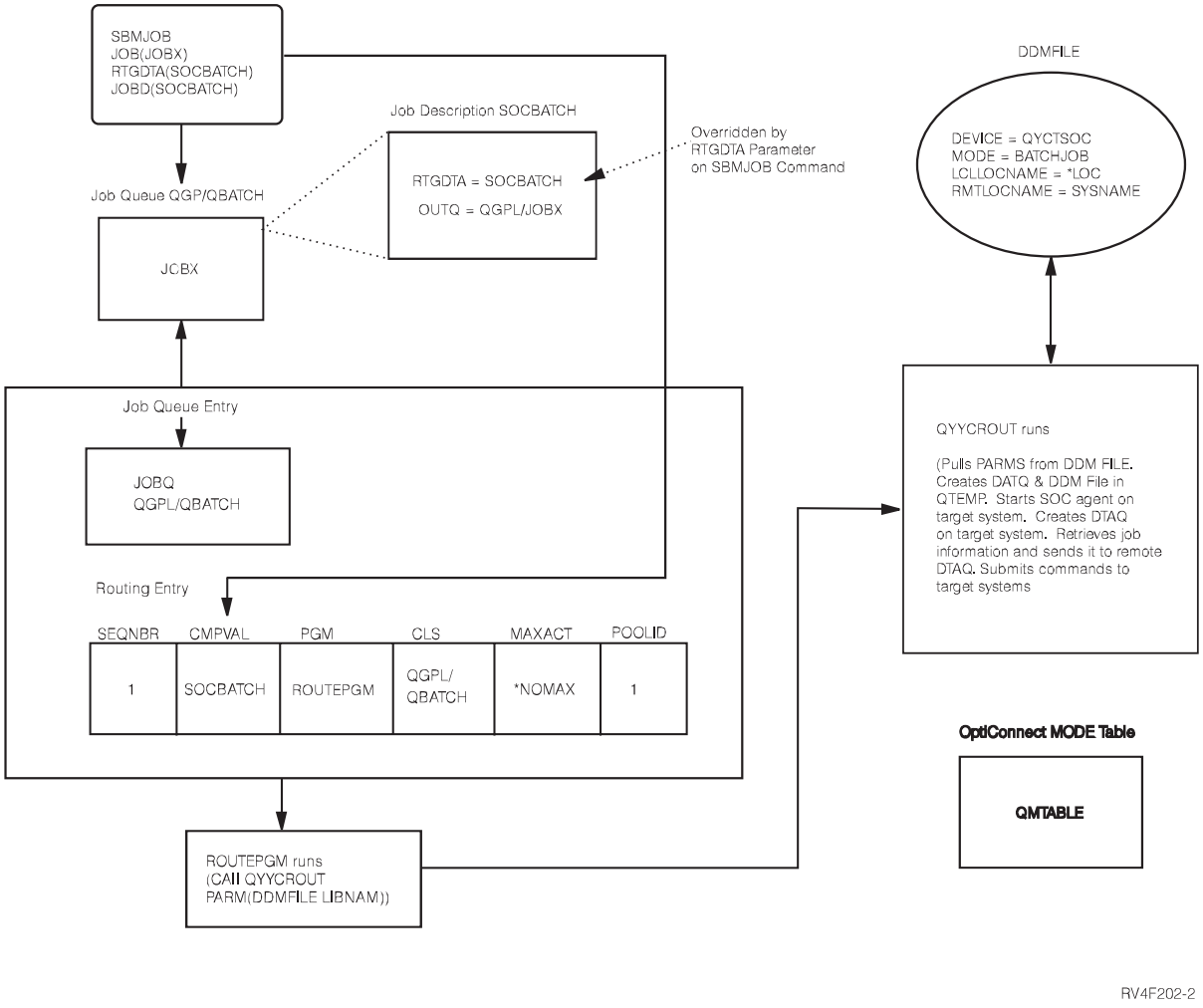

Figure 11. Remote job submission source system

Remote Job Submission Target System

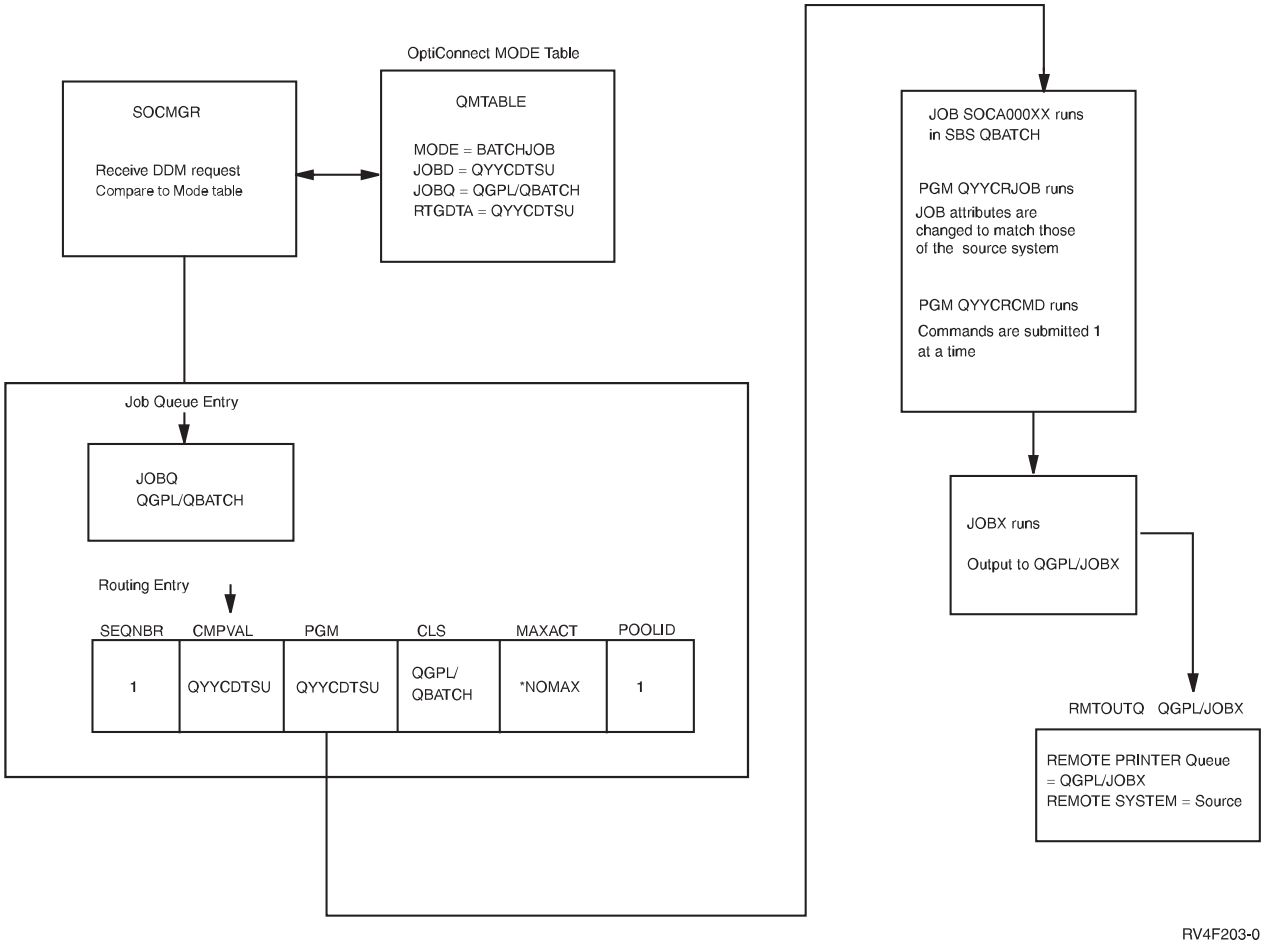

Figure 12. Remote job submission target system

Related reference

Create Output Queue (CRTOUTQ) command

Submit Database Jobs (SBMDBJOB) command

Submit Job (SBMJOB) command

Configuring TCP/IP over OptiConnect

This function allows applications that use TCP/IP to communicate over OptiConnect. Applications must run in a System i cluster with the HSL, Virtual, or SPD OptiConnect environment. Applications that are distributed across multiple systems can take advantage of the high bandwidth and the low latency of OptiConnect.

Features

The main purpose of the TCP/IP over OptiConnect function is to provide a standard IP interface.

This allows existing applications and services to work unchanged by simply defining a TCP/IP interface that uses OptiConnect. After you configure and start an interface, normal IP routing is used to send packets over OptiConnect.

The TCP/IP over OptiConnect function has the following features:

- It allows the configuration of TCP/IP interfaces across the OptiConnect link using standard methods (Configure TCP/IP (CFGTCP) command or iSeries Navigator).

  Note: Up to eight IP interfaces, each one on a separate subnet, can be configured to OptiConnect.
- It operates with standard functions (start, end, display).
- It supports IP packets, that is, all protocols that use IP, including TCP and User Datagram Protocol (UDP).
- It allows direct communication with other systems on the shared bus or buses, which have configured an IP interface with the same subnet.
- It supports broadcast and multicast.

Defining the OptiConnect TCP/IP interface

Before you start TCP/IP over OptiConnect, define a new interface to the TCP/IP configuration with the Add TCP/IP Interface (ADDTCPIFC) command. The interfaces defined are logical interfaces.

Required parameters

- Internet address (INTNETADR): This parameter specifies an IP address that the local system responds to on this interface. An interface is associated with a line description. The IP address is specified in the form *nnn.nnn.nnn.nnn*, where *nnn* is a decimal number ranging form 0 through 255. An IP address is not valid if it has all binary ones or all binary zeros for the network identifier (ID) portion or the host ID portion of the address. If you enter the IP address from a command line, enclose the address in single quotation marks (' ').
- Line description (LIND): The Add TCP/IP Interface (ADDTCPIFC) and Change TCP/IP Interface (CHGTCPIFC) commands have been changed to allow a new special value of *OPC for the LIND parameter. This special value is used to connect the TCP/IP interface with the OptiConnect transport layer.
- Subnet mask (SUBNETMASK): This parameter specifies the subnet mask, which is a bit mask that defines which portion of the IP address is treated as the (sub)network address and which portion is treated as a host address on the given subnet.

