



Session: 404365

## iSeries Access for Windows

### Overview & Tips

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## Agenda

- Topics to be covered
  - ▶ Packaging
  - ▶ AS/400 NetServer
  - ▶ Hardware/Software requirements
  - ▶ Environments Supported
  - ▶ Installation
  - ▶ SSL
  - ▶ PC5250
  - ▶ Data Transfer
  - ▶ Middleware

### Abstract

This session provides an overview of the functions included in iSeries Access for Windows. You will learn what capabilities this product provides for PC Windows users connecting to the iSeries server for working with OS/400 resources, such as its database, file system, printers, and 5250 applications. You will also learn about the variety of middleware it has that could make it easier for you to develop PC-to-iSeries applications, hear about tools for installing and maintaining software on your network PCs. And last, but not least, you will hear about other functions included with iSeries Access for Windows, such as iSeries Navigator, Operations Console, and EZ Setup. Come find out how you can exploit the use of iSeries Access for Windows in your business.

## Packaging / Deliverables

<b>V5R2 5722-XW1</b>  <b>iSeries Access Family</b>		<b>V5R1 5722-XW1</b>  <b>iSeries Client Access Family</b>
<ul style="list-style-type: none"> <li>■ 5722-XE1, V5R2 iSeries Access for Windows</li> </ul>	<ul style="list-style-type: none"> <li>■ Includes iSeries Navigator, EZ-Setup, Operations Console</li> <li>■ Cannot use the following functions without 5722-XW1                             <ul style="list-style-type: none"> <li>--5250 emulation</li> <li>--Data Transfer</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ 5722-XE1, V5R1 AS/400 Client Access Express for Windows</li> </ul>
<ul style="list-style-type: none"> <li>■ 5722-XH2, V5R2 iSeries Access for Web</li> </ul>	<ul style="list-style-type: none"> <li>■ Must have 5722-XW1 to use any of its functions</li> </ul>	<ul style="list-style-type: none"> <li>■ 5722-XH1, V5R1 iSeries Access for Web</li> </ul>
<ul style="list-style-type: none"> <li>■ 5724-B81, V4.0 WebSphere Host Publisher</li> </ul>	<ul style="list-style-type: none"> <li>■ Must have 5722-XW1 to use any of its functions</li> </ul>	<ul style="list-style-type: none"> <li>■ 5648-E25, V3.5 WebSphere Host Publisher</li> </ul>
		<p>Customers with Software Subscription can get V5R2 clients by ordering no-charge Feature No. 2645 of Product No. 5722-XW1</p>

## Tasks an 'End User' might want to do...

- Run 5250 applications
  - ▶ Use PC5250 display emulation
- Print output from 5250 applications
  - ▶ Use PC5250 print emulation
  - ▶ Can also set up a printer as a 'print server' for others to also send their 5250 output to a designated printer
- Store PC files on iSeries server
  - ▶ Use iSeries NetServer
- Print output from PC applications on iSeries printer
  - ▶ Use iSeries NetServer print support
- Work with iSeries database information
  - ▶ Use Data Transfer to download database information directly into an Excel spreadsheet or upload to the database
  - ▶ Use iSeries ODBC driver when running Windows database applications
- Use secure connection over Internet
  - ▶ Use built-in SSL capabilities



## Connection Options

## Environments Supported

### iSeries and AS/400e Systems

- OS/400 V5R1
- OS/400 V4R5
- Earlier versions of OS/400 have reached end of service

### PC Operating Systems

- Windows 95 
- Windows 98
- Windows Me\*
- Windows NT 4.0
- Windows 2000\*
- Windows XP ...\*

\* See iSeries Access web page at [www.ibm.com/eserver/series/clientaccess](http://www.ibm.com/eserver/series/clientaccess) for details on support:

- Information APAR II12268 for Windows Me
- Information APAR II11853 for Windows 2000
- Information APAR II12900 for Windows XP

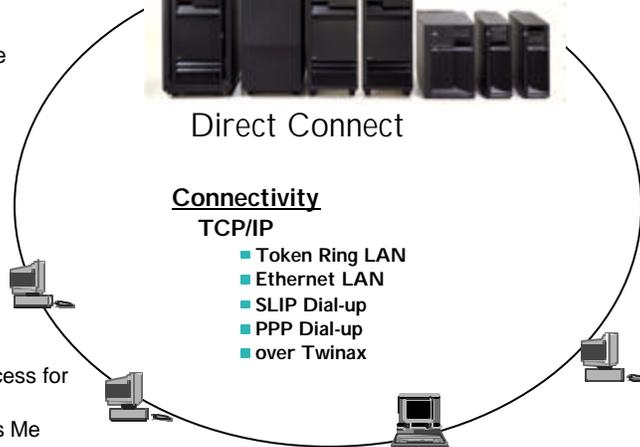


Direct Connect

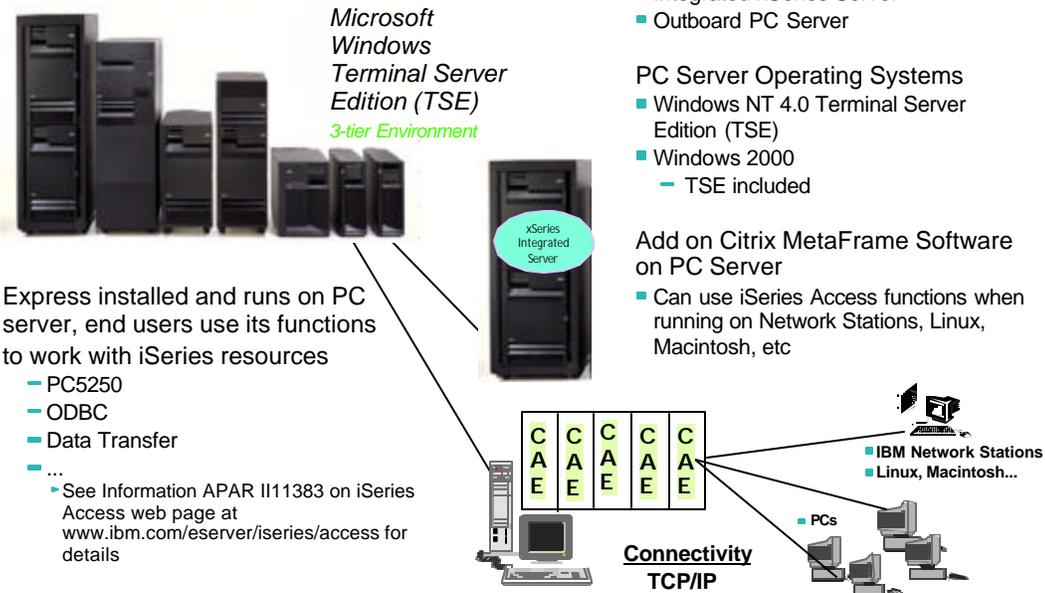
### Connectivity

#### TCP/IP

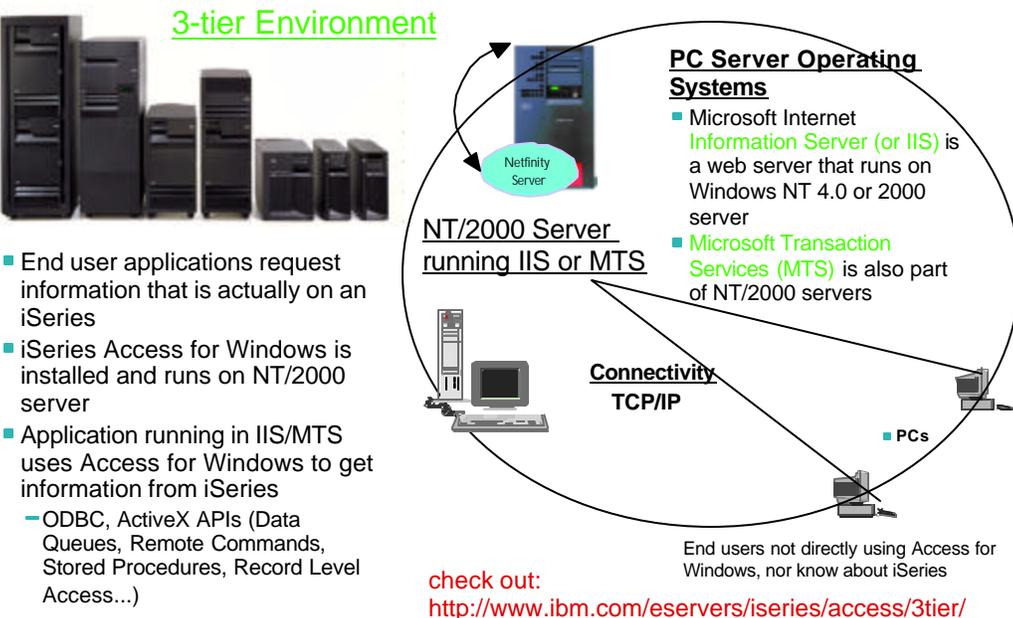
- Token Ring LAN
- Ethernet LAN
- SLIP Dial-up
- PPP Dial-up
- over Twinax



## Example of a 3-tier environment



## Web Serving with IIS or MTS



## Notes: 3-Tier Environments Supported

### Microsoft NT 4.0 Terminal Server Edition

This enables iSeries Access for Windows to run on the NT server only, but users connecting to the server can use iSeries Access functions without actually having them installed on their desktops. These attached workstations can be PCs and Network Stations. See Information APAR II11373 for details.

### Microsoft NT 4.0 (in a multiuser environment)

This support provides AS/400 database access from web pages. It uses Microsoft Windows NT 4.0 Server running Microsoft Internet Information Server (or IIS) and Microsoft NT 4.0 Workstation with a version of IIS called Peer Web Services. In this environment, PCs connecting to the NT server do not use iSeries Access directly. For example: A multiuser application can be written to ODBC, OLE DB provider, or other Access for Windows APIs. When the multi-user ODBC application makes a request for data which resides on the iSeries, the iSeries Client Access ODBC driver makes the request to the iSeries and returns the data which then is provided to the multiuser application on the PC.

### Microsoft Transaction Services (MTS)

Microsoft Transaction Server (MTS) is a feature of the Microsoft Windows NT and 2000 Server O/S for development and deployment of three-tiered, server-centric applications built using COM technologies. MTS offers automatic transaction support, role-based security, access to other databases (including connection pooling), message queuing products and mainframe-based applications. In this environment, The AS/400 ODBC driver runs on the NT or 2000 server and works with iSeries database to get/store information provided by an application running on the PC server.

See web page <http://www.ibm.com/eserver/iseries/access/3tier/> for information on how to access an iSeries database using the Internet Data Connection (IDC) component of Internet Information Server (IIS) or by using Active Server Pages (ASP) scripts.

## PC Hardware Requirements - Access for Windows

### For Users not running iSeries Navigator functions

#### Windows 98, Me

- Pentium 100 MHz
- At least 32MB RAM

#### Windows NT 4.0

- same as above, and also Microsoft Service Pack 5 or later

#### Windows 2000

- Pentium 133 MHz
- At least 64MB RAM

#### Windows XP

- Pentium 233 MHz
- At least 128 MB RAM

### For Users running iSeries Navigator functions

#### Windows 98, Me

- Pentium 400 MHz
- At least 128MB RAM

#### Windows NT 4.0

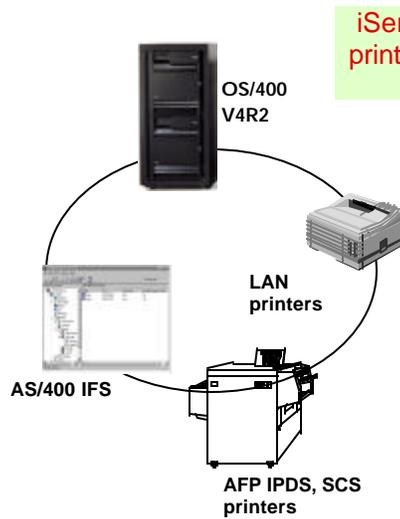
- same as above, and also Microsoft Service Pack 5 or later

#### Windows 2000

- Pentium 400 MHz
- At least 128 MB RAM

#### Windows XP

- Pentium 400 MHz
- At least 256 MB RAM



iSeries has 'native' file and print serving through iSeries NetServer

## iSeries NetServer for File and Print Serving

### NetServer Sessions:

- 25TB - iSeries NetServer Setup and Usage
- 25TC - iSeries NetServer: What's New

[www.ibm.com/eserver/iseries/netserver](http://www.ibm.com/eserver/iseries/netserver)

## Access for Windows uses iSeries NetServer

- File Serving
  - ▶ Doesn't require proprietary client software to be installed
    - Only need to install Client for Microsoft Networks
  - ▶ Can access iSeries IFS
- Print Serving
  - ▶ Can use iSeries direct-attached and LAN printers
    - Only need to install SCS or AFP print drivers shipped with Access for Windows
- iSeries NetServer shows up in Network Neighborhood
  - ▶ Uses Windows user-id and password for OS/400 authentication



## Notes: Getting Started with iSeries NetServer

iSeries Support for Windows Network Neighborhood (iSeries NetServer) is an IBM Operating System/400 Version 4 (OS/400) function that enables Windows clients to access AS/400 shared directory paths and shared output queues. PC clients on a network simply utilize the file and print sharing functions that are included in their operating systems. AS/400 NetServer supports the Server Message Block (SMB) protocol through the use of Transmission Control Protocol/Internet Protocol (TCP/IP) on AS/400. To function properly on AS/400 and with network clients, AS/400 NetServer requires the following:

- An iSeries system properly connected with Version 4 Release 2 (V4R2) OS/400, or later, configured for a TCP/IP network.
- A system name that does not conflict with the system name that iSeries Access uses. See Server name guidelines for more information.
- An up and running Network Printing Server (NPS) in order to make use of iSeries NetServer print sharing capabilities. See the Quick start guide for iSeries NetServer for more information. Client for Microsoft Networks network component installed on your PC client. Once this component, along with TCP/IP, is installed and configured, you will have access to the integrated file system directories and the iSeries output queues shared with the network.
- The iSeries NetServer server name and Internet Protocol (IP) address resolution strategy. For example, Domain Name System (DNS), Windows Internet Naming Service (WINS), or LMHOSTS file.

### Connecting your PC client to iSeries NetServer

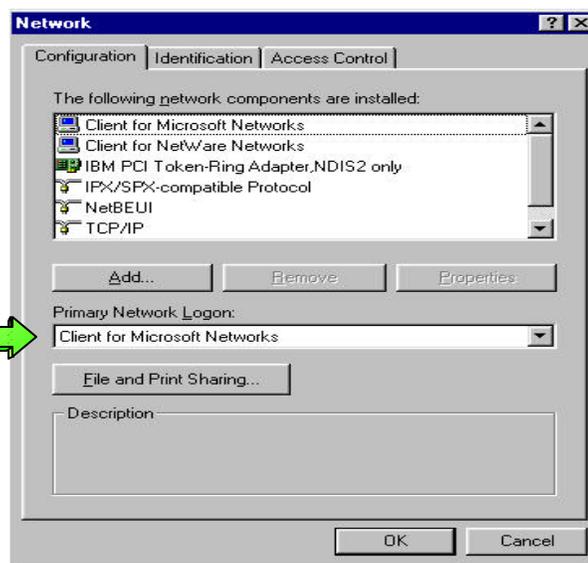
Configuring a PC client connection to iSeries NetServer ensures that network clients can locate iSeries NetServer and use file and print shares. Keep in mind that TCP/IP configuration does not require any changes to support iSeries NetServer. However, you must configure any PC client that uses iSeries NetServer with the following items:

- File and print clients specific to the operating system of your PC client. See your operating system documentation for more information on file and print clients.
- An iSeries that is placed in the same workgroup (domain) and the same subnet (network segment) as the PC client that uses iSeries NetServer UDP broadcasts. See iSeries NetServer UDP broadcasts for more details.
- The address of a DNS server if you are using DNS to locate and connect to iSeries NetServer. See iSeries NetServer and Domain Name System management for more details.
- The Windows Internet Naming Service (WINS) configuration information if you are using a network WINS server to locate and connect to iSeries NetServer. See iSeries NetServer and Windows Internet Naming Service (WINS) management for more details.
- LMHOSTS entries for iSeries NetServer if you are using LMHOSTS files to locate and connect to iSeries NetServer. See PC client LMHOSTS static configuration files for more details.

