iSeries Operations Navigator

2001 Announcements

ITSO Technical Overview

May 2001

Part 1 of 2

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Agenda

- Client Access Packaging
- Security
- Taskpad
- BRMS
- Database
- File Systems
- GUI Command Prompter
- Internet Setup Wizard
- EZ-Setup
- TCP/IP Configuration
- VPN
- RAS
- Windows Administration
- Enhanced Java Properties

- Management Central Overview
- Work Management
- Collection Services - Graph History
- DASD Management
- LPAR
- System Values
- Definitions, Fixes
- Users, Groups
- Extreme Support

V5R1 Operations Navigator

Redbooks planned
- Managing Your iSeries V5R1 with Operations Navigator- Volume 1, SG24-6226
- Managing Your iSeries V5R1 with Operations Navigator - Volume 2: Advanced Topics, G24-6227

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Notes: Agenda

This foil is a summary of the major new or enhanced areas of Operations Navigator for V5R1.

Two redbooks for V5R1 are planned for year 2001:
- Managing Your iSeries V5R1 with Operations Navigator- Volume 1, SG24-6226 (planned for 3Q-2001)
- Managing Your iSeries V5R1 with Operations Navigator - Volume 2: Advanced Topics, SG24-6227 (planned for 4Q 2001)

In addition to these redbooks, there is significant Operations Navigator information within V5R1 Information Center and Operations Navigator on-line help.

The web address for Information Center is http://www.ibm.com/eserver/iseries/infocenter

Note: The term "AS/400" is used throughout this presentation to include both AS/400 and iSeries systems running V5R1 unless otherwise noted.

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What's new in V5R1 Operations Navigator

- **Work Management**
  - Active jobs, job queues, memory pools, subsystems
- **Backup and Recovery**
  - BRMS GUI plug-in
- **All System Values**
  - Includes ability to copy to other AS/400s via Management Central
- **LPAR Configuration and Management**
- **TCP/IP, Network Enhancements**

- **Database Enhancements**
  - Navigator: show database objects and their relationships
  - Enhanced Visual Explain
  - Supports SQL new function, enhancements
  - Generate SQL
- **Distributed User, Group Management**
  - Manage users and groups across the network via Management Central
- **DASD Management, Stage 2**
  - Create and manage Independent ASPs (disk pools)
- **Independent ASPs**
  - Create and manage switchable Independent ASP's
- **Application Packaging**
- **Improved Java integration**

What's new in V5R1 Operations Navigator-2

- Simple Clusters
  - Create and manage simple two-node clusters
- Integrated Netfinity Server
  - Manage Windows server users and groups, disk storage
- Product and Fix definition and installation across the network
  - Create Products and fixes, distribute and install via Management Central
- File System GUI Enhancements
  - Additional IFS attributes, IFS journaling, list sorting, and performance enhancements
- New job, servers, message monitors and monitoring enhancements
- Taskpads
- GUI CL command prompter

- Network and TCP/IP Enhancements
  - Network Status and Traceroute
  - Quality of service support, server security and performance enhancements, availability enhancements
  - Configuration of the Simple Network Time Protocol client
  - Support for a new mode: Switched line - Dial-on-demand (remote peer enabled)
- Collection Services enhancements, including Graph History
- Integration of the Internet Setup Wizard into Operations Navigator
- Extreme Support
  - Automates Process
  - Enables Customization
  - Receive Fixes

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Notes: V5R1 Advanced Ease of Use

V5R1 will provide AS/400 and iSeries customers with major advances in ease of use.   Operations Navigator, the GUI for the AS/400 and iSeries systems, has undergone a major expansion in this release. New areas covered by Operations Navigator include:

- Work management (Active jobs, subsystems, job queues, memory pools)
- Backup and Recovery (BRMS GUI plug-in)
- Logical Partitioning (LPAR)
- System Values, including system comparison and update via Management Central
- Distributed user/group administration via Management Central
- Product and Fix creation, distribution, and installation via Management Central
- Job and Message monitors
- Graphical Collection Services Data to show performance history
- More DASD management functions including creation and management of new Independent Auxiliary Storage Pools that can be switched between iSeries systems under new Operations Navigator - Cluster creation and management (Simple Clusters)
- Simple two-node cluster configuration
- Integrated Netfinity Server: Windows user/group and disk administration
- Graphical command prompting

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Notes: Advanced Ease of Use

Other new features for V5R1 include the addition of numerous GUI extensions to existing Operations Navigator functions, the creation of more than 15 new configuration and administration wizards (many of which are in the new GUI areas listed above), and a new AS/400 Information Center -- AS/400's online documentation available on the web or CD. Key pieces of this work include:

- The Internet Setup Wizard, a configuration wizard that simplifies the process and work involved in putting an AS/400 on the Internet

- EZ Setup wizards, to help customize the AS/400 for your business needs. These wizards are available through Operations Navigator. Examples of what is available include the Internet Setup wizard and a Domino installation and configuration wizard.
  Note: EZ Setup Wizards are not generally covered in this presentation. See the EZ Setup presentation for details.

- New Operations Navigator-Database interfaces include: 1) Database Navigator that provides a pictorial view of the database showing the relationships between objects; 2) Generate the SQL statements for existing Database objects; this could be used to recreate the database on other systems or for documentation; 3) Create SQL Triggers (subset of complete new V5R1 SQL Trigger capabilities); 4 Integration of SQL Optimizer messages while running Visual Explain; 5) Print Visual Explain generated graphs..

- New Information Center, with an option to set up a locally served version of the Information Center, complete with full text search, and an option to install only selected Information Center topics. Content will be significantly enhanced, including additional Advisors to help users make decisions while performing AS/400 tasks.

- TaskPads, a user interface extension to Operations Navigator that will allow easy access to key administrative tasks.

- Improved Java integration, including support for displaying Java properties of Java classes and jar files, compile Java files (programs), interactive support for Input and Output, automating RAWT (Remote Abstract Windowing Toolkit) connections when launching Java programs

Client Access Packaging

- The V5R1 Client Access Express for Windows (5722-XE1) client is shipped with OS/400 V5R1 at no additional charge.

- Operations Navigator is a optionally installed component of the "IBM AS/400 Client Access Express for Windows"

- For AS/400 systems prior to OS/400 V4R2, the Client Access for Windows 95/NT (XD1) client should be used to perform Operations Navigator functions.

- Starting with V4R4, enhancements to Operations Navigator are delivered in Client Access Express only

Table of OS/400 releases and corresponding Client Access releases

OS/400 Version	Client Access Version	Client Access Product
V3R7	V3R1M2	5763-XD1
V4R2	V3R1M3	5763-XD1
V4R3	V3R2M0	5763-XD1
V4R4	V4R4M0 (Express)	5769-XE1
V4R5	V4R5M0 (Express)	5769-XE1
V5R1	V5R1M0 (Express)	5722-XE1

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Notes: Client Access Packaging

Operations Navigator has useful functions under either Client Access for Windows 95/98/NT or Client Access Express. You can run Client Access Express to OS/400 servers running at V4R2 or higher, because Express has some interfaces to OS/400 NetServer. You can run Client Access for Windows 95/98/NT to OS/400 releases prior to V4R2 because NetServer interfaces were not used.

With NetServer configured and active, Client Access Express can access releases V4R2 and V4R3, but V4R4, V4R5, or V5R1 enhancements are available only on the server with the corresponding enhanced V4R4/V4R5/V5R1 server code installed.

Function	Description	V3R7	V4R1	V4R2	V4R3	V4R4	V4R5	V5R1
Management Central	Manage groups of AS/400 systems				X	X	X	X
Performance Monitoring	Monitor AS/400 performance				X	X	X	X
Commands	Run and save commands					X	X	X
Packages	Create, save, and distribute objects					X	X	X
Hardware / Software inventory	Collect and display inventory					X	X	X
Scheduling	Schedule Management Central tasks					X	X	X
Fixes Inventory	Mange software fixes (PTFs)					X	X	X
Collection Services	Collect performance data					X	X	X
- Graph History	View historical Collection Services data							X
System Values	Display, change, and distribute system values					X	X	X
User and Group Administration	Create, change, and distribute users and groups					X		X
Product Installation	Create Products and fixes, distribute and install					X		X
Resource Monitors (Jobs, Messages)	Monitors for jobs, messages							X
Basic Operations		X	X	X	X	X	X	X
Messages	Work with AS/400 messages	X	X	X	X	X	X	X
Printer Output	Work with AS/400 printer output	X	X	X	X	X	X	X
Printers	Manage AS/400 printers	X	X	X	X	X	X	X
Spool filecut/copy/paste	Drag & drop, etc. printouts				X	X	X	X
Graphical CL command prompter	Prompt for CL commands from the client							X
Job Management		X	X	X	X	X	X	X
Jobs	Work with AS/400 jobs	X	X	X	X	X	X	X
Server Jobs	Work with Server jobs					X	X	X
Work Management								X
Active jobs, job queues, memory pools,	Manage active jobs, job queues, memory pools, and							X
subsystems	active subsystems							X
Configuration and Service		X	X	X	X	X	X	X
Hardware and Software Inventory	Display the hardware and software	X	X	X	X	X	X	X
DASD Management								X
Disk unit status & capacity,	Display disk units in auxiliary storage pools						X	X
capacity balancing							X	X
ASPs, HSM, compression, manage units	Manage ASPs, add, move, remove disk units							X
IASPs	Set up independent ASPs							X
LPAR Configuration	Configure and manage logical partitions							X
Simple Cluster Configuration	Configure and manage two-node clusters							X

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The evolution of Operators Navigator

Function	Description	V3R7	V4R1	V4R2	V4R3	V4R4	V4R5	V5R1
Network			X	X	X	X	X	X
Internet applications	Access AS/400 Internet applications			X	X	X	X	X
Point-to-Point communication	Manage AS/400 point-to-point communication			X	X	X	X	X
TCP/IP Setup	Set up and mange AS/400 TCP/IP interfaces			X	X	X	X	X
Server Management, including	Set up and monitor AS/400 server applications			X	X	X	X	X
DNS, DHCP, AS/400 NetServer,				X	X	X	X	X
NFS, DCE, Directory server (LDAP)					X	X	X	X
IP Security	Setup and manage IP Security				X	X	X	X
VPN	Setup virtual private networking					X	X	X
Additional IP interface and line types	PPP over L2TP and ISDN, WAN . Circuitless IP					X	X	X
Quality of service support	Manage TCP/IP quality of service							X
Windows Server (Int. Netfinity Server)								
Server management	Start/stop Windows servers, status						X	X
User management	Manage Windows users							X
Disk Management	Manage Windows disks							X
Security	Object authority and security system values	X	X	X	X	X	X	X
Permissions	Manage object authority	X	X	X	X	X	X	X
Security Policies	Maintain AS/400 security and auditing policies	X	X	X	X	X	X	X
Security Configuration Wizard	Configure AS/400 security		X	X	X	X	X	X
Selected hardware function signon	Service Tools Security							X
Users and Groups	Manage AS/400 users and user groups	X	X	X	X	X	X	X
Database	Configure and manage SQL objects, run SQL statements							
	Create DB tables, views, indexes				X	X	X	X
	Run SQL scripts				X	X	X	X
	Evaluate SQL statements (SQL Perf. Monitors)					X	X	X
	Visual Explain						X	X(E)
	Create Triggers							X
	Database Navigator, generate SQL							X

X(E) means significantly enhanced

Installation of Operations Navigator

- Functional subsets of Operations Navigator are selectively installable
- Management Central now integrated into Operations Navigator sub-components
- Basic Operations Installed with Client Access Typical Install (Messages, Printer output, Printers, Jobs)
- The rest can be installed using Client Access Custom Install or Selective Setup after install

Notes: Installation
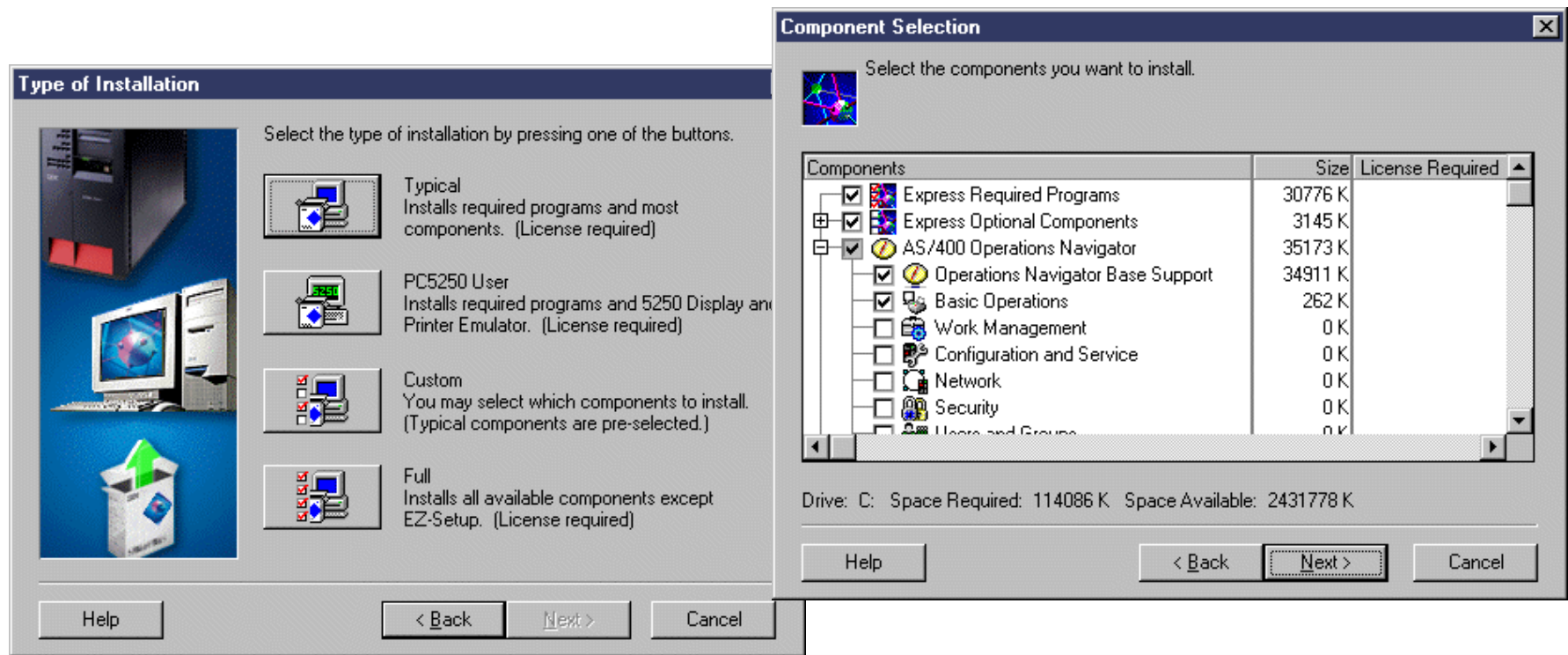
AS/400 Operations Navigator is installed as part of the AS/400 Client Access Express for Windows Installation. During this installation, you can customize your AS/400 Operations Navigator installation. Through a sub component of AS/400 Operations Navigator called Applications Administration, you are able to better control usage of AS/400 Operations Navigator. While AS/400 Operations Navigator embodies the same security principles of the AS/400 system, you can also administer the usage of AS/400 Operations Navigator itself. For example, you can tailor installations for different user types and allow accessibility to certain options and not others.

Installation sources: AS/400 Client Access Express for Windows installs onto the PC by using an installation wizard. You may install from different sources, as follows:

CD-ROM: The PC installation code is distributed on the AS/400 Client Access/400 for Windows Family CD. The AS/400 Client Access Express for Windows setup application is found in the directory x:\Express (where x is the letter of the CD-ROM drive that is used).

Mapped network drive: If you use a local area network (LAN), you may want to make the AS/400 Client Access Express for Windows installation code available from a network location. This can be done by copying the install image on the CD to the network share, and then mapping a network drive from the PC to this drive. The setup application is then run form the mapped network drive.

AS/400 NetServer share: When the AS/400 Client Access Express for Windows (5722-XE1) Licensed Program Product is installed on the AS/400 system, the PC side install image for the product is stored in the AS/400 system's Integrated File System (IFS). The install image is stored in \QIBM\ProdData\CA400\Express\Install\Image. The LPP installation of AS/400 Client Access Express for Windows (5722-XE1) automatically creates a share for \QIBM. PCs using normal Windows networking support can map a network drive to an AS/400 system's IFS and install AS/400 Client Access Express for Windows from there.

The AS/400 Client Access Express for Windows installation wizard offers four installation types:

- Typical
- PC5250 user
- Custom
- Full

The Typical installation option installs only the basic sub components of AS/400 Operations Navigator (base support and basic operations). PC5250 user installation is independent of Operations Navigator install options. If you want all capabilities of AS/400 Operations Navigator, you must take the custom or full installation option.

Notes: Installation

If you've already installed Client Access Express without including all of the Operations Navigator components, you can add additional components using Selective Setup:

- In the Client Access Express folder, select Selective Setup.
- Select Source Directory, making sure that the current source directory path is correct.
- In the Component Selection window click the '+' besides Operations Navigator.
- Select the Operations Navigator components that you want to add:

Once in the Component Selection Panel a complete list of Operations Navigator Subcomponents can be selected.

- Basic Operations
- Work Management
- Configuration and Service
- Network
- Security
- Users and Groups
- Database
- File Systems
- Backup
- Application Development
- Commands
- Packages and Products
- Monitors
- Logical Systems
- AFP Manager
- Application Administration

Note: Management Central is now integrated in to subcomponents of Operations Navigator and is no longer a installable subcomponent.

To install and use V5R1 AS/400 Operations Navigator, you must install Client Access Express for Windows V5R1 and your PC must be running one of the following Windows operating systems. The processor and memory requirements for each operating system are shown in the list.

Microsoft Windows 95/98/Me

Pentium processor (200 MHz or faster) and at least 128 MB of memory.

Microsoft Windows NT 4.0

Pentium processor (200 MHz or faster) and at least 128 MB of memory.

Microsoft Windows 2000

Pentium processor (200 MHz or faster) and at least 128 MB of memory.

V5R1 operational note: Due to technology incompatibilities, occasionally a window can be displayed behind other windows when running the Operations Navigator. If the Operations Navigator looks like it has stopped working (for example, the hourglass symbol remains displayed after clicking an option or action), it is possible that the window you are waiting for is being displayed behind another window on your desktop. Press the Alt key and then the Tab key to see a list of all the windows on your system and select window behind the Operations Navigator window, or another window on your desktop.

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Operations Navigator: Security

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Security - Change Password

- **Now available from the context menu from the main menu**
- **Change user's password on single AS/400 system or Change user's passwords on multiple AS/400s:**
  (select
  My Connections)
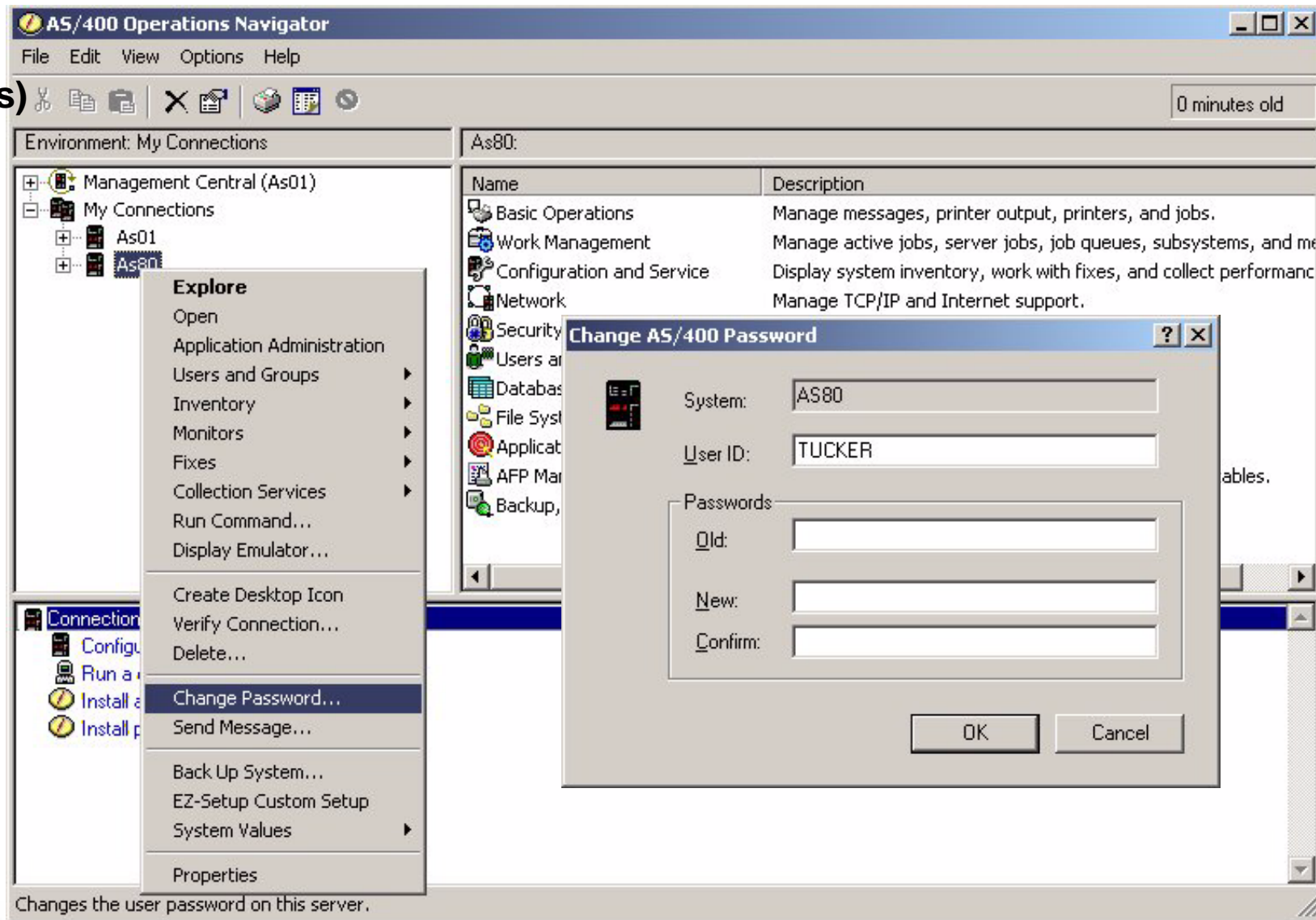
Notes: Change Password

In prior releases, the only way you could change your AS/400 password in Operations Navigator was through the Users and Groups component. However, this limited those users who did not have access to this component. And even if the user did have access, the user had to drill down through several layers to find their profile in order to change the password.

Outside of Operations Navigator, Client Access Express provided a way to change an OS/400 user profile's password. This method was not accessible from Operations Navigator, but could be accessed via the Passwords page of Client Access Properties. In either case, changing an AS/400 password through the GUI was not apparent to the user.

In V5R1, users can change their OS/400 passwords from the main Operations Navigator window. To change your password on a single system, right-click on that system and select Change Password. You can also change your passwords across multiple AS/400s by right-clicking on My Connections and selecting Change Passwords. This action displays the Passwords page of Client Access Properties. The functionality for that page has not changed from prior releases.

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Secure Sockets

"Use SSL for connection" moved from Connections page

If SSL component is installed:

- New Secure Sockets properties page appears
- Download OS/400 Certificate Authority from Operations Navigator
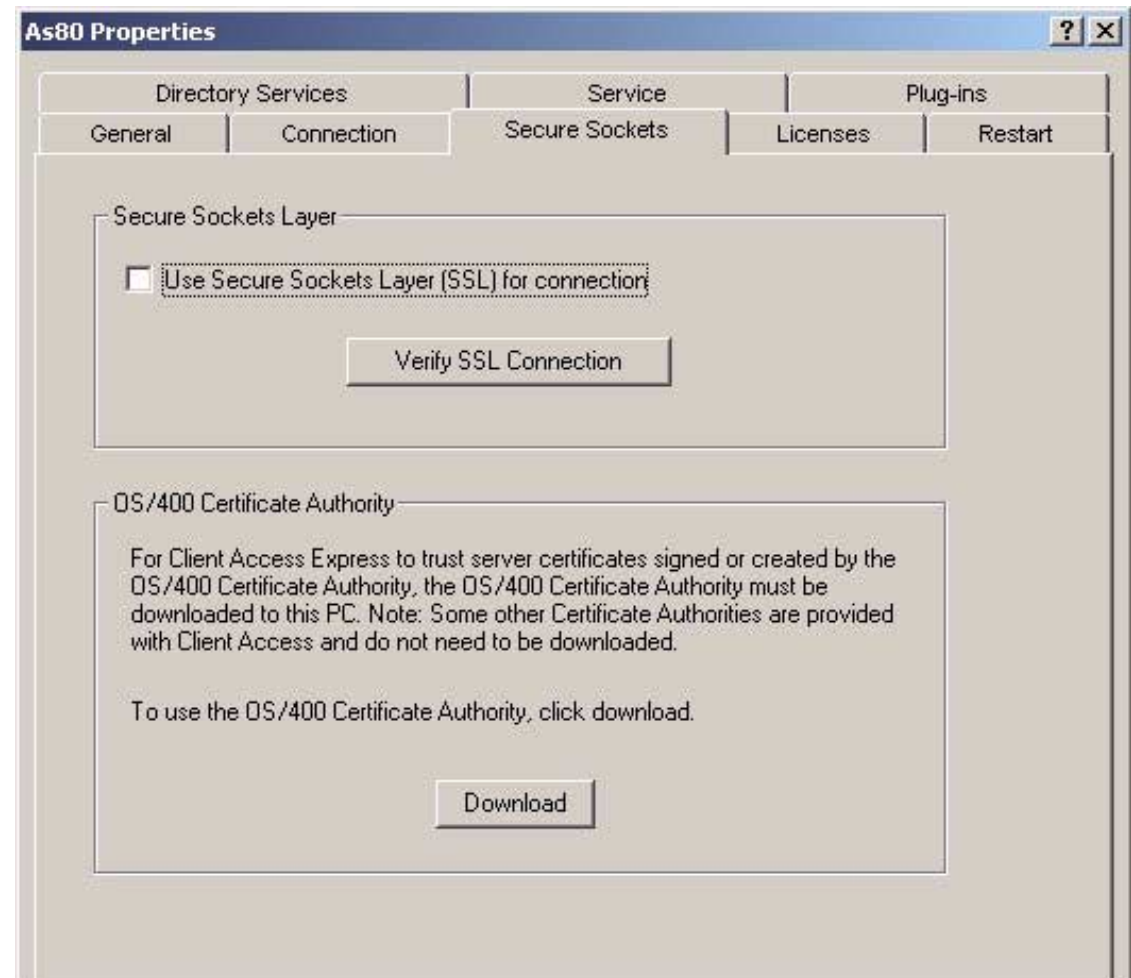
Secure Sockets Layer (SSL) Server authentication is a way for the PC to decide whether or not the server can be trusted. Server authentication is based on Certificate Authorities (CA). Trusted CAs are placed in a key database on the PC. Then when the PC is presented with an OS/400 server certificate, it can check the key database to determine whether the server certificate was created/signed by a trusted CA.

Several different CAs can be used to do server authentication. Some of these CAs are shipped as part of Client Access Express (just like Netscape and Internet Explorer). However, if the user chooses to use an OS/400 Certificate Authority, then it must be downloaded to the PC.

Client Access Express supported SSL server authentication starting in V4R4. An OS/400 Certificate Authority download tool was available via the Client Access web site (www.as400.ibm.com/clientaccess/cwbcossz.htm). In V5R1, this tool has been integrated into Operations Navigator, and made available for download from the Secure Sockets page of system properties (as long as the Secure Sockets Layer (SSL) component of Client Access Express is installed). The tool will continue to be available from the Client Access web site, but will be updated to detect V5R1 and display a message informing the user of the new function in Operations Navigator.

To make way for the OS/400 Certificate Authority download option, a new "Secure Sockets" page has been added to the system properties. This properties page is available only if the Secure Sockets Layer (SSL) component of Client Access Express is installed. Moreover, the "Use SSL for connection" checkbox, which used to be on the Connections page in prior releases, has been moved to the Secure Sockets page.

Note: Digital Certificate Manager (DCM) must be installed on the AS/400, and the DCM must contain an OS/400 Certificate Authority, in order to download the CA to the PC. The CA is placed in the SSL key database (cwbssldf.kdb) on the PC and in the Java class file (keyring.class).

See the IBM Redbook AS/400 Client Access Express for Windows, SG24-5191, for an overall look at Secure Sockets Layer.