Optional parameter

- Associated local interface (LCLIFC): The local interface is an optional parameter with which the IP address, defined in INTNETADR, will be associated. Defining an interface with an associated local IP address means that the associated local IP address will be used as the source IP address in packets that originate from the interface. If no associated local IP address is specified, the source IP address on outbound packets will only be the INTNETADR IP address of the interface. Any local LAN (token ring, Ethernet, or Fiber Distributed Data Interface (FDDI)) or *VIRTUALIP interface can be used for LCLIFC.
  - *NONE: No associated local interface used.
  - *local-interface*: Specify an associated local interface for the interface to be added.

    Note: The specified associated local interface must already exist.

Related reference

Add TCP/IP Interface (ADDTCPIFC) command

Change TCP/IP Interface (CHGTCPIFC) command

Configuring the TCP/IP interfaces for OptiConnect

There are two ways to configure the TCP/IP interfaces for OptiConnect.

In the first configuration, the OptiConnect bus is viewed similar to a local area network (LAN) and has a single subnet address. Each *OPC interface is assigned a unique IP address within the subnet, thus defining the host's connection to that subnet. Here is an example of this configuration:

```
System A:
 ADDTCPIFC INTNETADR('10.1.1.1') LIND(*OPC) SUBNETMASK('255.255.255.0')
System B:
 ADDTCPIFC INTNETADR('10.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.0')
System C:
 ADDTCPIFC INTNETADR('10.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.0')
```

In the second configuration, you use the associated local interface parameter (*local-interface*). Using this method, you can configure the OptiConnect interfaces as part of existing local subnets to which the system is attached by other local interfaces (for example, token ring or Ethernet interfaces). Each OptiConnect interface defines an endpoint of a point-to-point OptiConnect connection between two systems. The existing local interface is then specified as the associated local interface for the OptiConnect interface. Here is an example of this configuration:

```
System A:
 ADDTCPIFC INTNETADR('9.1.1.1') LIND(TRNLINE) SUBNETMASK('255.255.255.0')
 ADDTCPIFC INTNETADR('9.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.1)
 ADDTCPIFC INTNETADR('9.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.1)
System B:
 ADDTCPIFC INTNETADR('9.1.1.2') LIND(TRNLINE) SUBNETMASK('255.255.255.0')
 ADDTCPIFC INTNETADR('9.1.1.1') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.2)
 ADDTCPIFC INTNETADR('9.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.2)
System C:
 ADDTCPIFC INTNETADR('9.1.1.3') LIND(TRNLINE) SUBNETMASK('255.255.255.0')
 ADDTCPIFC INTNETADR('9.1.1.1') LIND(*OPC)  SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.3)
 ADDTCPIFC INTNETADR('9.1.1.2') LIND(*OPC)  SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.3)
```