## PC Setup

Set 'Client for Microsoft Networks' (comes with Windows O/S) as your Primary Network Logon

- To set up PC Workgroup, go to Control Panel > Network > Configuration



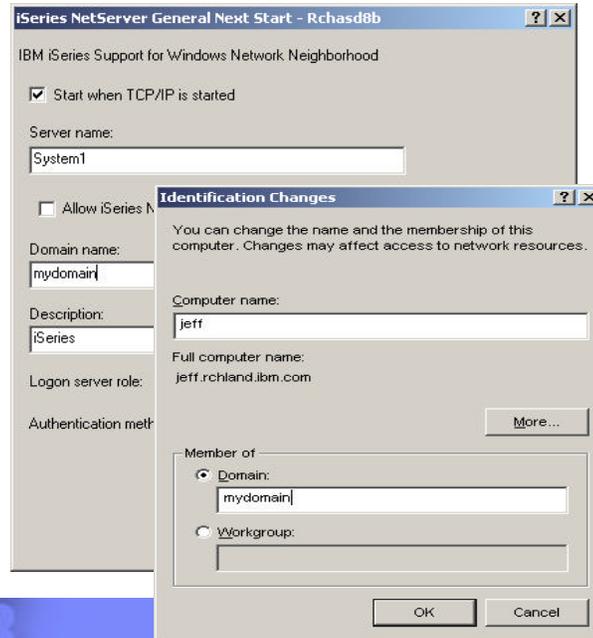
## PC Domain Name = NetServer Domain Name

Set 'Workgroup' name to match iSeries 'Domain name'

- To set up PC Workgroup, go to Control Panel > System > Network Identification > Properties
- Set to match iSeries Domain Name

Set iSeries Domain name with iSeries Navigator, select:

- Select iSeries system
- File Systems -> File Shares
- Right click and select 'Open iSeries NetServer'
- On iSeries NetServer -> right click and select Properties
- On General tab, select 'Next Start'



## TIP Notes: Configuring NetServer

The easiest way to configure the iSeries Support for Windows Network Neighborhood (iSeries NetServer) support is via iSeries Navigator. You access the configuration information by starting iSeries Navigator and selecting the iSeries system you want to set up. Then select File Systems -> File Shares. Right click and select 'Open iSeries NetServer'. On iSeries NetServer -> right click and select Properties. On General tab, select 'Next Start' where you can set up the Domain name, etc.

### Getting iSeries NetServer to show up in Network Neighborhood

Microsoft originally designed Windows Network Neighborhood to use the NetBIOS protocol--which forwards computer announcement messages (i.e., notifications that a computer is on the network) across routers. So when you use TCP/IP for Network Neighborhood browsing for Windows or for AS/400 NetServer, it can result in a complex environment as TCP/IP routers usually don't forward announcement messages in an effort to reduce network traffic. Once you've configured AS/400 NetServer, it can be tricky to get it to appear under Network Neighborhood. There are several possible solutions listed below that let you use Network Neighborhood with a TCP/IP network.

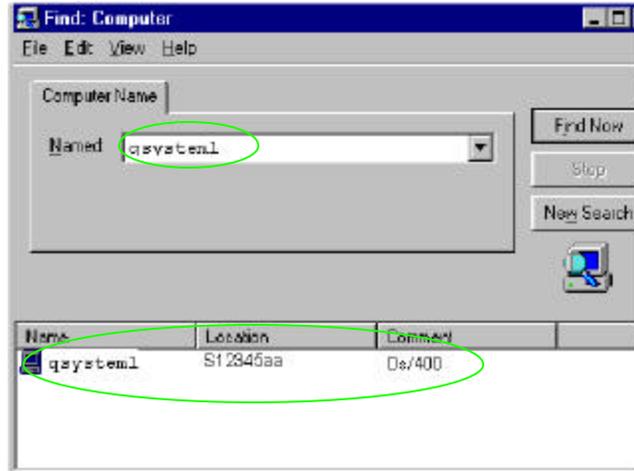
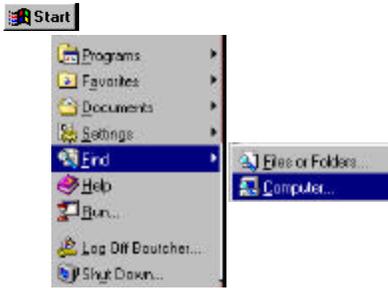
1. Use the Windows Internet Name Service (WINS) to resolve computer names to IP address. (WINS resolves NetBIOS-based host names over TCP/IP, thus letting a Windows client PC obtain the IP address of other PCs on the network.)
2. Contain your domain in one subnet. This way, announcements don't have to be forwarded to another subnet by routers.
3. Configure TCP/IP routers such that broadcast datagrams (i.e., packets) are forwarded across subnets in the same way they are forwarded for NetBIOS.

Whatever solution you choose, make sure you configure the iSeries NetServer and client PCs for the same domain (workgroup). Regardless of the solution you choose, the Start/Find/Computer button sequence on your Windows desktop will work in all situations once you've chosen an IP address resolution strategy for NetServer. You should then add the iSeries IP address and iSeries NetServer server name to one of the following:

Your network DNS server, your network WINS server, and your client PC's local LMHOSTS file

Thus, you can find an iSeries in the network just as you'd find a file on your PC. Once you've found the iSeries NetServer, you can double-click its icon to display a list of the iSeries' shared resources.

## Find iSeries NetServer

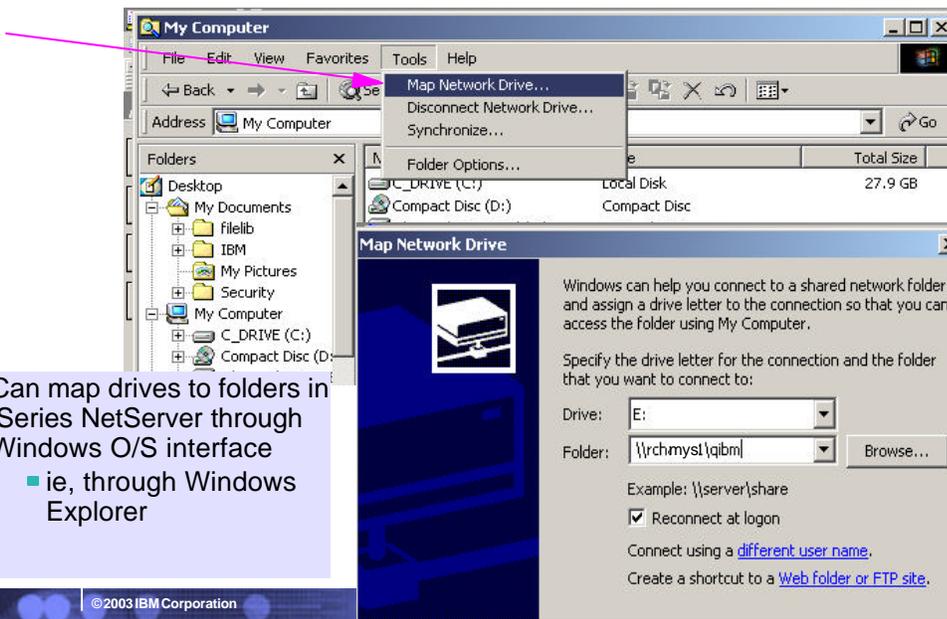


Easy way to find your iSeries NetServer is to Start -> Search -> For Files and Folders. Then click on "Computers" under Search for other items.

Then key in iSeries NetServer name

- This is iSeries name

## Map Drive through Windows Explorer



Can map drives to folders in iSeries NetServer through Windows O/S interface

- ie, through Windows Explorer



*Let's get Access  
for Windows  
installed*

## Installation on iSeries

- iSeries Access for Windows is on the iSeries *stacked media* and gets preloaded on new iSeries systems
- If upgrading from OS/400 V4R4 or V4R5, and if you already have 5769-XW1 installed on your system, these programs will be automatically installed as part of your upgrade

Product Name	Program Number	V/R/M	OS/400 supported
iSeries Access Family	5722-XW1	V5R2M0	
iSeries Access for Windows	5722-XE1	V5R2M0	V5R1 / V5R2

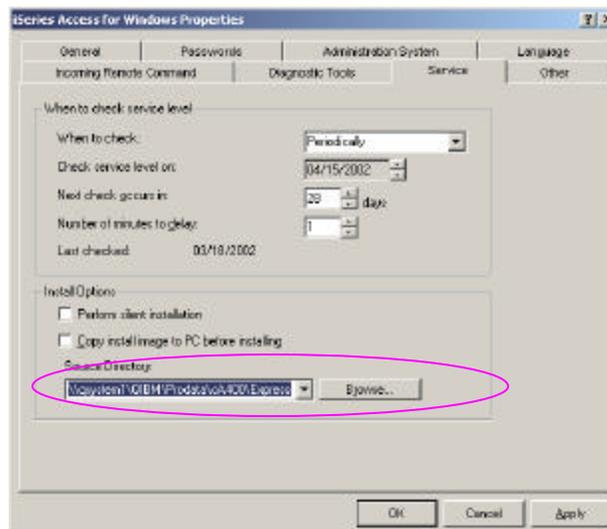
***Now you need to get iSeries Access for Windows installed on your PCs***

## Install Access for Windows on your PC

- Start PC install from:
  - ▶ IFS using iSeries NetServer function:
    - Client Install Image in IFS at \QIBM\ProdData\CA400\Express\Install\lImage
    - Already set up as 'shared' for NetServer
    - Service Pack is in IFS in with the main install image so no extra reboot required with V5R1 or later!
  - ▶ PC CD-ROM
    - PC CD-ROM packaged with Family product
    - You must then set up PCs to get Service Pack updates and future releases
- Express can install and service other code placed in IFS:
  - ▶ iSeries Toolbox for Java, Java Runtime Environment, Secure Sockets Layer (SSL) Encryption programs, Operations Navigator Plug-ins, Add-ins, EZ Setup

## How client code is kept 'up to date'

- Manage Updates
  - ▶ Access for Windows looks at directory identified in 'Source Directory'
  - ▶ This is directory code was installed from.
- Information is stored in 'Properties' and can be changed later
  - ▶ When to check
  - ▶ Where install should come from
  - ▶ Silent Install option



## Notes: Source Directory for Updates

The iSeries serves as the repository for all iSeries Access software fixes, modification upgrades or additional software installation components. You can also put these fixes/upgrades/additional components in any network directory. Access for Windows then performs file comparisons between the level of software at the iSeries (or source directory) and the PC. This software distribution model enables OS/400 administrators to use the Client Access functionality to transparently distribute the latest fixes or updates to PC users with no additional effort.

**Express Client uses Source Directory concept**

Whatever directory the Access for Windows code is installed from is put in the Source Directory field in the Access for Windows Properties -- and this address is checked for future updates. iSeries Navigator refers to this as the 'Default System' and this can be modified from within iSeries Navigator as well as from the properties page.

Express client Install Image placed in IFS in: \QIBM\ProdData\CA400\Express\Install\image

Every 28 days (default) from the time the code was installed on a particular PC, Access for Windows will look for later client code at the address stored in the Source Directory.

## PC Installation Choices

**PC5250 User install**

- Installs only what a user needs to run 5250 emulation
  - and a few additional functions to maintain the client code)

**Typical Install**

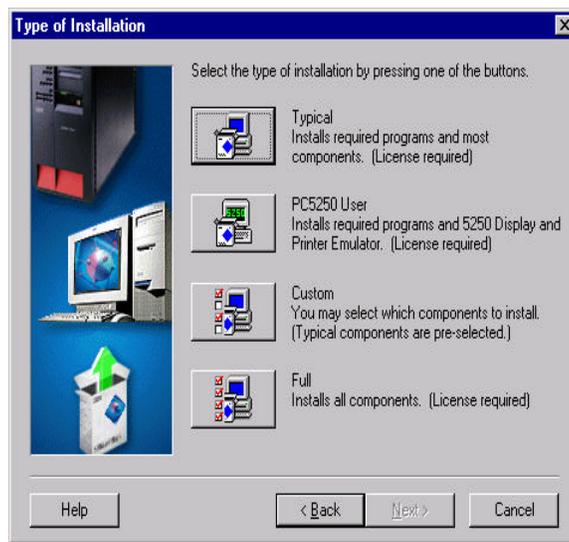
- Also installs Basic Operations functions of iSeries Navigator (Messages, Printer output, Printers)

**Custom Install**

- Select what you want to install

**Full Install**

- Install everything



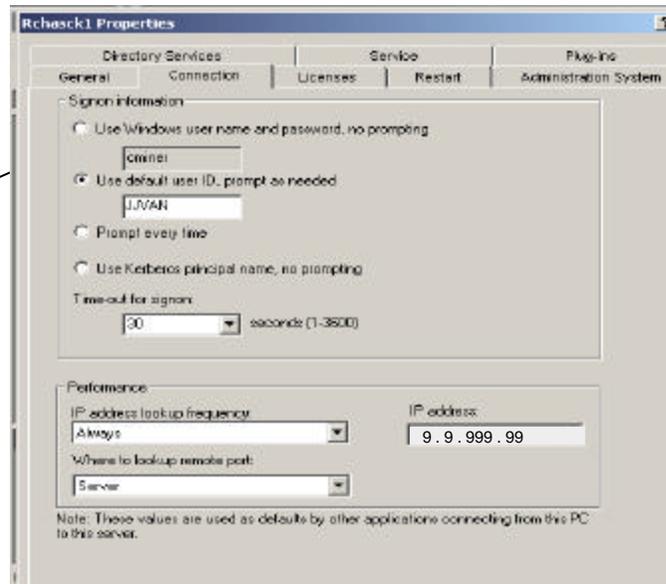
## Work with iSeries Connection Properties

Small portion of iSeries Navigator installed with every option

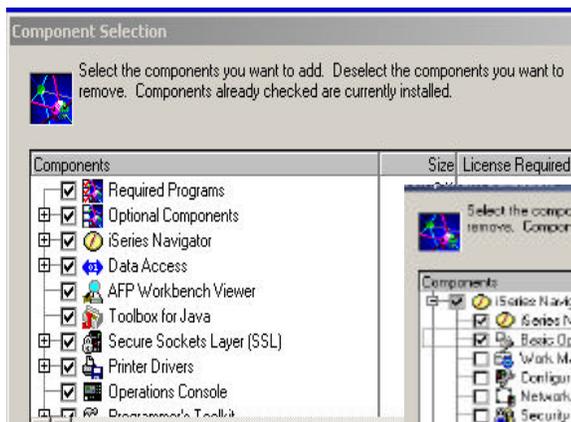
- To allow users to work with their 'Connection' properties

Start iSeries Navigator

- Point to iSeries system
- Right-click to bring pulldown
- Select 'Properties'



## Selective Install



**Plug-ins and add-ins also appear in the component selection panels**

**Easy to install additional items later**



## Administering Your PC Network

Go to the following sessions to learn more about install and service tips for administrators

- 33CR - Inside iSeries Access for Windows Install & Service
- 36CO - Administration of iSeries Access: Advanced Tips
- 41LA - Open LAB: iSeries Access for Windows

Learn about:

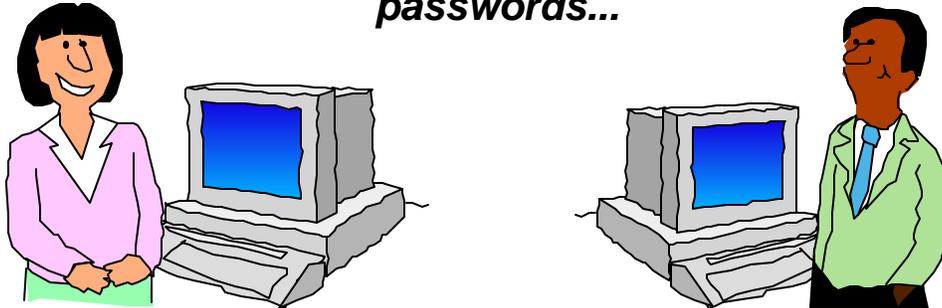
- 'Tailored' Full Install and the **Cwbinimg.bat** wizard
- Silent Install to eliminate the need for PC user interaction during the installation process
- Policies for controlling what PC users can use
- Application Administration to control what PC users can use

## Control What Users Can Use

The screenshot shows two windows. On the left is the 'iSeries Navigator' window with a tree view of 'My Connections' and a context menu open over it. On the right is the 'System Policy Editor - (Untitled)' window showing 'Default User Properties' with a tree view of policies. A green callout box points to the policy tree.

- Can use for configuration as well as restrictions
  - Install options
  - Passwords
  - Number of PC5250 sessions
  - SSL usage
  - and more...