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Security Wizard - Password Level
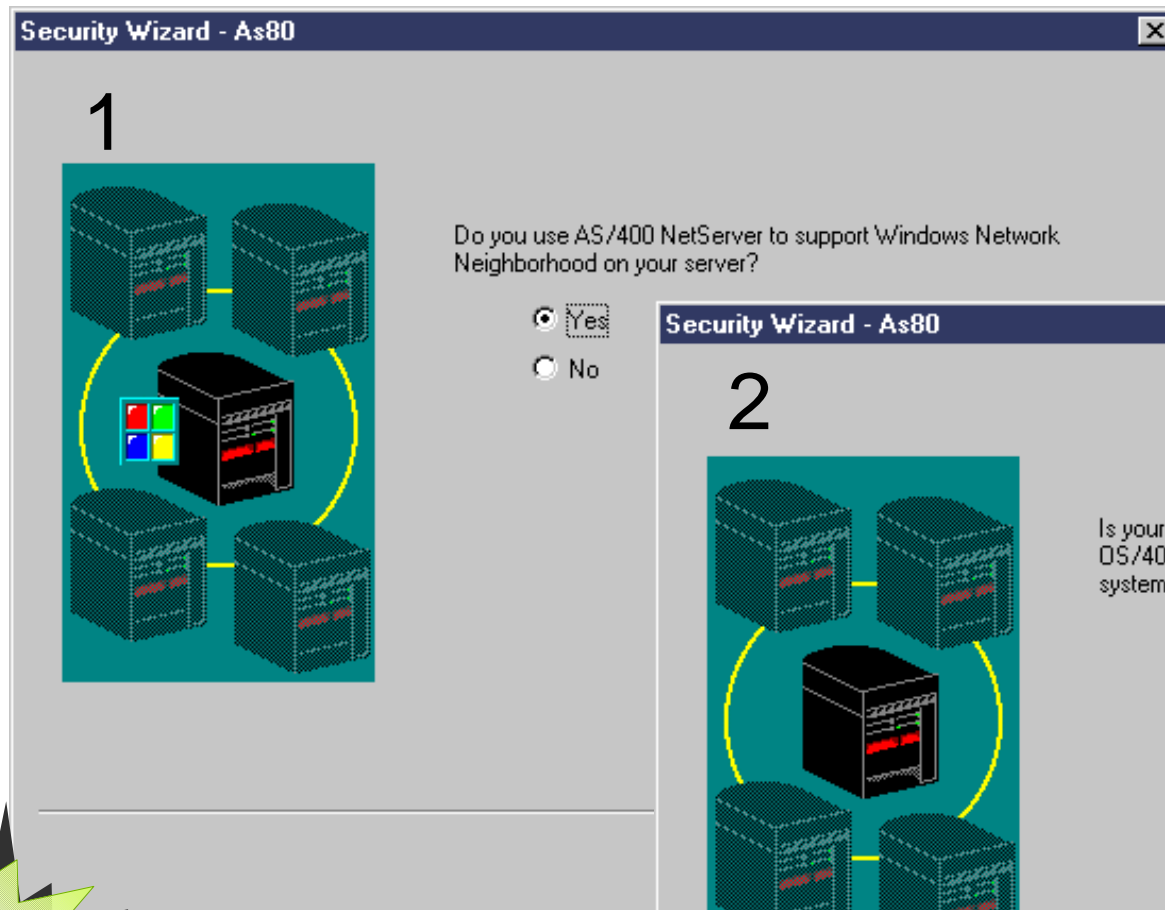
Enhanced to support new V5R1 system value

Security Wizard - As80

1

Do you use AS/400 NetServer to support Windows Network Neighborhood on your server?

- ○ Yes
- ○ No

Security Wizard - As80

2

Is your server networked with other servers that have an OS/400 version previous to V5R1M0 or other operating systems that limit the length of their passwords?

- ○ Yes
- ○ No

< Back   Next >   Cancel
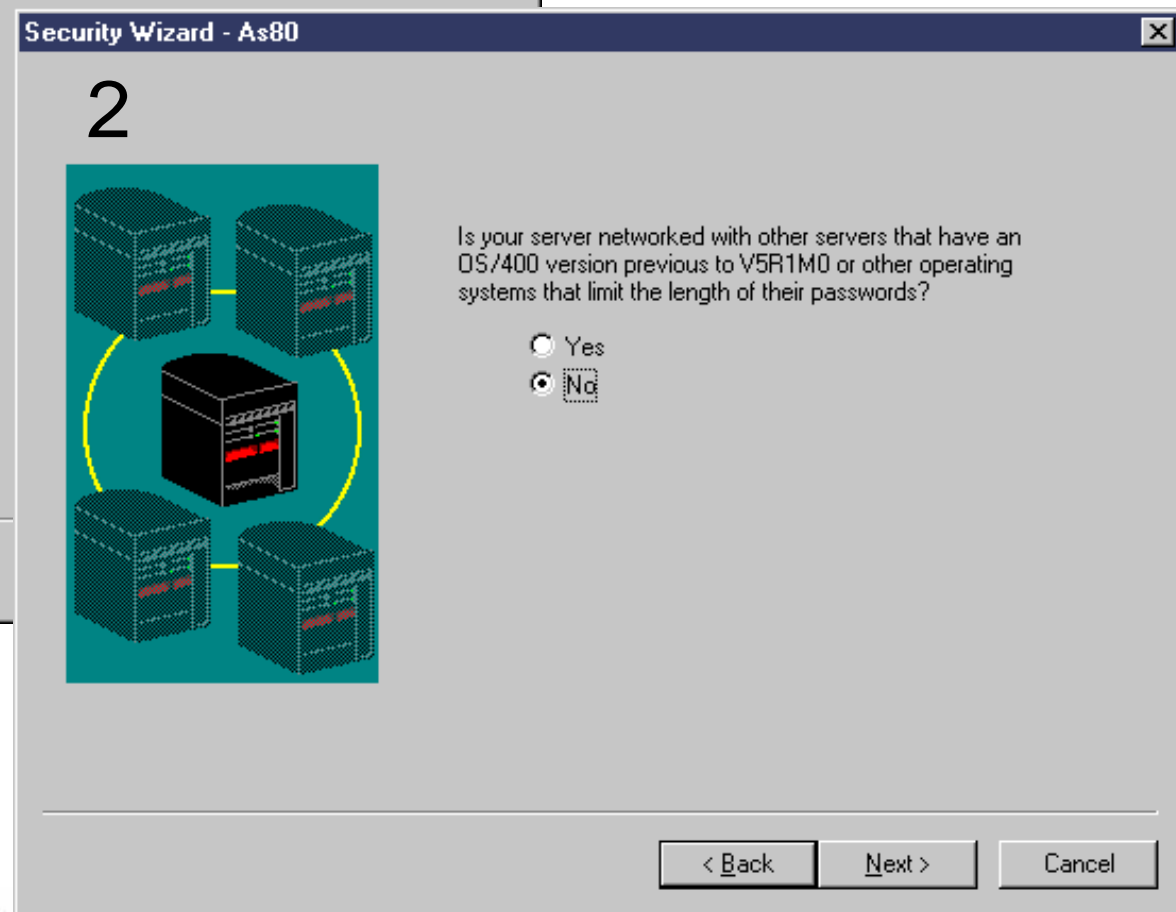
New

Password Level (QPWDLVL)

Notes: Security Wizard - Password Level

The Security Wizard in Operations Navigator has been changed to support the new V5R1 system value QPWDLVL (Password Level). Like other security system values, the Security Wizard will recommend a setting for Password Level based on how the user answers questions in the wizard. The Administrator Report generated by the wizard has also been updated to support this new system value.

Four new windows have been added. The first window (1) asks if you use the AS/400 NetServer product on Windows 95/98/ME. The second window (2) asks whether your AS/400 is in a network with pre-V5R1 AS/400 systems, or other operating systems that limit the length of their passwords. If you answer No to this question, another window (3), as shown on the next slide, appears asking if your AS/400 is in a network with other V5R1 systems running with a QPWDLVL of 0 or 1. Based on the answers, if the Security Wizard recommends a change to this system value, a window (4) with the recommended change is shown.

Note: If a change to QPWDLVL is recommended, the Security Wizard will NOT change the password level on your system--even if you apply the recommended changes at the conclusion of the wizard. This is a very critical system value, so you must carefully analyze your system and applications and if you decide to change it, you must do it manually. An IPL or system restart is required in order for a change to the Password Level system value to take effect.

Tip: Now, you can change system values within Operations Navigator. To change the system password level, expand Configuration and Service, select System Values, and then select Password. Support has also been added to the Security policies to change security-related system values, as described later in this presentation.

Security - Policies

- **Integrated with new System Values function**
- **New policies: Password Sign-On**
- **Enhanced policies: Audit Security**
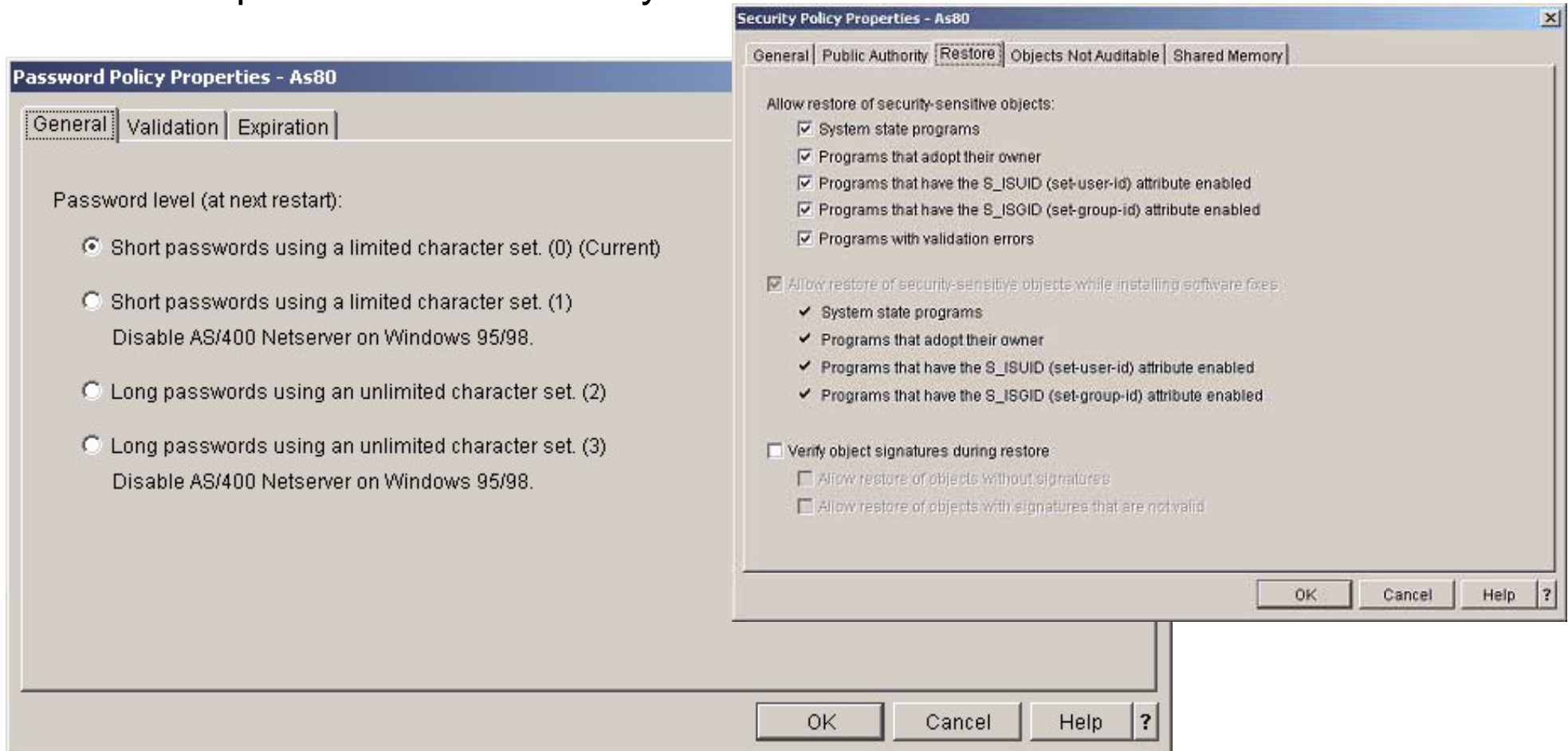
The Policies in the Security component of Operations Navigator have been revamped and integrated with the new System Values support in V5R1. This means that each of the policies will now share dialogs with their corresponding system values category under Configuration and Service. For instance, the Auditing Policy will now use the Auditing system values function. Therefore, any changes you make to the Auditing Policy will be reflected in the Auditing system values, and vice versa.

Prior to V5R1, the policies consisted of Audit and Security, which were a grouping of system values. In V5R1, all system values are supported in the GUI. As a result, the policies include two additional categories--Password Policy and Sign-on Policy--to match the security-related system value categories in Configuration and Service. Prior to V5R1, the Security Policy contained all password and sign-on settings.

There are now four policies in the Security component of Operations Navigator, with notable additions and changes as follows:

Auditing Policy

A new policy page called Journaling has been added; options on the System and New Objects pages were not changed.

Password Policy

This is a new policy, separating from the pre-V5R1 Security Policy and supporting the new system value QPWDLVL, which is explained on previous slides. This policy supports password-related system values, except for the Password Validation Program (QPWDVLDPGM). This system value is not included because it is recommended that users not change it.

Security Policy

This policy has been reorganized for V5R1 and updated to include support for new system values such as Verify Object Signatures During Restore (QVFYOBJRST) and Shared Memory Control (QSHRMEMCTL), which are explained on previous slides. Also, you can now change the QUSEADPAUT system value (Users who can work with programs with adopted authority) from this policy, as well as allow programs with validation errors to be restored, which is a new option for the QALWOBJRST system value (Allow restore of security-sensitive objects).
.

Sign-On Policy

This is a new policy, separating from the pre-V5R1 Security Policy. All sign-on options in the old Security Policy have been moved to the Sign-On Policy.

Tip: In V5R1, you can compare and update system values across multiple systems through Management Central. Therefore, if you make changes to the security policies on one system and want to disperse those changes to other systems, you can now do that. Management Central must be installed and a central system defined in order to compare and update system values. See the System Values (Configuration and Service) portion of this presentation for more details.

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Operations Navigator Taskpad

Taskpad

- Makes Operations Navigator easier to use
- Creates visibility for hard-to-find tasks, frequent tasks, and new tasks
- Eliminates need to jump around hierarchy to do a task related to area you're in
- Lists common tasks for each component
- Click on component (e.g., Basic Operations) and related tasks appear
- Move cursor over task and bubble help appears giving more details
- Click on task to open its associated dialog, window, or wizard
- Help for related tasks lists more tasks for selected component
- Click a task and Help window opens describing how to do that task
- Toggles off and on via View menu
- Just like the Tool and Status bars

New

Notes: Taskpad
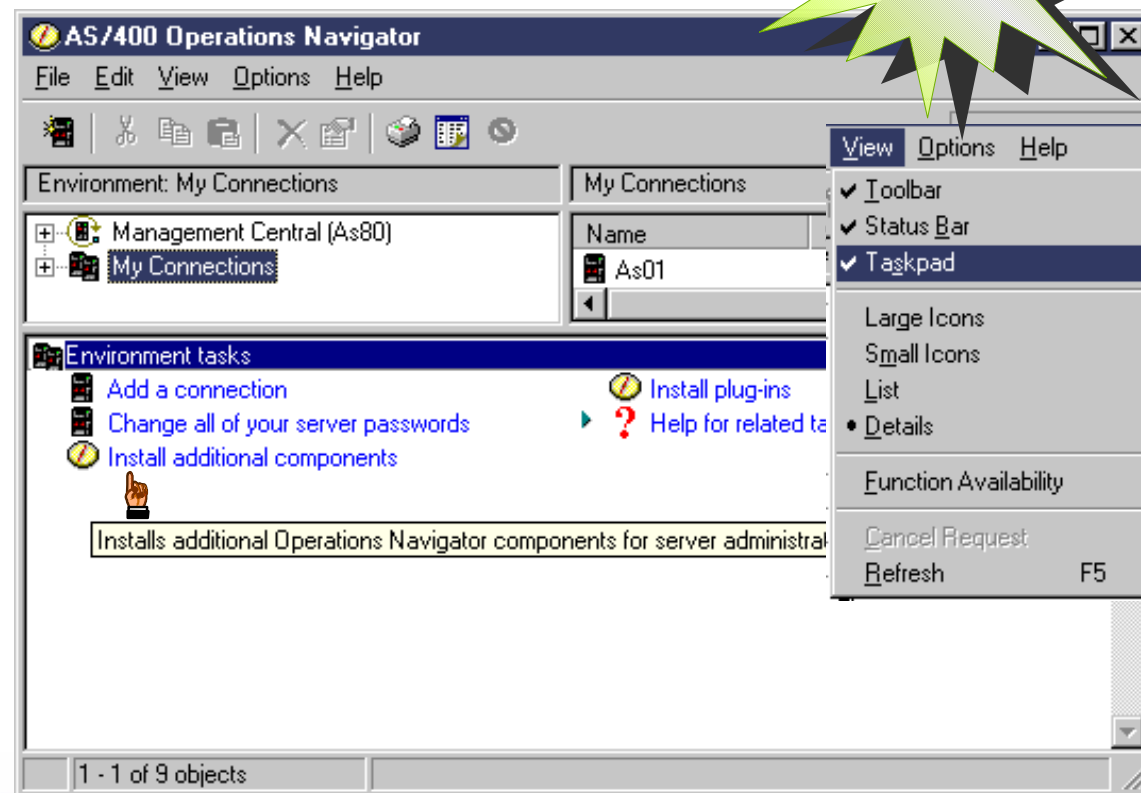
As part of an ease-of-use effort, the concept of a Taskpad has been implemented in Operations Navigator for V5R1. The following types of tasks are included in the Taskpads:

- Key tasks -- Tasks that are hard to find in the hierarchy (e.g., Security wizard)
- Global configuration tasks -- Tasks that configure a large portion of the operating system (e.g., Security wizard, Internet wizard)
- Frequent tasks -- Tasks that are run frequently (e.g., Run SQL script)
- Performance tasks -- Tasks that affect performance of Operations Navigator (e.g., changing connection properties)
- New object tasks -- Tasks that create new objects on the AS/400

The Taskpad is not meant to provide a one-to-one mapping of all functions in Operations Navigator. It is meant to highlight important, usable functions that appear right in your view as you explore the various components of Operations Navigator. This becomes especially critical as more and more functions get added to the interface, and you need a fast-path method to access them.

In addition, you no longer have to depend solely on the File menu or right-click context menu to run tasks. These tasks change depending on a component's objects you're working with, and in prior releases, you often had to jump to other areas to do a task related to the component you're working with at the time. A good example is in the Database component and running an SQL statement. If you were working with the objects in a library, you had to interrupt your activity with those objects and right click on Database to run an SQL statement. Now, you would see a task to run an SQL script in the Taskpad, regardless of where you are working within the Database component.

Notes: Taskpad - 2

The Taskpad contents change according to the component you're working with at the time. For example, when you expand Basic Operations, tasks related to Basic Operations are listed in the Taskpad. Then, you decide to go into Work Management. At that point, the Taskpad lists frequent tasks you might perform within the context of Work Management. In most cases, the Taskpad contents remain the same as you move between objects within a particular component (e.g., from Active Jobs to Job Queues in Work Management).

You can move the cursor (hand) over any task in the Taskpad to get additional details about that task. Selecting a task opens its associated dialog, window, or wizard so that you can perform that task. The Taskpad does not show the contents of component objects (e.g., the contents of a particular job).

In addition, the Taskpad includes a task called "Help for related tasks." Just expand it to see a list of other common tasks related to the component you're working with. Selecting a task here opens a help window describing how to do that task outside of the Taskpad pane. Help for related tasks also includes tasks on how to customize your views (includes, columns, and sorting). These tasks are listed so that you can learn how to control impacts on Operations Navigator performance.   For example, on the Taskpad for Work Management tasks, you can expand the help task "Customize Work Management folders," as shown on the next slide. Then, click "What's included" and learn how to limit the list of objects displayed in Operations Navigator to those that meet the criteria you specify. For example, you can change the Active Jobs list to include only the active jobs for a particular user. This can be particularly useful to find jobs more quickly and efficiently, especially if you have large systems with a large number of jobs.

Operations Navigator displays the Taskpad pane by default, however you can easily toggle it off and on from the View menu. Alternatively, you can resize the Taskpad by moving the horizontal splitter bar, which separates the Taskpad pane from the rest of the interface.

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Operations Navigator: BRMS

What's New V5R1 BRMS

A new BRMS GUI interface that:

- Provides wizards to simplify ease of use

- Integrates scheduling through the Management Central Scheduler or a third party scheduler

- Creating and running backup policies

- Restoring objects

- Adding media

- Runs maintenance

- Displays the backup history

- Displays the backup log
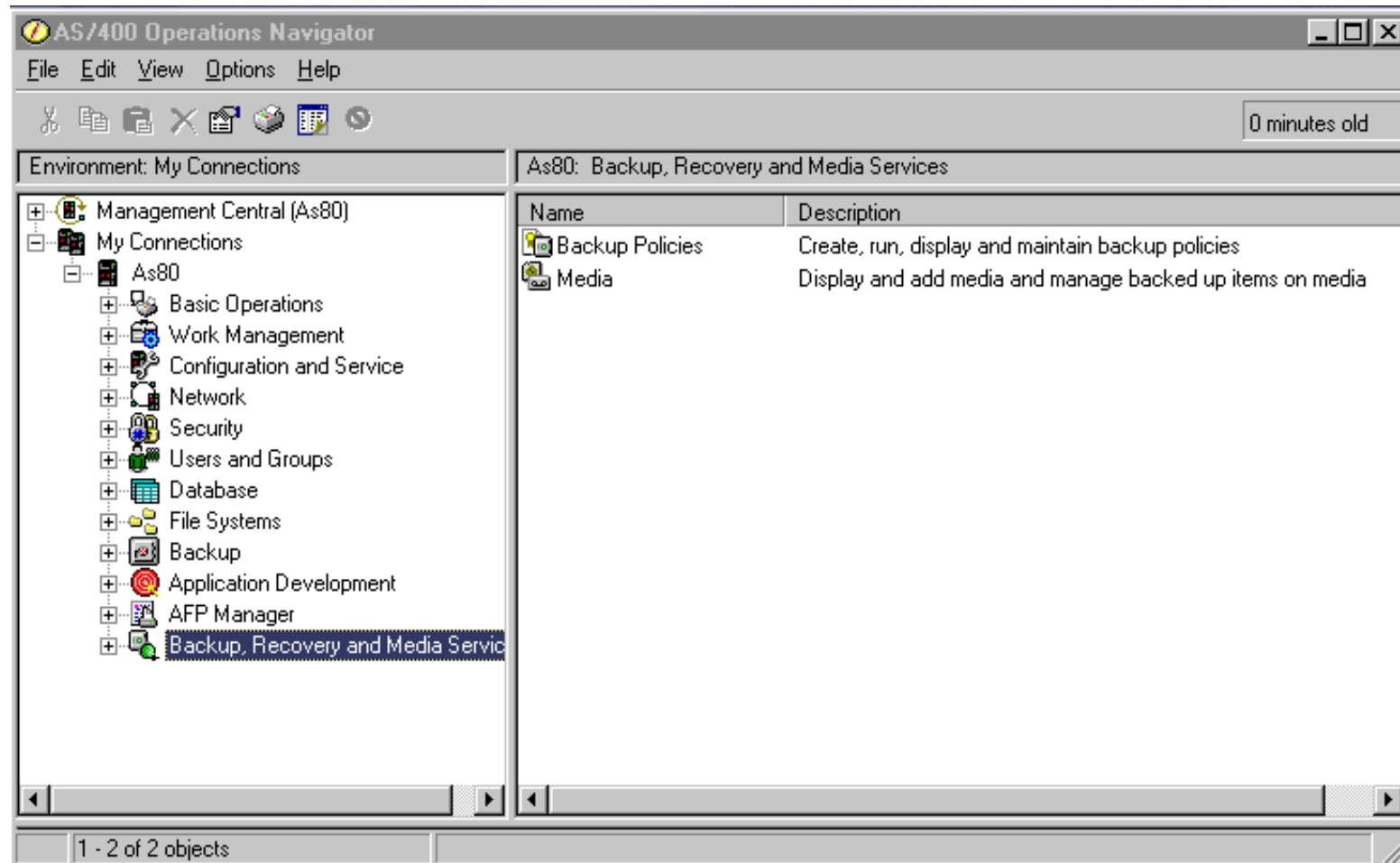
This section covers the V5R1 Operations Navigator interfaces to Backup and Recovery Media Services, 5722-BR1, if the product is installed on your system.
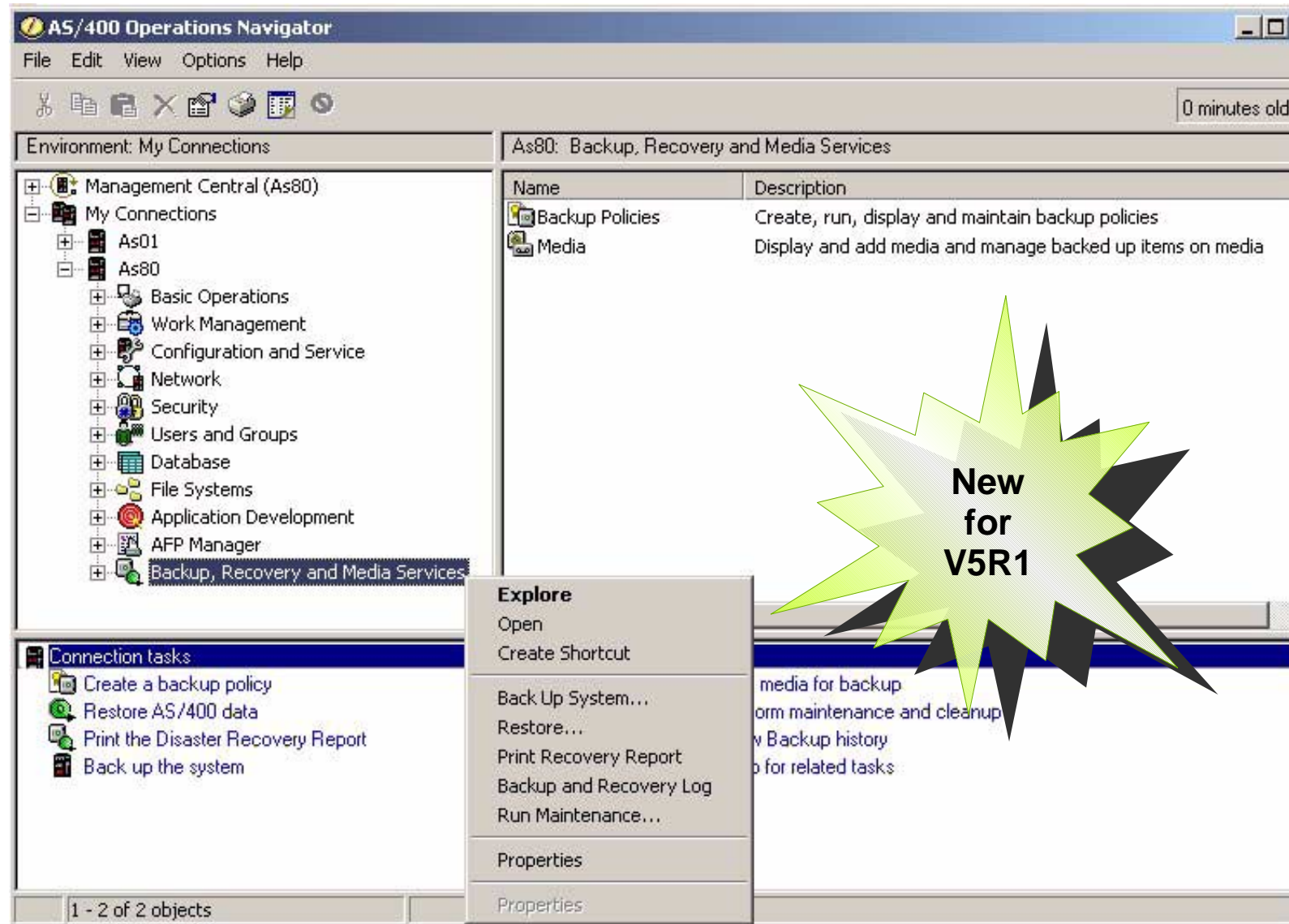
Note: V5R1 offers an impressive list of GUIs to BRMS functions. However, V5R1 support should be considered "stage 1' of a 2 stage functions roll out. More GUI to additional BRMS functions are planned for the next release of OS/400.

Backup, Recovery and Media Services

Requires 5722-BR1 Backup, Recovery, and Media Services for AS/400

Adds a graphical backup solution to the AS/400, similar to those functions available under Windows NT!