To use the associated local interface, you must configure an interface on each system, and both interfaces must be active. Based on the preceding example, the following lines represent a point-to-point configuration from System B to System C:

```
ADDTCPIFC INTNETADR('9.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.2)
ADDTCPIFC INTNETADR('9.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.3)
```

The advantage of the associated local interface technique is that there is no need to define new subnets for the OptiConnect bus. Subsequently, no external route tables need to be updated to provide connectivity between the OptiConnect interfaces and the rest of the TCP/IP network. Moreover, if one of the OptiConnect paths goes inactive, packets are automatically routed over the backup interface, for example, the TRNLINE in the second example. One disadvantage of this type of configuration is that an interface must be defined for every destination on the OptiConnect bus.

Related reference

Add TCP/IP Interface (ADDTCPIFC) command

OptiConnect and IP forwarding

IP forwarding and routing allows systems or partitions that are not connected to the same OptiConnect loop to communicate using TCP/IP.

To accomplish this, you need to configure a unique subnet for each loop, enable IP forwarding, and route packets from one subnet to another.

First, use the Change TCP/IP Attributes (CHGTCPA) command to turn on IP forwarding. This enables the forwarding of all packets, not just OptiConnect. Then define routes with the appropriate next hops to allow packets to flow to the destinations that you want.

The following example shows how to turn on IP forwarding on System B to allow System A to communicate with System C and System D:

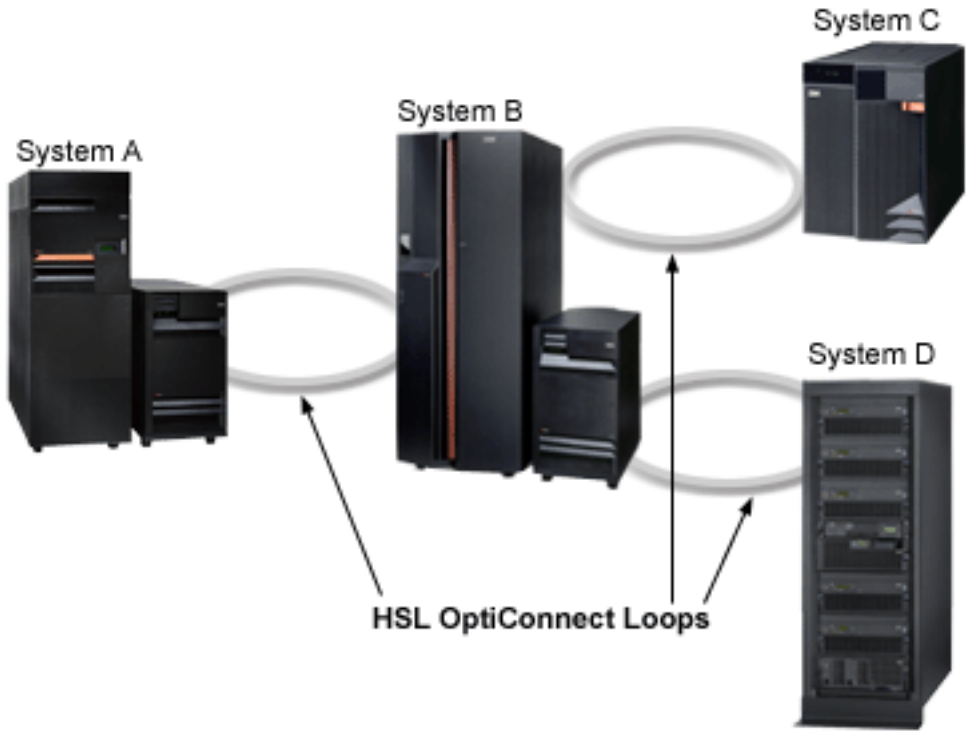

Figure 13. IP forwarding

1. Define a route to destination 10.0.1.0 with a mask of 255.255.0 and specify 10.0.0.2 as the next hop:

```
System A (10.0.0.1):
ADDTCPIFC INTNETADR('10.0.0.1') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPRTE RTEDEST('10.0.1.0') SUBNETMASK('255.255.255.0') NEXTHOP('10.0.0.2')
```

2. Turn on IP forwarding on System B:

```
System B (10.0.0.2 and 10.0.1.2):
CHGTCPA IPDTGFWD(*YES)
ADDTCPIFC INTNETADR('10.0.0.2') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPIFC INTNETADR('10.0.1.2') LIND(*OPC) SUBNETMASK('255.255.255.0')
```

3. On System C and System D, define a route to destination 10.0.0.0 with a mask of 255.255.255.0 and specify 10.0.1.2 as the next hop:

```
System C (10.0.1.3):
ADDTCPIFC INTNETADR('10.0.1.3') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPRTE RTEDEST('10.0.0.0') SUBNETMASK('255.255.255.0') NEXTHOP('10.0.1.2')

System D (10.0.1.4):
ADDTCPIFC INTNETADR('10.0.1.4') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPRTE RTEDEST('10.0.0.0') SUBNETMASK('255.255.255.0') NEXTHOP('10.0.1.2')
```

Related reference

Add TCP/IP Interface (ADDTCPIFC) command

Change TCP/IP Attributes (CHGTCPA) command

Proxy ARP with OptiConnect

Proxy address resolution protocol (ARP) allows physically distinct networks to appear as if they were a single, logical network.

The proxy ARP technique provides connectivity between physically separate networks without creating any new logical networks and updating any route tables.