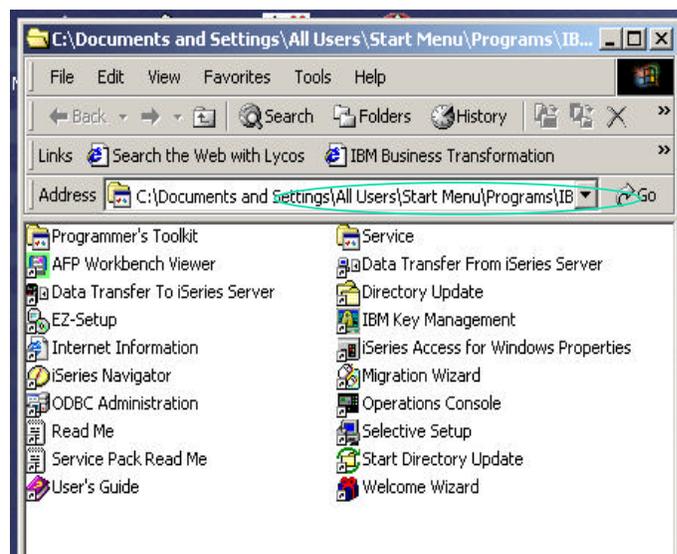
## **Getting Started** *Tips on initial connection, passwords...*



## Steps for a new iSeries connection

Start iSeries Access for Windows in any of the following ways:

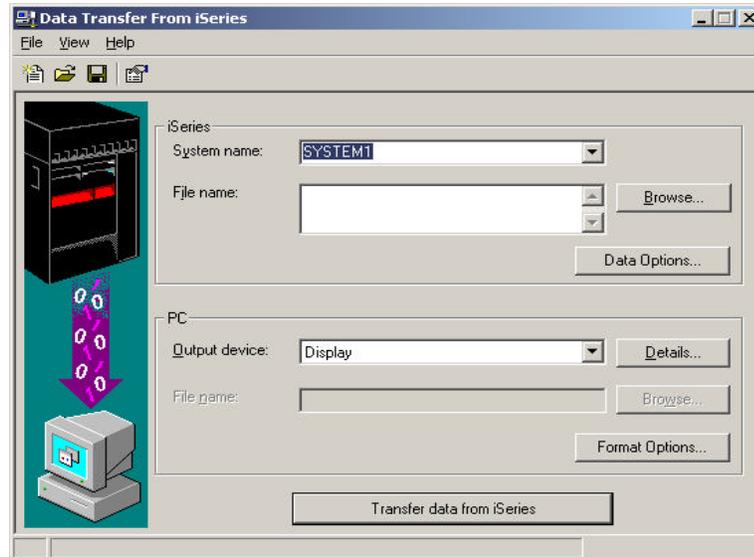
- Program Folder
- Start Menu
- Desktop icon



## Data Transfer Panel

### Use Data Transfer Wizard

- iSeries system name
- Data being requested
- Where to put data



## Notes: Connecting to iSeries

### Connectivity

iSeries Access for Windows supports TCP/IP connectivity and uses the standard TCP/IP stack shipped with Microsoft 32-bit operating systems (other Winsock-compatible stacks can also be used). The communications programs have been significantly streamlined and more efficient use of buffers results in increased stability and better performance than previous versions of Client Access.

### Communications Configuration

iSeries Access for Windows does not require a separate configuration step as connections are tied to the specific application that is connected to the iSeries. Users simply open the application they want to use (ie. PC5250, Data Transfer, etc) and specify the iSeries system name. Express initiates a TCP/IP session and the application is connected to the iSeries. For example, you can start Client Access Data Transfer and connect to the iSeries with user-id ABC. While leaving that instance of Data Transfer running, you can start a second instance of Data Transfer and connect to the same iSeries but with a different user-id. Likewise, the first instance of Data Transfer could have SSL enabled while a second one (such as Data Transfer, PC5250...) to the same system could be started with SSL disabled.

There are various ways that you can define the connections and sign-on information, for example:

- The Express client maintains a list of successful, recently-used connections made to iSeries servers, and adds them to the Operations Navigator system list with the attributes that were specified in the initial connection. A previously undefined connection is configured dynamically when an iSeries Access function references an iSeries TCP/IP name. The sign-on information for that connection is then used by any other iSeries Access function when accessing that iSeries name.
- Users can then use Operations Navigator to create, modify, and delete connection definitions and manage what systems are available and default configuration parameters to be used. Note: users do not need to go into iSeries Navigator to create connection definitions since the application itself does the connect/disconnect to/from an iSeries. A subset of the iSeries Navigator function is included in the iSeries Access base install and is available to users. All sign-on information for every iSeries connection is retained in this iSeries Navigator connection list, and can be modified as needed.
- The CWBCFG command-line utility can be used to specify a connection and its sign-on information.

These capabilities are not available with the Windows 95/NT client because once a connection is established that same connection is used by any Client Access application needing to communicate to a particular iSeries (such as Data Transfer and PC5250). Thus, the Windows 95/NT client has an iSeries Connection application to allow the user to create, manage, and delete connections. This does not exist in the iSeries Access for Windows client.

## Password Information

- This screen presented first time you connect to an iSeries
- All other applications use this setting
- Can remove password option selection via Policies

### Options for Signon

- Use Windows user name and password, no prompting
- Use default user ID, prompt as needed
- Prompt every time
- Use Kerberos principal name, no prompting

## Notes: Logon Options for iSeries Access

We have discussed thus far how it can simplify end user access logon if the Windows desktop and OS/400 passwords are identical. Now let's look at the options you have for setting up how you want the user ID and password provided to the iSeries. The first time you use a Client Access Express function to connect to an iSeries you receive a prompt asking you how you wish to logon to that specific iSeries now and in the future. (Note: this setting can be later changed via Operations Navigator by right-clicking on the desired iSeries system, clicking Properties, then selecting the Connection tab.) iSeries Access provides the following four logon options:

1. Use Windows user name and password, no prompting: This setting automatically uses your Windows user name and password when connecting to the iSeries. No iSeries sign-on prompt is displayed to the user. In order to use this option, your Windows user name and password must be the same as your OS/400 user name and password. Once the user signs on to the Windows workstation, no security prompting will occur when accessing OS/400 resources and data. For Windows 95 and 98 users, this setting could only be used if you actually do sign onto Windows (ie, you cannot cancel the Windows sign-on prompt and bypass providing your user ID and password). You may not want to use the no prompt option if users are sharing a workstation as you would have no tracking capability of which user is accessing iSeries information.
2. Use default user ID, prompt as needed: This setting causes Client Access to use the specified user ID for signing on. In this option, the user enters their password the first time they connect to the iSeries during a Windows session. The passwords will then be saved in the password cache when a successful connection is made to an iSeries. From then on anytime the user wants to use a resource on the iSeries, iSeries Access will automatically connect them with no prompt for password as it uses the previously successful saved password value. This saved password is deleted from cache when the user logs off their workstation.

On Windows 95 and 98 operating systems, Microsoft provides a long-term cache (in addition to the short-term cache discussed above) that provides the ability to save passwords across sessions and even across different Windows.

If you wish to have iSeries Access activate this ability, you can check the 'Save Password' box on the Client Access sign-on dialog, or you can go to the Client Access tab of the Passwords Properties in the Windows Control Panel. If you use this option you will not be prompted for a password even across reboots of your PC, thus you will want to insure your PC is protected as anyone who can use that PC can connect to the iSeries without providing a user ID or password.

Windows NT and 2000 do not provide a password cache in the operating system similar to Windows 95 and 98. Therefore, if you use the 'Use default user ID, prompt as needed' option, the system always prompts for the user ID and password the first time you connect to an AS/400 during the Windows NT or 2000 session. Subsequent connections to the same iSeries within the same Windows NT or 2000 session will not prompt the user. iSeries Access will remember the password for the duration of the session.

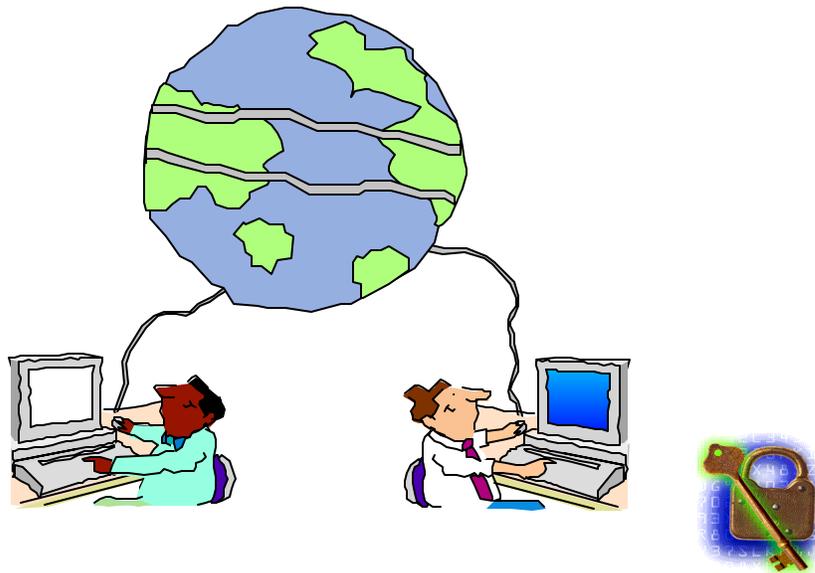
If you do wish to simulate persistent password caching on Windows NT or 2000, you can use a Client Access function called CWBLOGON that will add passwords to the Client Access password cache for the requested user ID. For example, you can add a batch file (containing invocations of cwblogin.exe) to the Windows NT or 2000 start-up folder. Then when you start a Client Access application later, it will find your password in the cache and will not prompt you. See the Express Online User's Guide for command syntax. Again, you would need to plan your workstation security before implementing use of this function as this makes Windows NT or 2000 password security more similar to the 'Save Password' option described above for Windows 95 or 98 users.

3. Prompt every time: This setting prompts for sign-on information every time an application connects to an iSeries system. This option provides more security for users who share a workstation as they are prompted every time another function (such as PC5250 or Data Transfer) is opened.

## Notes: Logon Options for iSeries Access (continued)

4. Use Kerberos principal name, no prompting: This option was added at V5R2. With this option, the user is never prompted. It does require that a Kerberos ticket server be installed somewhere in the network. When the PC user logs into Windows, a Kerberos "ticket" is retrieved from that Kerberos ticket server. Then when the PC user attempts a connection to an iSeries, the PC sends the Kerberos ticket to the iSeries, instead of a userid/password. The iSeries then communicates to the Kerberos ticket server to validate that the user is a valid user.

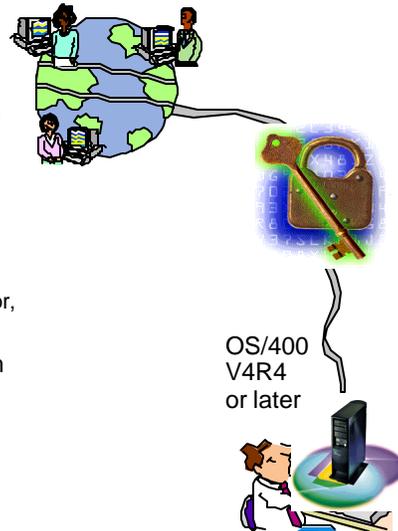
## Having a Secure Connection



## Secure Sockets Layer (SSL)

### Benefits

- Secure communications sessions between PC and iSeries
  - ▶ Session encrypted
  - ▶ Not subject to eavesdropping
- Can choose which Access for Windows program information is encrypted
  - ▶ PC5250, Data Transfer, Operations Navigator, etc
- Can assure connection is to iSeries system you expect
  - ▶ Server Authentication - diminishes spoofing possibilities



**Create Secure Connection to the intended iSeries**

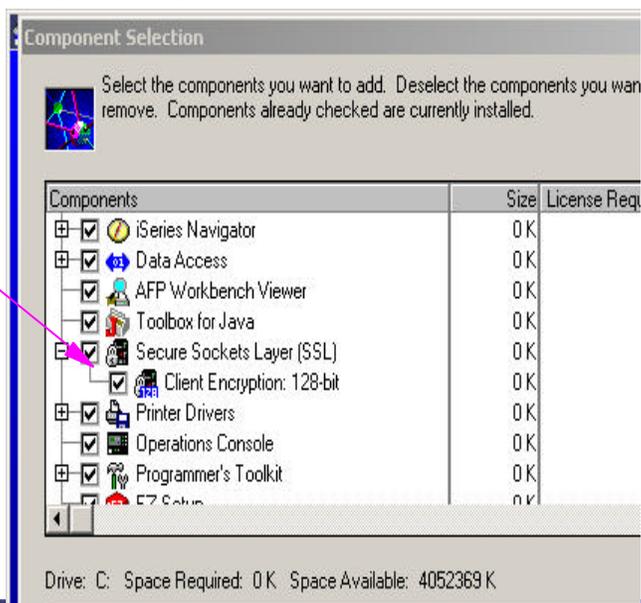
## Setting up to use Secure Sockets

### On iSeries

- Install Cryptographic Access Provider LPP
  - 5722-AC3 = 128-bit
- Install Client Encryption LPP
  - 5722-CE3 = 128-bit
- Authorize users to SSLxxx directory

### On PC

- Install client encryption
  - 5722-CE3 = 128-bit



## Notes: SSL Pre-reqs

To use the iSeries Access for Windows SSL capability, you must connect to iSeries servers running OS/400 V4R4 or later, and the following licensed program products (LPPs) and options installed on the iSeries:

5722-SS1 Option 34 - Digital Certificate Manager (DCM). You need DCM to create your digital authority and to maintain your digital certificates.

5722-TC1 - TCP/IP Connectivity Utilities for iSeries

5722-DG1 - IBM HTTP Server for iSeries. This product is required to access DCM browser-based interface.

5722-AC3 - Cryptographic Access Provider (128-bit key length). You need to install this no-charge LPP on your iSeries as it is the cryptographic product creates certificate keys.

You now need the client counterpart for encryption. Product Numbers 5722-CE3 (128-bit encryption) is now packaged with iSeries Access for Windows. It automatically gets installed on the iSeries, and can be installed on the end user client through Access for Windows install programs.

Because of export regulations for products containing encryption technology, the 5722-CE3 product is installed on the iSeries with authority set to 'PUBLIC EXCLUDE'. Before users can install the product on their PC, they need to be granted authority to the Client Encryption product.

For example to grant user CAROLE authority to use the 128-bit client encryption, the iSeries administrator would need to run the following command: CHGAUT OBJ(QIBM/ProdData/CA400/Express/SSL/SSL128) USER(CAROLE) DTAAUT(\*RX) . If you wanted to grant all users authority to install the 128-bit encryption support on their PCs, you could run the following iSeries command: CHGAUT OBJ(QIBM/ProdData/CA400/Express/SSL/SSL128) USER(\*PUBLIC) DTAAUT(\*RX)

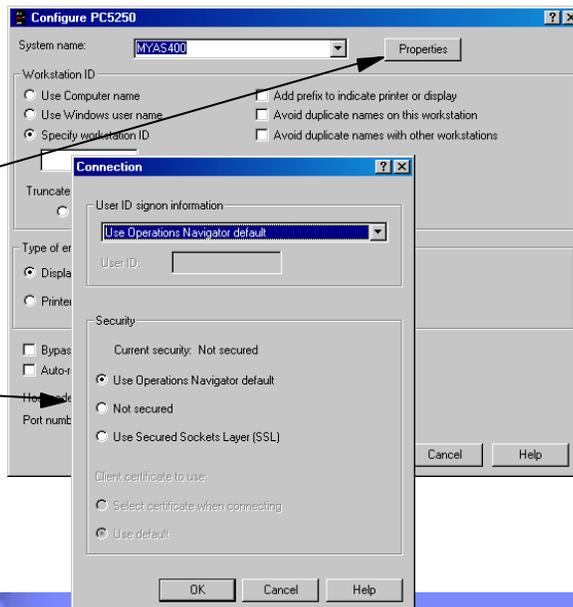
Access for Windows users can click on the 'Selective Setup' icon in the iSeries Access for Windows folder and install the Client Encryption product. (Note: if you are allowing the 'Check Service Level' function to be used, iSeries Access will periodically download any updates that get applied to the Client Encryption product on the iSeries.)

A new icon IBM Key Management is added to the Express client folder, and a new Secure Sockets tab is added to the iSeries Access Properties panel.