New for V5R1

BRMS

New Backup, Recovery, and Media Service container allows:

- Backing up the system
- Restoring
- Print Recovery Report
- Display the Backup and Recovery Log
- Run Maintenance
- Backup Policies
- Media Services
- New Wizards
  - Restore
  - New Policy
  - Add Media

Backup Policies capabilities:

- Explore
- Open
- Create Shortcut
- Create a New Policy
- Display the Backup History
- View Properties
- Manage policies

Media Services:

- Explore
- Open
- Create Shortcut
- Display the Backup History
- View Properties
- Manage Tape Volumes
  - Open
  - Include
  - Expire
  - Volume Set
  - Remove
  - Properties

Ability to backup and restore information with the context menu for :

- **Configuration and Service**

- **Users and Groups**

- **Integrated File System**

Users and Groups

Configuration and Service

IFS
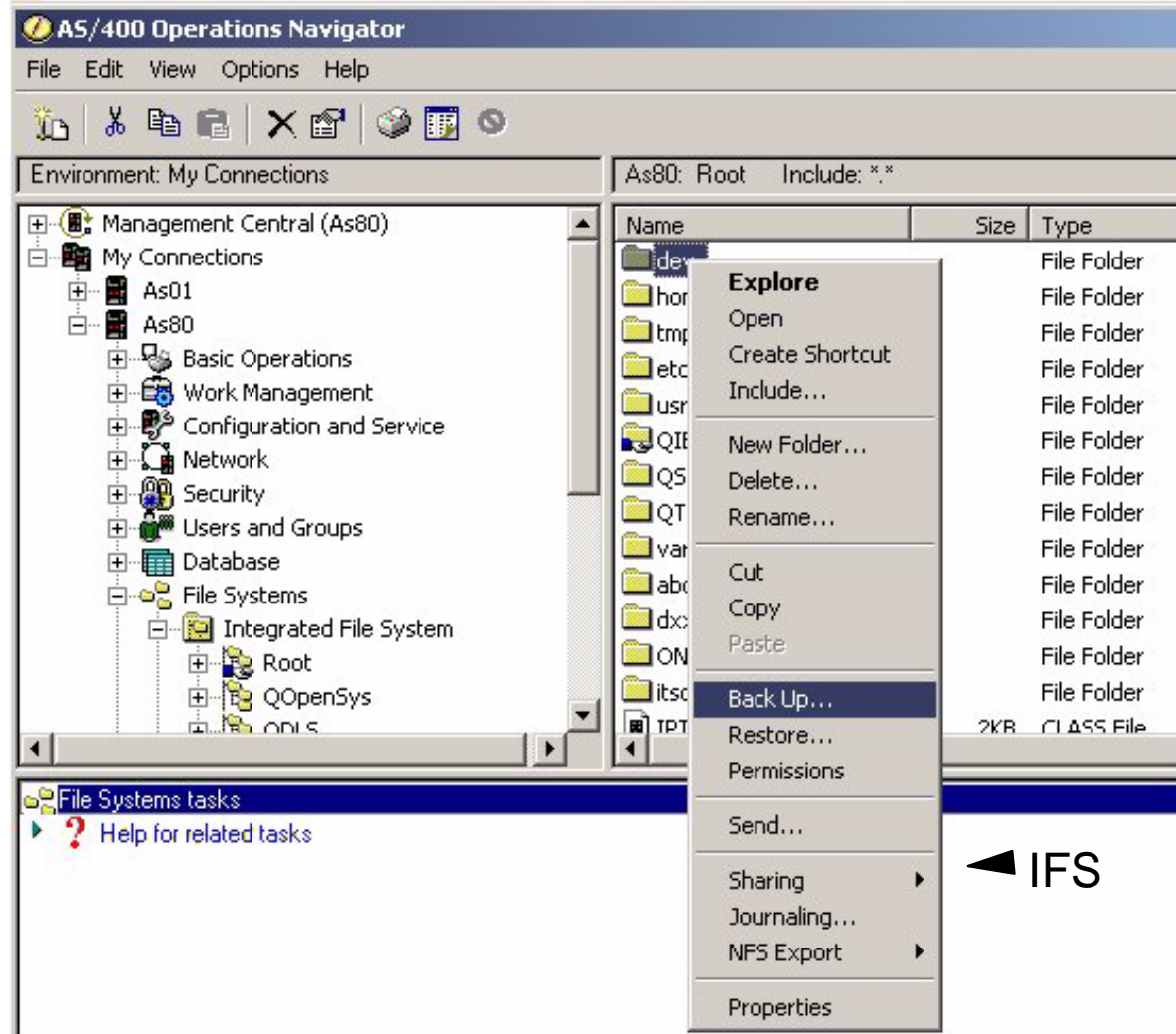
Ability to backup the system from the System context menu
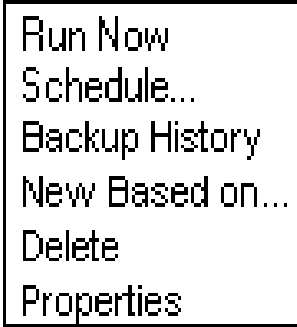
BRMS: Backup Policies
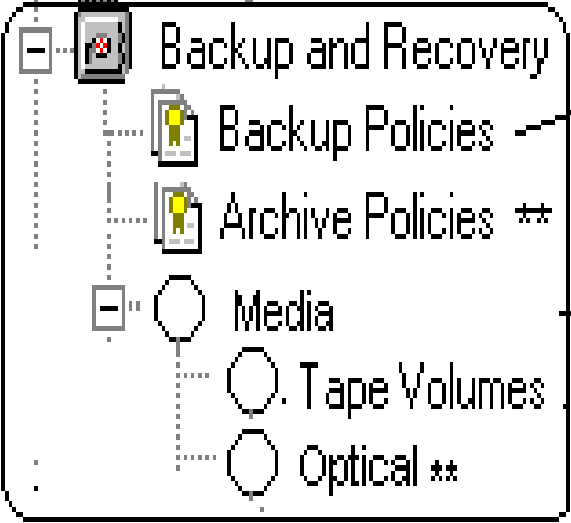
BRMS ships with three back up policies preconfigured:
*SYSTEM
*BKUGRP
*SYSGRP

Policy	Description
*Bkugrp	Backs up all user data
*Sysgrp	Backs up all system data
*System	Backs up the entire system

Run Now
Schedule...
Backup History
New Based on...
Delete
Properties

Backup and Recovery
Backup Policies
Archive Policies **
Media
Tape Volumes
Optical **

Explore
Open
Create Shortcut
New Policy...
Backup History...
Properties

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Notes: BRMS Backup Policies

Backup Policy

You can perform several operations on the Backup Policy container policies:

- Run Now - first displays a message detailing what must be accomplished prior to running the policy if it requires a restricted state. If a restricted state is now required, the policy is run.

- Schedule - displays a message detailing what must be accomplished prior to running the policy if it requires a restricted state, then the scheduler window will appear. You can either use the default Management Central Scheduler or any third party scheduling product installed.

- Backup History - displays the Backup History Log

- New Based on... - allows creation on a new policy based upon an already configured policy

- Delete - displays what lists associated with a policy may be deleted.

- Properties - displays the Before, During, and After properties of the policy

The Backup Policy container ships with three preconfigured policies:

- *SYSTEM   For backing up the entire system
- *BKUGRP   For backup up all user data
- *SYSGRP   For backing up all system (IBM) jobs
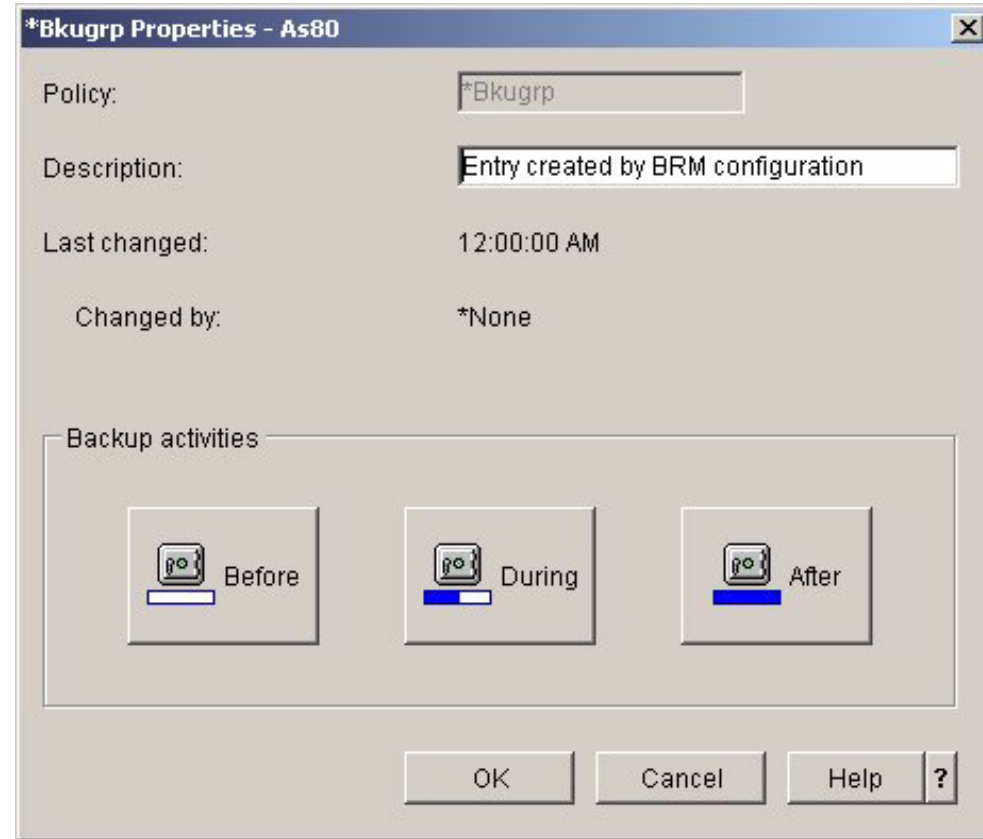
Backup Policies includes the New Policy wizard.

Print Recovery Log

Choose whether you want to print a disaster recovery report at this time

New for V5R1

Print Recovery Report

Click OK to print a report of the steps required to restore your system in the case of a disaster. This is recommended prior to restoring your system to assure the required media is available and that all necessary backups have been performed.

The report will be printed to an AS/400 printer output file (QP1ARCY).

| OK | Cancel | Help | ? |

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Print Recovery Report

Use the Print Recovery Report dialog to choose whether you want to print a disaster recovery report at this time. The disaster recovery report provides step-by-step instructions for recovering your system. You use this report, in conjunction with the Backup and Recovery book, to recover your system in the event of a failure. You should print at least one copy of this report each day. It is a good idea to keep one copy of the report on site and to keep a second copy of the report in a safe place off site so you will be sure to have a copy if you ever need to recover your system.

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Backup and Recovery Log

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Backup and Recovery Log – As01

File Edit View Options Help

Entry types: Maintenance   Minimum severity: 99

Message ID	Message	Date Sent	Time Sent
CPF124	Job ...	05/03/99	12:22:04

For ...

New for V5R1

Backup and Recovery Log – Include

Include

Entry types: All

Minimum severity (0-99):   0

Dates:

○ All dates

○ Specific dates

    From: February 6, 2001

    To: February 6, 2001

Times:

○ All times

○ Specific times

    From: 4:31:54 PM

    To: 4:31:54 PM

☑ Always show this first

OK   Cancel   Help   ?

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Include

The Include dialog enables you to select the messages you want to view in the backup and recovery log based on the criteria you specify. The backup and recovery log shows the success or failure of the backup and recovery tasks you perform.

The backup and recovery log contains the messages related to backup and restore activity that has occurred on the system.

To view the backup and recovery log, follow these steps:

- In Operations Navigator, expand My AS/400 Connections (or your active environment).
- Expand a system with Backup, Recovery and Media Services installed on it.
- Right-click Backup, Recovery and Media Services and select Backup and Recovery Log.
- On the Backup and Recovery Log - Include dialog, select the criteria you want to use to filter the log. Click Help if you need more information on any of the fields.
- When you have completed the fields, click OK.

Backup History

Backup History

| File | View | Options | Help |

Backed Up Item	Type	Date	Time	Backup Type	Vo
LibraryA	Library	05/03/99	12:22:04	Full	LN
Configuration ...		06/07/99	11:14:45	Changes o...	Sav

Backup History – Include

Include

Policy:

Media pool:

Saved dates
- ○ All dates
- ○ Specific dates:
  - From: February 7, 2001
  - To: February 7, 2001

Backed-up items

Backed-up item: All

Type: All

Type of backup: All

Volume: All

Completion status: All

Disk pool: All

☑ Always show this first

| OK | Cancel | Help | ? |

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The backup history contains information about each object that was saved as part of a Backup, Recovery and Media Services backup.

To view the backup history, follow these steps:

- In Operations Navigator, expand My AS/400 Connections (or your active environment).
- Expand a system with Backup, Recovery and Media Services installed on it.
- Expand Backup, Recovery and Media Services.
- Right-click Media or Backup Policies and select Backup History.
- On the Backup History - Include dialog, select the criteria you want to use to filter the backup history. Click Help if you need more information on any of the fields.
- When you have completed the fields, click OK.

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Wizards - Add Media, Policy, and Restore

Add Media - Welcome

Welcome to the AS/400 Add Media Wizard. This wizard takes you through the steps needed to prepare your media so it can be used for backup.

Restore - Welcome

Welcome to the AS/400 Restore Wizard. This wizard takes you through the steps needed to restore any backed up AS/400 data. To use the restore options in this wizard, you must have the required authority to system objects. Click Details for more information on what authority is needed.

Details

Click Cancel at any time to cancel the wizard.

New Backup Policy - Welcome

Welcome to the AS/400 New Backup Policy Wizard. This wizard helps you create a backup policy for your AS/400 data. You can define what you want to back up and prepare your backup media. At the end, you will be able to run this policy or schedule when you want it to run. Once you create a backup policy, you can reuse it as often as you want. You can change this policy using the Properties pages for the policy.

Before you create your policy, you need to decide what your backup strategy is going to be. For more information on how to plan that strategy, click Details.

Details

Click Cancel at any time to cancel the wizard.

⬅ Back   ➡ Next   ✔ Finish   ✗ Cancel

Add Media

You can add media into a media pool that BRMS uses when you do your backups. Once you have added your media, BRMS will draw the media it needs for the operations you are performing from this pool. You only have to add media once.

Do you want to add the media now?

○ Yes, I want to add media

○ No, the media is already added or I will add it later

⬅ Back   ➡ Next   ✔ Finish   ✗ Cancel   ? Help

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Notes: Wizards

Add Media wizard

This wizard configures what media pools and volumes to add and the initialization of volumes.

- The Add Media wizard enables you to add backup media to the pool of media that is already being used by Backup, Recovery and Media Services. It also enables you to prepare the media for use.
- To add media, follow these steps:
  - In Operations Navigator, expand My AS/400 Connections (or your active environment).
  - Expand a system with Backup, Recovery and Media Services installed on it.
  - Expand Backup, Recovery and Media Services.
  - Expand Media.
  - Right-click on Tape Volumes and select Add.
  - Follow the wizard's instructions to add the media to BRMS.

New Policy wizard

This wizard guides the user through selecting the type of backup strategy, customizing the type of data to be backed up, allows selection of Lotus Domino servers, choosing the folders / directories / files to be backed up, what backup lists to use, backup devices to use, and retention override settings. There are also backup features for users with Integrated Netfinity Servers, and User Defined Files Systems.

- You can create a new backup policy to control what items you back up and when. The New Backup Policy wizard enables you to create a backup policy, select the media you want to use for that policy, and then run or schedule the policy once it is created.
- To create a new backup policy, follow these steps:
  - In Operations Navigator, expand My AS/400 Connections (or your active environment).
  - Expand a system with Backup, Recovery and Media Services installed on it.
  - Expand Backup, Recovery and Media Services.
  - Right-click Backup Policies and select New Policy.
  - Follow the wizard's instructions to create a new backup policy.

Restore Wizard

This wizard will guide the user through selecting whether to restore from a backup history log or from a device, the type of information to restore, the library / folder / directory or file path, and the version to restore.

- The Restore wizard enables you to restore objects on your system either from the backup history, or from a device that you specify.
- To restore an object, follow these steps:
  - In Operations Navigator, expand My AS/400 Connections (or your active environment).
  - Expand a system with Backup, Recovery and Media Services installed on it.
  - Right-click Backup, Recovery and Media Services and select Restore.
  - Follow the wizard's instructions to restore objects on your system.

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Operations Navigator: Database Enhancements

Op. Nav. Database Enhancements - V5R1

- Database Navigator
  - Pictorial representation of a schema (DB objects and relationship): DB MAP
  - Generate SQL for objects in a map
- Support for SQL Triggers creation from Table Properties
- Generate SQL definition from existing DB objects
- RUN SQL Script enhancements
  - Support of additional V5R1 SQL statement syntax
  - Improved Visual Explain interface and closer integration with displaying Optimizer messages
- Ability to print Visual Explain graphs

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Notes: Op Nav DB Enhancements - V5R1

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Many V5R1 Operations Navigator Database enhancements are detailed in the following foils. Many of these are associated with DB2 UDB for AS/400 functional enhancements, while some are graphical user interface (GUI) enhancements to V4R5 level functions.

Not all V5R1 SQL-based database enhancements are covered under Operations Navigator

The following V5R1 SQL capabilities are implemented in compliance to the 1999 SQL standard:
- Right Outer Join
- Expressions within the INSERT statement
- SQL Triggers
- Allow greater than 6 triggers per table
- Column level triggers
- Longer than 80 character columns within C and C++ precompilers and RUNSQLSTM (Run SQL Statement) support
- User Defined Functions (UDFs) within Java

Other V5R1 database enhancements include:
- New licensed program - Database Text Extenders, 5722-DE1, that includes:
  - Text Search Engine
  - XML Extenders
  - DRDA 2 Phase Commit over TCP/IP
  - DRDA Results Sets

Note: The Database Business Intelligence presentation contains additional details on these V5R1 enhancements.

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Operations Navigator - Database
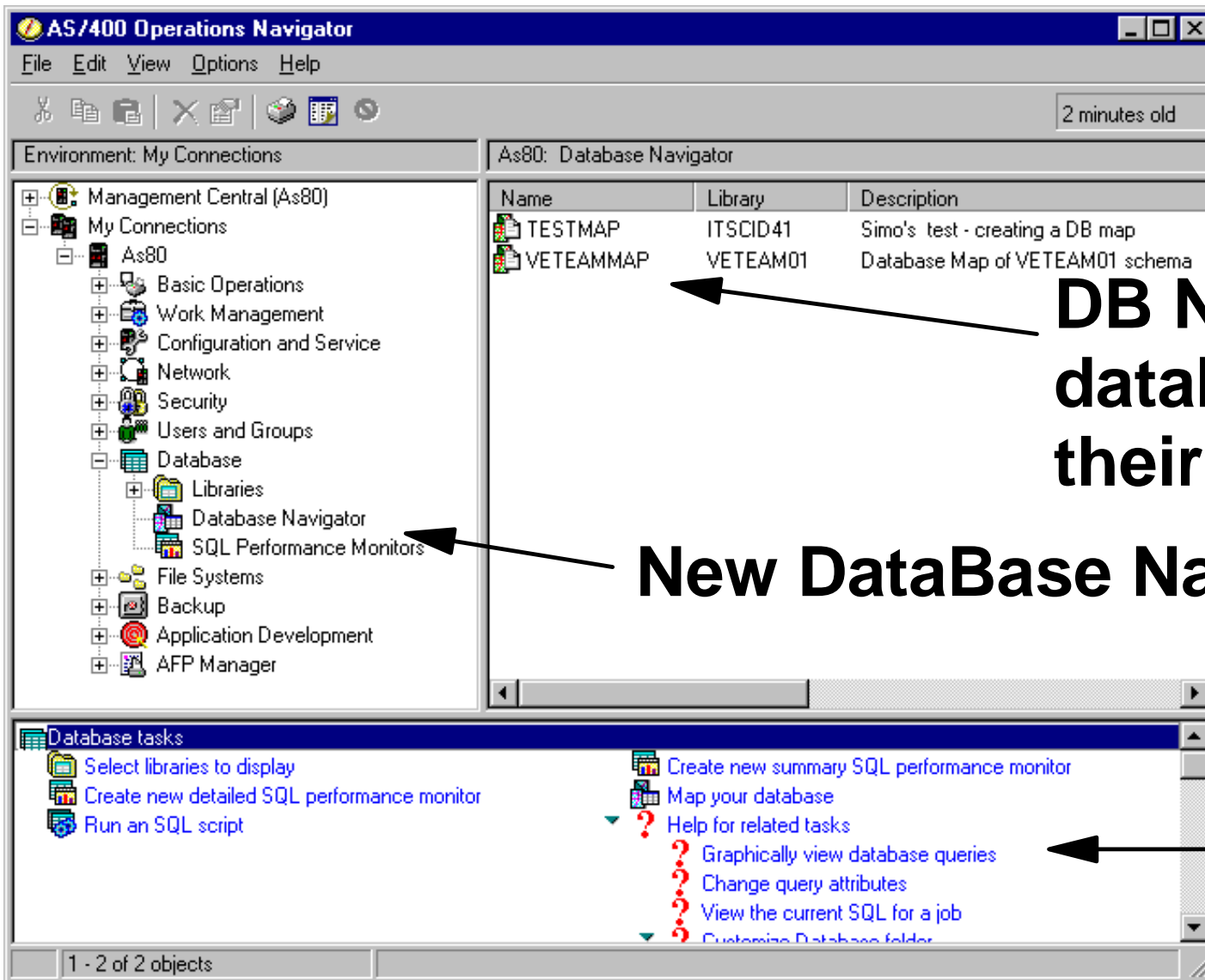
DB Navigator - Maps database objects and their relationship

New DataBase Navigator

Task Pad: wizards & help

Notes: Op Nav Dbase Enhancements - V5R1

In V5R1, the Database component of Operations Navigator has been modified to include a new item, Database Navigator, and to enhance the functionalities of some of the previously existing ones (objects in libraries, Run SQL Scripts, Visual Explain).

Before V5R1 if an OS/400 user wanted to understand what tables are part of a schema and the relationships between those tables and other objects, they would have used CL commands such as Display Library and Display Database Relation or queries to the system cross reference files, to generate (potentially long) lists of objects and relationships. They then had to try and piece things together by reading through these multiple lists or output files.

The goal of the Database Navigator function is to give a database administrator a pictorial representation of a schema in order to understand an existing complex database schema, create a new schema, communicate the schema, and manage the objects in that schema.

A DataBase MAP is a graphical representation of relationships existing between objects
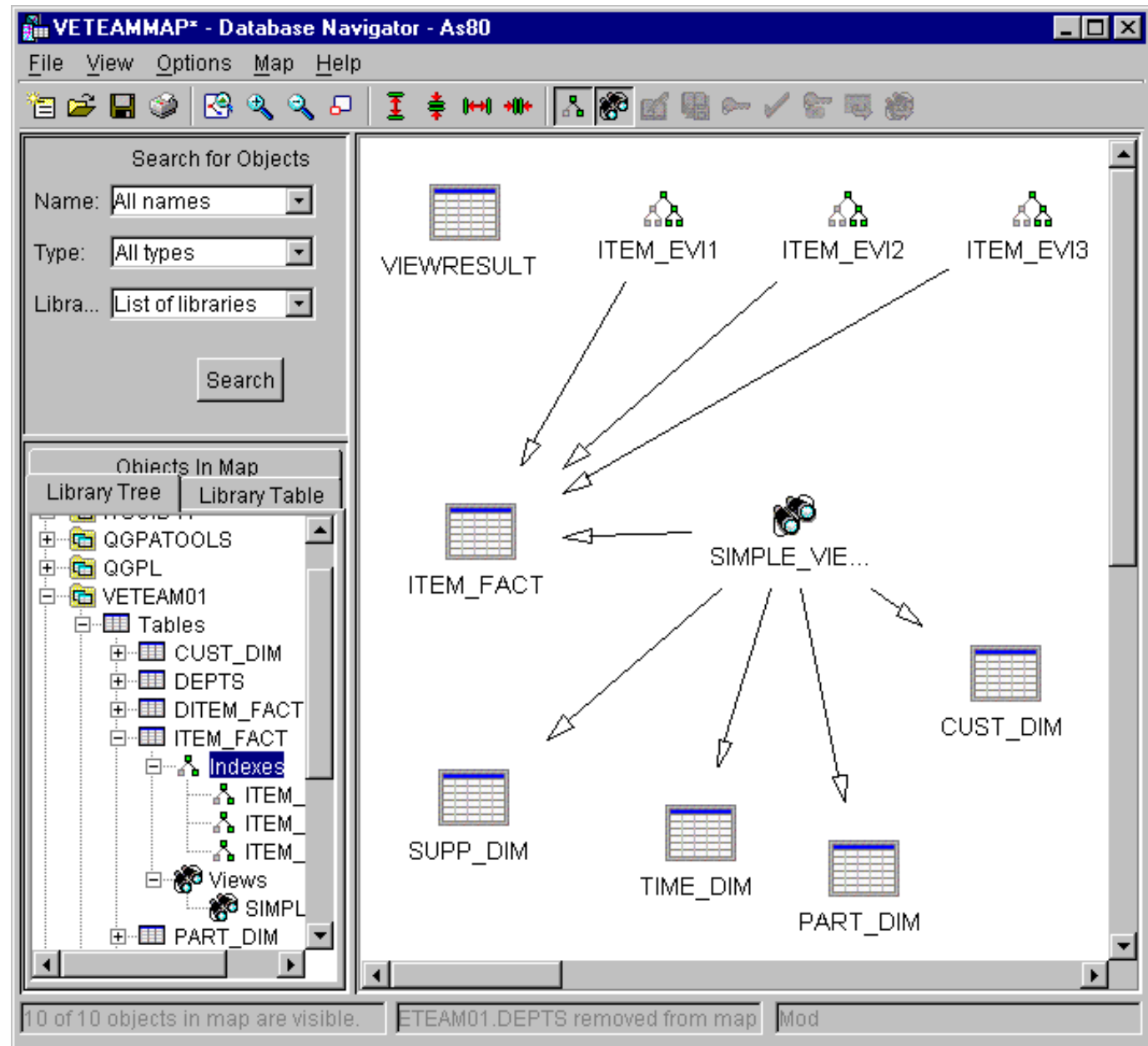
Notes: Database Navigator Map

The preceding picture is called a Database Navigator Map. Note that the objects within a DNM may go beyond the bounds of a schema in a database that is not normalized. With these goals in mind, it is anticipated that this function can be used from a beginner database programmer as an education aid and from the experienced DBA as a design and maintenance aid.

The default view of a Database Navigator Map contains tables and referential constraints.

With Database Navigator, you can explore the complex relationships of your database objects using a graphical representation that represents the tables and views in your database, the relationships between tables, and indexes and constraints that are attached to tables. After you are connected to your system, you can use Database Navigator to:
- Generate a map of a set of tables and the relationships between them
- Manipulate the map to show items of interest, without changing objects on the system
- Generate SQL for all the objects in the map
- Print maps
- Save maps and view them later

The following objects can be illustrated in a Database Navigator Map:
- Tables
- Views and Indexes
- Journals and Journal Receivers
- Aliases
- Referential Constraints
- Primary Keys and Unique Keys
- Check Constraints
- User Defined Relationships (UDRs)

Note: Trigger objects will be supported under the Navigator function in a future release.

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Database Navigator Map Objects

Actions can be performed on objects in a DB map, as from the main Operations Navigator list view
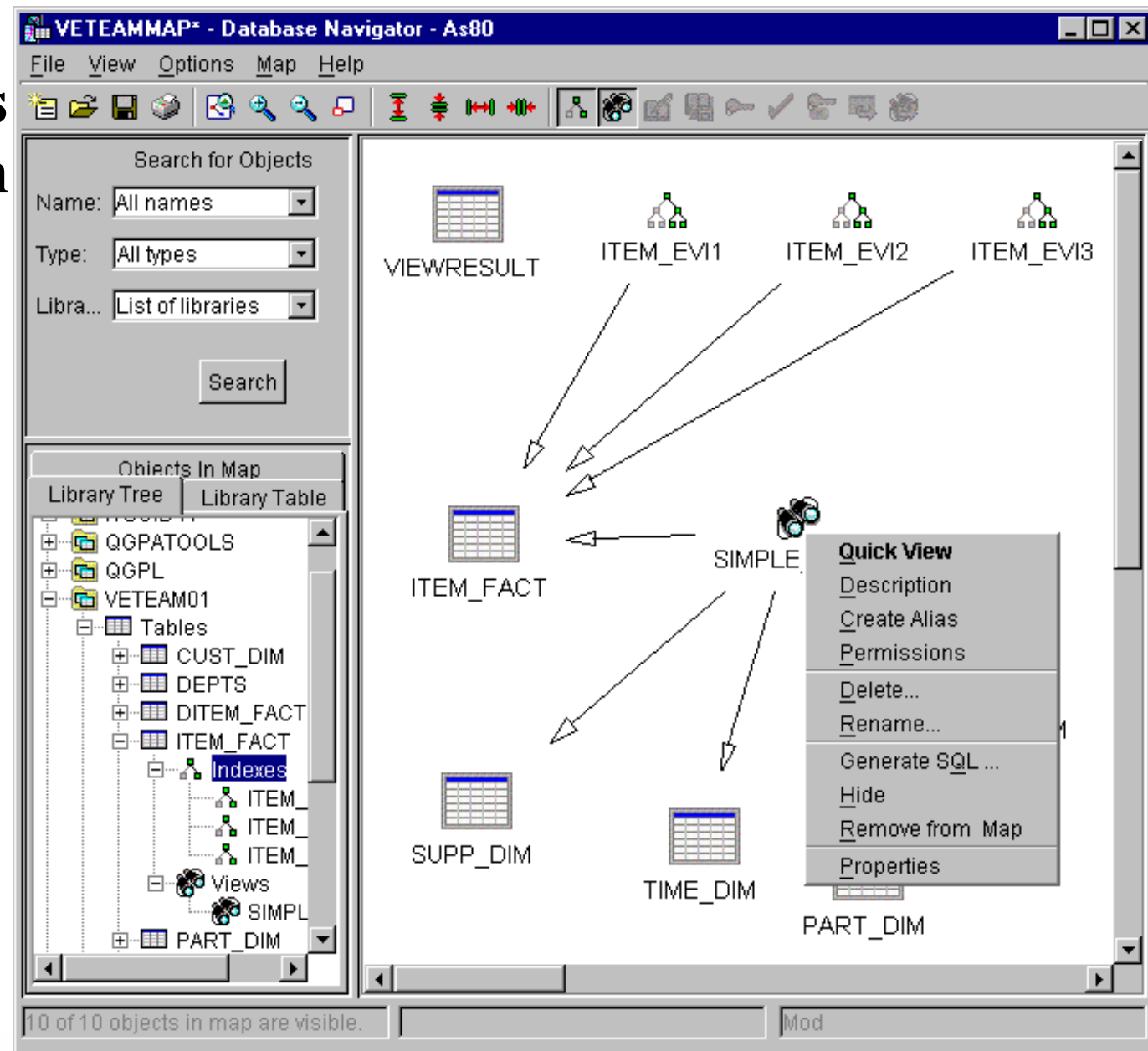
When the data for a map is collected the relationships between all of the objects is collected. However, the default view in the map contains only tables and referential constraints. The user can select the other objects by type to be shown. The exception to this 'rule' is the User Defined Relationship, which is always shown.
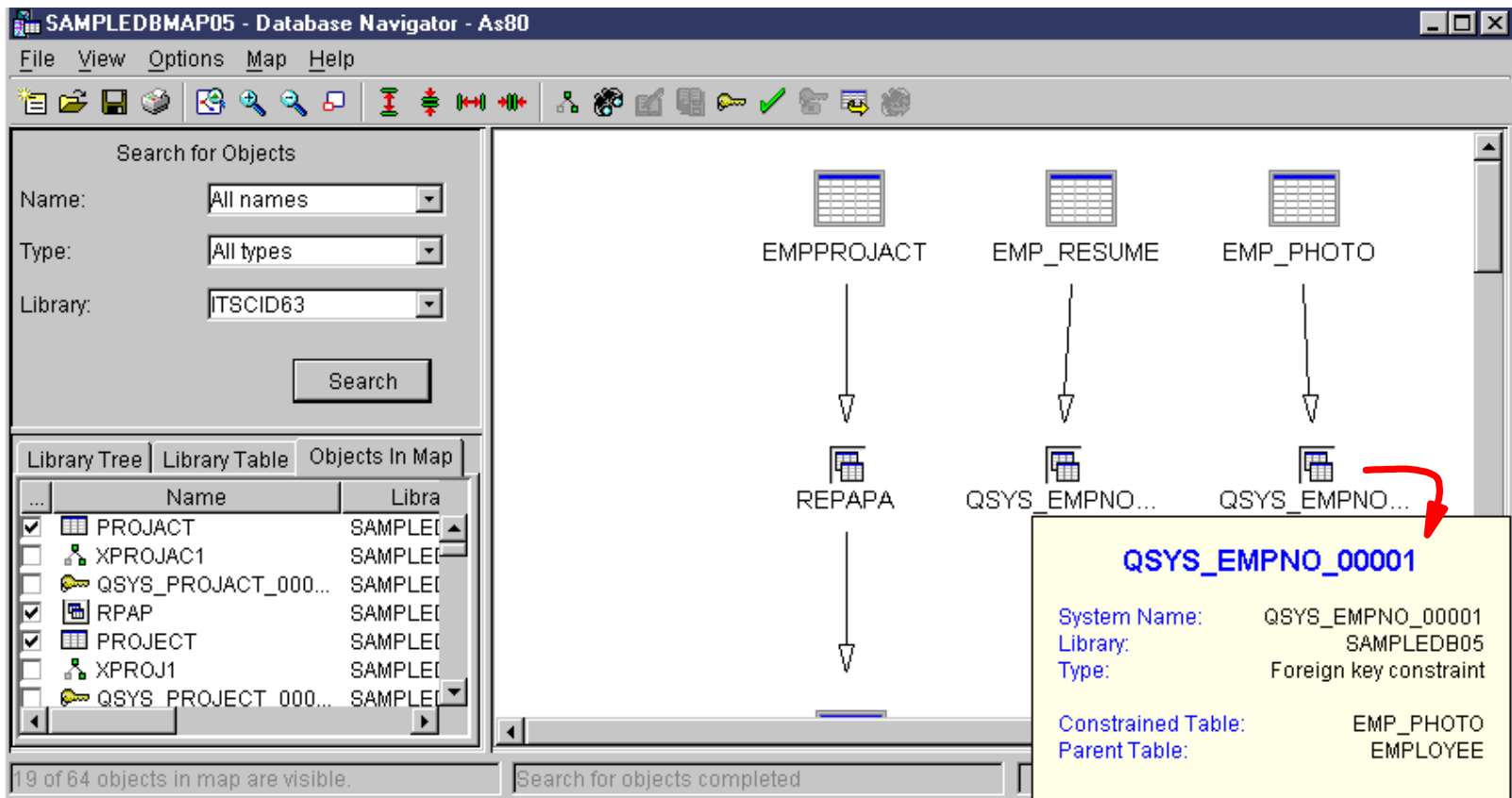
From a list of tables, views and indexes, objects can be selected and added to the map. In fact, you can start a map in this way, simply by selecting a table from the drop down list. It is added to the map, along with the relationships.