Proxy ARP allows systems that are not connected to the local area network (LAN) to appear as if they were. When a system on the LAN wants to send data to one of the remote systems, it sends an ARP request, asking for the medium access control (MAC) address of the remote system. When the System i platform that acts as the proxy sees this request, it replies with the MAC address of the remote system. Conversely, the system that requests the ARP sends its MAC address to the System i platform. The System i platform then forwards the data to the remote system only if IP forwarding is set to *YES.

If you want to apply the preceding scenario in terms of OptiConnect, consider the following scenario:

- Two physically distinct networks: a LAN and a network consisting of an OptiConnect bus need to communicate. In the preceding point-to-point configuration example, we assume that all systems are connected to the same OptiConnect bus and token-ring line. Suppose that SYSTEM A has a token-ring connection and all access to SYSTEM B and SYSTEM C has to go through it. Proxy ARP provides the necessary connectivity between these physically distinct networks.

Starting the OptiConnect IP interface

To start a TCP/IP interface for OptiConnect, use the Start TCP/IP Interface (STRTCPIFC) command.

The STRTCPIFC command can be used to do the following tasks:

- Start interfaces that have been specified with the AUTOSTART(*NO) value on the Add TCP/IP Interface (ADDTCPIFC) and Change TCP/IP Interface (CHGTCPIFC) commands.
- Start an interface that was ended by the End TCP/IP Interface (ENDTCPIFC) command.

Related reference

Start TCP/IP Interface (STRTCPIFC) command

Ending the OptiConnect IP interface

To end a TCP/IP interface for OptiConnect, use the End TCP/IP Interface (ENDTCPIFC) command.

When you use the ENDTCPIFC command, datagrams addressed to the IP addresses that are associated with this interface are no longer accepted. You can use the ENDTCPIFC command to end an interface that you previously started with the Start TCP/IP Interface (STRTCPIFC) or Start TCP/IP (STRTCP) command.

Notes:

- You can start and end regular and associated interfaces independently from starting and ending OptiConnect (when OptiConnect is ended, the interface is inoperative).
- After you start the interface with the STRTCPIFC command, the interface status shows `Active` if OptiConnect is up, but only `Starting` if OptiConnect is down.
- If the interface was active at one point and the OptiConnect subsystem has been ended, the interface status shows `RCYPND` for recovery pending. After OptiConnect is started, the interface status automatically goes back to `Active`.
- The status of an associated interface shows `Starting` even if OptiConnect is up. In order for the associated interface to be completely active, the other interface must also be started with OptiConnect up.

Related reference

TCP /IP Configuration and Reference

End TCP/IP Interface (ENDTCPIFC) command

Start TCP/IP (STRTCP) command

Start TCP/IP Interface (STRTCPIFC) command

Managing OptiConnect

You use control language (CL) commands to start and end OptiConnect and to monitor OptiConnect activity.

Starting OptiConnect

You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

When you start the QSOC subsystem, the OptiConnect connection manager, SOCMGR, starts as an autostart job. If prestart agent jobs (SOCA*nnnnnn*) are defined, they also start automatically when the QSOC subsystem is started.

To start the QSOC subsystem, you must enter the Start Subsystem (STRSBS) command on each system: `STRSBS QSOC/QSOC`.

Related concepts

"Considerations for starting and ending OptiConnect"
Here are the tips on balancing the number of prestart agent jobs and the time it takes to start and end the QSOC subsystem.

Related reference

Start Subsystem (STRSBS) command

Ending OptiConnect

You end OptiConnect by ending the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Before you end the OptiConnect subsystem on a particular system, make sure that there are no OptiConnect application programs that are using the connection.

If you are using remote journaling over OptiConnect on this system, end it before ending the QSOC subsystem. You cannot use the Work with Active Jobs (WRKACTJOB) command to display the remote journal jobs.

To end OptiConnect, enter the End Subsystem (ENDSBS) command: `ENDSBS QSOC *IMMED`.

The time required to end the OptiConnect manager varies depending on the number of agent jobs to end in the subsystem. During this time, the QSOC subsystem cannot be restarted.

Note: Ending OptiConnect on one system does not affect OptiConnect activity between other systems on the same bus.

Related concepts

"Considerations for starting and ending OptiConnect"
Here are the tips on balancing the number of prestart agent jobs and the time it takes to start and end the QSOC subsystem.

Related reference

End Subsystem (ENDSBS) command

Considerations for starting and ending OptiConnect

Here are the tips on balancing the number of prestart agent jobs and the time it takes to start and end the QSOC subsystem.

When you end OptiConnect, you also end any prestart agent jobs. The more agent jobs, the longer it takes to end the QSOC subsystem. Similarly, when you start OptiConnect, the larger the initial number of agent jobs that you specified, the longer it takes to start the subsystem.

Prestart agent jobs use resources when they are started or ended, so you must consider how many prestart agent jobs you need.

For example, if there are many short transactions as when retail stores process credit card authorizations, increasing the number of prestart jobs might be beneficial. Although increasing the number of prestart jobs increases the time it takes to start the QSOC subsystem, prestart jobs allow you to quickly process the credit card authorizations.

On the other hand, you might have longer or less numerous transactions, for example, when a teller at a bank signs on for the day. In this type of environment, you might want less prestart jobs and a shorter system startup.

Before ending the QSOC subsystem, you must vary off the *OPC controllers and the corresponding controllers on the other system. The ENDSBS QSOC command leaves the controllers in an unusable state that requires you to vary them off and then vary them on. If you vary off the controllers manually, less processing takes place when you end the subsystem.

Related concepts

"Starting OptiConnect" on page 38
You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

"Ending OptiConnect" on page 38
You end OptiConnect by ending the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Getting information about OptiConnect activity

You use control language (CL) commands to obtain information about OptiConnect activity, resources, and components.

Working with active jobs (WRKACTJOB)

To see a list of active jobs in the QSOC subsystem and monitor OptiConnect activity, use the Work with Active Jobs (WRKACTJOB) command. This can be helpful in determining the startup parameters that are passed to the OptiConnect connection manager.

To see the active jobs in the QSOC subsystem, enter `WRKACTJOB SBS(QSOC)`.

If the QSOC subsystem is running, you see a SOCMGR job. If an agent job has been started, you see one or more agent jobs (SOCA*nnnnnn* jobs) on the target system. Figure 14 on page 40 shows a sample of the Work with Active Jobs display. As you can see, the SOCMGR job is running, as well as one agent job (SOCA000001).