## Configure SSL

### Security Properties

- Specify if SSL is to be used. This option will be greyed out if CE2/3 not installed on PC
- Can override value at connection time
- Policy can require SSL



The iSeries Access client uses the TCP/IP Secure Sockets Layer (SSL) Version 3.0 for encryption. The Express client offers the flexibility to not only encrypt the user-id and password but to choose what functions of Express (ie, iSeries Navigator, PC5250 emulation, Data Transfer, ODBC) to encrypt. For example, you may wish to encrypt data being transmitted via Data Transfer but find it unnecessary to encrypt data being sent to your PC printer via PC5250 printer emulation. With SSL support, these applications are now able to establish secure communications sessions with their corresponding services.

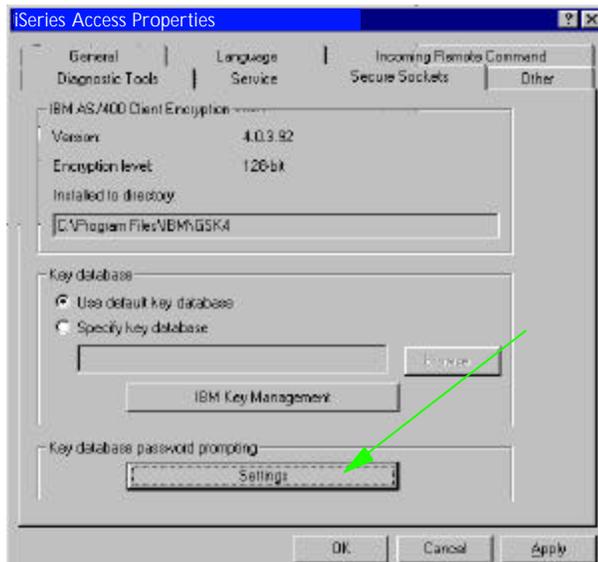
Enabling SSL on the PC

You have the ability to select from the following options: Do Not Use SSL, Use SSL, or Use iSeries Navigator default (default option). The advantage of using the same security as is enabled for iSeries Navigator is that you can enable all functions for a system at one time and have a totally secured environment. However, you must consider that encryption methods do degrade performance (perhaps as much as 20-30%); thus, it may be more advantageous to only use a secured connection for a few specific functions.

- To enable SSL for Operations Navigator, start the Operations Navigator and right-click on the iSeries you want to enable for SSL, select Properties, then the Secure Sockets tab, and check Use Secure Sockets Layer (SSL). A padlock will be added to that iSeries name to reflect that SSL is being used for that connection.
- If you have not enabled iSeries Navigator for SSL, or if you want to enable or disable the other iSeries Access client applications differently than iSeries Navigator you can do this.
  - For PC5250 sessions, open the session, and from the menu bar click Communication, select Configure, then Properties, then select the SSL option.
  - For Data Transfer sessions, you can selectively set each Data Transfer you define. Start the Data Transfer, and from the menu bar click File, select Properties, then the Connection tab, and select the appropriate SSL option.
  - For ODBC SSL is defined at the data source level so you have the flexibility to secure ODBC requests with different data sources. To set up SSL, start the ODBC Administration task, double-click on the user Data Source you want to work with in the User DSN tab, then select Connection Options, and then you select the SSL setting you wish to use.

You can also use the iSeries Access client Policy Editor templates to set up SSL for desktop users. For example, you can define policies for users (or groups of users) by connection environment. For example, when a user is connecting from the 'home' environment, SSL is required; however when using an 'office' environment SSL is not needed.

## PC5250 - SSL 'Client' Authentication



Set up iSeries Access properties on how often to provide client certificate to server for 'client authentication'.



## Notes: SSL Client Authentication

The PC5250 Telnet client supports required SSL Client Authentication.

- Client Authentication occurs when the server verifies the identity of the client by the client certificate passed up to the server application.
- For required Client Authentication, the client certificate must be passed from the client, be valid, and trusted by the server.

### Client/Server Authentication

There are two ways which Secure Sockets Layer (SSL) verifies identification: Client Authentication and Server Authentication. Server Authentication occurs when the client verifies the identity of the server application by the server certificate passed down to the client application. Client Authentication occurs when the server verifies the identity of the client by the client certificate passed up to the server application. If Client Authentication is performed, Server Authentication needs to be done first.

### Client authentication

In V5R1, the PC5250 Telnet client supports required SSL Client Authentication. You can also enable Client Authentication for the PC5250 Telnet client in V4R4 and V4R5 by issuing the following AS400 commands:

```
CALL PGM(QSYS/QT/VS/RV) PARM(*SSLCERT)
ENDTCP/VS/RV SERVER(*TELNET)
STRTCP/VS/RV SERVER(*TELNET)
```

To disable it, use the following commands:

```
CALL PGM(QSYS/QT/VS/RV) PARM(*NOSSLCERT)
ENDTCP/VS/RV SERVER(*TELNET)
STRTCP/VS/RV SERVER(*TELNET)
```

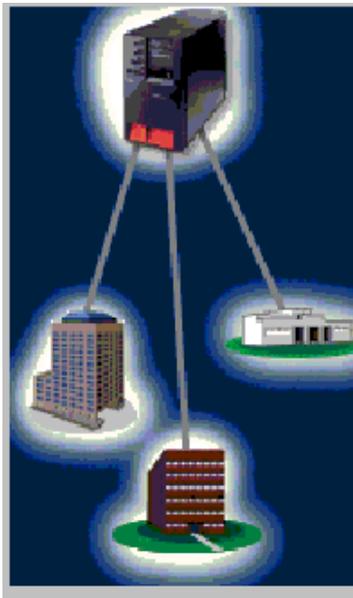
For V5R1, use Digital Certificate Manager (DCM) to change the AS400 Telnet server SSL properties to require Client Authentication.

### Notes

If the iSeries is used to create client certificates, a browser capable of importing/exporting secure PKCS12 files is required. (currently IE 5.x and Netscape 4.x have this compatibility). After the client certificate is created, you need to export it from the browser and import it into the PC SSL key database using IBM Key Management. When exporting client certificates from the browser, always include the private key.

The certificate authority that signed/created the client certificate needs to be imported into the PC SSL key database before the actual client certificate, or else the PC SSL key database will not be able to trust the client certificate and fail to import it. If more than one valid client certificate is in the PC SSL key database, you can either use IBM Key Management to change the default client certificate, or use the PC5250 configuration properties to allow selecting which one to use during a connection attempt.

## Virtual Private Networks



OS/400  
V4R5 or  
later



### Virtual Private Networks



Windows  
2000 and  
XP

*Create  
secure  
connections  
over the  
Internet*

- Can directly connect Windows 2000 or XP PCs to OS/400 over VPN
  - See Information APAR II11791 on Client Access web page for details
- Windows NT VPN client code is not compatible with OS/400 VPN code

## Notes: VPN Support

APAR II11791: iSeries Access Support of VPN Connections

iSeries Access for Windows can be used on connections to iSeries systems with a VPN connection. The following software is required for a supported connection:

- iSeries Access for Windows (V4R4M0 or later) running on a Windows 2000 or XP platform
- OS/400 must be at V5R1 or later

Only Windows 2000 and XP has VPN client support built in that is compatible with the AS/400. If third-party VPN client support becomes available on other platforms (Windows 95, 98, Me, NT 4.0), it may work, but it is not supported at this time. VPN clients must support the L2TP protocol to interoperate with the AS/400.

The type of scenario that is supported is documented:

- In a redpaper entitled "Remote Access to AS/400 with Windows 2000 VPN clients" (REDP0036). (View this redpaper online at <http://www.redbooks.ibm.com>).
- Similar information is also located in the redbook "AS/400 Internet Security Scenarios: A Practical Approach", SG24-5954. View the PDF version of this redbook at <http://www.redbooks.ibm.com/pubs/pdfs/redbooks/sg245954.pdf>. See Chapter 12, "Remote Access with Windows 2000 VPN clients".

As of this writing, the redbook has later updates than the redpaper. It is highly recommended that users read this redbook or redpaper before attempting a VPN connection, since detailed configuration information is included.

## PC5250 Display & Print Emulation



More detail in Sessions:

23CE - PC5250 Printer Emulation - Basics

51CO - PC5250 Printer Emulation - Advanced Basics

27TB - PC5250 Display Emulation - Productivity Tips

44TA - PC5250 Display Emulation - Administration Tips

52CO - PC5250 Error Recovery, Tracing & Miscellaneous

## Client Access Express PC5250 V5.5



**Personal Communications AS/400  
Client Access Express for Windows**

**WorkStation Program  
Version 5.5  
Windows 98, Windows NT and Windows 2000**

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20001120

OK



## Notes: PC5250 Emulation

PC5250 display emulation enables users to run iSeries programs, work with OS/400 screens, and to send iSeries output to PC printers. PC5250 display emulation supports up to 26 sessions to one or more AS/400 systems. To configure and start an emulator session:

1. Start the PC5250 configuration program.
2. Select Display for the session type.
3. Select the size for the session.

Note: Do not use End Connection \*YES to log off your emulator session and disconnect from the AS/400. Instead, select COMMUNICATION from menu bar then select DISCONNECT.

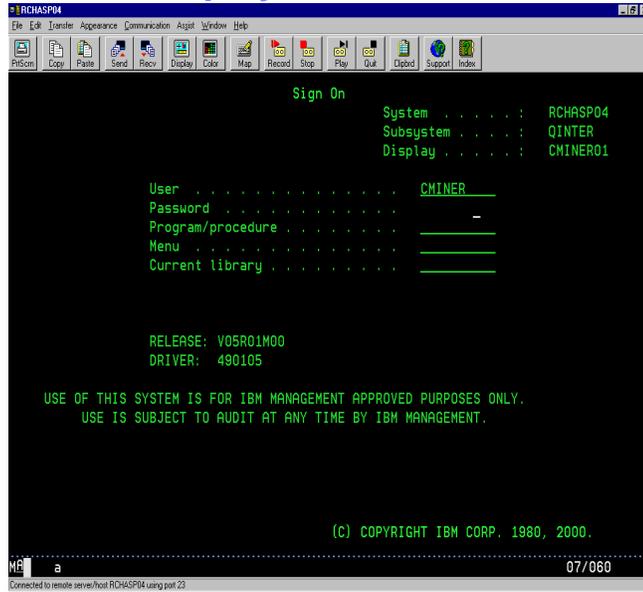
PC5250 print emulation can be used to print iSeries output on printers known to the iSeries -- this could be a network printer or a PC-attached printer. Up to 26 printer sessions can be simultaneously running to one or more iSeries systems.

To configure and start a printer emulation session

1. Start the configuration program.
2. Select Printer for the session type.
3. Click the Setup button to configure additional options for the printer session.

Help text is available if you need additional help with the options.

## PC5250 Display Emulation



- Display Setup
- Font Selection
- Customize Keyboard
- Customize Toolbar
- Keypad
- Record Macro/Script
- Access Web Browser
- Hotspots
- Edit/Cut/Copy/Paste
- Customize Mouse
- Setup/Change 5250 icon
- Supports DDE/EHLLAPI

## Notes: Give PC5250 Window titles more meaning

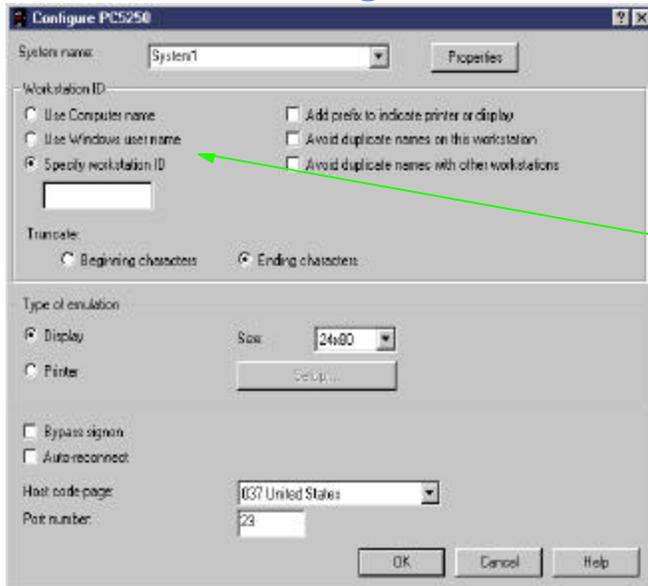
In shops that have several iSeries or iSeries machines, many administrators find themselves and their users plagued by obscure PC5250 Window title naming. (A Window title is the descriptive phrase that shows up in the topmost line of any Windows program.) By default iSeries Access PC5250 places 3 things in the Windows title of every PC5250 session: the word 'Session' followed by an IBM-generated session-ID (usually A, B, C, etc); a separator character of a '-' (dash); and the session dimensions (screen size) of the active PC5250 window. This default format leads to such inspiring PC5250 Window titles as: Session A - [24 x 80], Session B - [24 x 80], Session C - [24 x 80]. Generally, each PC5250 Window title looks the same, and it doesn't give you much information about the session it represents or the OS/400 box the user is connected to; and those titles aren't used in just your PC5250 emulation Window they also appear in 2 other important places on your Windows desktop--in the minimized icon indicator for the PC5250 session that is shown in the Windows toolbar at the bottom of your screen and as a description for the program icons that appear when you use the ALT-TAB key combination to switch between open Windows programs. And--because many shops may have multiple active PC5250 sessions that are connected to different iSeries or AS/400 machines--it would be valuable if you could change PC5250 titles to include something more meaningful so that you or your users know which OS/400 they are switching to when they maximize a particular session.

Fortunately, this problem doesn't have to exist with the new PC5250 facility that has been provided to change the Windows title for your PC5250 session. It's easy to use, and it allows you to manually insert a new title or insert some automatic values into your PC5250 Windows title fields. Here's how to use it.

In your Express client PC5250, go into the Windows Setup screen by selecting Edit-Preferences-Appearances-Windows Setup from the menu bar. On the Windows Setup dialogue that appears, you'll see an area called Windows Title that has approximately eight check boxes in it. Those check boxes control what values are displayed in your session's Windows title, and you can check (select) as many of those options as you want. As you check or uncheck a particular option, notice that your Windows title immediately changes, even before you leave the Windows Setup dialogue. That allows you to see what your new Windows title will look like before you commit to it by clicking the OK button on the dialogue. Using this area, you can add the following eight values into the Window title for a particular PC5250 session:

see next page...

## 5250 Session Configuration enhancements

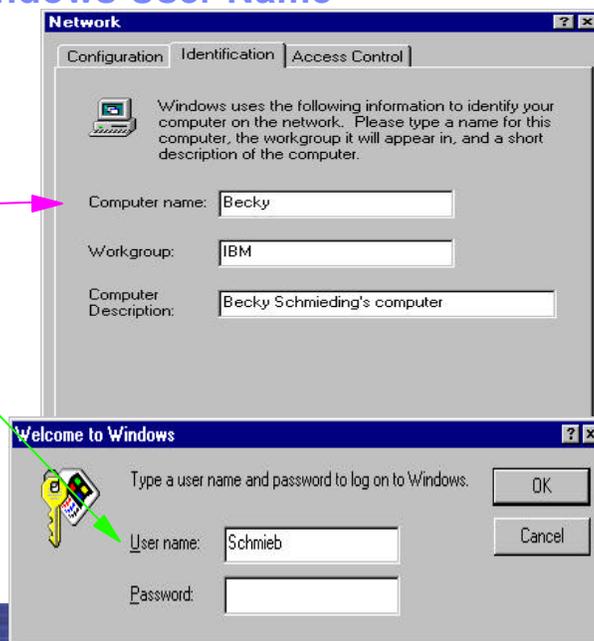


- GUI dialog now provided for configuring workstation id
  - ▶ Use Computer name
  - ▶ Use Windows user name
  - ▶ Specify a workstation ID

## Computer Name / Windows User Name

Value for Computer Name or Windows User Name comes from information stored on desktop

- Use Computer name
- Use Windows user name
- Specify a workstation ID



## Notes: PC5250 titles (continued)

**Long Session-ID:** One of the defaults listed above, checking Long Session-ID places the word 'Session' in the title, immediately followed by IBM's automatically generated session-ID. For the first PC5250 session on a box, it adds 'Session A' to the title, 'Session B' for the second session, and so on.

**Short Session ID:** This checkbox functions like the Long Session-ID except that checking this value adds only IBM's Session-ID to the title without including the word 'Session' (i.e., A, B, C).