Highlight an object in the map to obtain its action menu. Items in the action menu vary according to the object type. The action menu basically adds actions available in the library component of Operations Navigator, plus the ability to hide the object in the map or remove it from the map, or to generate SQL from the object.

Database Navigator is fully compatible with SQL objects. Some accommodations for database objects created through the native interface (DDS) is made, but not in all cases fully supported. An example is that multi-member physical files are treated as a table. The user may look at member related statistics through the Table Description functions. However, in order to represent member data (past the first member) in the Database Navigator map, an alias must be created. Remember also that logical files are treated as views.

DB Map - Visualize Constraints

The easiest way to discover and create constraints : seeing them drawn in a DB Map

Prior to V5R1, the only way of finding out whether constraints existed in a schema was to use the CL Command Work with Physical File Constraints (WRKPFCST), and scan the resulting list, trying to work out which constraint was associated with which object.

For V5R1, Database Navigator provides a viable alternative. For each database table, Primary Key, Unique, Referential and Check constraints can be displayed. A referential constraints is illustrated with an arrow from the foreign keyed table and another arrow pointing to the parent keyed table.

To find a constraint after starting the Navigator function, with your mouse "hover over a DB object" and see what "details window" is displayed. In this example we have "hovered over" the rightmost QSYS_EMPTNO object to find out it is a Foreign Key constraint in library schema (library) SAMPLEDB05.
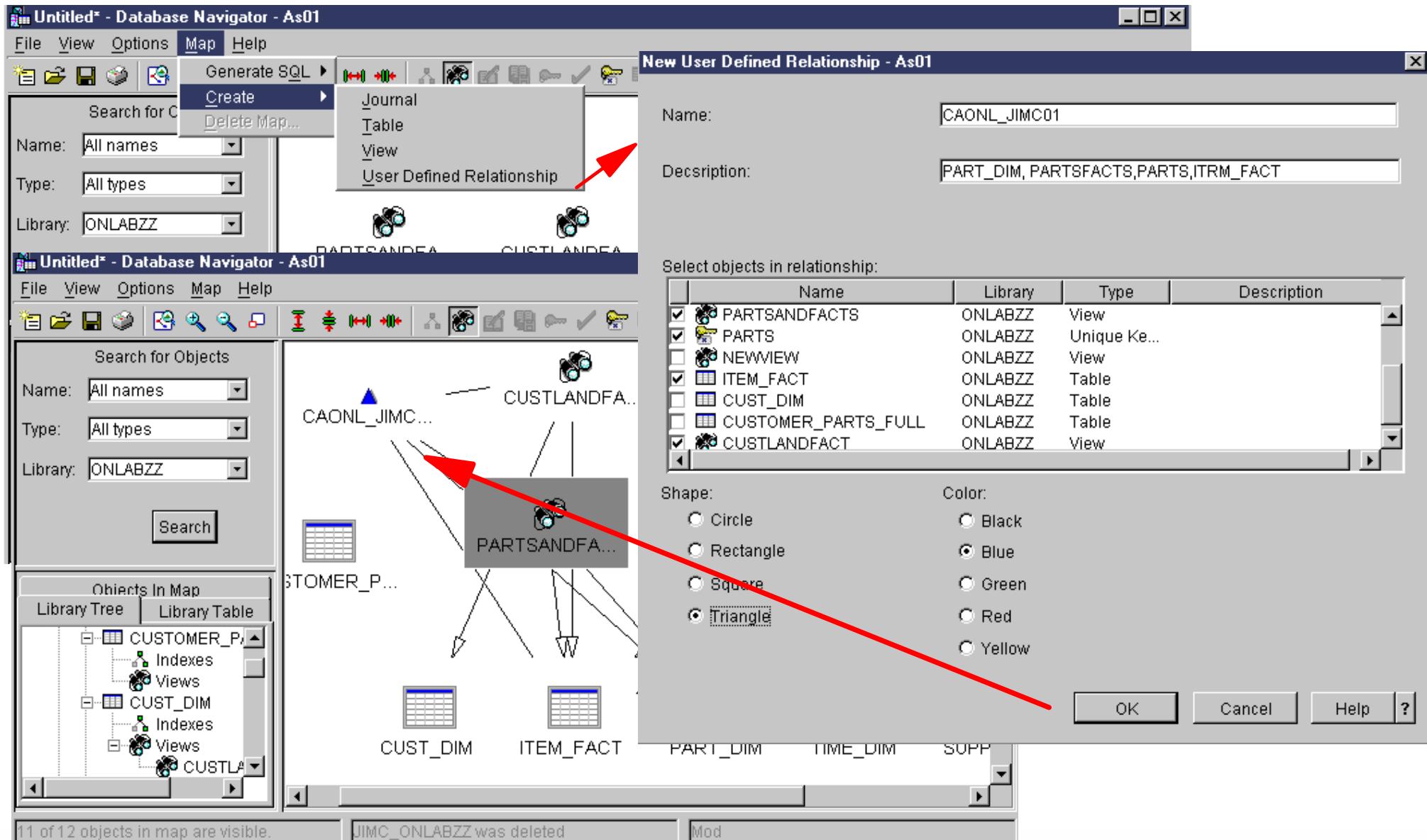
By using the properties for a table on the database map, you can create new Constraints. All four of the constraint types are supported: Unique, Primary Key, Check and Referential.

Depending on which of these is selected, the appropriate create dialog will appear. Once created, it will be drawn in the Database Navigator Map.

When a referential integrity constraint is added, other database objects may get brought into the database map at the same time. This is because the user could have selected a table in the table properties dialog that did not currently appear on the map. If another table is added to the map in this way, other relationships for that table could also be included.

DB Navigator - User Defined Relationship

Create your own Relationships to illustrate your system!

Notes: DB Map - User Def. Relationship

There are many instances when the user has "relationships" which are defined in their programs. This function allows them to be represented in a map.

- The "Select objects in relationship" list box contains a list of the objects in the map. It is a "check list", so the user checks the database objects forming the relationship. Objects must already be in the map for a relationship between them to be formed.
- User Defined Relationships (UDRs) are always shown in a DB Navigator Map.

When you have relationships that are defined by your programs, you can create a user-defined relationship in Database Navigator, so that your relationship is displayed in the map. An example of this might be creating a user-defined relationship to remind programmers of an important join between two tables.

- To add user-defined relationships to a map:
  - Open a Database Navigator Map .
  - Right-click the map and select Create.
  - Select User-Defined Relationship.
  - Type a Name and a Description for the user-defined relationship. Unlike some Operations Navigator functions where the description is optional, it is important to provide a meaningful description for your user-defined relationship, since it is the only way for you to indicate what the user-defined relationship represents.
  - Select the objects that you want to include in the relationship by selecting from the list of objects.
  - Choose the Shape and Color you want for the object.

DB Navigator Map - Generate SQL

SQL DDL can be generated for any (or all) of the objects in a DB map, on the AS/400 or as a PC File

Notes: DB Map Generate SQL
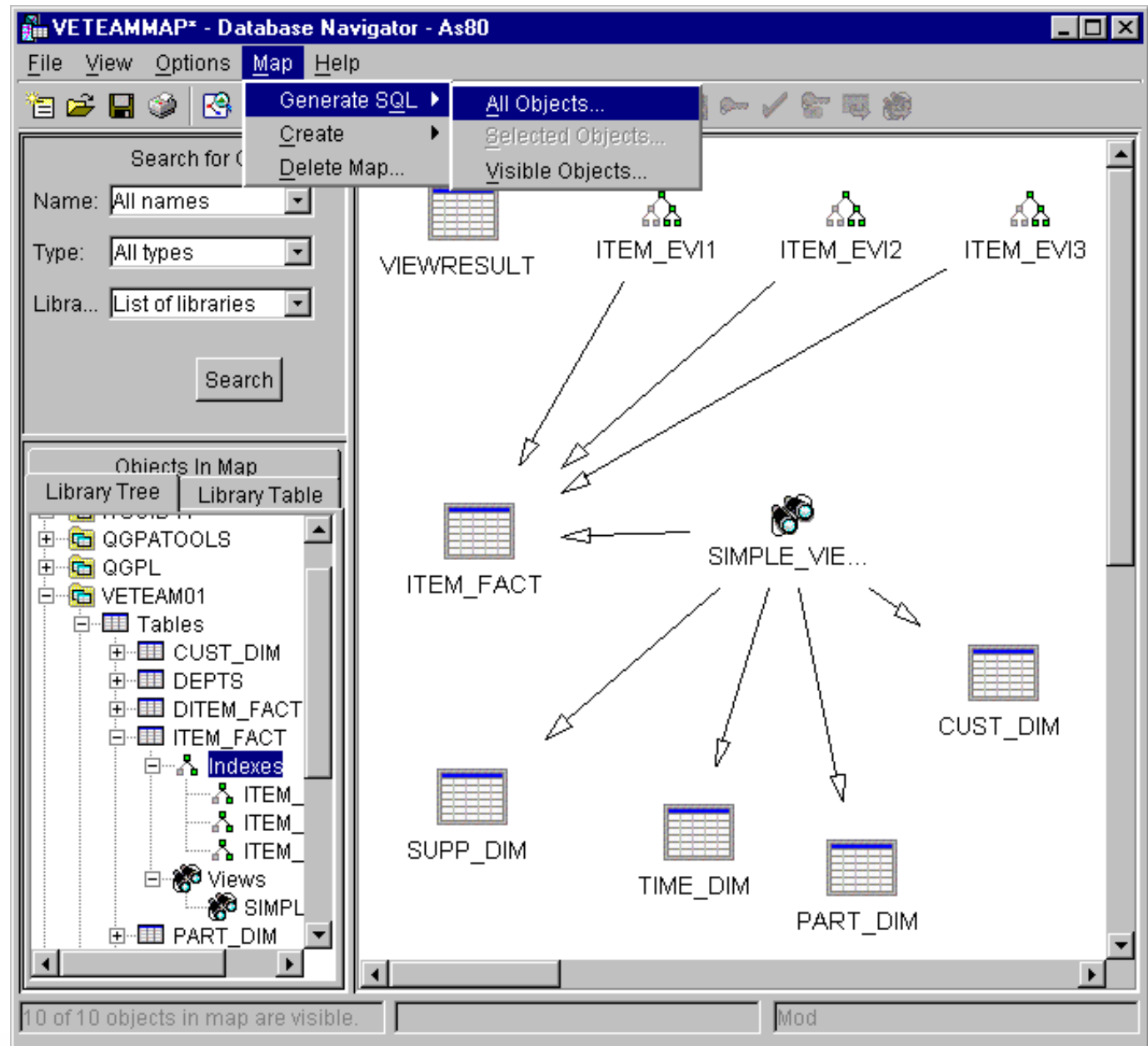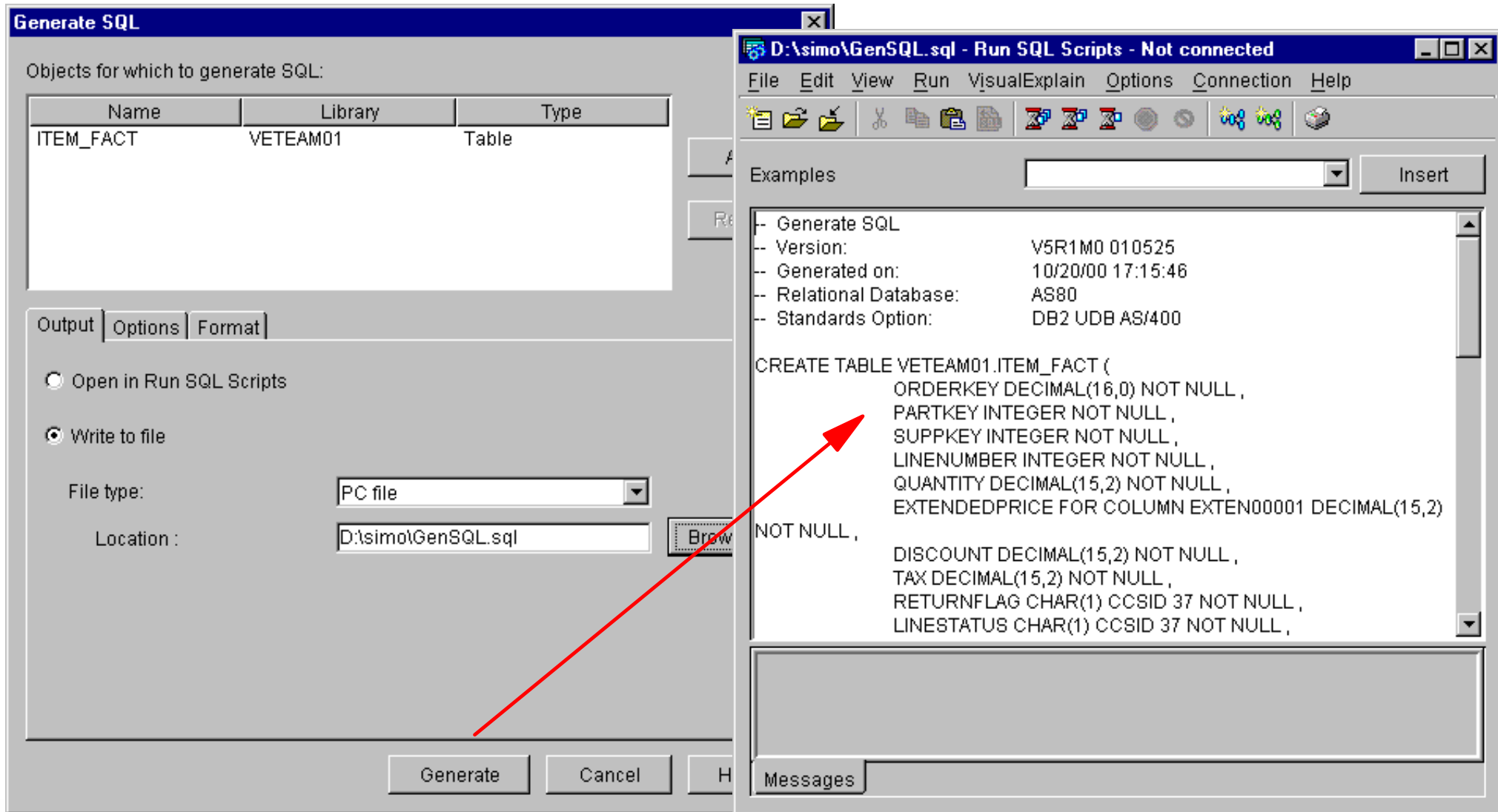
The Database Navigator Map can be used to generate SQL for one, any or all of the objects included in the Map.

This function will build SQL statements to be displayed in the Run SQL Script Center or to be saved in a file.

The file can be an AS/400 source file or a PC file.

SQL can be generated according to ANSI or DB2 UDB standards.

Generate SQL

Reverse engineer any DB Object into SQL

Generate SQL

Objects for which to generate SQL:

Name	Library	Type
ITEM_FACT	VETEAM01	Table

Output | Options | Format

○ Open in Run SQL Scripts

● Write to file

File type: PC file

Location :   D:\simo\GenSQL.sql   Brow

Generate   Cancel   H

D:\simo\GenSQL.sql - Run SQL Scripts - Not connected

File   Edit   View   Run   VisualExplain   Options   Connection   Help

Examples   Insert

```
-- Generate SQL
-- Version:              V5R1M0 010525
-- Generated on:         10/20/00 17:15:46
-- Relational Database:  AS80
-- Standards Option:     DB2 UDB AS/400

CREATE TABLE VETEAM01.ITEM_FACT (
        ORDERKEY DECIMAL(16,0) NOT NULL ,
        PARTKEY INTEGER NOT NULL ,
        SUPPKEY INTEGER NOT NULL ,
        LINENUMBER INTEGER NOT NULL ,
        QUANTITY DECIMAL(15,2) NOT NULL ,
        EXTENDEDPRICE FOR COLUMN EXTEN00001 DECIMAL(15,2)
NOT NULL ,

        DISCOUNT DECIMAL(15,2) NOT NULL ,
        TAX DECIMAL(15,2) NOT NULL ,
        RETURNFLAG CHAR(1) CCSID 37 NOT NULL ,
        LINESTATUS CHAR(1) CCSID 37 NOT NULL ,
```

Messages

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Notes: Generate SQL

This function allows the user to reconstruct the SQL, or more accurately the DDL, statements used to create existing database objects. This process is often referred to as reverse engineering. After selecting one or more objects to be reverse engineered, the user has the option of having the resulting SQL displayed in the Run SQL Scripts dialog, or saving the output to a file - either an AS/400 or a PC file. Using the existing Run SQL Scripts functions, the statements can be edited, run, and saved to a file on the PC.

The actual SQL will be generated by calling the new Generate SQL Database Objects (QSQGNDDL) API. The following objects are supported:

- Aliases
- Distinct Types
- Functions
- Indexes
- Procedures
- Schemas (collections) and libraries
- Tables and physical files
- Views and logical files (some will not be supported)
- Triggers

From DDS to SQL

Use Generate SQL to port your DDS files to SQL Tables and Views!

```
.T.Name+++++RLen++TDpB......Functions+++++++++++++++++++
 Beginning of data ****************************************
R CERTREC
   EMPNUM          9  0       COLHDG('Employee' 'Number')
                             EDTCDE(4)
   EXAMREF         5          COLHDG('Exam' 'Code')
   ATTENDED          L        COLHDG('Date Exam' 'Taken')
   PERCENT         3  0       COLHDG('Mark' 'Achieved')
                             EDTCDE(4)
   PASSDATE          L        COLHDG('Date Passed')
                             ALWNULL
   VERSION         6          COLHDG('Version')
                             ALWNULL
```

Different defaults highlighted

Constraints

Comments

Untitled - Run SQL Scripts - As80

File   Edit   View   Run   VisualExplain   Options   Connection   Help

Examples   Insert

```
-- Generate SQL
-- Version:                    V5R1M0 010525
-- Generated on:               10/24/00 16:30:08
-- Relational Database:        AS80
-- Standards Option:           DB2 UDB AS/400

CREATE TABLE VETEAM01.CERTIFY (
-- SQL150B  10  REUSEDLT(*NO) in table CERTIFY in VETEAM01
ignored.
-- SQL1509  10  Format name CERTREC for CERTIFY in VETEAM01
ignored.
                EMPNUM DECIMAL(9,0) NOT NULL DEFAULT 0 ,
-- SQL150D  10  EDTCDE in column EMPNUM ignored.
                EXAMREF CHAR(5) CCSID 37 NOT NULL DEFAULT '',
                ATTENDED DATE NOT NULL DEFAULT
CURRENT_DATE ,
                PERCENT DECIMAL(3,0) NOT NULL DEFAULT 0 ,
-- SQL150D  10  EDTCDE in column PERCENT ignored.
                PASSDATE DATE DEFAULT NULL ,
                VERSION CHAR(6) CCSID 37 DEFAULT NULL ) ;

ALTER TABLE VETEAM01.CERTIFY
        ADD CONSTRAINT VETEAM01.QSYS_EMPNUM_00001
        FOREIGN KEY( EMPNUM )
        REFERENCES VETEAM01.EMPLOYEE ( EMPNUM )
        ON DELETE NO ACTION
        ON UPDATE NO ACTION ;

LABEL ON TABLE VETEAM01.CERTIFY
```

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Even DDS created database objects can be "reverse engineered" to SQL using the new Generate SQL function. You are cautioned about different behaviors and defaults by warning messages embedded in the newly generated SQL file.

- Reverse engineering database objects in this way is not an official "conversion" program, but it can provide a significant step forward in moving to SQL for data definitions.

Field names translate into column names, and field attributes are carried forward, e.g. character fields, signed and packed decimal fields, decimal places, date, time etc. Some DDS functions are also carried forward into the SQL, for example, column heading, text, alwnull, default, date format etc. One or two others, such as edtcde, are not carried into the SQL statements. Any existing physical file constraints are generated in the new SQL environment.

An immediate benefit of moving to SQL is that the code for constraints and column definitions is now all in one place. So if you needed a little encouragement, DDS to SQL is a good a place as any to start.

- Be aware that you do need some knowledge of SQL, and the differences to "traditional DDS". For example, only single member files supported by SQL, no keys on views, record format name is same as file name, alwnull is SQL default, re-use deleted records is SQL default etc.
- Also be aware that several items do not convert too well, for example, a DDS logical file is treated by SQL as a view - a view does not have a keyed access path!
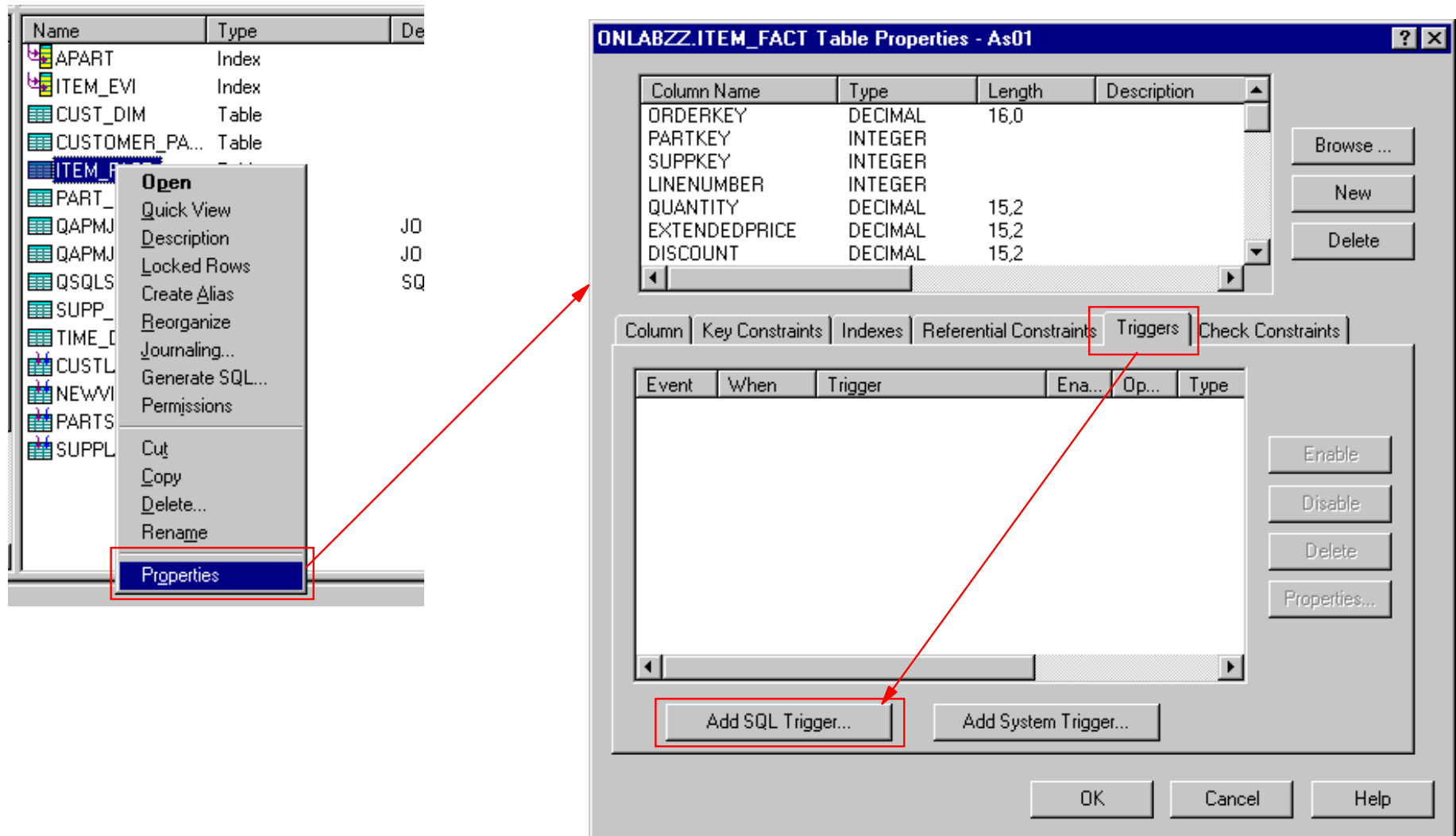
SQL Triggers

Notes: SQL Triggers

This section discusses SQL Triggers support through Operations Navigator.

For more complete Trigger information, refer to the Database Business Intelligence presentation.

Add SQL Trigger Interface

Add SQL Trigger Interface

Add SQL Trigger Interface

Add SQL Trigger Interface

Add a System Trigger

Notes: SQL Triggers

DB2 UDB for AS/400 has supported native HLL (system) triggers since V3R1. A trigger is program to initiate an action (trigger) when an event occurs on a database file/table (insert, update, or delete). Triggers can be initiated either before or after the event. Update triggers can differentiate whether or not a record/row was actually changed.