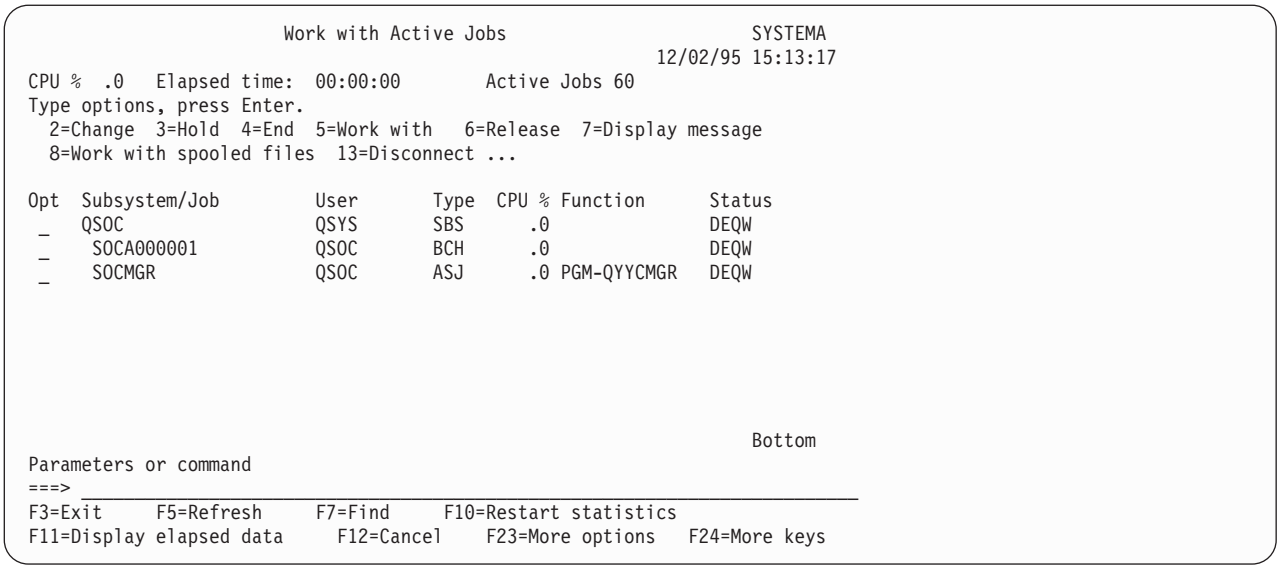

Figure 14. Work with Active Jobs display

To determine if agent jobs are active or inactive (prestarted), enter 5 (Work with) to the left of the job name. Select the option that allows you to see the call stack or open files. Inactive agent jobs are SOCA*nnnnnn* jobs with no open files.

Active agent jobs are often present until one of the following situations occurs:

- The source system job ends, or you log off.
- The source system job ends, or you use the Reclaim Resources (RCLRSC) command.
- The source system job ends, or you use the Reclaim DDM Conversations (RCLDDMCNV) command.

Related reference

Reclaim Distributed Data Management Conversations (RCLDDMCNV) command

Reclaim Resources (RCLRSC) command

Work with Active Jobs (WRKACTJOB) command

Working with OptiConnect activity (WRKOPCACT)

To gather information about database transactions, fiber-optic bus activity, and the connection status of client and server systems, use the Work with OptiConnect Activity (WRKOPCACT) command.

To show the Work with OptiConnect Activity display, enter `WRKOPCACT`. When you run this command, three views of the Work with OptiConnect Activity display are available.

Figure 15. Work with OptiConnect Activity display

```
                      Work with OptiConnect Activity
                                                          System:   SYSTEMA
Collection Start Time  . . . . . . . . . :   15:03:46
Collection End Time  . . . . . . . . . . :   15:54:56
Collection Elapsed Time  . . . . . . . . :   00:51:10

Type options, press Enter.
  1=Vary on   2=Vary off

    System           Total   Trans    Data   Data   %     Connection
Opt    Resource      Trans   /Sec     Count  Rate  Used   Status
    SYSTEMB          8       0        4      1     0      Varied on
       SOC13                          2      1     0      Active
       SOC02                          2      0     0      Active
    SYSTEMC          0       0        1      0     0      Active
       SOC08                          1      0     0      Varied on
       SOC10                          0      0     0      Active
    SYSTEMD          3       0        3      0     0      Varied on
       SOC07                          1      0     0      Active
       SOC04                          2      0     0      Active

    Totals           11      0        8      1     0
                                                                Bottom
F3=Exit     F5=Refresh   F13=Reset   F11=Client statistics view   F12=Cancel
F14=Jobs and tasks
```

Figure 15 on page 40 shows the Work with OptiConnect Activity display from the perspective of an application system. The display shows the connection status and total transactions between the system that issued the command and the other systems in the OptiConnect network.

The activity is broken down by individual OptiConnect adapters for each system and defined over the collection period. The collection period is shown at the top of the display. To reset the collection data on this display, press F13 (Reset). You can also use the option to vary on or vary off the systems or resources.

Press F11 (Client statistics view) to show this system's activity as a client. Press F11 again to show this system's activity as a server.

Press F14 (Jobs and tasks) to see a list of OptiConnect jobs and tasks. OptiConnect jobs and tasks have one or more OptiConnect conversations attached. The initial prompt panel, shown in Figure 16, allows the division of jobs and systems into subsets. If any of the input character strings are ended with an '*', the '*' are treated as a wildcard.

Figure 16. Work with OptiConnect Jobs display

```
                        Work with OptiConnect Jobs                 SYSTEMA
                                                             00/00/00  00:00:00
Type choices, press Enter.

  Job name  . . . . . . . . . . . . .   *ALL             Name, generic*, *ALL
    Job user  . . . . . . . . . . . .     *ALL           Name, generic*, *ALL

  Remote job name . . . . . . . . . .   *ALL             Name, generic*, *ALL
    Remote job user . . . . . . . . .     *ALL           Name, generic*, *ALL

  Remote system . . . . . . . . . . .   *ALL             System, generic*,
                                                           *ALL

F12=Cancel
```

After you enter the selection information and press Enter, the Work with OptiConnect Jobs and Tasks display shows the following information:

- Local job

  The name of the job or task that exists on the system where you run the WRKOPCACT command.
- Local user

  The user of the local job. This field is blank if the entry is a task.
- Remote job

  The name of the job or task that exists on the remote system.
- Remote user

  The user of the remote job.
- Remote number

  The job number of the remote job.
- Remote system

  The system where the remote job or task exists.