**Session Name:** This check box is accompanied by an entry that allows you to fill in your own literal for use in the Window title. You must use a literal that is 16 characters or fewer.

**Session Profile:** Checking this option adds the name of your session profile (the .WS file) to the session's Window title.

**Session Dimensions:** Another default, this check box adds the PC5250 screen size dimensions (ex, [24 x 80]) to the title.

**Session API Status:** This box appends what IBM refers to as a visual indication of who is using this session -- a user or a DDE session -- to the Window title. Checking it merely adds the word 'USER' or 'DDE' to the title.

**Separator:** The separator check box comes with an input box that defines what separator character should be used between each literal that is added to the title when you select the other check boxes. This option is a default that uses a '-' (dash) as a separator.

Once you've made your selection and you're happy with the new title you've created, click the OK button on the Windows Setup dialogue and the session will display your new Window title. To save the title change as part of your .WS file, click on File-Save from the PC5250 menu bar and it will save your Window title changes to your .WS session configuration file.

Changing a Window title is one of those little features that may help your users locate and use their PC5250 emulation sessions more effectively.

## PC5250 Display Emulation

- Bypass Signon screen
- Auto-reconnect
- Password encrypted
- Supports long passwords

## How this would work

### Computer Name

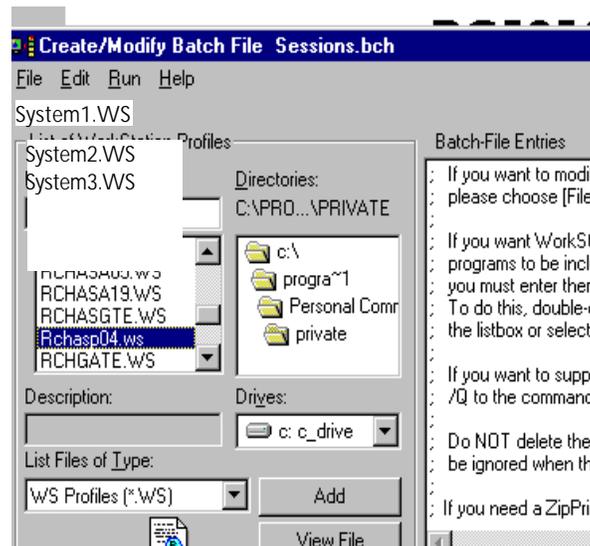
- 1st session would be called BECKYA
- 2nd session would be called BECKYB
- ...

### Windows User Name

- 1st session would be called SCHMIEB0
- 2nd session would be called SCHMIEB1
- ...
- Last available session would be called SCHMIEBZ

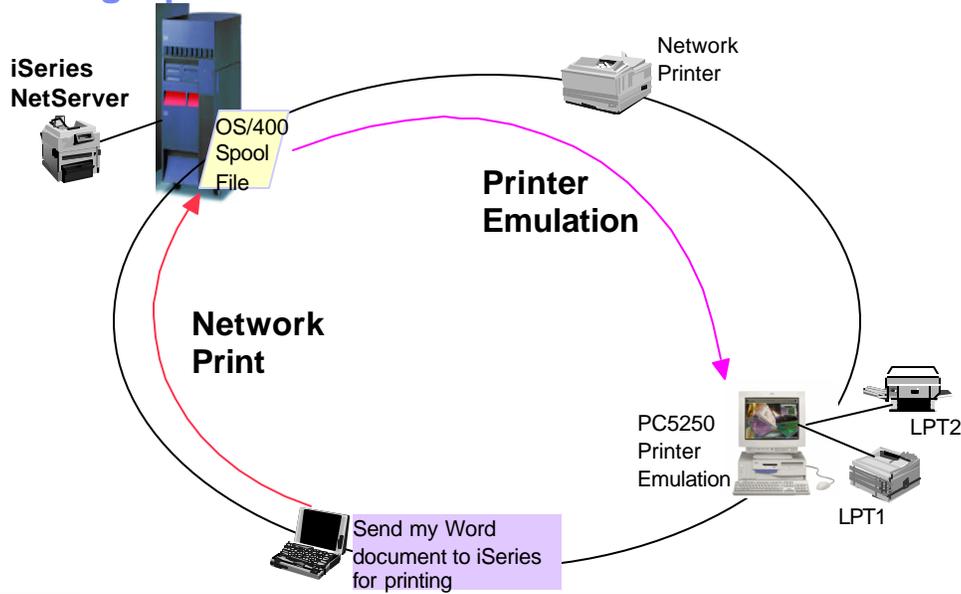
Session name must be unique on iSeries.  
If someone else signed on at SCHMIEB,  
it would skip that workstation name

## Keep Profiles on PC or iSeries



- Administrator can maintain one .WS profile on the iSeries that all PC5250 sessions can use
  - ie, standardize the keyboard, display, etc, settings that are being used

## Printing Options



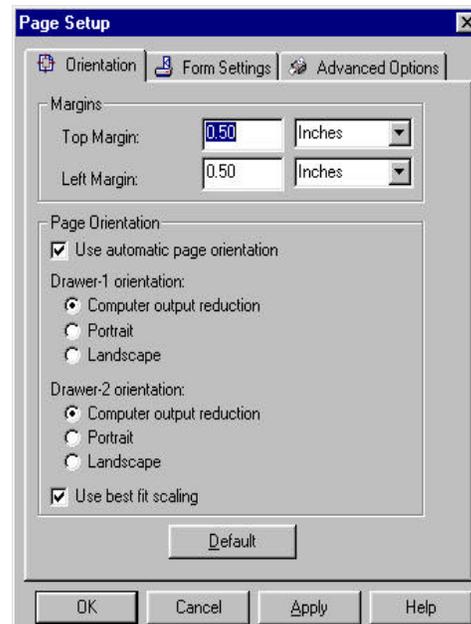
## PC5250 Printer Emulation

### Print iSeries output

- PC-attached printer
- Network printer
- PC file

### Supports:

- Host Print Transforms
  - Can print AFP documents to PC printers
  - More consistency amongst emulators
- PDT--printer definition table
  - PC type transforms
  - Work done on PC, great flexibility, fastest
- GDI--graphical device interface (printer driver transform)
  - Windows print drivers
  - Easiest, supports Postscript



## Notes: Pros/Cons of various print emulation options

### Host Print Transforms

- Advantages
  - Can print iSeries Office documents with imbedded images via HP LaserJet, HP DeskJet and IBM 4019 compatibles printers
  - Can print AFP documents to PC printers
  - Most consistent output when different emulators and Print Drivers are used
  - In the future will be able to do Postscript (level 1) via Image Print Transform Configuration which is specified on the printer device description (converts GIF, TIF, Postscript, BMP to Postscript, PCL, AFP) when Spool file type = User ASCII
- Disadvantages
  - Takes host CPU to do transform
  - New Printers may require modifications of existing WSCSTs, the AS/400 does not automatically come with updated WSCSTs

### GDI (Windows Print Drivers)

- Advantages
  - Supports Postscript and Windows specific printers and any printer for which Windows has a driver
  - Standard use
  - Easiest to use
  - Only choice for some printers (eg, latest Canon BJ Printers, HP DeskJet 820 and some multi-function devices; fax/print/copy)
- Disadvantages
  - Cannot print AS/400 office documents with imbedded images
  - Cannot print AFP documents
  - Print Driver can not be modified like HPT or PDT

### PDT - Printer Definition Tables

- Advantages
  - WSF Printer Function Tables (PFT) can be converted to PDFs using PCSPFC.EXE
  - Emulator does most of work, bypassing print driver processing
  - PDT gives great flexibility (make printer do what it can do)
  - Usually faster
- Disadvantages
  - Cannot print AS/400 office documents with imbedded images
  - Cannot print AFP documents
  - Cannot support Postscript data stream
  - New printers may require modifications of existing PDTs. They do not automatically come with updated PDTs
  - PDT is not supported for HP LaserJet printers that use PPA instead of PCL (eg, 820 Series)

## PC5250 Printer Emulation

.WS profile enables users to have multiple pcspd.dat files for special use with certain printer drivers

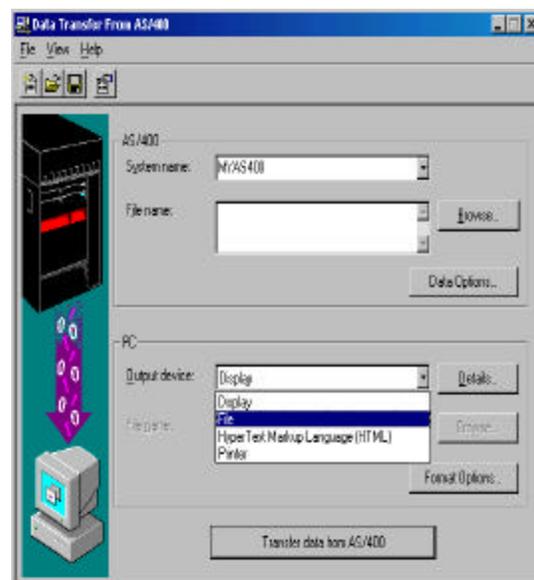
## Data Transfer



- More detail in Sessions:
  - ▶ 32TA - Client Access Express Data Transfer - The Basics
  - ▶ 37TA - Client Access Express Data Transfer - Advanced Topics
  - ▶ 41LA - Open LAB: iSeries Access for Windows and iSeries Navigator

## What is Data Transfer?

- Data Transfer provides users with the ability to:
  - ▶ Download selected DB2 UDB for iSeries information to a
    - PC file
    - HTML file
    - Excel or Lotus spreadsheet
    - PC display
    - PC printer
- Upload PC data to DB2 UDB for iSeries
  - ▶ From PC file or Excel spreadsheet



## Data Transfer Provides Data Conversions

- Provides an SQL-like interface
  - ▶ To allow full file SELECT or customized queries including joins, sorting, and record grouping
  - ▶ Provides access to AS/400 file members
- Capable of transferring data to and from many popular PC file types including
  - ▶ ASCII Text
  - ▶ CSV
  - ▶ Excel and Lotus spreadsheet types
  - ▶ Tab-Delimited Text
  - ▶ UTF-8 (used by browsers)



## Many Ways to Run Data Transfer

- Easy-to-use GUI screens
- Can be placed in start-up file
- Batch Transfers
  - ▶ RTOPCB and RFROMPCB
  - ▶ Can also run multiple batch requests can run on a single connection
- Can be started from
  - ▶ PC5250 Toolbar
  - ▶ Express icon group
  - ▶ Desktop objects or Explorer
  - ▶ Create new ones from Windows New menu
- Pre-defined Transfer Request
- Compatible with previous formats (ie, Enh.Win3.1, RUMBA)
- Auto-run without user intervention

## Notes: Data Transfer

Data Transfer provides an extensive array of graphical interfaces for desktop users and batch programming enablers for application programmers to retrieve data from an iSeries database and to quickly and easily store PC file data in the iSeries database.

Data Transfer enables users to select up to 32 iSeries files and transfer them with one request. Specified records or fields of records can also be selected and transferred to a desktop display, PC printer, PC file, HTML file, or directly into an Excel spreadsheet. PC files with most of the common PC formats can be transferred to the iSeries database.

Wizards are provided so users can create, modify, and run transfer requests, then save them and recall for later use.

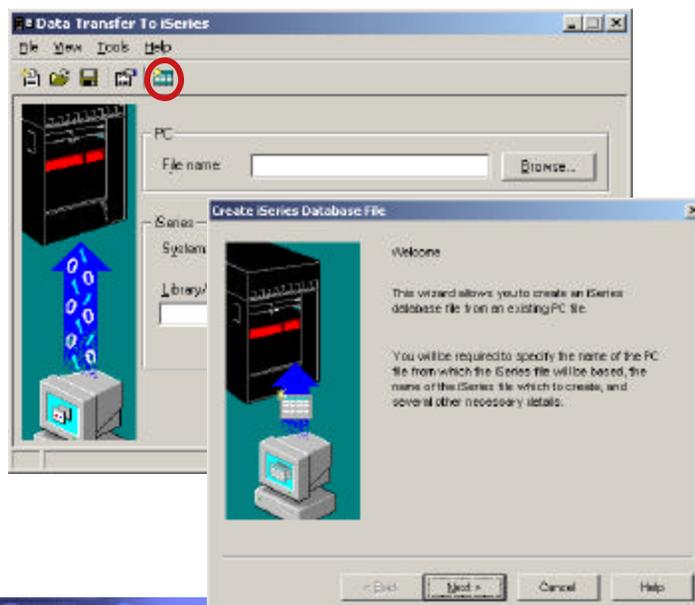
Batch transfers are also supported (via the RTOPCB and RFROMPCB commands).

## Create iSeries Database File Wizard

To help you create new tables in DB2 UDB for iSeries, use the **Database File Wizard**

- It also creates the File Description File (FDF) required for uploading the data to a new file

Start the Create iSeries Database File tool by selecting it from the Tools menu or by clicking on its icon in the toolbar



## Notes: Create Database File Wizard

In iSeries Access for Windows, Data Transfer now has the ability to define and create a new iSeries database file based on an existing PC data file. The new file is created as an SQL table. In previous releases, Data Transfer was only able to create files based on existing iSeries database files. The new function will also create the FDF file required for uploading the data to the new file. The interface to create a new database file is found in the Data Transfer to iSeries application. The function can be started from the Tools menu or a new toolbar icon.

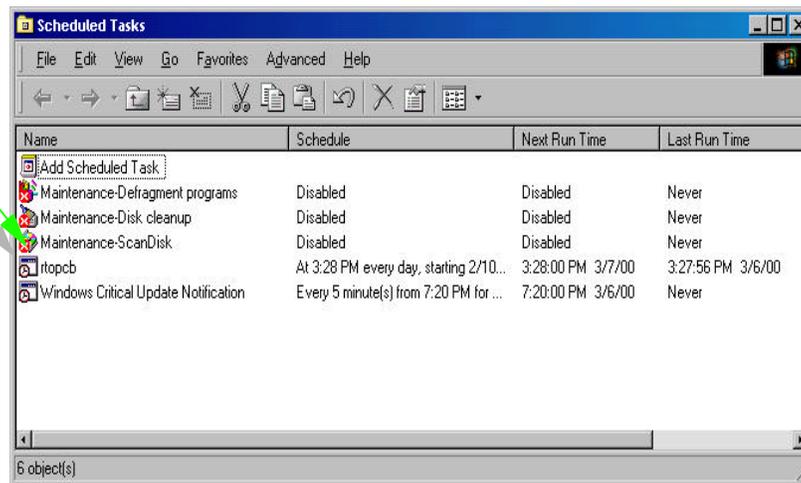
The first step in creating a new iSeries database file is to specify the PC file that you want the file based off of. The file can be in any of the following formats: ASCII text, BASIC Sequential, BIFF3, BIFF4, BIFF5, CSV, DIF, Tab-delimited text, or WK4. If you pick a file type containing detailed type information, such as BIFF or WK4, Data Transfer is able to more accurately determine the definition of the AS/400 file you will want to create to hold your data. After specifying your PC file, Data Transfer attempts to determine the type of the file. The type detected by Data Transfer is shown in the window. If this "guess" by Data Transfer is not correct, you will need to set the correct file type before you continue. If this is not done, Data Transfer will not be able to read the data file correctly, and an error will be displayed.

The information you enter along the way in the wizard will be loaded into the Data Transfer to iSeries application upon completion of the wizard function. The FDF file is an essential item for step of transferring the data to the iSeries. This panel allows you to set the name of the FDF file to be used for the transfer. In order to retrieve the field information from the PC data file, Data Transfer must "scan" or parse the data. If you chose not to do this, you will be required to manually set up the field definitions from scratch. If you run the scan operation, Data Transfer will scan the PC file and come up with a first pass at what the field definitions of the new database file will need to be to hold the data from the PC data file. If you chose to have Data Transfer scan the PC data file, you will be presented with a list of fields found in the PC data file. If you chose a simple file type such as ASCII text, the field definitions will almost always need to be modified. If you chose a more complex file type such as BIFF or WK4, only minor modifications may be needed. Either way, it is a good idea to verify the field definitions are going to allow for all possible values you will want to insert into the iSeries database. A context menu (right click in Details list control) is available to allow users to add to or remove fields from the list.

## Automating Data Transfer

You could schedule Batch Transfers using a Windows Scheduler

RTOPCB is scheduled to run at a given date and time



## Notes: Scheduling a Data Transfer Request

iSeries Access does not provide a scheduler program. For an example of how to schedule a Data Transfer request, we picked Microsoft's System Agent application.