SQL Triggers are new for V5R1. For SQL Triggers, SQL code is used to create the trigger using SQL syntax. With native triggers, a program name is specified to execute (which could of course contain SQL).
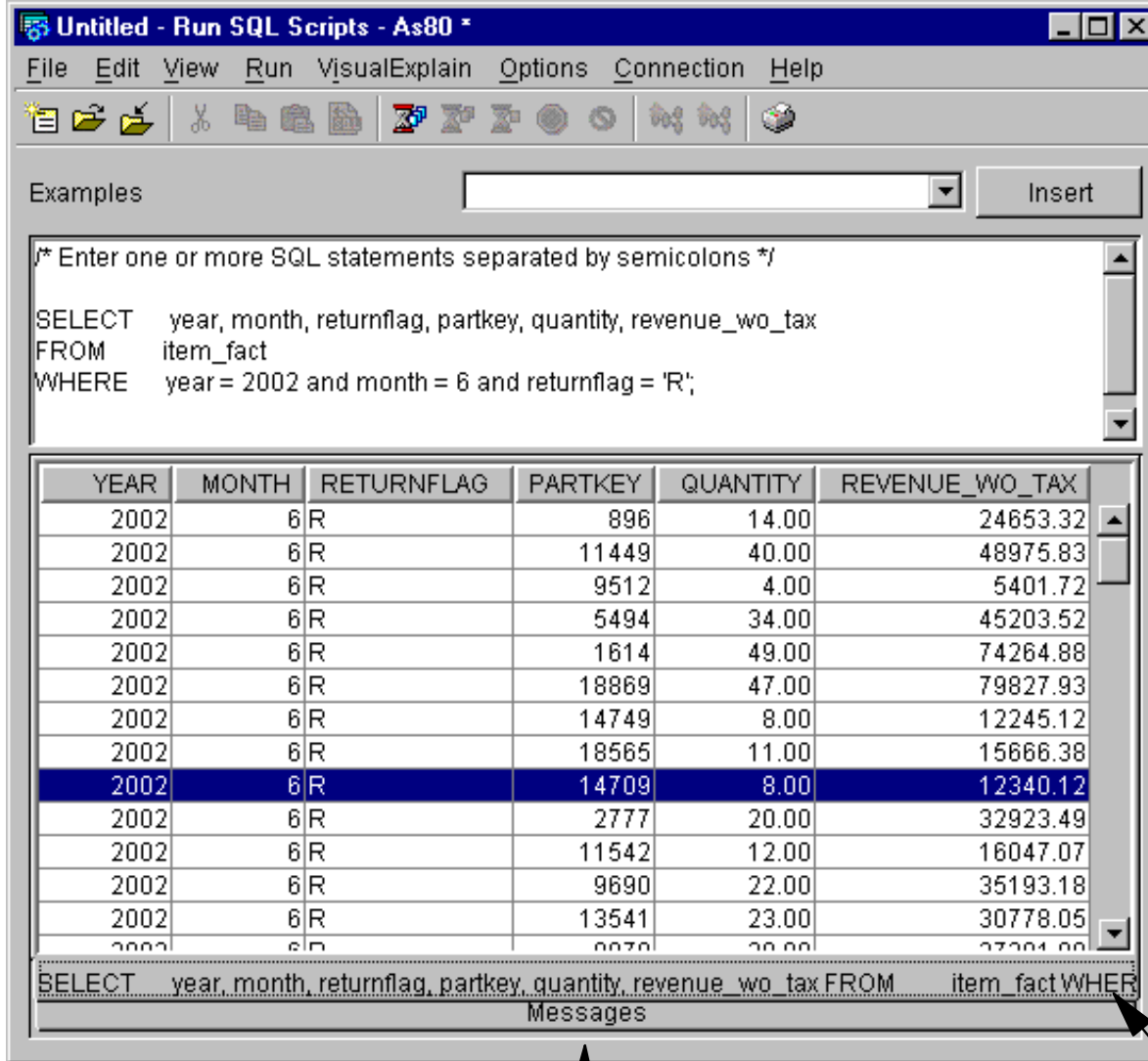
New for V5R1 is the support for more than 6 triggers per table. You are now provided with the option to add or replace triggers when you associate a trigger with a database table. Also new in V5R1 is the support for READ triggers - a trigger program that executes when a record is read from a database table.

Since DB2 UDB for AS/400 now supports both Native and SQL triggers, the Operations Navigator Database component now interfaces to both kinds of trigger.

Trigger definition and properties are part of the table Properties dialogue. The Properties page for triggers has been changed to display a list of triggers for the table, which could include a mixture of both Native and SQL triggers. Then the user can select a trigger and go to a more detailed Properties dialogue for that specific trigger. The properties dialogues are different for Native and SQL triggers.

Through the Operations Navigator interface you can also enable and disable a trigger.

Java and "SQL Script Center" terminology now used

Connection
Connect to Server...
JDBC Setup...

Result data in same or separate window

Options
✔ Stop on Error
✔ Smart Statement Selection
Display Results in Separate Window
Include Debug Messages in Job Log
✔ Run Statement On Double-Click
Change Query Attributes...

Messages and/or result data

Untitled - Run SQL Scripts - As80 *

File   Edit   View   Run   VisualExplain   Options   Connection   Help

Examples   Insert

```
/* Enter one or more SQL statements separated by semicolons */

SELECT     year, month, returnflag, partkey, quantity, revenue_wo_tax
FROM       item_fact
WHERE      year = 2002 and month = 6 and returnflag = 'R';
```

YEAR	MONTH	RETURNFLAG	PARTKEY	QUANTITY	REVENUE_WO_TAX
2002	6	R	896	14.00	24653.32
2002	6	R	11449	40.00	48975.83
2002	6	R	9512	4.00	5401.72
2002	6	R	5494	34.00	45203.52
2002	6	R	1614	49.00	74264.88
2002	6	R	18869	47.00	79827.93
2002	6	R	14749	8.00	12245.12
2002	6	R	18565	11.00	15666.38
2002	6	R	14709	8.00	12340.12
2002	6	R	2777	20.00	32923.49
2002	6	R	11542	12.00	16047.07
2002	6	R	9690	22.00	35193.18
2002	6	R	13541	23.00	30778.05

SELECT   year, month, returnflag, partkey, quantity, revenue_wo_tax FROM   item_fact WHER

Messages

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Notes: Run SQL Scripts

In V5R1 the Run SQL Script Center has been rewritten using Java.
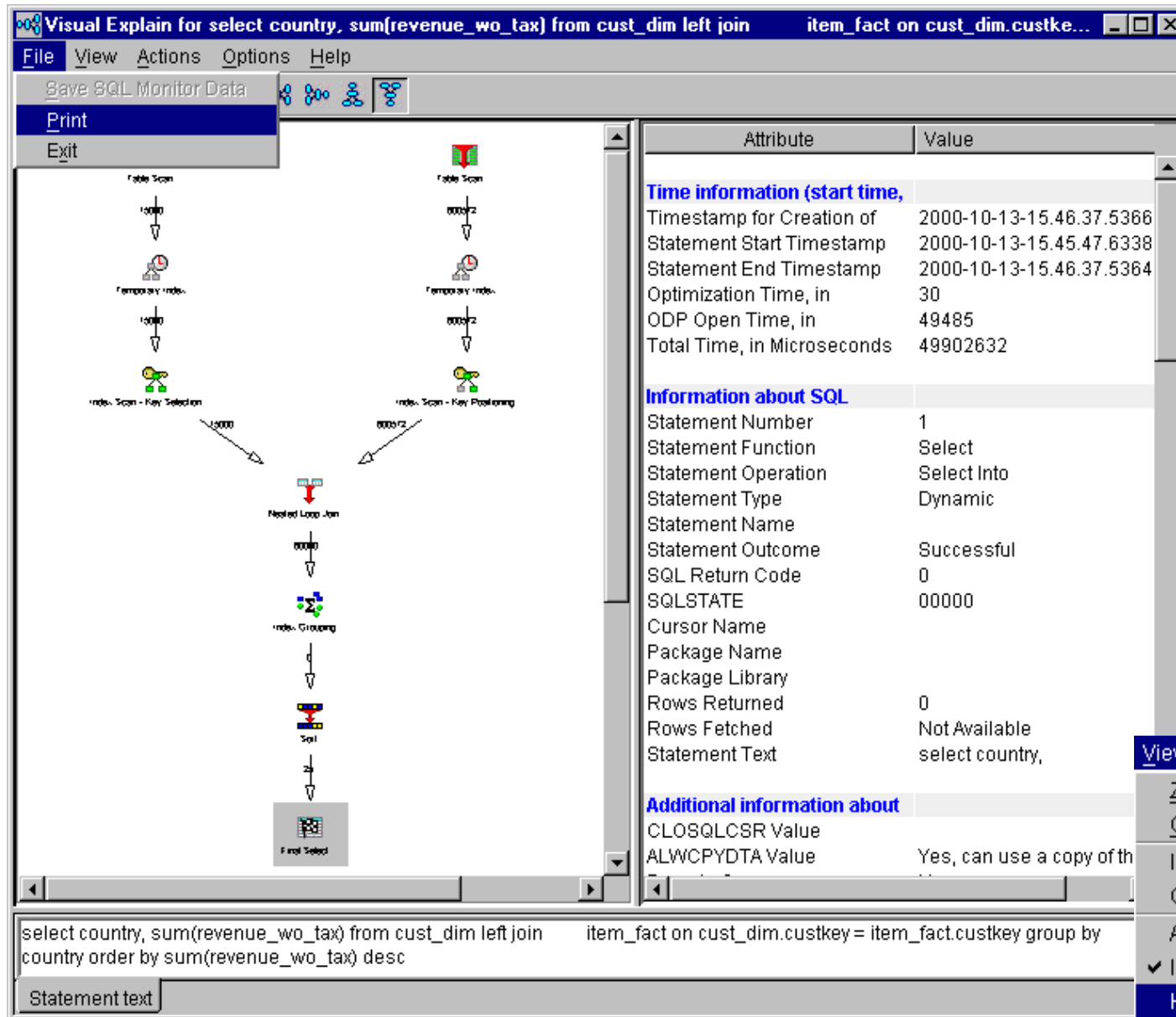
Enhanced layout with an optional integrated results viewer and a hot-key to the run history.

Many smaller changes:

- Icon design
- Option to run on double click

In previous releases, the query results appeared in a separate window. In V5R1 yo must specifically select this as shown in the lower right action list.

Additionally, there are new run SQL statement icons for running only one or multiple SQL statements.

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Visual Explain

Enhancements:

– Visualize SQL

– Print

– Save Image Preferences

– Highlight Expensive icons and Index Advised

Visual Explain has been enhanced to:
- Include the SQL statement that is being analyzed in a new frame
- Allow printing the query implementation graph
- Remember preferences across sessions
- Give a clearer presentation of query attributes and values
- Highlight the most expensive (time and resource consuming) steps
- Highlight advised indexes
- Button to show Optimizer message details (no need to select Include Debug messages in joblog Option)
- Save SQL Performance Monitor data used by Visual Explain

V5R1 Visual Explain, Optimizer Messages

Visual Explain output can be used to help analyze performance of the SQL function. In many cases you needed to also run an SQL Performance Monitor or specify to include Optimizer messages in the job log.

You then had to analyze the job log messages in a separate window or look at various SQL Performance Monitor reports to determine, for example if an index should be created that may improve performance.

In V5R1 the Visual Explain interface makes it easier to identify something like a new index recommendation by providing a real time "Optimizer messages" button. Click that button and the lower "message area" is expanded as if you were looking at only the query-related messages, including Optimizer recommendation as shown on the right window of this foil.

You can click on an Optimizer message and get the complete help text as shown on the following foil.

Notes:

- The Business Intelligence presentation has some additional pages on database functions.
- V4R5 Visual Explain had some limitation on the complexity level of the SQL statement being explained. V5R1 Visual Explain has most restrictions removed.
- With V5R1, when exiting Visual Explain, you are given the chance to store the SQL performance information collected by Visual Explain into an SQL Performance Monitor without having to define and run an SQL Performance Monitor during a separate session.
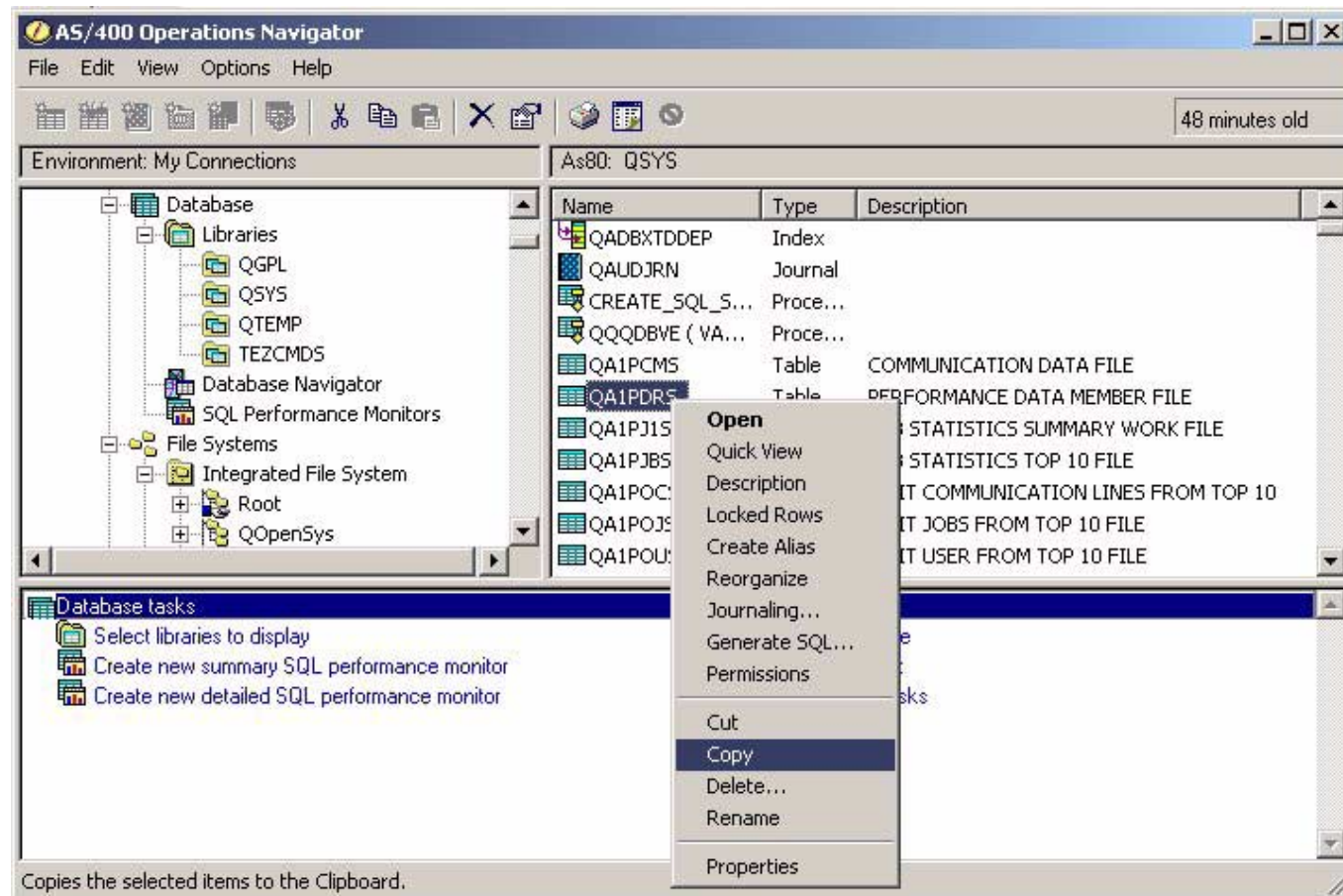
Operations Navigator: File Systems

File Systems - QSY.lib Support

Enhanced QSYS.lib support

- Ability to drag and drop objects within QSYS.lib

- Ability to drag and drop objects between QSYS.lib and other file systems

- Ability to journal physical files from the File Systems tree

- Additional property pages for QSYS.lib objects

QSYS drag and drop support

Drag and drop support for QSYS objects is enabled in V5R1. The CPY CL command is called to copy the objects being dropped. This command will do the appropriate copy internally (CRTDUPOBJ, CPYF, etc). Because the CPY command is being used, drag and drop in QSYS will not be enabled across AS/400s. But you can drag and drop objects between QSYS and different file systems on the same AS/400.

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File Systems

Enhanced file and folder support
- Ability to journal files and folders from within Operations Navigator
- Ownership and permissions now preserved after copy/move of folders
- Additional property pages for files and folders

Support for mixed CCSID text conversions
- Ability to use mixed CCSID for all EBCDIC to ASCII file data conversions
- Applies to V5R1 and later servers

Other ease-of-use enhancements
- Retrieval of certain object or file types now preserved after a refresh
- Ability to specify which columns to display in the list view

Notes: File Systems

Journaling

You can start and stop journaling on QSYS physical file objects by selecting the Journaling menu option when working in the File Systems component of Operations Navigator. The dialog for QSYS physical file objects is the same dialog used by the Database component for journaling.
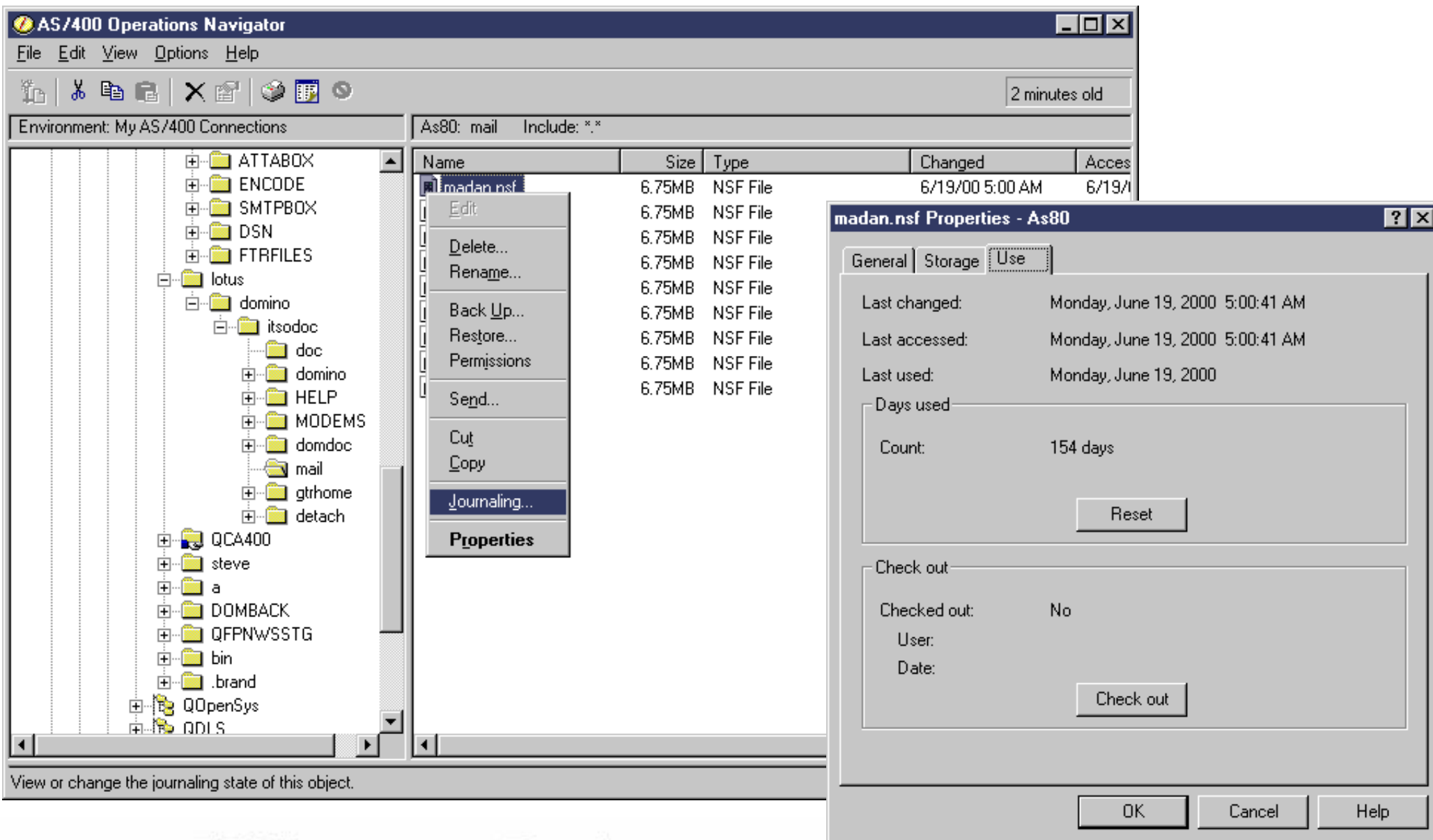
Properties

Many more properties are available for QSYS objects in V5R1. Previously, only properties that MS Windows displayed for files and folders were shown in Operations Navigator. This was a rather limited set of properties. The new property pages (Storage, Save, Creation) mimic the information you'd see when running the DSPOBJD CL command. The existing General tab now includes more detail such as file owner. Keep in mind that the new property pages described here are not just for objects in the file systems component. File systems supplies these property pages to other areas of Operations Navigator as well, such as authorization lists (under the Security component) and libraries (under the Database component).

Other enhancements

The Type column for QSYS objects now includes a more thorough indication of the type of object you're working with. For example, the file type is now displayed for a file, such as "File - Physical" or "File - Save." Moreover, a Description column has been added; this is the text description associated with QSYS objects.

Files and Folders

Additions to: Drag/Drop, Owner and Properties

Notes: Files and Folders

Journaling files and folders

You can now journal an entire folder; for example, the directory containing your Domino for AS/400 files. You can also journal specific files within a directory. The journaling of files and folders differs slightly from journaling QSYS.lib physical files. The "Journal before images" option is not supported on files and folders and is therefore not shown. File and folder journaling is also only available when using V5R1 and later hosts and within Root, QOpenSys, and user-defined file systems.
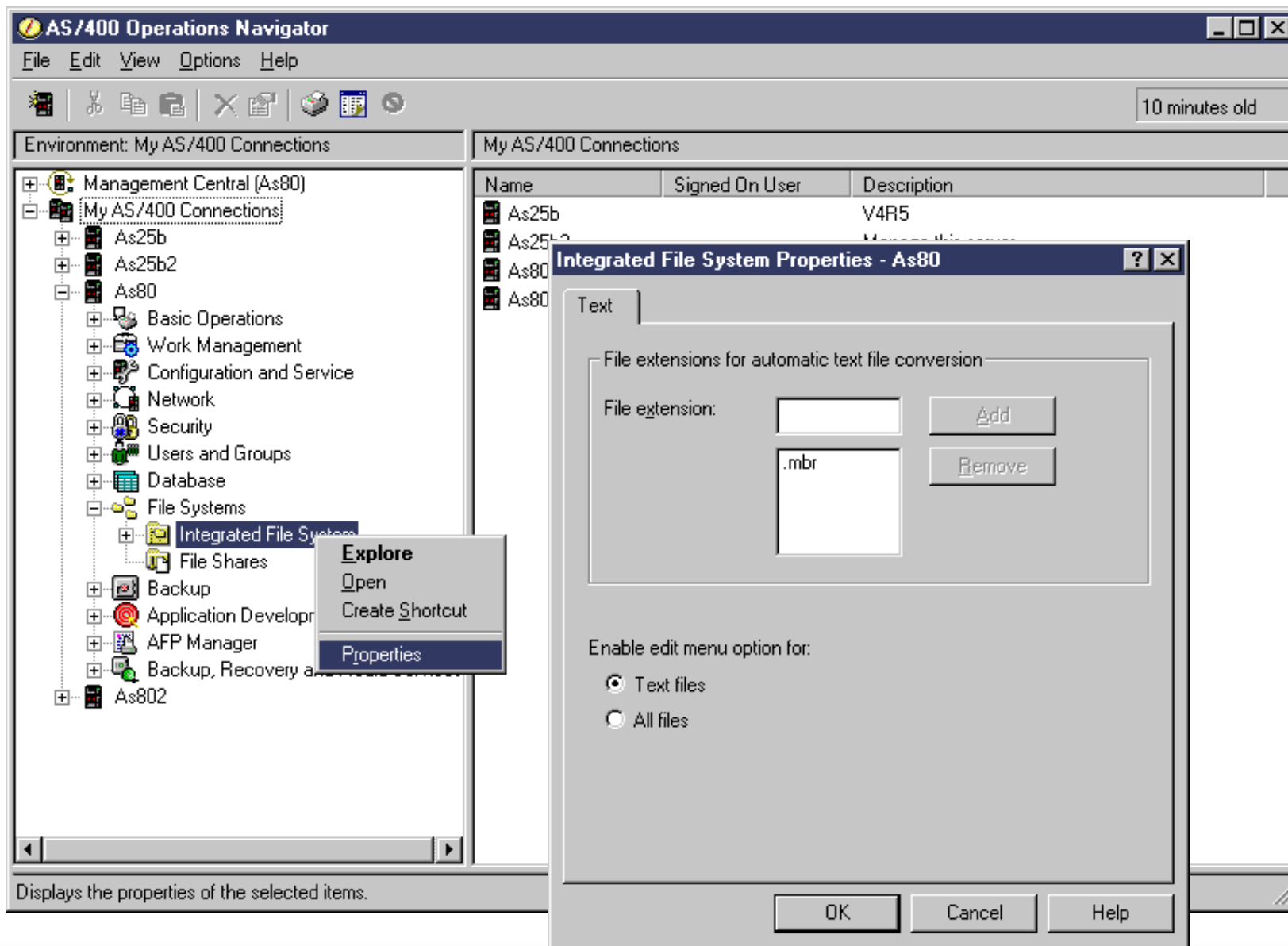
Drag and drop

In previous releases, the ownership and permissions associated with a folder were not preserved. A new folder was created during the copy or move, which caused the user doing the copy to become the owner. This has been changed in V5R1 in an effort to match the CL CPY command. The OWNER(*KEEP) parameter of this command is used when copying the directories if the user has authority to use it. Otherwise, the owner of the copied objects will be the user doing the copy.

Properties

Many more properties are available for files and folders in V5R1. Previously, only properties that MS Windows displayed for files and folders were shown in Operations Navigator. This was a rather limited set of properties. The new property pages (Storage and Use) mimic the information you'd see when running the WRKLNK CL command and choosing option 8 (Display attributes). The existing General tab now includes more detail such as file owner.

Mixed CCSID Text Conversions

Notes: Mixed CCSID Text Conversions

In V5R1, support has been added to allow mixed CCSID text conversions. Files are now tagged with a CCSID instead of a code page. All references to code page have been changed to CCSID when accessing V5R1 and later servers. The text conversion page for the Integrated File System properties was changed to allow the specification of files to receive mixed data conversions when going to V5R1 and later servers. Mixed CCSID conversion can be used for all EBCDIC to ASCII conversions since the Files Systems component in Operations Navigator does not do random file access.

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More Folder Enhancements

Viewing Selection Criteria - Filter Criteria now include Use Specific Criteria

Notes: More Folder Enhancements

Saving of selection criteria

When viewing folders in file systems, you can define a selection criteria for the folder. When viewing the contents of the folder, only the items which match the criteria are displayed. This makes it easier to find a file or improve performance by not retrieving files you do not wish to see. In prior releases, however, the criteria was never preserved through refreshes or different sessions of Operations Navigator.

In V5R1, the filter criteria specified is now be preserved. The criteria applies only to the folder for which you defined it and does not span folders. The criteria is now preserved through refreshes and different sessions of Operations Navigator and will remain until you set the filter back to a blank value, *.*, or *. In V5R1, this functionality has been renamed from Filter to Include. Moreover, the selection criteria dialog has been changed to have a combo box so that you can re-use previous filters. The combo box contains *.* plus up to 10 previous filters you specified.

Choice of columns to display in list view

You will now be able to specify which columns to display in the right pane of Operations Navigator for file system objects. In previous releases, the columns were fixed with the Name, Size, Type, and Changed columns. You are now able to display additional columns such as creation date, last accessed date, and description, depending on the type of file system. Column settings are stored for each of the three different types of file system lists. You can define different columns for viewing IFS folders, QSYS folders, and user-defined file system files.