To select an option, enter the option number in the **Opt** column and press Enter. The function associated with the selected option is then performed for each of the selected jobs. For more information about the options available, move the cursor to the **Opt** column and press Help. The options are not available for tasks.

Note: You can enter an option next to one or more jobs.

You can select the following options:

- Option 5 (Work with job)

  Use this option to display the Work with Job (WRKJOB) menu. You can use the WRKJOB menu to end the local job and, consequently, the remote job as well. While the jobs are ending, the path status shows close pending (CLSPND). If you press F13 (Reset) after both jobs have ended, the job entry is removed from the list.
- Option 9 (End remote job)

  Use this option to run the End Job (ENDJOB) command on the remote system. When the remote job is ended, the path status shows close pending (CLSPND). Local and remote job names remain in the job list entry until the local job is ended or distributed data management (DDM) conversations are reclaimed. You can reclaim these conversations using the Reclaim DDM Conversations (RCLDDMCNV) command. If you the RCLDDMCNV command, the local job will not be ended, but it will be removed from the list after it is refreshed. At this point, it is no longer considered to be an OptiConnect job, although it is still available for other work.

If you press F11 (Display statistics view), the Work with OptiConnect Jobs and Tasks display shows the following information:

- Path status

  `BUSY`: The job or task has at least one OptiConnect transaction that has not been completed.

  `IDLE`: There is no OptiConnect transactions in queue, and the job or task is not doing any OptiConnect communications work.

  `CLSPND`: An OptiConnect close path is pending, and the path or conversation is in the process of closing down.

  `LBUSY`: At least one transaction has not been completed, and it has been in queue for one second or more.
- Transaction count

  The total number of OptiConnect requests that have been initiated since the last WRKOPCACT restarting. The transaction count is expressed in individual transactions and has been accumulated since either the last time OptiConnect was started or the last time the job and task data collection were reset.

- Response time

  The total time, in seconds, waiting for OptiConnect transactions to be completed, divided by the completed transaction count. The completed transaction count is the previously defined transaction count if idle, or is the transaction count minus one if busy. Response time is an average that has been measured since either the last time OptiConnect was started or the last time the job and task data collection were reset.
- Data count

  The data that is transferred by the job or task in KB. This figure has been accumulated since either the last time OptiConnect was started or the last time the job and task data collection were reset.

Note: If you have requested one or more remote jobs to end and you press F4 (Prompt), the End Remote OptiConnect Job (OPCJRCF) display is shown for each job. Otherwise, the Confirm End of Remote OptiConnect Jobs (OPCECNF) display is shown for a single confirmation.

Related reference

End Job (ENDJOB) command

Reclaim Distributed Data Management Conversations (RCLDDMCNV) command

Work with OptiConnect Activity (WRKOPCACT) command

Displaying OptiConnect link status (DSPOPCLNK)

To display the connection status of HSL or optical links, use the Display OptiConnect Link Status (DSPOPCLNK) command.

The Display OptiConnect Link Status display varies depending on your hardware configuration.

If your hardware configuration includes HSL OptiConnect, the Display OptiConnect Link Status display shows the connection status of each HSL OptiConnect.

Note: If your hardware configuration includes HSL OptiConnect, you can still access information about optical links by pressing F6 (Display optical links) on the Display OptiConnect Link Status display.

On the Display OptiConnect Link Status display, you can select option 5 (Display loop details) to see the status of a specific high-speed link ring and information about the bus adapter and port on each side of a system connection. You can also select option 6 (Display connection details) to obtain information about the status of an HSL OptiConnect connection from the system that issued the DSPOPCLNK command to another system.

If your hardware configuration does not include HSL OptiConnect, the Display OptiConnect Link Status display shows information about remote optical links. Press F11 (Display local links) to obtain information about local optical links. Press F11 again for information about the bus owners.

The Display OptiConnect Link Status display provides the following information:

- The local system or resource and the associated local bus number
- Remote resource
- Remote bus number
- Bus owner, which is the system that owns the shared bus
- Link status
  - `Active`: The cable is in use for logical path SOC*xx*.
  - `Down`: The cable fails, or the optical hardware or the remote system is down.
  - `Ready`: The cable is available for use.
  - `Unknown`: The remote system cannot be contacted.
- Connection status
  - `Active`: The connection is in normal status and currently in use.

- Active/degraded: This status is same as Active with redundancy reduced.
- Failed: The connection fails.
- Varied on: The connection is in normal status.
- Vary on pending: The remote system cannot be contacted.
- Varyon/degraded: The connection is in normal status with redundancy reduced.

You might receive a connection status message indicating that some troubleshooting is required. Monitor the following status for potential problems:

- If the link or connection status is Active, Ready, or Varied on, OptiConnect is operating correctly.
- If the link status is Down or the connection status is Varyon/degraded or Active/degraded, either a hub system is down or a cable or an OptiConnect card has failed. To solve the problem, follow these steps:
  1. Check that all systems are operational.
  2. If a hub system is down, wait for it to be turned on and try the command again.
  3. If all hub systems are operational, call your IBM service representative.

  Note: This does not apply to customers with 500 or 510 systems in an OptiConnect cluster.
- If the link status is Unknown or the connection status is Vary on pending, check that the remote system is operational and the QSOC subsystem has been started.
- If the Display OptiConnect Link Status display is blank, the QSOC subsystem has not been started on the system that you have signed on.

To print the entire Display OptiConnect Link Status display, enter DSPOPCLNK OUTPUT(*PRINT).

Related reference

Display OptiConnect Link Status (DSPOPCLNK) command

Working with hardware resources (WRKHDWRSC)

To display information about OptiConnect adapters, use the Work with Hardware Resources (WRKHDWRSC) command. The adapters shown on the display represent systems that are linked to this system through the shared bus or HSL environment. An adapter that is associated with this system is not shown.

To display OptiConnect adapters, enter WRKHDWRSC TYPE(*CSA). This displays a resource for each remote system that had, at some point, an operational connection to the system on which you are entering the command.