From Microsoft Task Scheduler select Add Scheduled Task. Go through the wizard to create the scheduled task and enter

"C:\Program Files\IBM\Client Access\RTOPCB.EXE" your.TTO

for the task to execute.

Complete the other scheduling options offered by the System Agent application. You are now ready to run transfer requests on a scheduled basis.

## For Microsoft Excel Users

■ Add-ins automatically added to Excel

- Add-ins for **downloading** data directly into a worksheet and **uploading** data directly from a worksheet into the database

■ Supports Latest Formats

- Supports Excel 97 and 2000 file formats (such as Version 7 (BIFF7) and Version 8 (BIFF8)) as well as older file formats

## For Lotus 1-2-3 Users

The screenshot shows the Lotus SmartSuite 1-2-3 interface. The title bar reads "Lotus SmartSuite - 1-2-3 - [Untitled.123]". The menu bar includes File, Edit, View, Create, Range, Sheet, Window, and Help. The toolbar contains various icons for file operations and data manipulation. A callout bubble points to the "Print Preview" icon. Another callout bubble, titled "Supports Current Formats", lists the supported file formats.

**Supports Current Formats**

- Supports Lotus 97 Edition (.123, .WK4) file format as well as older file formats

	A	B	C	D	E	F	G
1	CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	
2	938472	Henning	G K	4859 Elm	Dallas	TX	
3	839283	Jones	B D	21B NW 1	Clay	NY	
4	392859	Vine	S S	PO Box 75	Broton	VT	
5	938485	Johnson	J A	3 Alpine W	Helen	GA	
6	397267	Tyron	W E	13 Myrtle	Hector	NY	
7	389572	Stevens	K L	208 Snow	Denver	CO	80226 400 1
8	846283	Alison	J S	787 Lake	Isle	MN	56342 5000 3
9	475938	Doe	J W	59 Archer	Sutter	CA	95685 700 2
10	693829	Thomas	A N	3 Dove Cir	Casper	WY	82609 9999 2
11	593029	Williams	E D	485 SE 2	Dallas	TX	75218 200 1
12	192837	Lee	F L	5963 Oak	Hector	NY	14841 700 2
13	583990	Ahraham	M T	392 Mill St	Isle	MN	56342 9999 3

## Notes: Enhancements for Excel and Lotus 1-2-3 users

Lotus .123 .123 file support added. The .123 file type is the standard type used in 97 Edition of Lotus 123. Lotus .WK4 support was added in release V4R4. The current .WK4 selectively installed option is expanded to include .123 support since these file types use the same LMBCS character conversion routines. The .123 support includes UNICODE character set support and support for new .123 numeric storage types. These types are defined in the Lotus .123 file format specification. Like .WK4 file support, .123 file format support includes the capability to read and write records to multiple sheets within a single workbook. Support for these types is also now included in the 'Create AS/400 Database File' wizard.

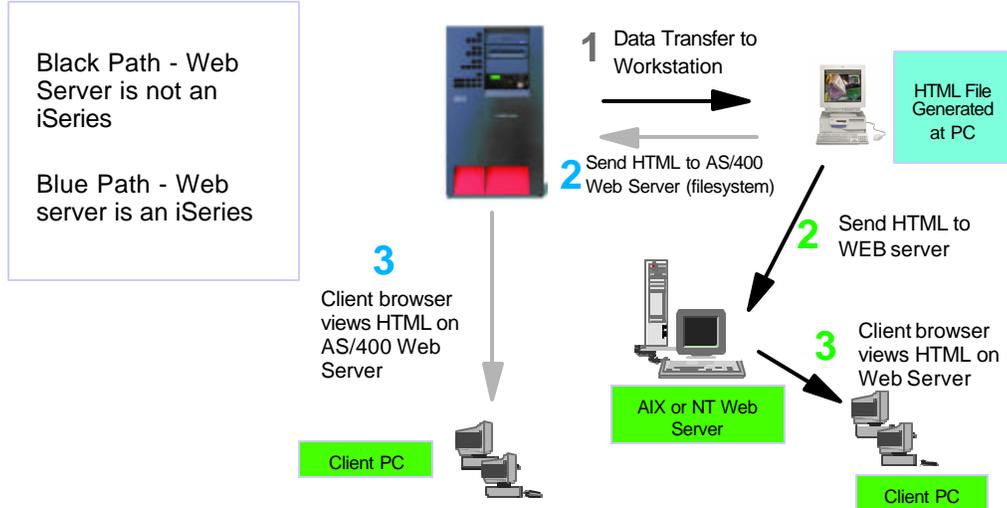
Upload from Excel Add-In. Today, Data Transfer provides the ability to download information into an Excel spreadsheet. This function is integrated into the Excel by providing (1) an Excel add-in module called cwbtfxla.xll, (2) a toolbar icon/button the user can select to invoke a Client Access data transfer GUI, and (3) a menu option from the Excel "Data" pulldown menu called "Transfer Data From AS/400..." Data Transfer now extends its integration with Excel by providing an option to upload information from Excel to the AS/400. This additional integration includes (1) an additional icon/button on the Client Access toolbar, (2) an additional menu option on the Excel "Data" pulldown menu called "Transfer Data To AS/400...", (3) a new dialog similar to the current download dialog, which allows the user to specify what data to upload and where to upload it to. A new DLL to be shipped and installed to provide this new capability.

Microsoft Excel BIFF7 and BIFF8 file support - support for the Microsoft Excel Versions 7 and 8 file formats. Version 7 support is simply an extension of the Version 5 file format which Data Transfer currently supports. The major change from Version 7 to Version 8 is that in Version 8 character data is stored as UNICODE. Like .WK4 file support, Excel Version 8 support includes the option to save to multiple sheets within a workbook. Support for these types also has been added to the Create iSeries Database File wizard.

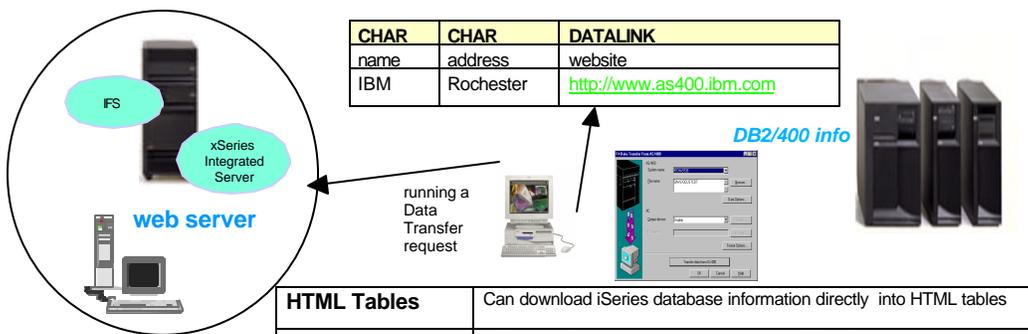
Previously Data Transfer "ignored" formula cells and passed the default value of the field type to the iSeries. For example, a numeric formula cell found in Excel today would cause Data Transfer to pass a value of 0 to the iSeries database file. Data Transfer now determines if the formula is for a numeric value. If it is, Data Transfer pulls the result of the formula from the cell and passes it to the iSeries database file. If the formula does not resolve to a numeric value, Data Transfer will continue to pass the default value for the cell type.

## Using Data Transfer for e-Business

### HTML File support - Updating a web server



## Some e-business Capabilities



<b>HTML Tables</b>	Can download iSeries database information directly into HTML tables
<b>UTF-8 file types</b>	HTML details panel supports writing to a UTF-8 file (used by Netscape Navigator and IE). This allows web pages to contain characters from many different character sets.
<b>Update an existing HTML file with new DB2/400 info</b>	Database information can be inserted directly into a section of an existing HTML file. A 'template' section is used to tell D/T where to put the resulting table in the HTML file. This enables users who have web pages of text/images update a section of database information yet leave the rest of the web page text intact. Previously the entire HTML file was replaced with a table containing the database data.
<b>DATALINK data type support</b>	OS/400 V4R4 added a DATALINK data type. This type supports url entries pointing at files accessible by your network. When transferring to an HTML table Data Transfer provides a link for this url.

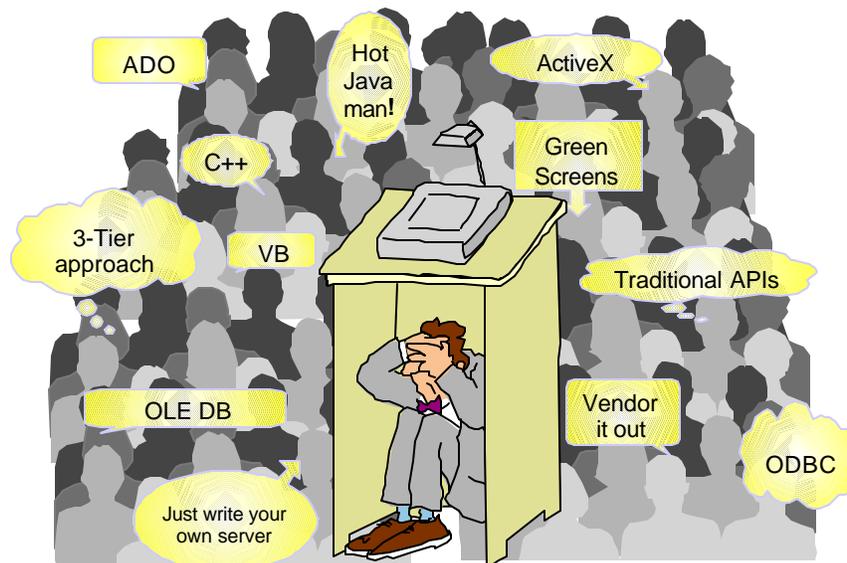
## iSeries Access for Programmers

### Application Enablement



- Sessions directly covering Access for Windows application enablement:
  - ▶ 33CC - iSeries Access Programming Overview
  - ▶ 45TC - iSeries Access ActiveX Development
  - ▶ 27CT - Client Access: Three Tier Development
  - ▶ 36CR - DB2 UDB for iSeries: Making IBM's ODBC Fly
  - ▶ 41LA: OPEN LAB: iSeries Access
- Other Sessions:
  - ▶ 41CB - Introducing IBM Toolbox for Java
  - ▶ 56CK - Developing Wireless Applications for iSeries
  - ▶ 31CT - Can you find the 'I' in .NET?
  - ▶ 26CE - iSeries ODBC Driver for Linux

## So many options...



## Access for Windows Middleware

Express Function	Where it fits	Value to iSeries
iSeries ODBC driver	<ul style="list-style-type: none"> <li>Industry-standard Windows database access method.</li> <li>Supports Microsoft V3.0 specification.</li> </ul>	<ul style="list-style-type: none"> <li>Access to DB2 UDB for iSeries</li> </ul>
iSeries OLE DB provider (driver)	<ul style="list-style-type: none"> <li>Microsoft's universal data access standard interface for Windows applications working with relational and non-relational data.</li> <li>Supports OLE DB 2.5</li> <li>Can use ADO 2.2 and 2.5</li> </ul>	<ul style="list-style-type: none"> <li>Access to DB2 UDB for iSeries</li> <li>Can use OS/400 Data queues, Remote Commands, Stored Procedures, Distributed Program Calls...</li> </ul>
Visual Basic Wizards	<ul style="list-style-type: none"> <li>Can use VB 6.0</li> </ul>	<ul style="list-style-type: none"> <li>For use with AS/400 OLE DB provider</li> </ul>
<ul style="list-style-type: none"> <li>Data Queues</li> <li>Remote Commands</li> <li>Stored Procedures</li> <li>Distributed Program Calls</li> <li>SQL APIs</li> <li>Data Transfer APIs</li> </ul>	<ul style="list-style-type: none"> <li>Active X Automation Controls &amp; Objects – industry-standard Windows programming interface</li> </ul>	<ul style="list-style-type: none"> <li>Works with OS/400 Data queues, Remote Commands, Stored Procedures, Distributed Program Calls...</li> <li>Access to DB2 UDB for iSeries</li> </ul>
PC5250 enablers	<ul style="list-style-type: none"> <li>Industry-standard EHLLAPI, WinHLLAPI, DDE for code conversion. Includes ActiveX controls</li> </ul>	<ul style="list-style-type: none"> <li>For 5250 applications</li> <li>ENPTUI for enhanced 5250 datastream functions</li> </ul>
iSeries Toolbox for Java (GUI classes, JDBC...)	<ul style="list-style-type: none"> <li>Portable across platforms.</li> </ul>	<ul style="list-style-type: none"> <li>Access to DB2 UDB for iSeries</li> <li>Can use OS/400 Data Queues, Stored Procedures, Remote Commands...</li> </ul>

## Notes: Middleware

### iSeries ODBC Driver

ODBC is a Microsoft-defined standard database access interface for Windows users. Client Access provides an iSeries ODBC driver to enable any ODBC 32-bit Windows application (written to MS V3.0 specification) to transparently access DB2/400 information. iSeries ODBC driver supports Dynamic SQL access at static SQL speed (4x improvement), Block Fetch, Insert, Update, & Delete functions, takes advantage of DB2/400 Optimizer, supports Stored Procedures (result sets from stored procedures), SQL Collections do not need to be defined

### iSeries OLE DB Provider (driver)

OLE DB is a Microsoft 32-bit Windows architecture for universal data access. OLE DB is defined as a multi-platform access method for relational and non-relational data, and is a superset of ODBC. Client Access includes an iSeries OLE DB Provider so that any PC application written to this interface can be used to access AS/400 resources. The iSeries OLE DB Provider can be used for record level access, SQL calls, stored procedures, data queues, programs, and CL commands. The OLE DB and ActiveX toolkit which provides Visual Basic wizards and other sample programs is provided as part of the Client Access Toolkit.

### ActiveX Automation Objects

ActiveX automation objects are provided for Client Access data queues, remote commands, and distributed program calls. Many popular client languages, such as Visual Basic, Delphi, PowerBuilder, and Visual C++, support ActiveX automation objects, and now these programs can use the Express client key components to develop client/server applications between the PC and the iSeries. Online help (including example code) is provided and can be accessed from object browsers.

### iSeries Toolbox for Java

The iSeries Toolbox for Java includes a series of low-level APIs for accessing iSeries data and resources from a Java program. It also includes a set of GUI classes to present iSeries data to the user from a Java program. The GUI classes use the Java Swing 1.0 (JFC 1.1) framework. This is a separately installable option of Client Access install. Once installed through Client Access, future updates to the Java Toolbox will be delivered to PC users through the Client Access 'service' function (ie, whenever a PTF for the Java Toolbox is applied to the iSeries Check Service Level recognizes the new level and downloads the fix to the client).

### PC5250 Enablers

EHLLAPI support is provided so programmers can add a graphical interface to applications written to a 5250 interface to perform functions such as host data access, screen scraping and host automation. This industry-standard 32-bit support also enables applications currently written to another emulation products' EHLLAPI to migrate and run unchanged using PC5250.

WinHLLAPI support is implemented so customers who have WOSA-compliant applications can migrate to PC5250.

PC5250 DDE now includes code conversion support. This provides a more consistent set of DDE APIs thus making it easier to migrate applications across different platforms.

Enhanced Non-Programmable Terminal User Interface (ENPTUI) provides 5250 datastream functions such as ability to show radio buttons and check boxes on end-user desktops that can support these functions (such as a PC versus a 5250 terminal).

PC5250 ActiveX Controls have been added and can be used in any application that supports ActiveX controls (such as Visual Basic, C++, etc). These controls enable host applications to use a list box or button.



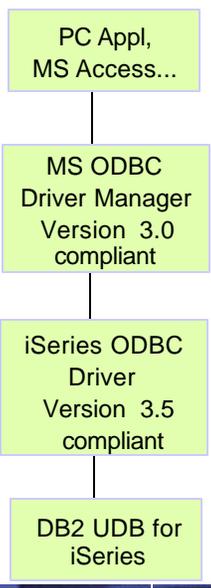
ODBC

Most popular database access method from a Windows application



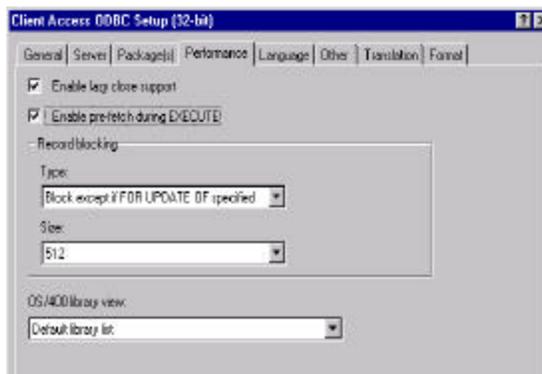
**iSeries ODBC Driver**

## Industry-Standard ODBC Database Access



- Work with iSeries database information by:
- Running any off-the-shelf Windows application written to Microsoft ODBC specification
  - Writing your own Windows application using the Microsoft ODBC specification

**iSeries ODBC Driver**



## Notes: iSeries ODBC Driver

### ODBC Support

The Client Access iSeries ODBC driver provides SQL access to iSeries database files, using standard ODBC interfaces. Applications developed according to the ODBC specification can be used to access data from any database management system (DBMS) which provides an ODBC driver. This eliminates the need to code to multiple proprietary database interfaces. A disadvantage of implementing a standard interface is the lack of flexibility to provide the fastest possible way to retrieve/update data from/to databases. If optimal performance is a requirement, one of the other Client Access database interfaces should be considered.