Operations Navigator: GUI Command Prompter

Available with Existing Components

Available with existing components such as:

- Run Command
- Command Definition
- Package Definition
- Monitor Host Command automation

To access the GUI Prompter, press F4 or select the Prompt button

Notes: GUI CL Command Prompter
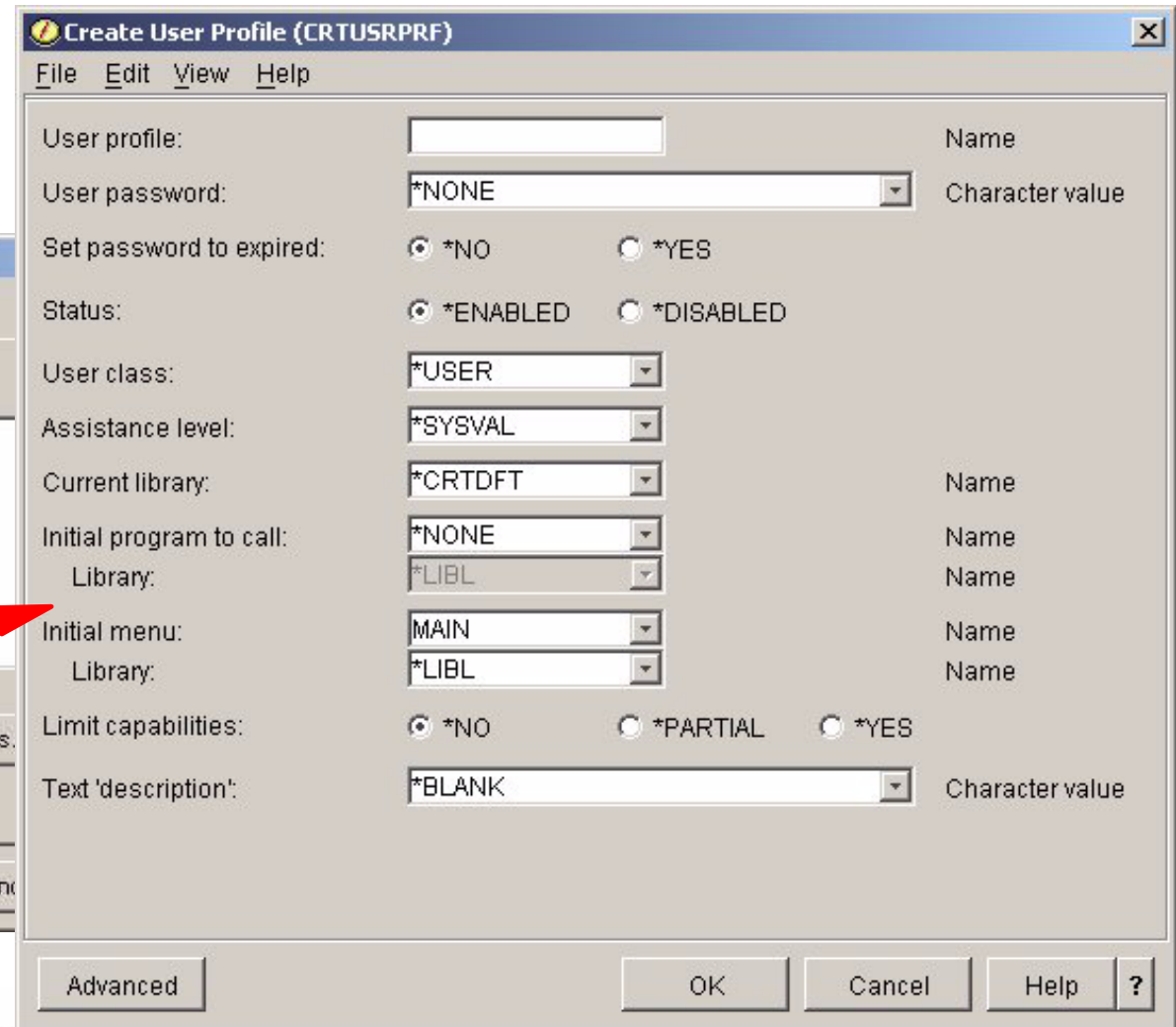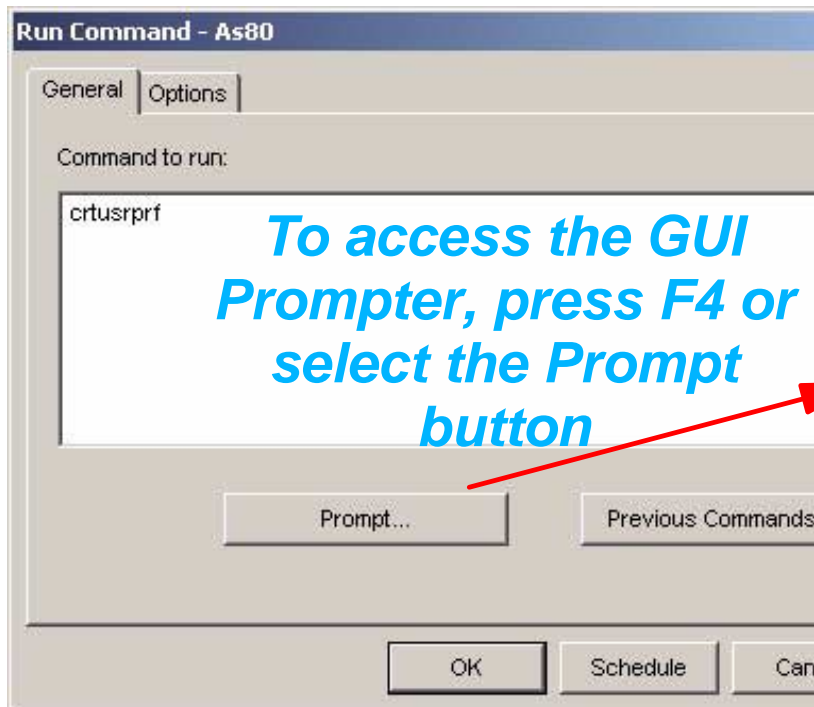
GUI CL Command Prompter

This feature is available to both C++ and JAVA components of Operations Navigator as well as any third party components that need it. The requirements for this support include:

- Callable client interface to launch the prompter
- Support the specification of parameters in the starting command string
- Show the possible choices for a parameter
- check validity of parameters before generating command string
- Support prompt control and "Additional Parameters" for commands
- Support context sensitive help for a parameters and the entire help for an entire command

The General page of the Run Command dialog displays the command to be run on multiple AS/400 and iSeries systems and/or system groups of these systems. This can be any command that can be used in the batch environment.

You can type a command to be run or you can click Previous Commands to select a command from a list of commands you have previously run on the AS/400. You can click Prompt (or press F4) to get assistance in entering or selecting a command

You can click OK to run the command immediately. When the command is run, a task is created. You can select the task under Task Activity in the Operations Navigator window and view the status of the task on the system or group. From the status window, you can select Task Output to see the job log and other printer output related to the task.

You can click Schedule to specify when and how often you want to run the command. When you have specified the schedule, a scheduled task is created. You can select the task under Scheduled Tasks in the Operations Navigator window and view the status of the task on any system or group. From the status window, you can select Task Output to see the job log and other printer output related to the task.

Previous Commands

The Previous Commands dialog displays a list of commands you have previously requested to run from **this PC** and allows you to specify the number of commands you want to save in the list. You can delete commands from the list by selecting them and then pressing your Delete key.

Note: The Management Central section of part 2 of this Operations Navigator presentation discussions already available (pre V5R1) "scheduled tasks" and "task activity" which may be used to schedule running of these commands and view the results of running the command:

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Command Prompting with New Components

Available with new components such as:

- **User Definition**
- **Send and Install Products**
- **Resource Monitor**

Job Resource Monitor example

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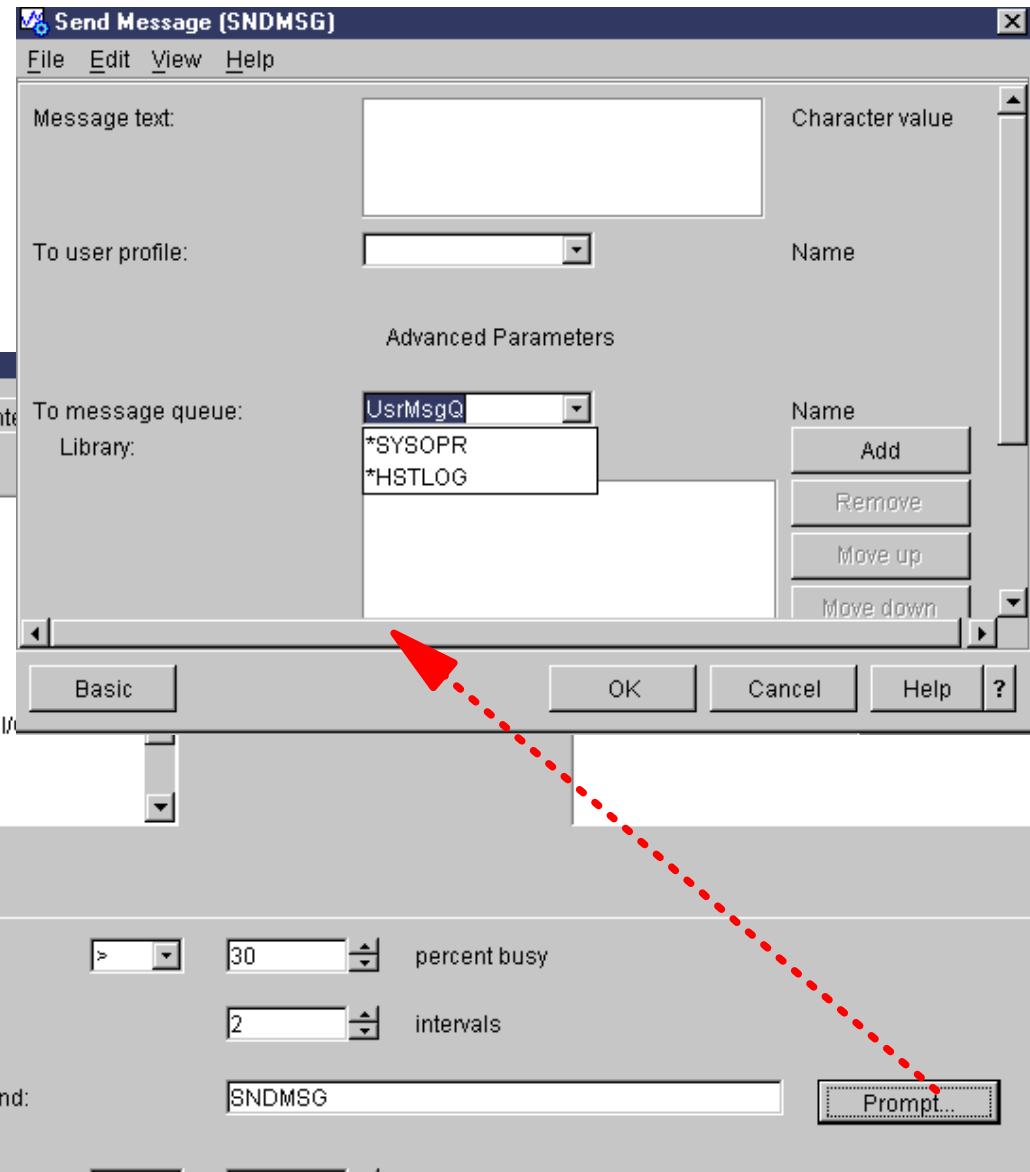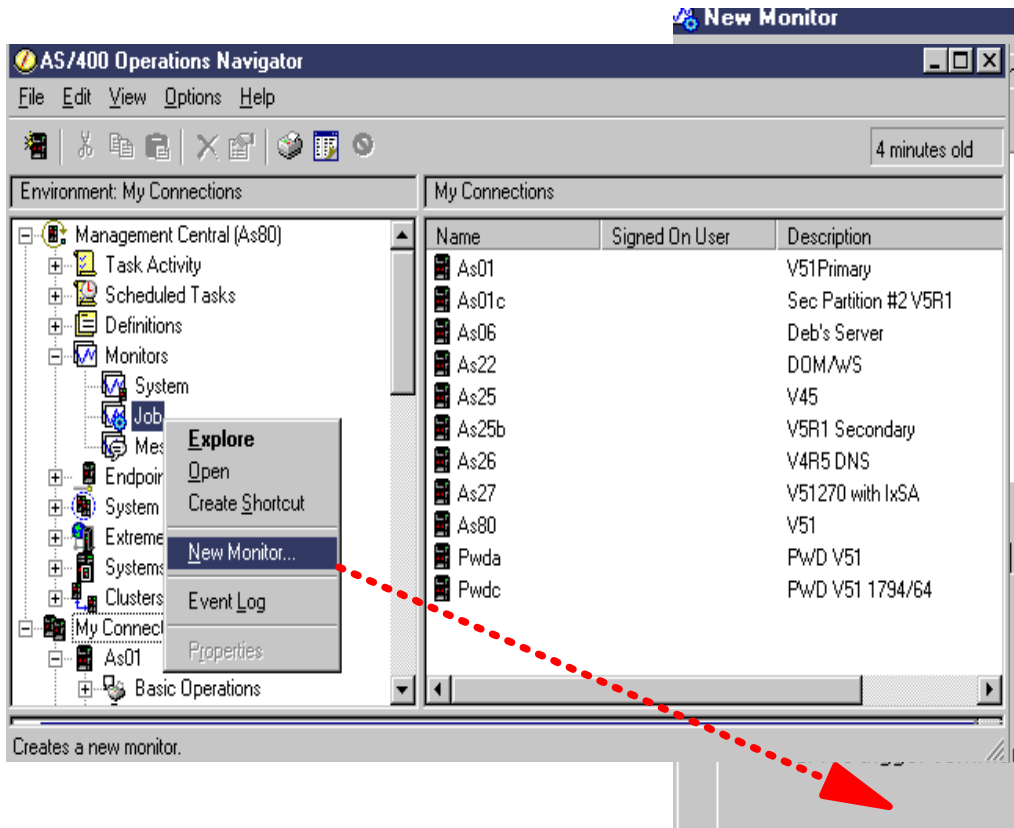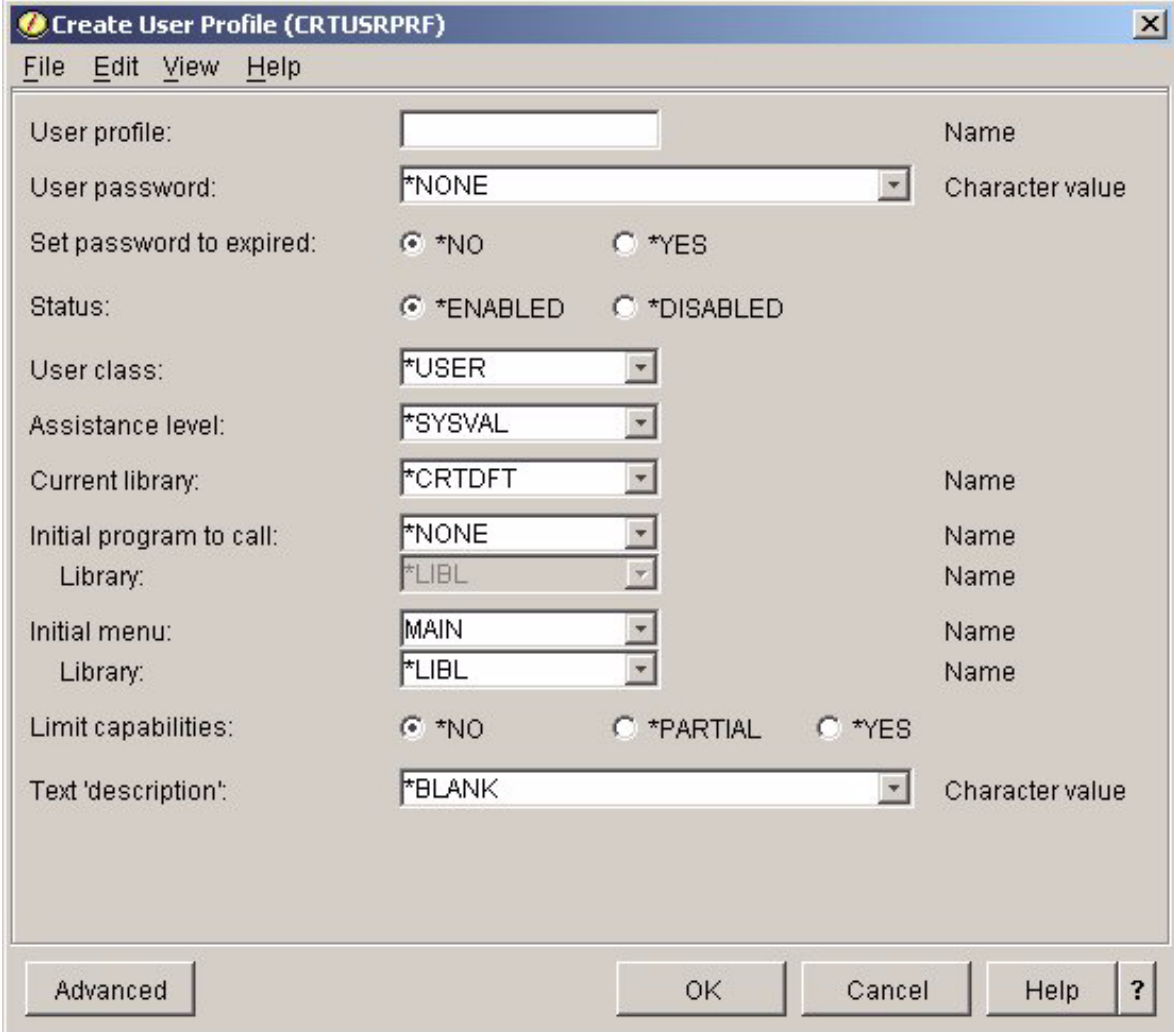
Four Components of the GUI Prompter

Title Bar

Menu Bar

Prompt Panels

Action Buttons

Create User Profile (CRTUSRPRF)

File   Edit   View   Help

User profile:		Name
User password:	*NONE	Character value
Set password to expired:	○ *NO ○ *YES	
Status:	○ *ENABLED ○ *DISABLED	
User class:	*USER	
Assistance level:	*SYSVAL	
Current library:	*CRTDFT	Name
Initial program to call:	*NONE	Name
Library:	*LIBL	Name
Initial menu:	MAIN	Name
Library:	*LIBL	Name
Limit capabilities:	○ *NO ○ *PARTIAL ○ *YES	
Text 'description':	*BLANK	Character value

Advanced   OK   Cancel   Help   ?

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Title Bar

The title bar displays the AS/400 command's prompt text followed by the command's name in parenthesis.

Menu Bar

The menu bar contain four actions: File, Edit, View, and Help.

- File
  - Cancel   Exits the user from the dialog while not saving any changes
- Edit
  - Cut
  - Copy
  - Paste
  - Select All
- View
  - Advanced   Toggles on the Advance Parameters field
  - Keywords   Toggles on keywords to the right of the prompt text
  - All Parameters   Displays all parameters
  - Command String   Allows previewing the command string
  - Reset   Returns all fields to their default values
- Help
  - How to use this display
  - Help

Notes: Components of the GUI Prompter (2/2)

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Prompt Panels

The prompt panel contains the command parameters controls. It automatically sizes a "best fit" size most applicable to the command and its required parameters. This panel is broken into four vertical columns:

- Prompt text: Contains the command parameter text
- Keywords: Contains the applicable keyword for the parameters (not shown by default)
- Entry field: Contains the entry for the applicable field
  - If there is a default value, it will be specified in the field
  - Standard text fields display one of two sizes: 10 characters or 20 characters
  - Fields greater than or equal to 50 characters display as a text area
  - Radio buttons, Qualified object names, Element Definitions, and Lists are also supported
  - Lists support selecting more than one value
  - Lists functions include Add, Remove, Move Up, and Move Down
- Description: Contains descriptive text for the applicable parameter

Action Buttons

Contains buttons for the most common actions:

- Advanced/Basic: Toggles the display of additional parameters
- OK
- Cancel
- Help

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Additional Functions of GUI Prompter

- Selective prompting supported

  ??   ?*   ?<   ?/   ?-   ?&   ?%

- Generic names supported

  DSP* WRK*   CRT*

- Positional parameters supported

- Syntax verification supported

- Field checking

- Length checking

- Dependent parameter checking

- Range and relationship checking

- Required parameter checking

- Variables

Run Command - As80 ? X

General | Options

Command to run:

dsprf

Prompt...   Previous Commands...

OK   Schedule   Cancel   Help

Notes: Additional Functions
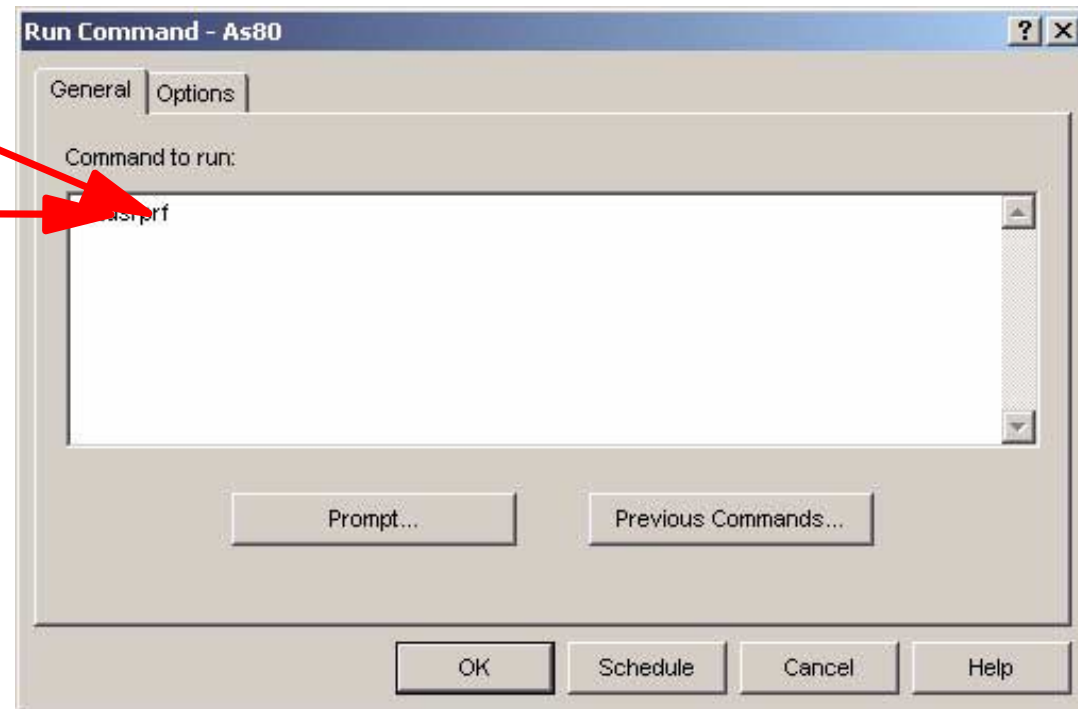
Selective prompting supported

??   ?*   ?<   ?/   ?-   ?&   ?%

These characters are primarily used in CL programs, however, the ?? and ?< will be supported for prompt override program purposes.

Generic names supported

DSP*   WRK*   CRT*

* Command strings can be used with generic names. For example DSP* will display in a list, all commands beginning with DSP. Selecting one of the commands will allow the user to proceed with the command prompting.

Positional parameters supported

Allows the user to enter a number of command parameters without having to use the keyword names.

Syntax verification supported

Field checking	Fields will be checked for valid field type
Length checking	The maximum input length is checked.
Dependent parameter checking	Dependent parameters will be checked
Range and relationship checking	Parameter will be checked for valid ranges. Not all commands have range information.
Required parameter checking	Commands will be checked to ensure all required parameters are included

Variables

Allows the use of variables. When a variable is used (&variable), type, dependent parameter, and syntax checking is not performed.

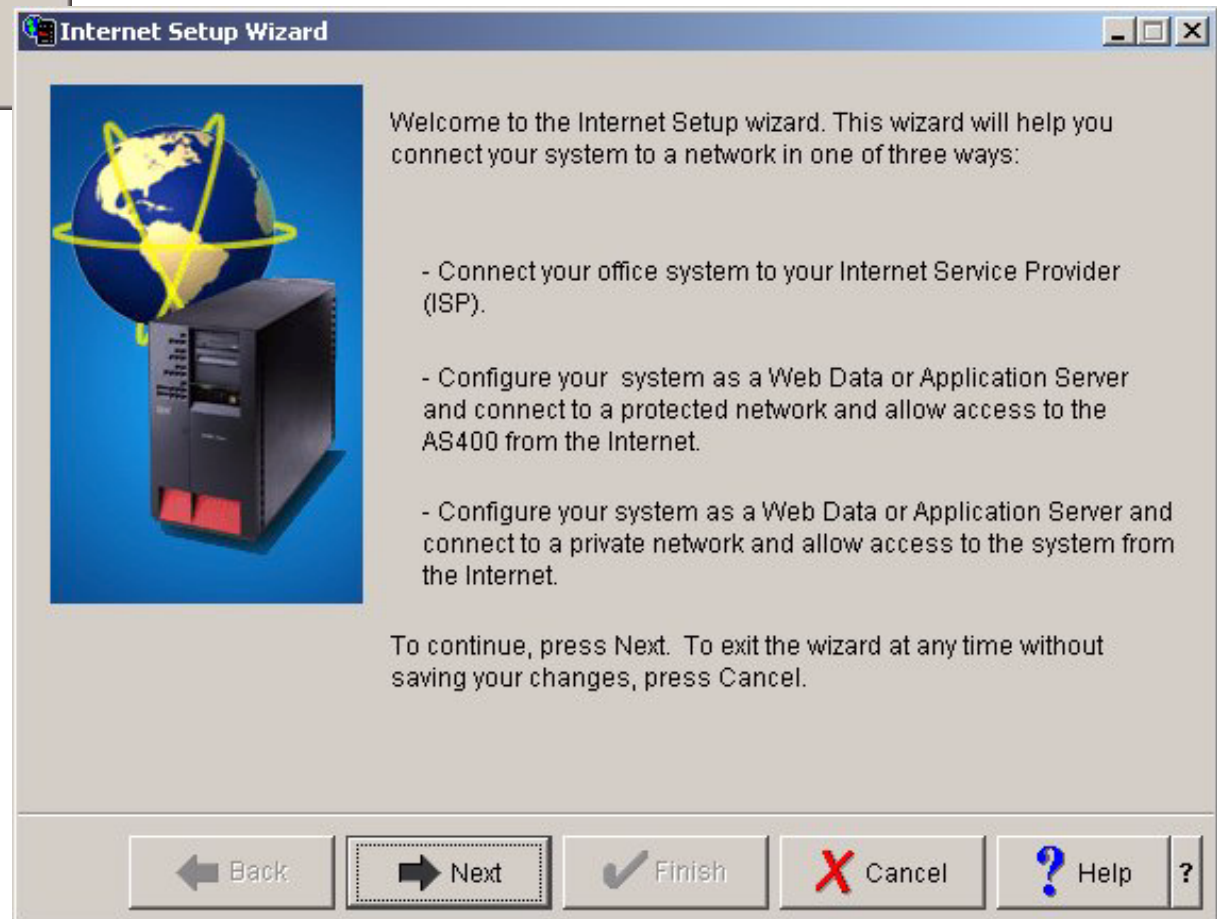# Operations Navigator: Internet Setup Wizard

Internet Setup Wizard

- **Webserving**
- **Proxy serving**
- **Enable Net.Data**
- **FTP access**
- **Setup of packet filtering rules**
- **Setup of Virtual Private Network**
- **Setup of Virtual IP interface**

Internet Setup Wizard _ □ ✕

Loading and initializing Internet Setup Wizard ...

Internet Setup Wizard _ □ ✕

Welcome to the Internet Setup wizard. This wizard will help you connect your system to a network in one of three ways:

- Connect your office system to your Internet Service Provider (ISP).

- Configure your system as a Web Data or Application Server and connect to a protected network and allow access to the AS400 from the Internet.

- Configure your system as a Web Data or Application Server and connect to a private network and allow access to the system from the Internet.

To continue, press Next. To exit the wizard at any time without saving your changes, press Cancel.

Back | Next | Finish | ✕ Cancel | ? Help | ?

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Notes: Internet Setup Wizard

Internet Setup Wizard

The Internet Setup Wizard is a new feature to V5R1. It provides the means to connect your system to a network through one of three methods:

- Through a private network - connecting to a private network but allowing access to the server via the Internet, through a firewall or router.
- Through a protected network - connecting to a protected network providing access to services via the Internet, through a firewall or a router.
- Company/Office to an ISP - directly connected to the Internet via a dialup connection to an ISP or through a router.

Depending upon the scenario selected, the Internet Setup wizard enables the following services:

- Web serving
- Proxy serving
- Enable Net.Data
- FTP access
- Setup of packet filtering rules
- Setup of Virtual Private Network
- Setup of Virtual IP interface

This wizard can be accessed in Operations Navigator by several methods:

- By selecting **Network->Internet** from the desired system, then right click **Internet** and select **Internet Setup Wizard** from the context menu.
- By right clicking on the name of the desired system and selecting **EZ-Setup Custom Setup** from the resulting context menu. When the EZ-Setup Custom Setup window displays, select **Internet Setup Wizard** from the choices displayed in the window.

Connecting to a Protected Network

- Configure a connection to the network

- Configure routes to your firewall and private network

- Protect your AS/400 using IP packet filtering

- Configure your AS/400 as a Web Server

- Configure your AS/400 as an HTTP proxy server

Notes: Connecting to a Protected Network - 1
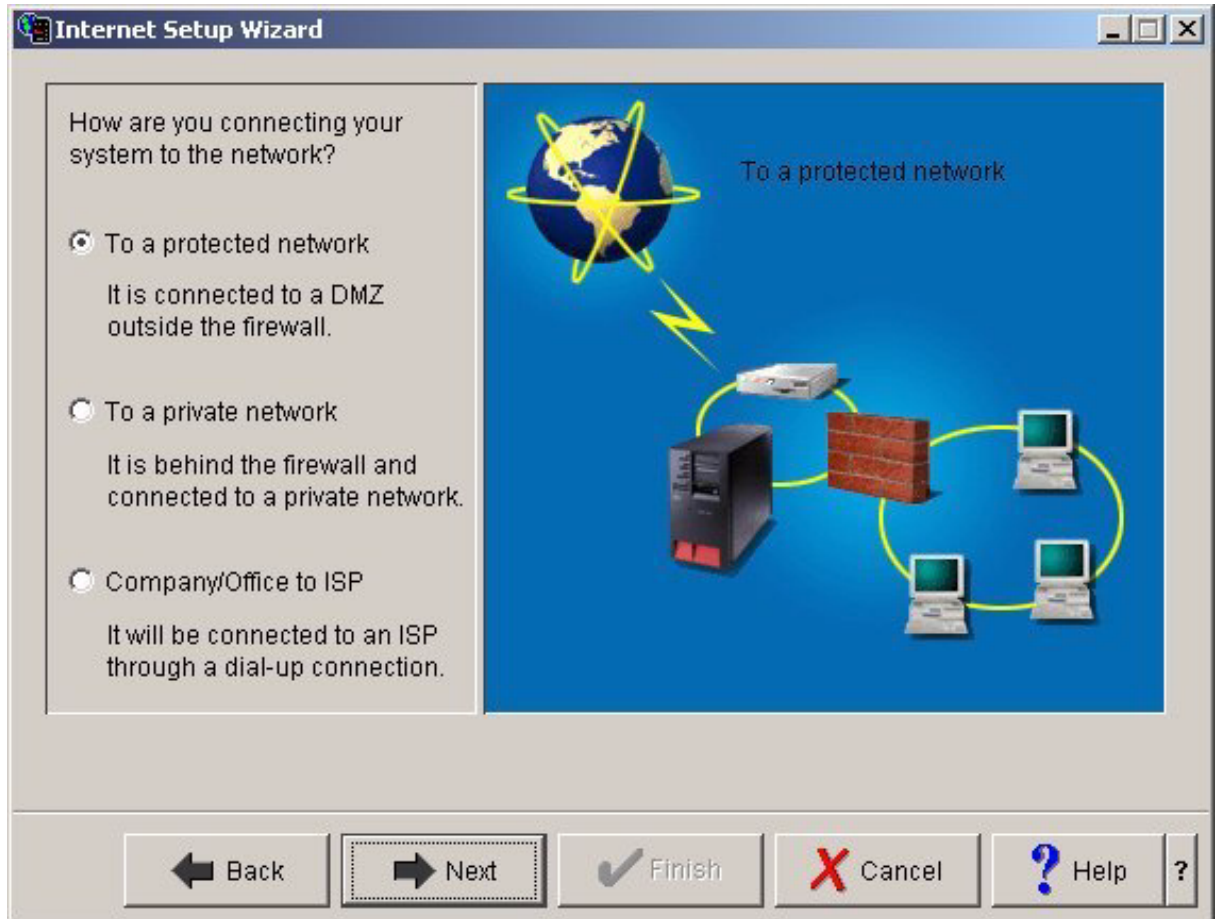
Your AS/400 is connected to a public network that anyone may access. You protect your AS/400 by setting up filtering rules and starting only services that you want people to be able to access. This is also known as a DMZ configuration.