Communication between two systems uses a pair of adapters: a source adapter and a target adapter. The source adapter is the adapter to which a system is connected with optical cables. The target adapters are any remaining adapters on the shared bus that are connected to other systems. The WRKHDWRSC command does not display the source adapters to which you are optically connected. It displays the target adapters for other system adapters on the shared bus. These, in turn, represent systems to which you can communicate.

Note: Virtual OptiConnect adapters might also be shown on the Work with Coupled Resources display. They have an adapter type of 268B and a text description of Virtual Bus Adapter. HSL adapters have an adapter type of 268A and a text description of Nonhost Bus.

Some resources might have status Not detected because of a change in your configuration or because a remote system was not turned on when the OptiConnect system was started. If a remote system was not turned on when the OptiConnect system was started, turn on the remote system. The resource should become operational as soon as the initial program load (IPL) on that system is completed. The connection is still displayed even though the subsystem on the remote system is not operational.

To display resource details, such as physical locations and logical addresses, you can select option 7 (Display resource detail). Fields are blank for cards that physically reside in a bus on another system. Serial numbers are shown as zeros for these cards.

Related concepts

"Re-establishing system connections when OptiConnect is installed" on page 46
You must always use the Power Down System (PWRDWNSYS) command to turn off a system that is connected with OptiConnect.

Related tasks

"Basic troubleshooting procedure"
If you have a problem with OptiConnect, follow this procedure to determine the cause.

Related reference

Work with Hardware Resources (WRKHDWRSC) command

Displaying hardware resources (DSPHDWRSC)

To display, print, or direct OptiConnect adapter information to an output file, use the Display Hardware Resource (DSPHDWRSC) command.

This OptiConnect adapter information includes the resource name, status, location, resource description, and the remote systems that are connected to the OptiConnect adapters. To print the information, enter `DSPHDWRSC TYPE(*CSA) OUTPUT(*PRINT)`.

Related reference

Display Hardware Resources (DSPHDWRSC) command

Troubleshooting

You can follow a procedure to diagnose OptiConnect problems. Error messages and informational system reference codes (SRCs) can also help you troubleshoot these problems.

Basic troubleshooting procedure

If you have a problem with OptiConnect, follow this procedure to determine the cause.

In general, it is helpful to try the same distributed data management (DDM) transaction over a communications link, for example, over a local area network (LAN). If no error occurs, take the following steps to determine where OptiConnect is failing. If the error still occurs, the problem is not likely to be OptiConnect.

If all OptiConnect DDM accesses are failing, check the following items:

1. Enter `WRKHDWRSC TYPE(*CSA)` to verify that the system-to-system connections are operational.
2. Enter `DSPOPCLNK` to verify that the cables are operational.
3. Enter `WRKACTJOB SBS(QSOC)` to verify that the QSOC subsystem is running on both the application systems and the database system.
4. Verify that the SOCMGR job is running in the QSOC subsystem. If the QSOC subsystem is not running, start it. If the subsystem is running but there is no SOCMGR job, either the SOCMGR job has been ended or a software failure has occurred. Enter `WRKJOB QSOC` to locate the job log that is associated with the SOCMGR job. Display the log to determine why the SOCMGR job was ended. Report software failures to your service provider.
5. Verify that the OptiConnect connection manager has established communications between the source and target systems. Each time a connection is opened or closed, a message is sent to the system operator message queue. Connections are closed when the QSOC subsystem is ended, the SOCMGR job is ended, a system is turned off, or a failure occurs. To display the system operator messages, enter `DSPMSG MSGQ(*SYSOPR)`. Otherwise, use `DSPLOG LOG(QHST)` to select a particular time period.

Note: To see only QSOC messages, use `DSPMSG QSOC`.

6. Enter `WRKJOBQ JOBQ(QSOC/QSOC)` to verify that the QSOC job queue is not held.
7. Verify that the correct remote location name, device, and mode are defined in the DDM file used for OptiConnect.

Follow these steps if you suspect a problem with a particular application:

1. Locate the failing job or job log on the source system.
2. Display the job log information and find this message: `DDM JOB STARTED ON REMOTE SYSTEM`.
3. Press F1 to display the detailed message text. The detailed message text shows the OptiConnect agent job name.
4. Locate the agent job on the target system.
5. Check the job log information for both the application and agent jobs to locate any unexpected errors.
6. If you encounrter MSGCPF9167, see "OptiConnect error messages" on page 47 for more information about communications messages.

Related concepts

"Configuring OptiConnect" on page 16
You can use either the fast path method or the extended function path method to route data requests through OptiConnect. The fast path method provides faster communication, but it does not support two-phase commit as the extended function path method does.

"Working with hardware resources (WRKHDWRSC)" on page 44
To display information about OptiConnect adapters, use the Work with Hardware Resources (WRKHDWRSC) command. The adapters shown on the display represent systems that are linked to this system through the shared bus or HSL environment. An adapter that is associated with this system is not shown.

Related reference

Display Log (DSPLOG) command

Display Messages (DSPMSG) command

Display OptiConnect Link Status (DSPOPCLNK) command

Work with Active Jobs (WRKACTJOB) command

Work with Hardware Resources (WRKHDWRSC) command

Work with Job (WRKJOB) command

Work with Job Queues (WRKJOBQ) command

Re-establishing system connections when OptiConnect is installed

You must always use the Power Down System (PWRDWNSYS) command to turn off a system that is connected with OptiConnect.

If you do not use the PWRDWNSYS command, you might experience difficulties with system-to-system connections.

Certain conditions can cause system-to-system connections to be inoperative. Performing an initial program load (IPL) on one of the systems is the only way to reestablish these connections.

You can avoid these conditions by using the PWRDWNSYS command. However, some conditions, such as abnormal operations or loss of power on one system in the OptiConnect network, might make it necessary to perform an IPL. Here is a list of additional examples:

- Emergency power off (EPO)
- Utility or uninterruptible power supply failure
- Hardware failures
- Interrupted IPLs or failure of an IPL

If you suspect one of these conditions has occurred, use the Work with Hardware Resources (WRKHDWRSC) command to check the status of the bus expansion adapter. Report hardware failures to your IBM service representative.

Note: Problems can occur if the odd bus on the optical link card was connected to a nonOptiConnect expansion unit.