There are multiple ways in which to access the ODBC driver:

- Application programmers can write directly to the ODBC interface, to create a custom ODBC application.
- Application programmers can write to a higher level interface, such as RDO, which provides support for running over the ODBC driver.
- End users can use off-the-shelf applications such as Lotus Approach, Microsoft Access, etc., to access the iSeries database via the ODBC driver. This option does not require any programming by the user. The off-the-shelf application actually makes the ODBC calls, thus removing the burden from the user.

### Interface definition

Microsoft ODBC Programmer's Reference and SDK Guide  
Microsoft ODBC Software Development Kit and Programmer's Reference

### Sample applications

Client Access Express samples - database

### Related information

- Client Access Express for Windows ODBC User's Guide
- DB2 UDB for iSeries SQL Reference
- Microsoft ODBC Web Page
- Partners In Development Client-Server Home Page
- Client Access Information APARs, see ODBC section
- Inside ODBC, Author: Kyle Geiger, ISBN: 1-55615-815-7 (book)



- Record level access
- Data Queues
- Stored Procedures
- ODBC
- ...

Microsoft-recommended access for 32-bit Windows applications



OLE DB

**iSeries OLE DB Provider**



plus Visual Basic Wizards

## OLE DB Provider for iSeries

**OLE DB Provider supports Microsoft OLE DB 2.5 specifications**

OLE DB provider will work with new Windows products such as

- ADO 2.1 - this ships with Microsoft IE 5.0 and Office/2000 products
- ADO 2.5 - this ships with Microsoft Windows/2000
- Visual Basic 6.0 OLE DB controls and wizards

OLE DB Provider also has many unique to iSeries custom properties to enhance Windows-to-iSeries application development

## Visual Basic Programming Aides

The screenshot shows the Microsoft Visual Basic IDE interface. The 'Link Tables...' menu option is highlighted, with a context menu open showing options like 'Link Stored Procedures...', 'Link Data Queues...', 'Link Commands...', 'Link Programs...', 'Create Form from Links...', 'Work with Stored Procedures...', 'Work with Data Queues...', 'Options...', and 'Help...'. A green callout box is overlaid on the interface, listing the following:

- Wizards to aid in developing Visual Basic applications using
  - Record Level Access
  - Data Queues
  - Stored Procedures
  - Remote Commands
  - SQL
  - ODBC
- Sample programs for IE, PowerBuilder, Delphi, Visual C++, Lotus 1-2-3

## Notes: Visual Basic Wizards

### About Visual Basic wizards

The Visual Basic code-generating wizards are designed to provide client application programmers a jump start at developing their AS/400 client/server applications. Programmers who know little about Visual Basic, ActiveX Data Objects (ADO), OLE DB, or the AS/400 can quickly create simple, customized applications.

To access the Visual Basic wizards, go to the Add-Ins pull-down menu and select Express Toolkit. Then select from the list of Visual Basic wizards displayed. The wizards support the following functions:

- Link tables
- Link stored procedures
- Link data queues
- Link commands
- Link programs
- Create form from links
- Work with stored procedures
- Work with data queues
- Options

The wizards are optimized for use with Visual Basic, the iSeries Access OLE DB provider, and with your iSeries server. They use the Client Access Express OLE DB provider to connect to your iSeries, and to retrieve necessary information including lists of files, lists of data queues, file descriptions, and SQL stored procedure definitions. The Visual Basic wizards generate code into your new or current Visual Basic project. Most of the code is generated into a class object called DA400Links.cls. To generate code into a newly created form object (Form2.frm, Form3.frm), select Create Form from Links.

The wizards generate ADODB code, as well as Visual Basic code. ADODB is an implementation of ADO for use with OLE DB providers. This is a high-level programming interface. ADODB makes calls to an OLE DB provider.

When you have completed your application, use the Visual Basic File menu to create an executable program (.EXE). You can run this program on any PC that has the iSeries Access OLE DB provider.

We hope that you find these wizards an easy and exciting way to start developing client/server applications to your iSeries.

## iSeries-Specific Middleware

## Data Transfer ActiveX Automation Support

### ActiveX Automation support for all Data Transfer GUIs

- ActiveX automation objects for transferring database data to and from iSeries and AS/400e servers.
- These objects provide both a high-level and a low-level interface.
- These objects can be used from Visual Basic and other languages which support ActiveX automation.

## Notes: Data Transfer enhancements

### Provide APIs for Data Transfer

Automation object support - customers continue to ask for a replacement for the "old" File Transfer API and also for better programmatic control over the current data transfer batch interfaces. Client Access Express has added ActiveX automation objects to meet these requests. Both high-level and low-level interfaces are provided. The high-level interface provides a fastpath approach for running database transfers. It requires minimal input and defaults many behaviors. The low-level interface provides programmatic access to most aspects of the Data Transfer GUI application, including the ability to create and save transfer requests.

### AS/400 Database

BIGINT (8 byte integer) support - OS/400 V4R5 (UDB) added support for 8 byte integers. Data Transfer now supports this new column type for both upload and download. For some file types (such as BIFF and WK4 where double is the largest numeric value supported), roundings may occur. Users will be warned when this happens.

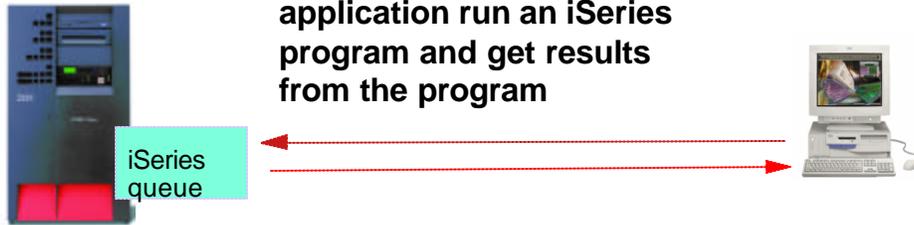
Support for transferring data to and from float and double database fields on the AS/400 - the database API currently supports float and double fields in iSeries database files. Data Transfer conversion routines and file types now support transferring these types to and from PC files and the iSeries

### Improve handling of CCSID

Global request priming from set values - to help users set up default requests for such items as 65535 data conversion, an option to save a data transfer profile as the "template" for newly created data transfer requests has been added. To accomplish this, a 'Save Template' option is added to the user interfaces. This template information is stored in the registry.

User-defined CCSID setting in GUI - an option was added to the File Details panel for both Data Transfer To iSeries and Data Transfer From iSeries to allow users to manually set the CCSID of their data. If a user defines their own CCSID, Data Transfer will convert data using that CCSID. This option will be stored in the transfer request file and be used when the request is opened or run. This option is also added to allow BIDI users to separately control Data Transfer conversions from the rest of the conversions performed in Client Access.

## Data Queues



- Data Queues lets a PC application run an iSeries program and get results from the program

- iSeries program is running, watching queue for work
- iSeries program performs activity, and returns output to PC program.

### Data Queues

- FIFO, LIFO, KEYED
- Send/Receive entries
- Multiple formats
- Reads single entry or all entries from the queue
- Can read specific key value

## Notes: Data Queues

### Data Queues

Loosely connected program-to-program communications

Allows multiple programs (client or server) to read and write data from one place. This provides another (loosely connected) type of program to program communication. Data in the data queue is free format. The format must be understood by both client and server applications.

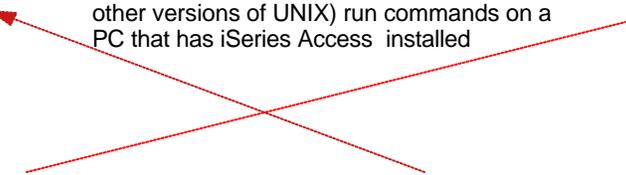
## Distributed Program Call

- **Distributed Program Call** allows a PC program to start up a program residing on the AS/400 using input and output parameters



- Starts an iSeries program
- iSeries program performs activity, and returns output to PC program.

## Remote Commands



- Incoming Remote Command lets users from various systems (such as iSeries, VM, AIX, and other versions of UNIX) run commands on a PC that has iSeries Access installed

### RUNRMTCMD

- Submit PC commands from an iSeries system to start a PC batch program
- Start a Client Access batch Data Transfer
- Copy a PC file
- Display a directory on the PC hard disk
- ...

### RMTCMD

- Starts a 5250 program
- The command is sent as if it was entered at a DOS prompt
- Output that normally would appear in the DOS window is sent to the requesting system

- In both these scenarios these commands can be run without already having a connection established between the two systems.

## Notes: Remote Commands

Incoming Remote Command lets users from various systems (such as OS/400, VM, AIX, and other versions of UNIX) run commands on a PC that has Client Access Express installed. This enables non-interactive commands and programs to be started by another host in the network. The iSeries server uses the Run Remote Command (RUNRMTCMD) to send commands to a PC. iSeries programs can also be started from a PC by using Remote Program calls (RMTCMD). In both these scenarios these commands can be run without already having a connection established between the two systems. The command sent to the PC runs as if it was entered at a DOS prompt. The output that would normally appear in the DOS window is sent to the requesting system. For example, you can submit PC commands from an iSeries system to start a PC batch program, or start an iSeries Access batch Data Transfer, copy a PC file, or perhaps display a directory on the PC hard disk.

To enable remote commands to run on the PC, iSeries Access provides incoming remote command daemon programs. CWBRXD is the name of a program that enables your PC to receive requests from other computers and run commands on your PC, and CWBRXDSD is the program to stop commands from running on your PC. When running on Windows 95 or 98 operating systems, you start CWBRXD or CWBRXDSD from a DOS prompt. When running on Windows NT or 2000, you start the iSeries Access Remote Command service to start the CWBRXD program, and stop this service to end the program. Additional options can be specified in the Startup Parameters field when you start the service, or can be saved for use whenever the service is started by using CWBRXDOP program.

### Controlling use of Incoming Remote Commands on remote PCs

For Windows NT and 2000, the incoming remote programs run as a service called iSeries Access Remote Command. The Windows NT security manager is used to control access. The Client Access Express Remote Command service must be running before remote commands sent to the PC will work.

When running on Windows 95 or 98, you automatically disable Incoming Remote Commands when you set your Windows operating system to disallow password caching as the incoming remote programs rely on the Windows password cache for storing and retrieving passwords. For Windows 95 and 98 users, a new parameter has been added to the Client Access tab of 'Passwords' within the Control Panel. The setting enables all Incoming Remote Commands to either run or be rejected. If this parameter is not checked then all incoming command requests will be rejected. On the other hand, if Windows password caching is enabled, then this policy setting has no effect.

## Allow Commands to be run on remote PC

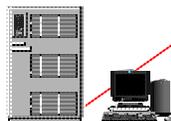
### CWBRXD program

- Enables your PC to receive requests from other computers
- Run commands on your PC



### CWBRXDSD program

- Stops commands from running on your PC



## Notes: CWBRXD program

The CWBRXD program in Client Access Express (V4R5M0) added parameters to provide more flexibility for running commands in certain ways, for configuring security required to run commands, and a utility is included to save these options so they can be reused across PC reboots. The syntax and new options for CWBRXD command are 'CWBRXD [/cmddet | /cmdnewcon | /cmdnorm] [/runssystem] [/cache] [/nosecok] [/usewinlogon]'.

The **/cmddet** (Detached Mode), **/cmdnewcon** (New Console Mode, the default), and **/cmdnorm** (Normal Mode) are command mode parameters, and only one may be specified. The 'Normal Mode' option states the console window owned by the CWBRXD command be used (if required), and allows the output to be captured and sent back to the user who sent the command. The 'New Console Mode' and the 'Detached Mode' options specify that the command should run in its own console window rather than the one owned by CWBRXD. When running interactive console applications in their own console window (for example using the text editor, edit.com, that comes with Windows) does not keep subsequent commands from running as they might do if running in 'Normal Mode'. The 'Detached Mode' is necessary when running an application such as xcopy.exe on Windows NT as it can only run in detached mode. The 'New Console Mode' allows the output to be captured and sent back to the user who sent the command--this is not always possible when running in 'Detached Mode'.

The following options are only applicable when running on Windows NT or 2000 PCs.

**/runssystem** - says run in the context of the account the Remote Command service is configured to run under (System account is default). If this option is not specified, then commands run in the context of the user ID who sent the command.

**/cache** - causes CWBRXD to perform a user logon, using the NT security manager, only once per user ID, caching (saving) the user ID and password for use the next time the same user sends a command. This option implies /runssystem is also being used.

**/nosecok** - tells CWBRXD to accept and run commands sent with no security (\*NONE for both user ID and password). This is useful when a program cannot retrieve a valid user ID and password. You should limit access to the RUNRMTCMD command on your AS/400 systems to only trusted users and programs, or implement some other security measure, to avoid intentional or accidental execution of destructive commands being sent to the PC. This capability is already available for Windows 95 and 98 PCs by using wildcard characters (\*) for both user ID and password on the Incoming Remote Command tab of Client Access Express Properties.

**/usewinlogon** - allows commands to be issued using \*NONE for user ID and password but tells iSeries Access to attempt to retrieve the user ID and password of the user currently logged onto the PC, and run the command in the context of that user. If no user is logged-on, the command will not run. If there is no logged-on user, but /nosecok was also specified, the command will be run in the context that the service was started in, usually System. This option is useful when you want to use resources such as network drives and network printers and you wish to run the RUNRMTCMD without a user ID and password but do want it to run in the context of a logged-on user so that resources mapped in that user context can be accessed.

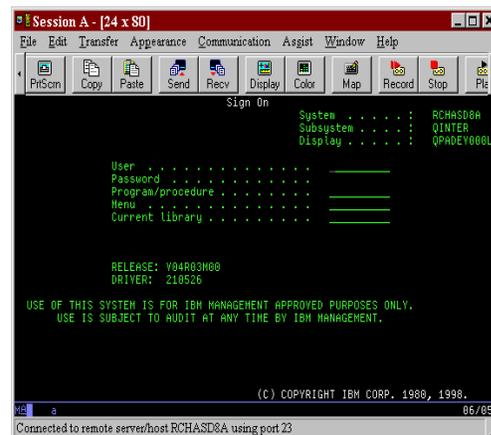
## Industry Standard Emulation Programming

### Emulator High Level Language API

- EHLLAPI is a simple, single-entry point interface, which interprets the emulator screen so programmers can add a graphical interface to applications written to a 5250 interface
- Can perform functions such as host data access, screen scraping and host automation.
- This industry-standard 32-bit support also enables applications currently written to another emulation products' EHLLAPI to migrate and run unchanged using PC5250.

### Dynamic Data Exchange

- DDE enables applications to exchange data
- Similar to EHLLAPI in that it provides a programmable means to read the host screen, send keystrokes, and perform related functions



## Notes: PC5250 APIs using C or C++

### C/C++ APIs

Client Access Express provides C programming interfaces for managing host emulator sessions and for enabling interaction between workstation programs and host systems. The interfaces provided are:

#### Emulator High Level Language API (EHLAPI)

This interface provides functions to access emulator "presentation space" data such as characters on the host screen. It also provides functions for sending keystrokes to the host, intercepting user-entered keystrokes, querying the status of the host session, uploading and downloading files, and other functions. This interface is often used for "automated operator" applications which read host screens and enter keystrokes without direct user intervention.