- The wizard helps you to do the following:
  - Configure a connection to the network
  - Configure routes to your firewall and private network
  - Protect your AS/400 using IP packet filtering
  - Configure your AS/400 as a Web Server
  - Configure your AS/400 as an HTTP proxy server
- Features of this option include the following:
  - AS/400 TCP/IP network connection
  - A default route to your router
  - A route to your intranet back through your Firewall
  - Web server and HTTP proxy server
  - WebSphere 2.02 Standard Edition (enabled in the Web server)
  - IP packet filtering

Connect your AS/400 as a Web Data and/or Application Server to a boundary network and allow access to it from the Internet.

Information required to complete each step:

- To configure your connection to your private network:
  - Will you use an existing TCP/IP interface to connect to the network or will a new interface be created?
  - If creating a new TCP/IP interface, what type of adapter will be used? (either Token ring or Ethernet)
    - ✓ Will you use an existing line to run TCP/IP over or create a new one?
      - If using an existing line, which line will you use?
      - If creating a new ethernet line, what is the speed of the ethernet network?
      - If creating a new token ring line, what speed does the token ring run at?
    - ✓ What are the TCP/IP settings to be used by the connection?
      - What is the IP address for the AS/400?
      - What is the subnet mask for the AS/400?

- To configure routes to other networks:
  - What is the IP address of the router that provides access to the internet?
  - What is the IP address of the router and the network address (network address and subnet mask) of your private network?
- To protect your AS/400 using packet filters:
  - Which systems should be allowed full access to your AS/400?
    - ✓ You will need to know the IP address, or range of addresses or subnet that you wish to give access to the AS/400. At least one IP address must be given full access to the AS/400, to administer the AS/400.
- To configure your AS/400 as an HTTP Web server:
  - The port you want to run your Web server on. The default port is 80, but if you have another Web server running on 80 another port must be used. The default Web server running on port 80 will be stopped if you choose to run your Web server on port 80.
  - If you want to serve existing files on your AS/400, you need to know where those files are located in the IFS.
  - The host name for the IP address you previously chose, if you want to use URLs with hostnames rather than IP addresses (for example, http://www.mycompany.com/ rather than http://9.1.2.3/).
- To configure your AS/400 as an HTTP Proxy server
  - The port you want to run your proxy server on. The default port is 8080, but if you have another proxy server running on 8080 another port must be used.
  - The host name for the IP address you previously chose, if you want to use URLs with hostnames rather than IP addresses (for example, http://www.mycompany.com:8080/ rather than http://9.1.2.3:8080/).

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Connecting to a Private Network

- Configures an interface to connect to the local (LAN) network

- Configures routing

- Configures packet filter rules

- Configures Virtual IP

- Configures the HTTP Web Server

- Configures the AS/400 HTTP Proxy Server

- Configures VPN support

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The wizards used in this scenario used the following assumptions:
- The default route will be the firewall
- IP forwarding is turned ON
- Additional routes need to be built for other networks attached to the Intranet
  - IP forwarding is turned OFF
  - Masquerading is OFF

The wizard will provide the following services:
- Configure the interface to be used for connection to the local LAN network
- Configure routing
- Configure packet filter rules
- Configure Virtual IP
- Configure HTTP Web Server
- Configure AS/400 as HTTP Proxy Server
- Configure VPN support

To a private network Your AS/400 is connected to a private network behind a firewall. Though the network is private, you may allow systems on the network to access external systems, such as for Web browsing.
- The wizard helps you to do the following:
  - Configure a connection to the network
  - Configure routes to your firewall and optionally to other networks
  - Protect your AS/400 with IP Packet Filtering
  - Configure a public IP address for the AS/400 (Virtual IP)
  - Configure your AS/400 as a Web Server
  - Configure your AS/400 as an HTTP proxy server

Notes: Connecting to a Private Network - 2

- Features of this option include the following:
  - AS/400 TCP/IP network connection on your private network
  - A default route to your Firewall
  - A network route to your subnet router
  - Web server and HTTP proxy server
  - WebSphere 2.02 Standard Edition (enabled in the Web server)
 - IP packet filtering for traffic from Firewall

- Configure your connection to the network
  - What TCP/IP Interface will be used to connect to the network?
  - If creating a new TCP/IP interface, what type of adapter will be used? (either Token ring or Ethernet)
    - ✓ Which line you will run TCP/IP over?
      - If creating a new ethernet line, what is the speed of the ethernet network?
      - If creating a new token ring line, what speed does the token ring run at?
    - ✓ What are the TCP/IP settings to be used by the connection?
      - What is the IP address for the AS/400?
      - What is the subnet mask for the AS/400?
- Configure routes to other networks
  - What is the IP address of the router that provides access to the internet?
  - What additional networks (other than the internet) will your AS/400 send data to?
    - ✓ For each network, what is:
      - The network address and subnet mask?
      - The IP address of the router providing access to the network?

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- Configure a public IP address for the AS/400.
  - Will a router map a public address to a private address on your AS/400 using Network Address Translation or will you configure a public IP address on the AS/400.
  - If a public IP address is going to be configured, what public IP address will you assign the AS/400?
- To configure your AS/400 as an HTTP Web server:
  - The port you want to run your Web server on. The default port is 80, but if you have another Web server running on 80 another port must be used. The default Web server running on port 80 will be stopped if you choose to run your Web server on port 80.
  - If you want to serve existing files on your AS/400, you need to know where those files are located in the IFS.
  - The host name for the IP address you previously chose, if you want to use URLs with hostnames rather than IP addresses (for example, http://www.mycompany.com/ rather than http://9.1.2.3/).
- To configure your AS/400 as an HTTP Proxy server
  - The port you want to run your proxy server on. The default port is 8080, but if you have another proxy server running on 8080 another port must be used.
  - The host name for the IP address you previously chose, if you want to use URLs with hostnames rather than IP addresses (for example, http://www.mycompany.com:8080/ rather than http://9.1.2.3:8080/).

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Connecting Your Office to an ISP

- Configures an interface to an Internet Service Provider (ISP)

- Configures an interface to local LAN

- Implements default filtering rules

- Configures AS/400 HTTP Proxy Server
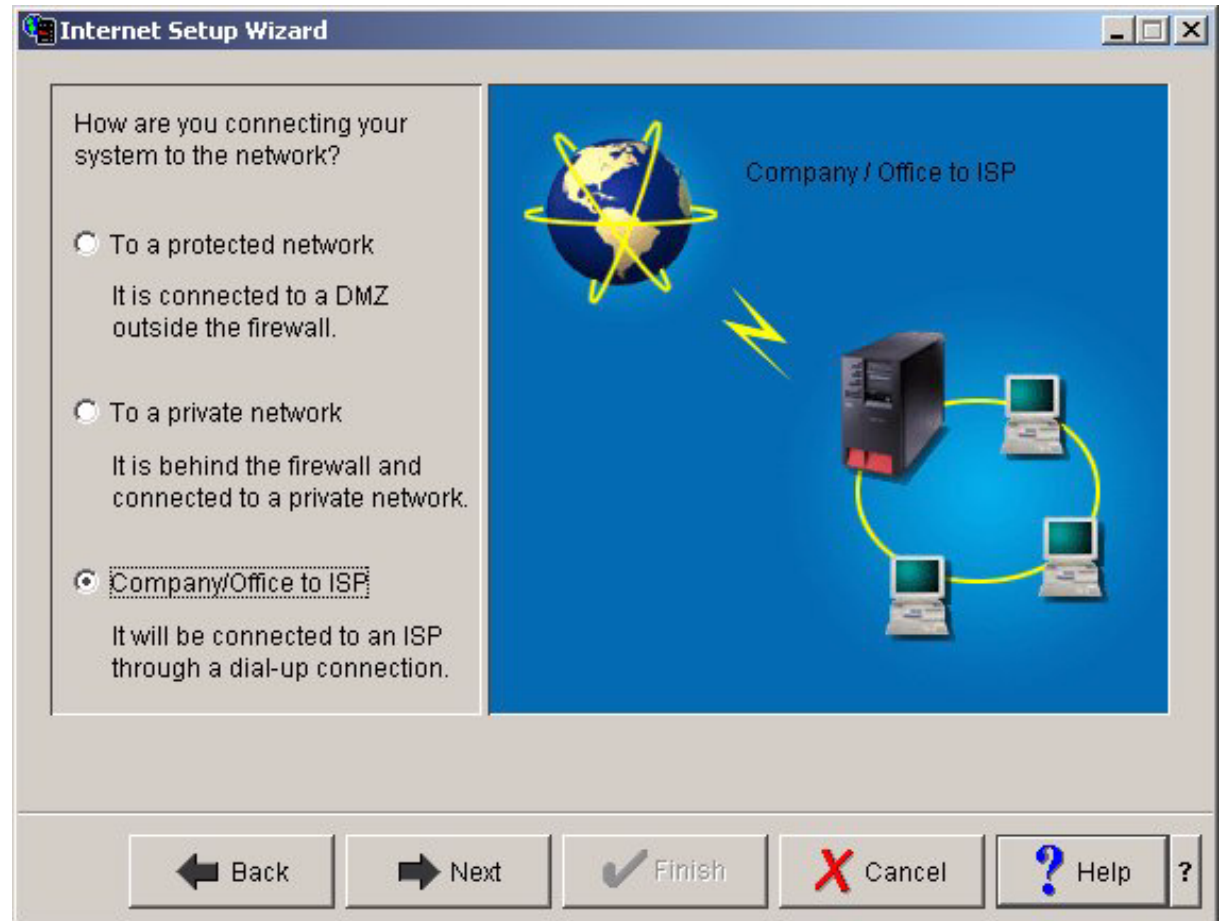
Connecting Your Office to an ISP

The wizards used in this scenario used the following assumptions:
- Webserving is not required
- VPN is not required
- Masquerading will be turned ON for the PPP profile
- IP forwarding will be turned ON
- The route to the Internet will be the default route
- Both local and remote addresses are assigned dynamically
- Intranet is the only network attached

The wizard will provide the following services:
- Configure the interface to be used for connecting to the Internet Service Provider (ISP)
- Configure the interface to be used for connection to the local LAN network
- Inform the user of and implement default filtering rules (outbound connections only)
- Configure the AS/400 as a HTTP Proxy Server (**optional**)

Company/Office to ISP Your AS/400 connects to the Internet through a dial-up (modem) connection to an Internet service provider (ISP). You may also choose this option if you are working in a branch office of a company that has a private network that uses dial-up connections.

The wizard helps you to do the following:
- Configure a dial-up (modem) connection to your ISP or private network
- Configure your AS/400 as an HTTP proxy server (The proxy hides the addresses of the systems on your network behind one public address and makes it so that each system does not need to have a separate address).

Features of this option include the following:
- A PPP profile that uses a dynamic IP address from your ISP
- A route for traffic to go to your ISP and the Internet when not resolved internally (it will be the default route for the PPP interface)
- Network Address Translation (also known as "Full Masquerading")
- IP packet filtering (deny all incoming connections that are not a response from NAT)

To configure your connection to your Internet Service Provider (ISP):

- Will you use an existing dial-up connection profile to connect to your ISP (if so, which one) or will you create a new profile?
- If creating a new dial-up connection profile, you will need to know the following:
  - What name will you give to the new profile?
  - What is your ISP account userid and password?
  - Does your ISP require that this account information be encrypted?
  - What hardware resource will be used for this dial-up connection?
  - What is the hardware resource interface type?
  - What line description will be used for the dial-up connection or if a new one is to be created, what name will you use?
  - A line description describes the type of communication line that is attached to the AS/400.
  - What is the phone number that the modem will dial to connect to your ISP?
  - What type of modem is attached to the hardware resource that the dial-up connection profile will use?
  - Has your ISP provided you with an IP address for a domain name system (DNS) server, or will one be assigned when you connect?
  - Do you want to automatically disconnect the phone line after an inactivity period?

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To configure your connection to your private network:
- Will you use an existing TCP/IP interface to connect to the network or will a new interface be created?
- If creating a new TCP/IP interface, what type of adapter will be used? (either Token ring or Ethernet)
  - Will you use an existing line to run TCP/IP over or create a new one?
    - ✓ If using an existing line, which line will you use?
    - ✓ If creating a new ethernet line, what is the speed of the ethernet network?
    - ✓ If creating a new token ring line, what speed does the token ring run at?
  - What are the TCP/IP settings to be used by the connection?
    - ✓ What is the IP address for the AS/400?
    - ✓ What is the subnet mask for the AS/400?

NetServer Enhancements

V5R1 NetServer Enhancements include:

- Logon Server support

- Master Browser services

- Configuration Wizard

- View disabled user profiles

- New and enhanced messages

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Notes: NetServer Enhancements

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Logon Server:
- Domain discovery
- Login Mailslot handler
- Enables roaming users
- Store, retrieve, and maintain Windows system policies
- Windows 95/98 require no additional software
- Windows NT/2000 require IBM NT Client for logon services

Master Browser Support
- Support additional SMB APIs
- Support/register additional NetBIOS name types
- Mailslot created to receive election request and browser list requests
- Forward requests to other domains
- Build and maintain browser lists

Operations Navigator
- Configuration Wizard
  - Wizard to configure NetServer based on customers environment
- View disabled profiles
  - Ability to display and re-enable disabled profiles (for NetServer)
- Administration for multiple sessions on same workstation

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Notes: NetServer Enhancements

- New status messages
  - CPIB687 - Sent to QSYSOPR to alert of certain non-fatal errors or conflicts
  - CPIB688 - Sent to QSYSOPR when remote users log into NetServer requesting share point created for home directory
- Updates to configuration file for login server
  - QAZLSCFG
- New subdirectory (/NetLogon) for windows users login scripts
- Changes to APIs to accommodate enhancements
  - QZLSCHSI
  - QZLSENSS
  - QZLSLSTI

Operations Navigator: TCP/IP Configuration

See the Communications Enhancements presentation for additional details on the TCP/IP enhancements described in this section.

TCP/IP Configuration

Protocols Folder removed

TCP/IP Folder moved under Networks

TCP/IP Configuration folders
- ►Interfaces
- ►Routes
- ►Connections
- ►Physical Interfaces Activity

Additional TCP/IP Properties

Additional Utilities
- ►Ping
- ►Trace Route
- ►Look Up Host

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Notes: TCP/IP Configuration

The "Protocols" container under Network has been collapsed. It used to contain TCP/IP but now it is called "TCP/IP Configuration". The main view of the TCP/IP Configuration folder is the same as for the other Network folders. The TCP/IP Configuration folder will be shown at the same level and right below the Point-to-Point folder. When TCP/IP Configuration is selected in the tree view, the list view shows the following new folders

- Interfaces
- Routes
- Connections
- Physical Interfaces Activity

With V5R1 new Utilities have been provided by doing a **Right Click** on **TCP/IP Configuration**
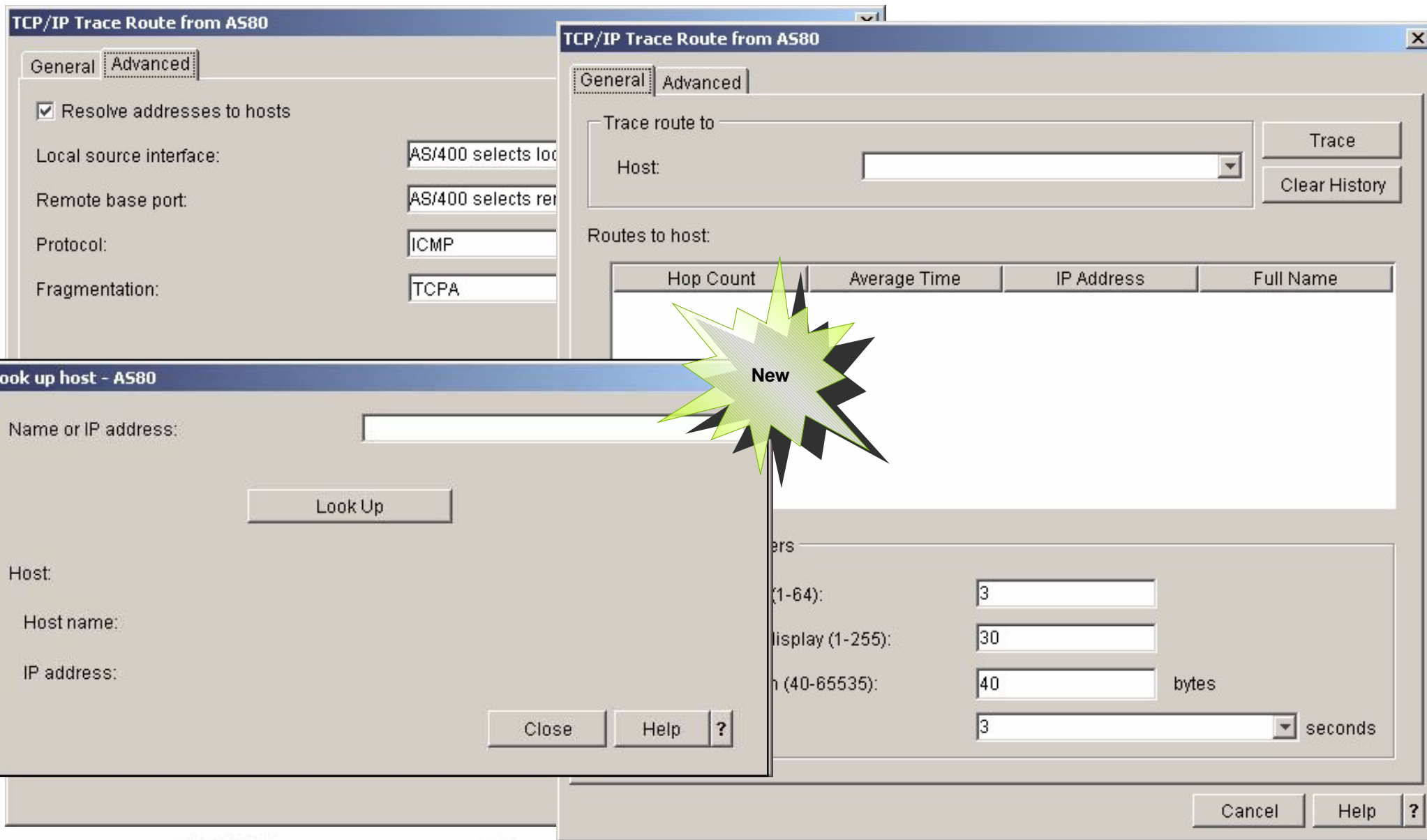
- Ping
- Trace Route
- Look Up Host

Properties window now shows the new Quality of Service (QoS) tab and many more attributes to be configured.

Note: The folder for TCP/IP Configuration and the Interfaces subfolder will be shown when connected to an AS/400 system at the V4R2 or later release level. All other subfolders are supported in the V5R1 release and later.

TCP/IP Utilities Enhancements

Look up Host, Trace Route

TCP/IP Trace Route from AS80

General | Advanced

☑ Resolve addresses to hosts

Local source interface: | AS/400 selects loc
Remote base port: | AS/400 selects rer
Protocol: | ICMP
Fragmentation: | TCPA

TCP/IP Trace Route from AS80 ✕

General | Advanced

Trace route to
Host: | | ▼ | Trace | Clear History

Routes to host:

Hop Count	Average Time	IP Address	Full Name

New

Look up host – AS80

Name or IP address: | |

Look Up

Host:

Host name:

IP address:

Close | Help | ?

ers

(1-64): | 3
display (1-255): | 30
n (40-65535): | 40 | bytes
| 3 | ▼ | seconds

Cancel | Help | ?

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Look Up Host

Look Up Host utility allows IP address resolution to a host name or Host name to an IP address. The user can specify an IP address to resolve a host name to, or the host name to resolve an IP address in the **Name or IP address** field. This function has been hidden under the green screen covers but not shown directly, if you did an Option 5 on the Work with TCP/IP Connection Status the Display Connection Status screen would be displayed. The fields Remote host name and Local Hostname show the values.

Trace Route

In V5R1 we now have a new CL command Trace TCP/IP Route (TRCTCPRTE) command, also known as TRACEROUTE, this traces the route of IP packets to a user-specified destination system. The route can involve many different systems along the way. Each system along the route is referred to as a hop. You can trace all hops along the route or specify the starting and ending hops to be traced. The route is traced by sending packets (called probes) to the destination system. Each probe contains an upper limit (called Time To Live or TTL) on the number of hop systems the probe can pass through. A route is traced by successively incrementing the TTL of the probe packets by one hop. The trace ends when either a probe response is received from the destination system or when the probe Time To Live value equals the maximum allowed.

With Operations Navigator V5R1 this new command is provided as a Utility for TCP/IP from the graphical user interface. The results are shown in a tabular fashion rather than looking at Message Queue or Joblog. The Attributes for the GUI are divided in General and Advance Tabs. The General parameters are

– **Host**: Specifies the remote system name (255 characters) or IP address (nnn.nnn.nnn.nnn) of the destination system.
– **Number of Probes**: Specifies the number of probe packets sent to each hop system for each probe TTL value in the range specified by the RANGE parameter.
– **Max hops to Display**: Specifies the range of hop systems from which probe responses are expected. Each probe specifies a TTL (Time To Live) integer value. This TTL value is the maximum number of hops the probe can traverse. For example, a probe packet with a TTL of 3 can pass through, at most, 3 hop systems before the hop system discards the probe and sends information back to the system from which the probe originated.
– **Probe Packet Length**: Specifies the total length, in bytes, of the IP packet sent for each probe.
– **Timeout**: Specifies the maximum time, in seconds, to wait for a response from a hop system to each probe.

The Advanced Tab allows you configure additional parameters. Check online help for more details.

TCP/IP Interfaces

ARP Cache

Interface Statistics

Packet Rules

Associated Routes

Additional Columns

Create New Interface

Enhanced

ARP Cache and Packet Rules
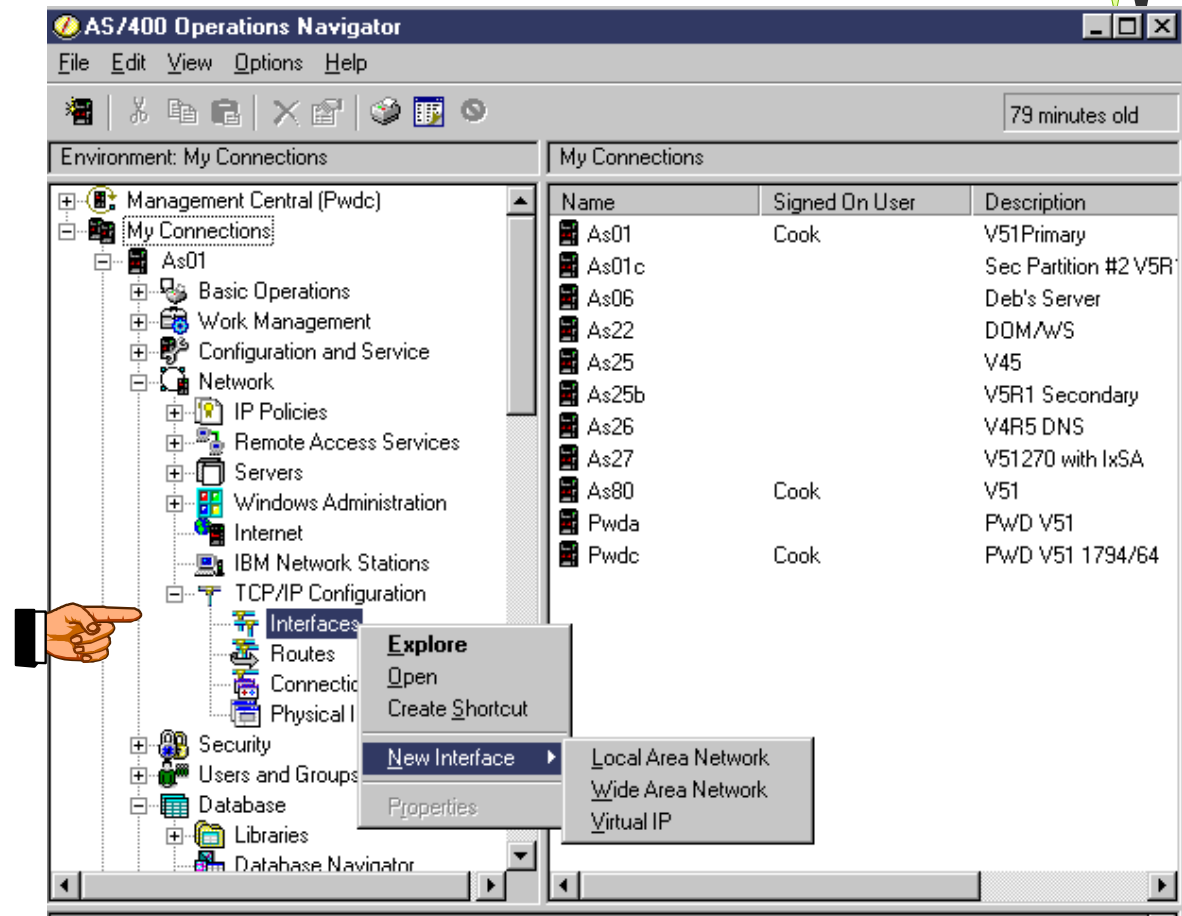
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TRNLINE Interface ARP cache - As80   ×

IP Address	Physical Address	Type	Routing Information F.
9.5.92.1	40:00:1F:4D:AC:16	Dynamic	
9.5.92.11	10:00:5A:9D:00:05	Dynamic	0270
9.5.92.47	00:20:35:7C:77:39	Dynamic	0270

Delete Entry

Delete All

ARP Cache

View

Delete Entry

Delete All

New

ETHLINE Packet Rules - RS037.ENDICOTT.IBM.COM   ×

Filters

Inbound:

Action	Sourc...	Destinatio...	Source P...	Destination P...	Protocol	Orig
Permit	17.17...	17.17.1.37	500	500	UDP	Ope
Permit	*	*	*	*	*	Ope
Deny	*	*	*	*	*	Con

Properties

Packet Rules

Inbound

Outbound

Security

Associations

Outbound:

Action	Sourc...	Destinati...	Source P...	Destination P...	Proto...	Cc
Permit	17.17...	17.17.1.33	500	500	UDP	
Permit	17.17...	17.17.1.33	500	500	UDP	
IPSec	184.1...	Mask{18...	*	*	*	Ne
IPSec	184.1...	Mask{18...	*	*	*	Ne

Properties

Security Associations

Cancel

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Notes: TCP/IP Interface, ARP Cache and Packet Rules

Interfaces allows you to
- manage and configure TCP/IP interfaces
- view the interfaces associated routes and packet rules
- manage the ARP cache.

This screen shows much more information than Work with TCP/IP Network Status (NETSTAT) Option 1 Work with TCP/IP Interface Status.

With V5R1 of Operations Navigator, you can now view more columns on the Interface window. The Columns supported are

Internet Address, Network Address, Line Name, (Interface) Status, Subnet Mask, Type of Service (TOS), Maximum Transmission Units (MTU), Line Type, Interface Name, Host Address, Directed Broadcast Address, Network Name, Associated Interface, TRLAN Bit Sequencing, Rules, Autostart, Interface Type, Proxy ARP Enabled

ARP: Address Resolution Protocol cache table. This displays the ARP Cache for the interface and allows you to delete a entry from the cache if required. This function is available through Operations Navigator interface.

Statistics: This display contains information about Physical Interface Statistics. The properties page from this window is identical to the Physical Interface Statistics page when using the tree structure. The interface allows you to see Bytes Sent, Bytes Received, Inbound Packets Discarded, Outbound Packets Discarded, Broadcast packets Sent, Broadcast Packets Received, Line Name, Interface Type, MAC Address, Interface Status, and Packet Rule Counters.

Packet Rules: Allows you to view what packet rules have been defined using the IP Security policies. It also shows NAT rules if defined on the system. If the Rules column is added in the main Interface window it will show if NAT or IP rules have been implemented for this interface.

Associated Routes: This display contains details about routes associated with a specific TCP/IP interface. The address of the interface the routes use appears at the top of the display. Only the routes that use this interface are displayed in the list.

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TCP/IP Routes

New

Notes: TCP/IP Routes

Display TCP/IP Route Information

This display contains information about TCP/IP routes. This command is similar to doing the CL Command Work with TCP/IP Network Status (NETSTAT) Option 2 Display TCP/IP Route Information. The previous page shows the comparison between the CL and GUI interface.