Related concepts

"Working with hardware resources (WRKHDWRSC)" on page 44
To display information about OptiConnect adapters, use the Work with Hardware Resources (WRKHDWRSC) command. The adapters shown on the display represent systems that are linked to this system through the shared bus or HSL environment. An adapter that is associated with this system is not shown.

"SPD OptiConnect" on page 6
System product division (SPD) is a bus architecture that allows I/O to communicate to the processor. SPD OptiConnect is a high-speed physical OptiConnect connection that uses the SPD bus technology.

Related reference

Power Down System (PWRDWNSYS) command

Work with Hardware Resources (WRKHDWRSC) command

OptiConnect error messages

Listed here are the error codes and function codes for OptiConnect error messages.

OptiConnect error messages are contained in the QCPFMSG message file in the QSYS library. You can display and print these messages by entering the following Work with Message Files (WRKMSGF) or Work with Message Descriptions (WRKMSGD) command:

- `WRKMSGF MSGF(QCPFMSG)`
- `WRKMSGD CPDADA1`

When you are using OptiConnect, you can also display system messages in the same ways. These messages are also in the QCPFMSG message file.

The following list describes the major or minor codes for message CPDADA0. There are two pieces of information in the CPDADA0 secondary text. The first piece of information is the '*yyxx*'X data, which includes an error code followed by a function code. The second piece of information, which the message identifies as a major or minor return code, is a code point that identifies (to the OptiConnect developer) where the operation fails.

The '*yyxx*'X data can be interpreted as follows:

- *yy* = Error code (what failure is detected)
- *xx* = Function code (what function was being run)

Error codes:

01*xx* Coupling environment not open. For example, the QSOC subsystem or the SOCMGR job is not started.

02*xx* System name not found. This error causes message CPF9162: `cannot establish DDM connection with remote system`.

03*xx* Source or agent connection ID not valid. For example, the source or target job ends the OptiConnect conversation without a clean disconnection.

04*xx* Source or target conversation startup error. This error is typically due to timeout.

05*xx* Bad conversation state. The job receives the wrong message type when waiting for a request,

response, or control message (for example, the job is waiting for a request and receives a control message or any other combination of a request, response, or control message). Typically, this happens when the job receives a close-conversation message because of an unexpected error on the other job. Look at the target job log if the 05*xx* error occurs on the source job. Look at the source job log if the 05*xx* error occurs on the target job.

06*xx* Communication error from the IPCF/transport layer. In a dual bus setup, this typically means that the operation cannot be done on either adapter. Most operations are automatically retried on the alternate connection if available. This is typically caused by the errors returned from Hardware Management Console (HMC) I/O.

07*xx* Transaction ended. This error is almost always 070B: `Terminate waiting for response`. It indicates that an inflight request is ended without any response. It typically means that the associated target or source job fails and ends the OptiConnect conversation without sending a response. It can also occur if the communication between source and target systems is lost while a request is waiting for response. The 06*xx* error occurs only if the communication is lost during request or response transport, while the 07*xx* error results from a failure during wait for response.

90*xx* Internal error. An unexpected or unhandled condition is detected by the OptiConnect device driver. A Vertical Licensed Internal Code log with a major or minor code of 0700/0DDD is logged when the error occurs. This can indicate a code problem or incorrect data; for example, 900B indicates bad data in the messages that are sent over the bus.

Note: There are some known cases in the device driver where this error results from loss of communication during certain states. That is, errors that should be 06*xx* show up as 90*xx*. A 90*xx* error, which happens at the same time when an SOC*nnnnnn* OptiConnect connection closes the message, can be a 06*xx* error.

Function codes:

*yy***01** Open-stream. This function connects a job with the OptiConnect device driver. It fails only if Coupling environment not open = 0101.

*yy***03** Open-conversation; namely, Open-path. This function connects the source and agent job through the SOCMGR job on the target system.

*yy***05** Close-conversation; namely, Close-path. This function disconnects the source and agent job.

*yy***07** Send-request. This function sends a request message. Either the source job or the agent job can originate requests.

*yy***08** Receive-request. This function receives a request message.

*yy***0A** Send-response. This function sends a response message associated with a previous request message.

*yy***0B** Receive-response.

OptiConnect cluster diagnostics

These informational system reference codes (SRCs) are the most common OptiConnect network-related messages that are posted in the Product Activity Logs of systems in a cluster.

B600 69A8 Link Operational

This informational SRC indicates that a fiber-optic link has become operational again. The satellite system posts the message. The message is normally seen after the redundant link cable is reconnected.

B600 69C1 Loss of Contact With the Remote System

This informational SRC indicates that a remote system in an OptiConnect network has been brought down or has crashed. To prevent this SRC during the normal shutdown of a system in the cluster, run `ENDSBS QSOC *IMMED` before bringing the system down.

B600 69D8 Link Non-operational

This informational SRC indicates that the fiber-optic link between two systems has become nonoperational. Pulling a fiber-optic cable can cause this SRC. Because the OptiConnect hardware provides redundant links, the hardware can switch over to the other fiber-optic link and continue to operate both buses on the one remaining cable.

When you turn on a hub system, this SRC can occur during the initial program load (IPL) and can be ignored.

Related reference

End Subsystem (ENDSBS) command

Related information for OptiConnect

Listed here are the product manuals, information center topics, and Web sites that relate to the OptiConnect topic. You can view or print any of the PDFs.

Manuals

- Backup and Recovery (6305 KB)
  This manual provides general information about backup and recovery options for the System i product.
- APPC Programming (1497 KB)
  This manual describes Advanced Program-to-Program Communication (APPC) support for application programmers. The manual includes configuration requirements, commands, problem management, and general networking considerations for APPC.
- SNA Distribution Services (2259 KB)
  This manual discusses the network configuration using Systems Network Architecture distribution services (SNADS) and the Virtual Machine/Multiple Virtual Storage (VM/MVS) bridge. Object distribution functions, document library services, system distribution directory services, and shadowing are also discussed.
- TCP/IP Configuration and Reference (591 KB)
  This manual discusses the TCP/IP configuration and the programming that uses the TCP/IP application interface.

Web sites

- OptiConnect

Other information

- Installing, upgrading, or deleting i5/OS and related software
- Work management

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