EHLAPI functions can be used in workstation application programs to:

- automate repetitive tasks
- mask complex applications from the user
- consolidate several complicated tasks into one simple task
- simplify existing host applications
- provide for unattended operation through a programmed operator, which monitors tasks without human intervention.
- write programs that divide the work between host and workstation sessions

In order to provide compatibility with a large number of existing applications, Client Access Express supports a number of EHLAPI interfaces:

- Standard HLLAPI - this is the original HLLAPI interface for providing programmatic access to a host emulator session.
- Enhanced HLLAPI - this interface is based on the standard HLLAPI interface. It provides all of the existing functionality but uses modified data structures to take advantage of the 32-bit environment.
- WinHLLAPI - this interface provides the same functionality as the standard HLLAPI interface and adds extensions which take advantage of the Windows message driven environment.

EHLAPI is a simple, single-entry point interface, which interprets the emulator screen. The C++ and ActiveX automation interfaces to the Host Class Library (HACL), on the other hand, provide object-oriented interfaces which access host information at the data stream level. The HACL interfaces also provide a number of features not available with EHLAPI. For a list of these features, see the Emulation C++ or ActiveX topics.

#### Personal Communications Session API (PCSAPI)

This interface is used to start, stop, and control emulator sessions. Whereas EHLAPI is used to manage the interaction between a workstation application program and host systems after the session is established, the PCSAPI can be used to control the PC5250 session itself.

### C++

The iSeries Access PC5250 emulator provides a Host Access Class Library (HACL) which contains a set of objects that allow C++ application programmers to access host applications easily and quickly. Client Access Express also provides an ActiveX automation interface to the HACL as well.

HACL provides a set of classes that allow the development of applications which can access host information at the data stream level. This provides an advantage over "screen-scraping" interfaces such as EHLAPI, since there is no overhead associated with interpreting the emulator screen. HACL provides an object-oriented abstraction of a host connection that includes:

- reading and writing the host presentation space
- enumerating the fields on the screen
- reading the operator indicator area (OIA) for status information
- accessing and updating information about the visual emulator window
- transferring files
- performing asynchronous notification of significant events

Features included in the HACL which are not part of EHLAPI:

- connection start/stop functions
- event notification for host communications link connect/disconnect
- event notification for connection start/stop
- comprehensive error trapping
- generation of language-specific error message text
- no architectural limit to the number of connections
- support for multiple concurrent connections and multithreaded applications
- row/column addressing for host presentation space
- simplified model for presentation space
- automatic generation of list of fields and attributes
- keyword-based function key strings

Features included in EHLAPI which are not part of HACL:

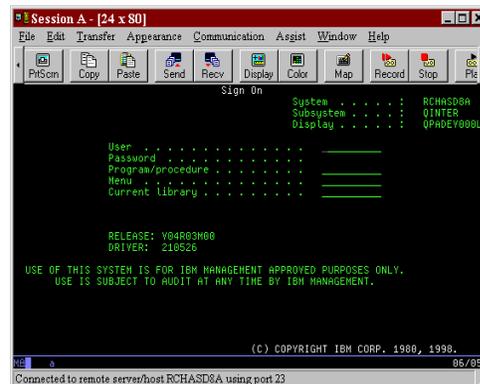
- structured field support
- OIA character images
- lock/unlock presentation space

For complete documentation on the PC5250 emulation interfaces, see: eNetwork Personal Communications for Windows 95 and Windows NT - Library

## Express PC5250 has ActiveX Enhancements

### Host Access Class Library (HACL)

- A set of objects that allow ActiveX automation programmers to access host applications easily and quickly.
  - Controls enable host applications to use a list box or button and run unchanged using PC5250.
  - An advantage over "screen-scraping" interfaces such as EHLAPI, since there is no overhead associated with interpreting the emulator screen.
- These objects can be used from Visual Basic and other languages which support ActiveX automation (such as C++)
  - Host Access Class Library (HACL) - can be downloaded from CA/400 web page



**PC5250 Version 5.5**

## Notes: Active X for PC5250

### ActiveX

The iSeries Access PC5250 emulator provides a Host Access Class Library (HACL) which contains a set of objects that allow ActiveX automation programmers to access host applications easily and quickly. These objects can be used from Visual Basic and other languages which support ActiveX automation. Client Access Express also provides a C++ interface to the HACL as well.

HACL provides a set of classes that allow the development of applications which can access host information at the data stream level. This provides an advantage over "screen-scraping" interfaces such as EHLLAPI, since there is no overhead associated with interpreting the emulator screen. HACL provides an object-oriented abstraction of a host connection that includes:

- reading and writing the host presentation space
- enumerating the fields on the screen
- reading the operator indicator area (OIA) for status information
- accessing and updating information about the visual emulator window
- transferring files
- performing asynchronous notification of significant events

Features included in the HACL which are not part of EHLLAPI:

- connection start/stop functions
- event notification for host communications link connect/disconnect
- event notification for connection start/stop
- comprehensive error trapping
- generation of language-specific error message text
- no architectural limit to the number of connections
- support for multiple concurrent connections and multithreaded applications
- row/column addressing for host presentation space
- simplified model for presentation space
- automatic generation of list of fields and attributes
- keyword-based function names

Features included in EHLLAPI which are not part of HACL:

- structured field support
- OIA character images
- lock/unlock presentation space

### DDE

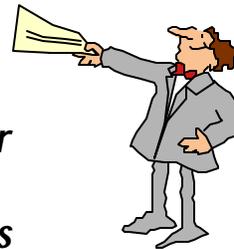
The iSeries Access PC5250 emulator provides a Dynamic Data Exchange (DDE) interface which allows applications to exchange data. The exchange of data between two Windows applications can be thought of as a conversation between a client and a server. The client initiates DDE conversations. The server in turn responds to the client. PC5250 is a DDE server for the open sessions that PC5250 is managing.

This interface is similar to the EHLLAPI interface in that it provides a programmable means to read the host screen, send keystrokes, and perform related functions. It has some additional functions for access to the emulator clipping rectangle, intercepting mouse events, and adding/removing commands on the emulator menu bar.

For complete documentation on the PC5250 emulation interfaces, see: eNetwork Personal Communications for Windows 95 and Windows NT - Library

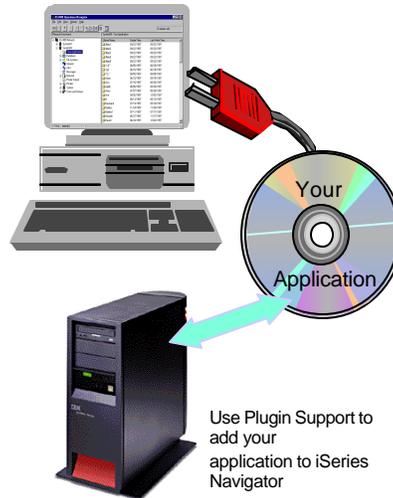
## If you wish to write in Java...

*Use the iSeries Toolbox for Java that is shipped with iSeries Access for Windows*



## Plug-In Support through iSeries Navigator

- Allows you to add your own PC applications to iSeries Navigator
  - ▶ Application can be initiated from the iSeries Navigator tree
  - ▶ Plug-in APIs provided so application can be written in Java, Visual Basic, and C++
- Your application can use other iSeries Navigator capabilities, such as properties, etc
  - ▶ Control usage of iSeries resources through iSeries Navigator Application Administration
  - ▶ For example an application can be added as a menu option on the iSeries Navigator library or table objects which would eliminate the need to add application code to specify which library or table users can work on



## Notes: Plug-in Support

Plugin Support was first provided in Operations Navigator with the Windows 95/NT client (V3R1M3, 9/98). It is also in the iSeries Access client. The Plugin Support will only work on iSeries with V4R2 or later.

It allows you to add your own applications to iSeries Navigator to allow your users to seamlessly gain access to ALL iSeries function, including your application, from one location. iSeries Navigator is now THE OS/400 user interface of choice and this new support allows YOU to be part of the continuing strategy of the iSeries.

The Plugin Support provides you with the following capabilities:

1. Plug in your custom tools and applications into the iSeries Navigator hierarchy.
2. Modify existing pieces of iSeries Navigator's hierarchy (i.e. add a menu option to an object)
3. Add property pages to the Properties dialog for an object.
4. Distribute your software to your PCs easily via the Client Access Selective Setup.

Support is also provided for:

- uninstalling your application
- applying fixes
- upgrading your application code for new releases or revisions.
- automatically provides Multinational language support so that your application will be installed using the correct language.

Sample code is available in the iSeries Access Toolkit to help you implement to plug in to iSeries Navigator. Currently, the plugin code is required to be in C++, Java, or Visual Basic.

Plug-ins are components that are not shipped with iSeries Access but are used by iSeriesNavigator.

If the plug-in exists on your install source, it will automatically appear in the component selection dialog either through a new iSeries Access install or selective install. The plug-in will display as a subcomponent of iSeries Navigator. After iSeries Access is installed, iSeries Access check service level detects the level of these components and allows servicing and upgrading.

The directories on the iSeries that Install and CheckVersion look for to determine installability/service of 'extra' components are:

**Plugins:**  
 XD1 IBM Plugins = \QIBM\ProdData\GUIPlugin  
 XD1 3rd Party Plugins = \QIBM\UserData\GUIPlugin  
 XE1 IBM Plugins = \QIBM\ProdData\OpNavPlugin  
 XE1 3rd Party Plugins = \QIBM\UserData\OpNavPlugin  
**Addins:**  
 Addins = \QIBM\UserData\CA400\Express\Addin

Other functions used by Client Access are installed at:  
 Express = \QIBM\ProdData\CA400\Express\Install\image

Note: Can be changed by customer on Client Access Properties service tab (upgrades) or via Selective Install to look in a different location.

Client Access ServicePack Image:

Express SP = \QIBM\ProdData\CA400\Express\Service\image

Note: Can be changed by customer on Client Access Properties service tab to look in a different location.

Secure Sockets:

SSL = \QIBM\ProdData\CA400\Express\SSL\SSL140  
 = \QIBM\ProdData\CA400\Express\SSL\SSL156  
 = \QIBM\ProdData\CA400\Express\SSL\SSL128

Java Toolbox = \QIBM\ProdData\Http\Public\Jt400

## Add-in Support

iSeries Access for Windows can:

- Deliver your PC applications to PC users in the network
- Deliver updates to your PC applications to PC users in the network

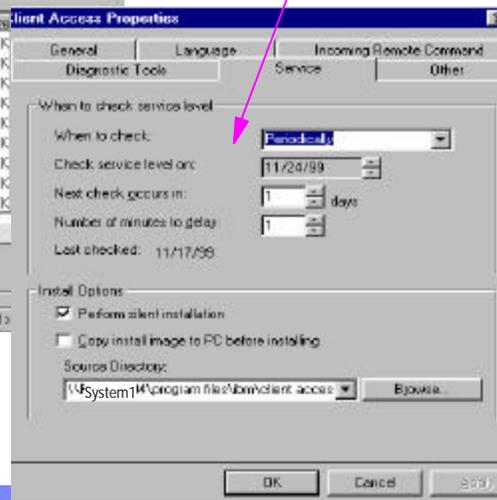
Use iSeries Access for Windows **Add-in support** to distribute your PC application code to PC users...

## Add-in Support (continued)

Selective Install



Check Service Level



- Use 'Selective Install' to install program on PC user workstation.
  - This could all be set up using Silent Install function.
- 'Check Service Level' will then automatically check for future updates on the default iSeries system

## Notes: Add-in Support

### Additional files (add-ins)

The iSeries Access for Windows installation and service functions allow you to distribute additional parts along with iSeries Access. These user-defined additional parts are referred to as add-ins.

Add-ins may consist of uncompressed files, product installation images, user-written programs, or product setup programs. Any combination of the previously mentioned parts can be used to construct an add-in.

An add-in must contain a file called ADDIN.INI that describes the add-in to the Client Access Express install and service functions. You can specify several different properties and command line arguments for the programs that run during the add-in install, upgrade, or uninstall process. The parameters that define a program to run consist of:

- The path that the program resides in and should be run from.
- The file and extension that make up the program name.
- The command line arguments to pass into the program when it loads.
- Whether or not a return code from the program should be checked to determine whether the add-in install, upgrade, or uninstall should continue.
- Whether or not the Client Access Express install program should wait for the program to finish running before continuing with the add-in install, upgrade, or uninstall.

Note: If you set the property to check the return code for the program, then the iSeries Access install program will always wait for the program to finish before continuing to install, upgrade, or uninstall the add-in.

### ADDIN.INI

The key to installing, upgrading, and uninstalling an add-in using the Client Access Express installation and service functions is the ADDIN.INI file. The ADDIN.INI file describes the add-in to the Client Access Express installation functions.

The ADDIN.INI file follows the normal Windows INI file conventions and syntax. The ADDIN.INI file consists of sections that contain values that are interpreted by the Client Access Express installation functions. An explanation of the sections that are supported in the ADDIN.INI file follows. For each section, there is a detailed description of each of the values that you can specify in that section.

Many of the ADDIN.INI file sections contain values that specify paths. These can be source paths, target paths, or paths that contain programs to be run. Paths in the ADDIN.INI file can be hard-coded, that is, you can use a path such as C:\Program Files\IBM\Client Access to specify the Client Access Express default installation path. Since many paths such as the Client Access Express installation path can be different across PCs, you should specify paths using the pre-defined ADDIN.INI path symbols.

For information on Add-In support visit the Client Access web page at [www.as400.ibm.com/clientaccess](http://www.as400.ibm.com/clientaccess), then select Information Center from left, then iSeries Access, then Administrating.

## Pulling it all together with the iSeries Access for Windows Toolkit



## Toolkit

**Client Access Express Toolkit**

Contents | Toolkit web page

- Overview
- AS/400 Operations
- Client Information
- Communications and Security
- Data Area
- Database
  - ActiveX
  - ADO/OLE DB
  - C/C++ APIs
  - Java
  - JDBC
  - QDBC
- Data Manipulation
- Data Queues
- Directory
- Directory Update
- Emulation
- Error Handling
- FTP
- Integrated File System
- Multimedia
- Program Call
- Remote Command
- Servlet and HTML
- User Space

**Database | [overview](#)**

**ActiveX**

**Database Transfer Automation Objects**

Client Access Express provides a set of ActiveX automation objects for transferring database data to and from the AS/400 system. These objects provide both a high-level and a low-level interface. The high-level interface is the easiest to use and it defaults many behaviors. The low-level interface provides programmatic control over most functions supported by the Data Transfer GUI application. These objects can be used from Visual Basic and other languages which support ActiveX automation. For languages other than C/C++, this interface is often easier to use than the C API. For complete documentation of these objects, including their properties and methods, see:

[Client Access Express ActiveX Automation Objects - data transfer](#)

**Visual Basic Script include file**

[cwbxvbs.inc](#)

**C/C++ interface definition**

[cwbx.h](#)  
[cwbx\\_1.c](#)

**Sample applications**

[Client Access Express samples - database](#)

**Database Automation Objects**

Client Access Express provides ActiveX automation objects for SQL access to the AS/400 database. These objects are implemented as wrappers around the C/C++ APIs provide most of the same level of functionality as the C interface. These objects can be used from Visual Basic and other languages which support ActiveX automation. For high-level languages such as Visual Basic, this interface is often easier to use than the C API. The automation objects provide a higher level interface than the C API, so it may also be easier to program for C/C++ programmers as well. However, the automation

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## Other Access for Windows Toolkit Content

The Access for Windows Toolkit contains items, such as:

- Sample programs and documentation to provide you with a single interface for developing your applications using iSeries Access middleware
- Links to header files and Windows Help files installed on your PC
- Links to sample programs, documentation, and other helpful information that is on the iSeries Access web page.

The Toolkit is an optionally installable piece of iSeries Access for Windows.

## Other functions included in Access for Windows that we have not covered:



- iSeries Navigator
- Management Central
- Operations Console
- EZ-Setup

## Web Information

*iSeries Access web page has latest up-to-date information*



- <http://www.ibm.com/eserver/series/access> 



### For Information on

- Information APARs on specific topics, such as Windows 2000/XP support
- Access to all Red Books and other Reference Manuals
- FAQs, Articles, links to Administrator Guide...

### Select 'Additional Links'

- iSeries NetServer for information on setting up your file and print serving
- Operations Console for information on setting up a PC as your system console
- iSeries Navigator / Management Central for OS/400 administration

## Access for Windows - SUMMARY



### Strategic 32-bit Windows client

- Easily installable and maintainable
- Reliable, stable, improved performance
- Connects without configuring
- Designed for TCP/IP networks

### Includes all key functions

- iSeries NetServer for file/print serving
- 5250 display and printer emulation
- Data Transfer
- SSL to encrypt your connections
- Key middleware such as ODBC, OLE DB, ActiveX Automation Objects, iSeries Toolbox for Java

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