You can now delete a route entry from the route table through the Operations Navigator interface. The delete function is not available through the 5250 command interface.
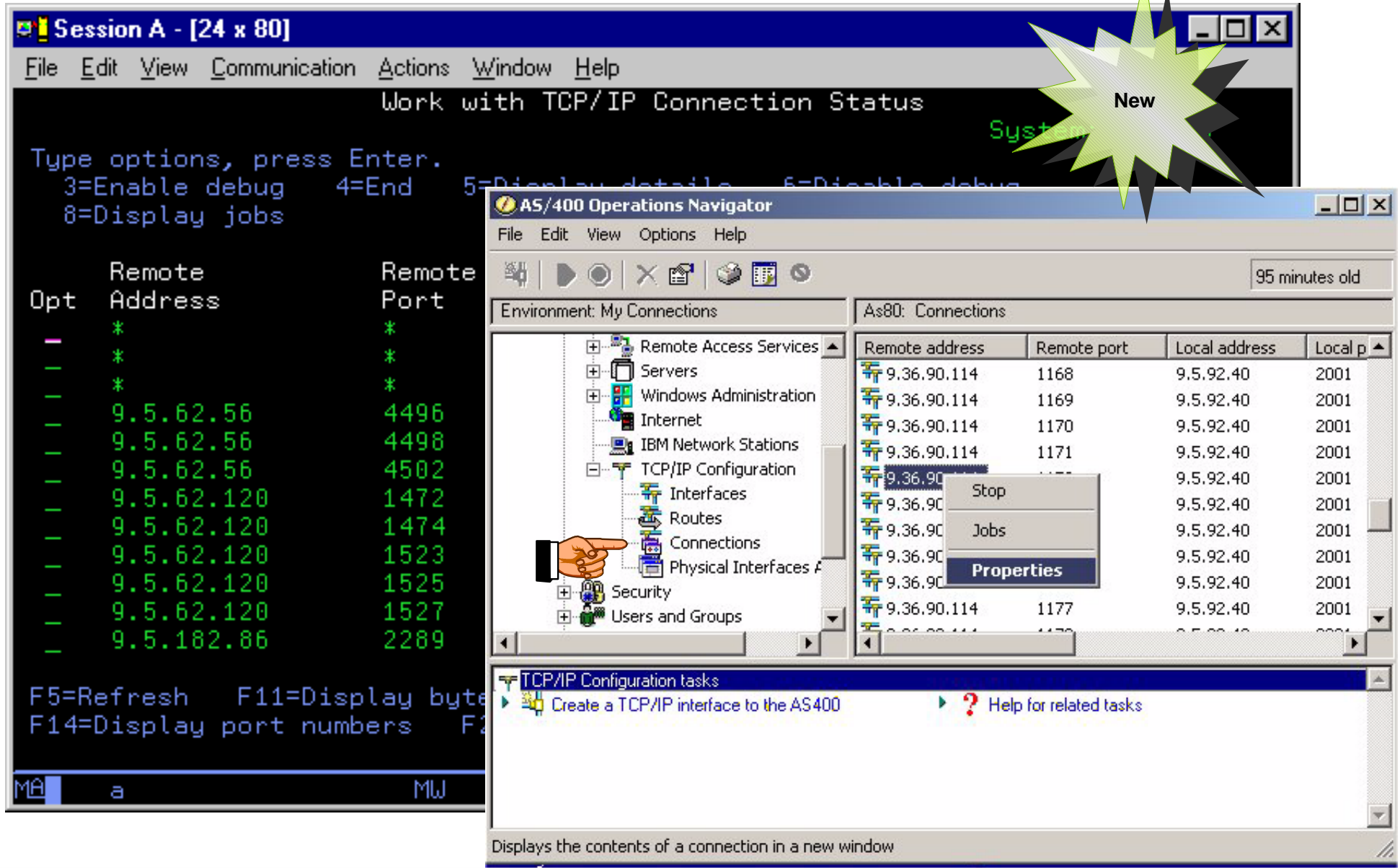
The Operations Navigator Interface for the TCP/IP Routes provides additional Columns on a user's request. The columns can be sorted in whichever way the user wants. Possible columns are:

- Remote Network, Subnet mask, Type of Service (TOS), Next Hop, Status, Local Binding Interface Address, Route type, Maximum Transmission Units (MTU), Route Source, Last Changed, Route Precedence, Binding type, Local Network Address, LocalSubnet mask, Local Interface Status, Local line description, local line type,

Details of a Particular Route can be found by doing a Right Click on the Specific Route and then going into Properties. This would be similar to doing a option 5 Display Details on the Command line. Properties of a particular route gives the above columns value in a different format.

New

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TCP/IP Socket Connections

New

Session A - [24 x 80]

File Edit View Communication Actions Window Help

Work with TCP/IP Connection Status

Syst

Type options, press Enter.
 3=Enable debug   4=End   5=Display details   6=Disable debug
 8=Display jobs

	Remote		Remote
Opt	Address		Port
—	*		*
—	*		*
—	*		*
—	9.5.62.56		4496
—	9.5.62.56		4498
—	9.5.62.56		4502
—	9.5.62.120		1472
—	9.5.62.120		1474
—	9.5.62.120		1523
—	9.5.62.120		1525
—	9.5.62.120		1527
—	9.5.182.86		2289

F5=Refresh   F11=Display byte
F14=Display port numbers   F2

MA   a   MW

AS/400 Operations Navigator

File Edit View Options Help

95 minutes old

Environment: My Connections   As80: Connections

- Remote Access Services
- Servers
- Windows Administration
- Internet
- IBM Network Stations
- TCP/IP Configuration
  - Interfaces
  - Routes
  - Connections
  - Physical Interfaces
- Security
- Users and Groups

Remote address	Remote port	Local address	Local p
9.36.90.114	1168	9.5.92.40	2001
9.36.90.114	1169	9.5.92.40	2001
9.36.90.114	1170	9.5.92.40	2001
9.36.90.114	1171	9.5.92.40	2001
9.36.90		9.5.92.40	2001
9.36.90		9.5.92.40	2001
9.36.90		9.5.92.40	2001
9.36.90		9.5.92.40	2001
9.36.90		9.5.92.40	2001
9.36.90.114	1177	9.5.92.40	2001

Stop

Jobs

Properties

TCP/IP Configuration tasks
▶ Create a TCP/IP interface to the AS400   ▶ ? Help for related tasks

Displays the contents of a connection in a new window

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Notes: TCP/IP Socket Connections

Connections allows you to monitor the status of connections, end a connection or debug a connection. You can also view the associated jobs, properties for the connection.
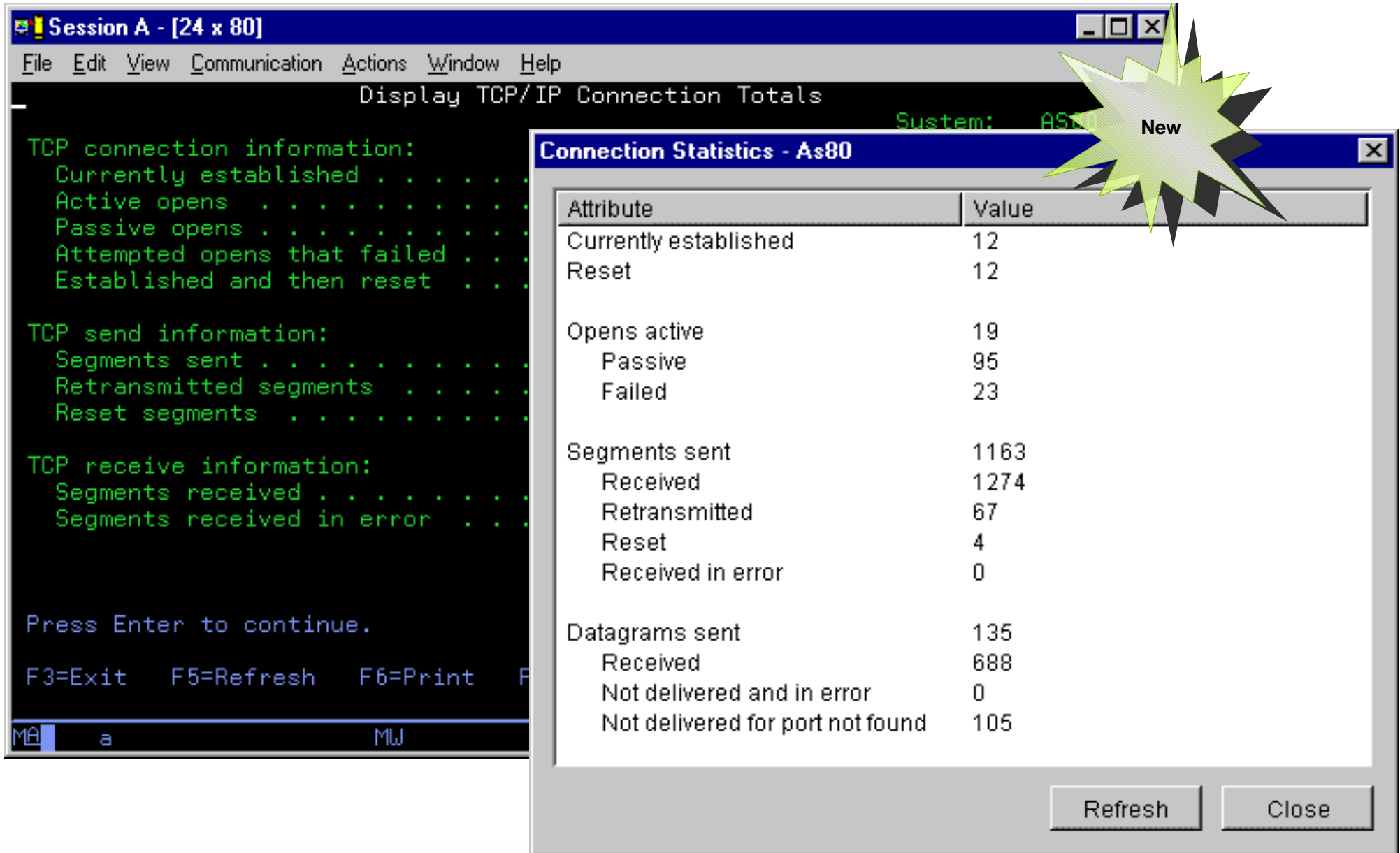
This command is similar to doing the CL Command Work with TCP/IP Network Status (NETSTAT) Option 3 Work with TCP/IP connection status. The above example shows the comparison between the CL and GUI interface.

The Connections screen shows the
- Remote Address: Connections Internet address of the remote host
- Remote Port: Connections remote host port number or well known port name
- Local Address: Connections local system internet address
- Local Port: Connections local system port number or well known port name
- State: Connections State. Listen, Sysnchronous-sent, Synchronous-received, Established, Finish-wait-1, Finish-wait-2. close-wait, Closing, Last-ACK, Time-wait, close, UDP
- Idle Time: Approximate length of time since the last activity on this connection
- Bytes Received: Number of bytes received from the remote host
- Bytes Sent: Number of bytes sent to the remote host
- Opening Type: Specifies the connection type, Passive or Active
- User Name: User profile of the job on the AS/400 system which bound the connection

If you do a Right Click on the connections than you can see the **Properties** for the connection. With V5R1 you can start and stop debug for a particular connection. this can be accomplished from Option 3 **Enable Debug** and Option 6 **Disable Debug** on the Work with TCP/IP Connection Status screen or under Properties go to the **Socket Option** tab. This also allows you to view the debug.

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Connections Statistics

Session A - [24 x 80]

File Edit View Communication Actions Window Help

```
                    Display TCP/IP Connection Totals
                                                   System:    AS__
TCP connection information:
   Currently established . . . . . .
   Active opens  . . . . . . . . . .
   Passive opens . . . . . . . . . .
   Attempted opens that failed . . .
   Established and then reset  . . .

TCP send information:
   Segments sent . . . . . . . . . .
   Retransmitted segments  . . . . .
   Reset segments  . . . . . . . . .

TCP receive information:
   Segments received . . . . . . . .
   Segments received in error  . . .




Press Enter to continue.

F3=Exit    F5=Refresh    F6=Print    F
MA    a                    MW
```

New

Connection Statistics - As80

Attribute	Value
Currently established	12
Reset	12
Opens active	19
Passive	95
Failed	23
Segments sent	1163
Received	1274
Retransmitted	67
Reset	4
Received in error	0
Datagrams sent	135
Received	688
Not delivered and in error	0
Not delivered for port not found	105

Refresh   Close

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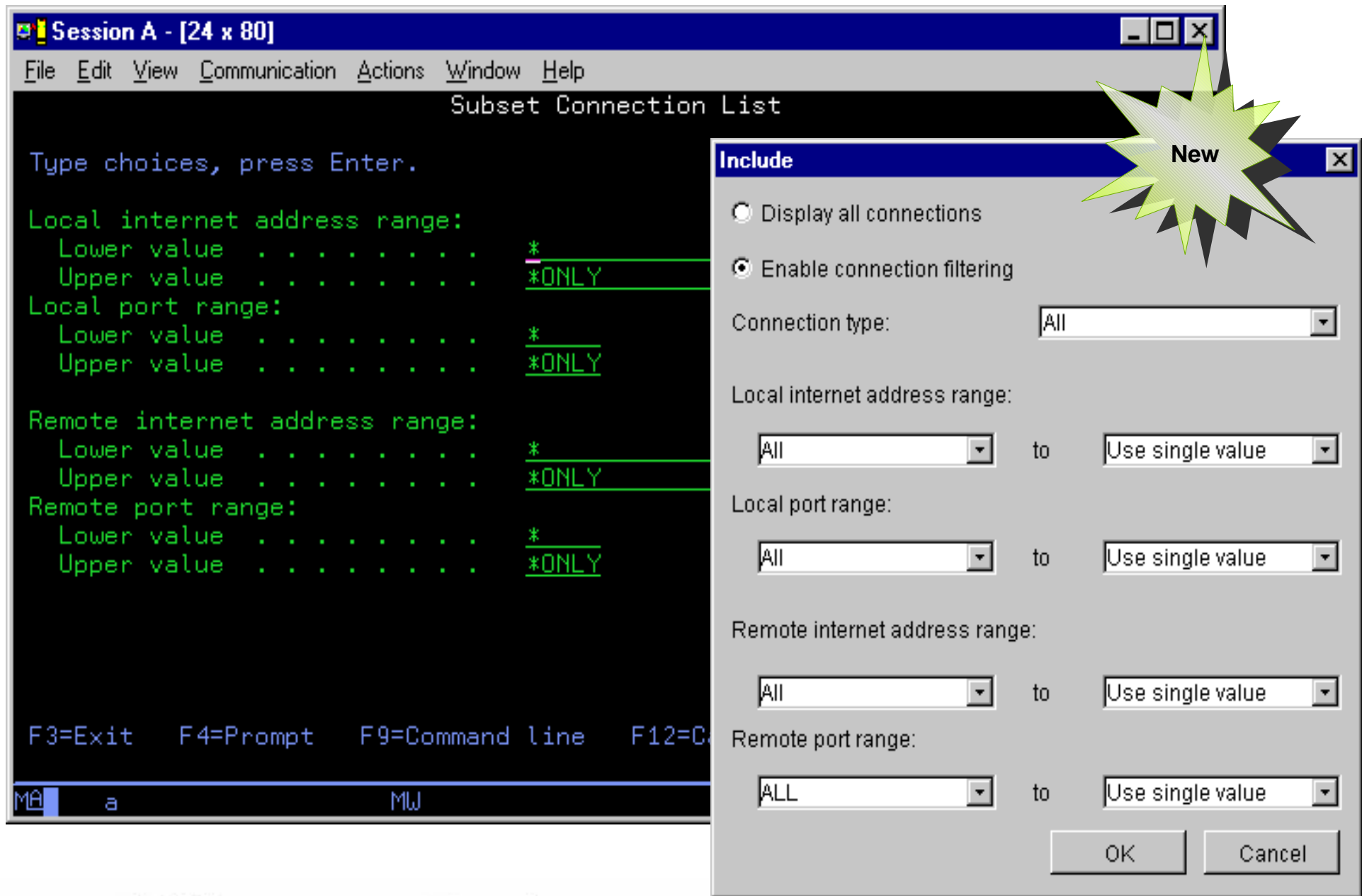
Notes: Socket Connection Statistics Table

This shows the user the associated connection totals to the socket connection. Attributes include

- Currently Established, Active opens, Passive opens, Failed opens, Reset, Segments sent/received, Segments retransmitted, Segments Reset, Segments received in error, Data grams sent/received, Data grams not delivered and in error.

With V5R1 you can now see the same function from the 5250 command interface by pressing F10 Display TCP/IP Connections Total on the Work with TCP/IP Connection Status screen.

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Connections Jobs and Include

Session A - [24 x 80]

File Edit View Communication Actions Window Help

Subset Connection List

Type choices, press Enter.

Local internet address range:
   Lower value . . . .   *
   Upper value . . . .   *ONLY
Local port range:
   Lower value . . . .   *
   Upper value . . . .   *ONLY

Remote internet address range:
   Lower value . . . .   *
   Upper value . . . .   *ONLY
Remote port range:
   Lower value . . . .   *
   Upper value . . . .   *ONLY

F3=Exit   F4=Prompt   F9=Command line   F12=C

MA   a   MW

New

Include

○ Display all connections

⦿ Enable connection filtering

Connection type: [All ▾]

Local internet address range:

[All ▾]   to   [Use single value ▾]

Local port range:

[All ▾]   to   [Use single value ▾]

Remote internet address range:

[All ▾]   to   [Use single value ▾]

Remote port range:

[ALL ▾]   to   [Use single value ▾]

[OK]   [Cancel]

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Notes: Connections Jobs and Include

Jobs

Right Clicking on the Connection Socket displays which jobs are associated with this connection. The Jobs Property page allows the user to view the attributes. It shows the user the Entry type (Job or Task), Name, User Name (User profile under which the job or task is run), Number (Job or Task number). This function can also be done from the green screening V5R1 by doing a Option 8 besides the connection under the Work with TCP/IP Connection Status screen.

Include

The Include Button from the Options Menu allows the administrator to filter the information displayed on the connections window. This function is similar to doing a F15 **Subset** under the Work with TCP/IP Connection Status screen. The subset (Include) function is modified to have more filters. You can now filter using following parameters

- Connection Type
- Local Internet Address Range
- Local Port Range
- Remote Internet Address Range
- Remote Port Range

Connection type filtering can only be used under the Operations Navigator GUI.
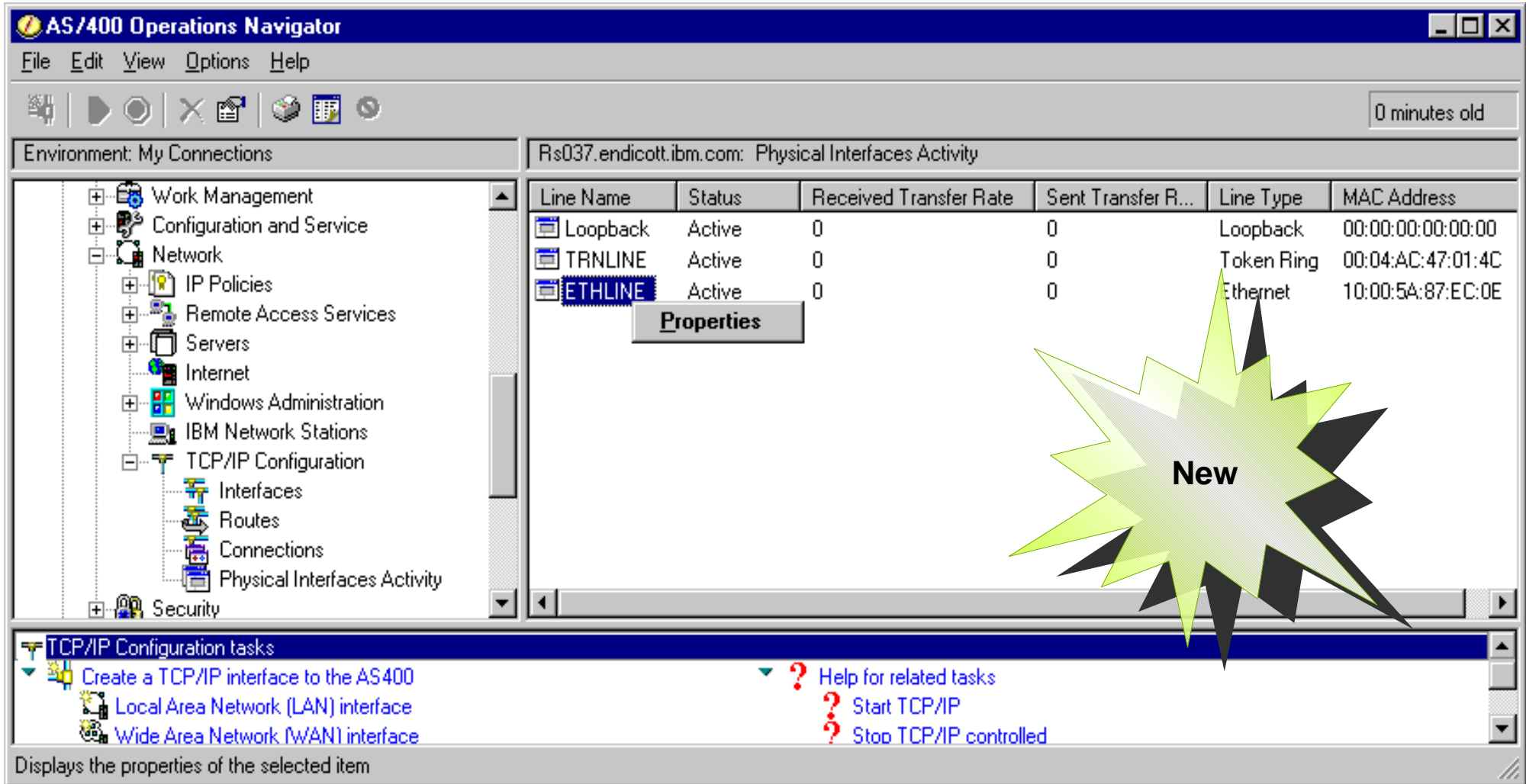
Physical Interfaces Activity

Shows All TCP/IP Physical Line Status

Only available under Operations Navigator

Received Transfer Rate

Sent Transfer Rate

Notes: Physical Interfaces Activity

Physical Interface Activity hierarchy under TCP/IP Configuration allows you to view the status of a Line description on the AS/400. This view is only available under the Operations Navigator GUI and is not available through green screen.
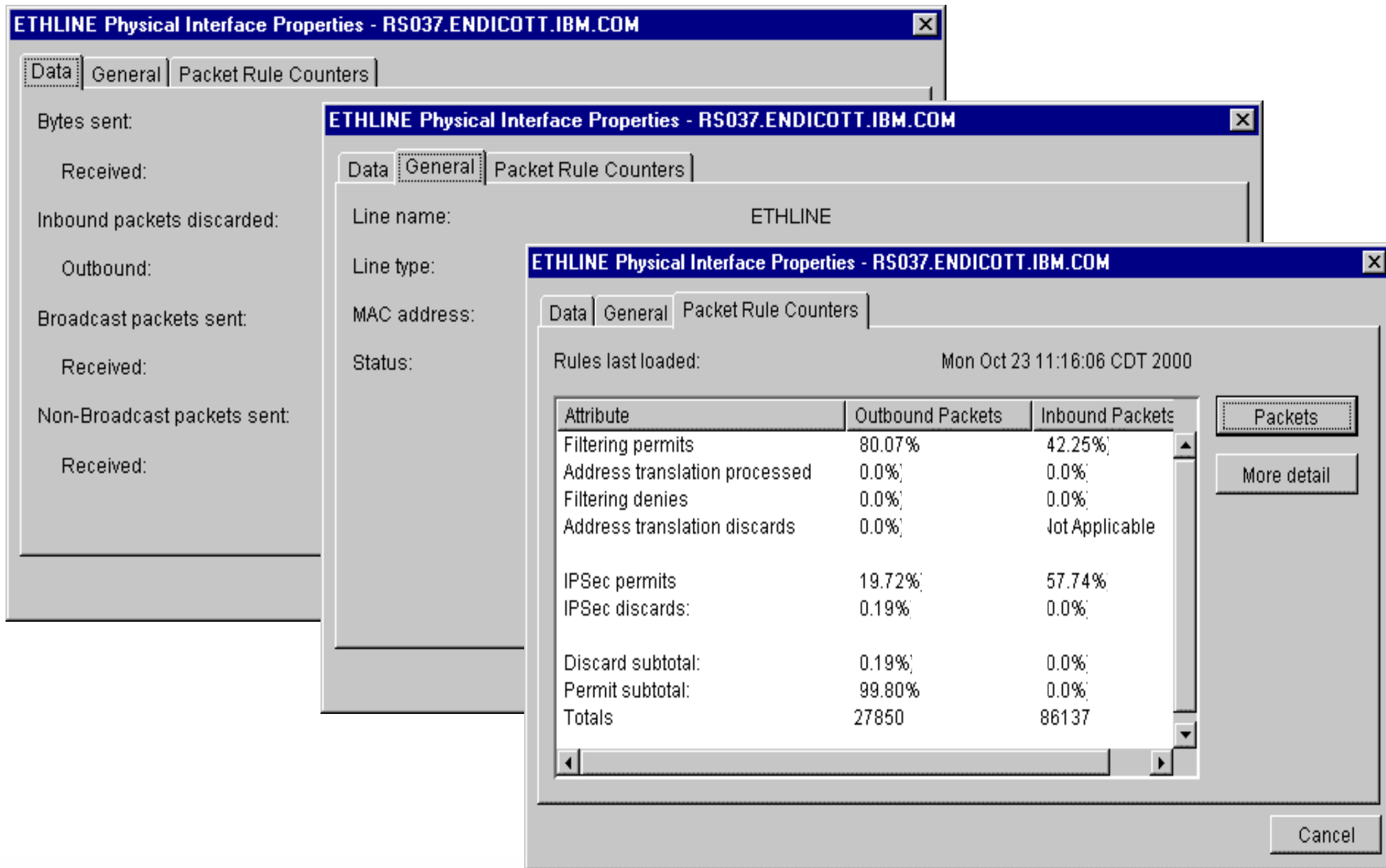
This window shows the
- Line Name: Physical Interface Name
- Status: Current operation state of the physical interface. Active, Inactive, Testing
- Received Transfer Rate: Transfer rate of bytes received on this physical interface
- Sent Transfer Rate: Transfer rate of bytes sent on this physical interface
- Type: Specifies the Interface type. Broadcast capable, Non-Broadcast capable, and un-numbered Network
- Line Type: Interface line type. Ethernet, Token-Ring, DDI, Frame Relay, Asynchronous, PPP, WLS, X.25, TDLC, IPI, IPS, none.
- MAC Address: Hardware address at the protocol layer for this interface

Detailed description for the line can be obtained by doing a Right click on the line and going into Properties. The same Properties window can be seen through the Interface Section in the Operations navigator Hierarchy.

The Received Transfer Rate and Sent transfer Rate will show a initial value of '0' . To see the current transfer rate the user needs press Refresh. This will display the statistics on transfer since the last refresh of the window.

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Physical Interface Properties

ETHLINE Physical Interface Properties - RS037.ENDICOTT.IBM.COM [×]

Data | General | Packet Rule Counters

Bytes sent:

  Received:

Inbound packets discarded:

  Outbound:

Broadcast packets sent:

  Received:

Non-Broadcast packets sent:

  Received:

ETHLINE Physical Interface Properties - RS037.ENDICOTT.IBM.COM [×]

Data | General | Packet Rule Counters

Line name: ETHLINE

Line type:

MAC address:

Status:

ETHLINE Physical Interface Properties - RS037.ENDICOTT.IBM.COM [×]

Data | General | Packet Rule Counters

Rules last loaded: Mon Oct 23 11:16:06 CDT 2000

Attribute	Outbound Packets	Inbound Packets
Filtering permits	80.07%	42.25%
Address translation processed	0.0%	0.0%
Filtering denies	0.0%	0.0%
Address translation discards	0.0%	Not Applicable
IPSec permits	19.72%	57.74%
IPSec discards:	0.19%	0.0%
Discard subtotal:	0.19%	0.0%
Permit subtotal:	99.80%	0.0%
Totals	27850	86137

[Packets]

[More detail]

[Cancel]

Notes: Physical Interface Properties

This display contains information about Physical Line. The properties page from this window is identical to the Interface Statistics page when using the tree structure. The window is divided into three sections.

Data:
- Bytes Sent: This specifies the number of total bytes sent on this physical interface.
- Bytes Received: This specifies the number of total bytes received on this physical interface.
- Inbound Packets Discarded: This specifies the number of total inbound packets that have been discarded on this physical interface.
- Outbound Packets Discarded: This specifies the number of total packets outbound on this physical interface.
- Broadcast Packets Sent: This specifies the number of total packets sent on this physical interface.
- Broadcast Packets Received: This specifies the number of total packets received on this physical interface.
- Non-Broadcast Packets Sent: This specifies the number of total non-broadcast packets sent on this physical interface.
- Non-Broadcast Packets Received: This specifies the number of total non-broadcast packets received on this physical interface

General:
- Line name: This specifies the name of the physical interface associated with this logical interface.
- Interface Type: This specifies the type of interface.
- MAC Address: This specifies the media access control (MAC) address of the physical interface.
- Interface Status: This specifies the interface status.

Packet Rule Counters:
- Date loaded: This specifies the last time that rules were successfully loaded on this line.
- Packet Counter Table: This specifies the packets inbound and outbound for this line. Attribute - values: Discarded by action DENY, Permitted by action PERMIT,Not filtered, IPsec processed successfully, IPsec permitted, IPsec discarded, (No connection started, Starting on-demand connection, VPN NAT IP address pool empty, AH/ESP header invalid, Anti-replay audit failure, Packet selector mismatch, Mode mismatch, Other) Processed by address translation, Discarded by address translation, Other packets discarded, Discard subtotal, Permit subtotal, Totals.
- Percentages: This specifies the inbound and outbound columns in percentages instead of packets, and toggles between packets and percentages.
- Less Detail/More Detail: This displays more attributes when requesting more detail, and collapses the IPsec discards when less detail is requested.

Operations Navigator: VPN

VPN Configuration GUI

- **VPN Server now listed in TCP/IP Server Window**
- **IP Security changed to IP Policies**
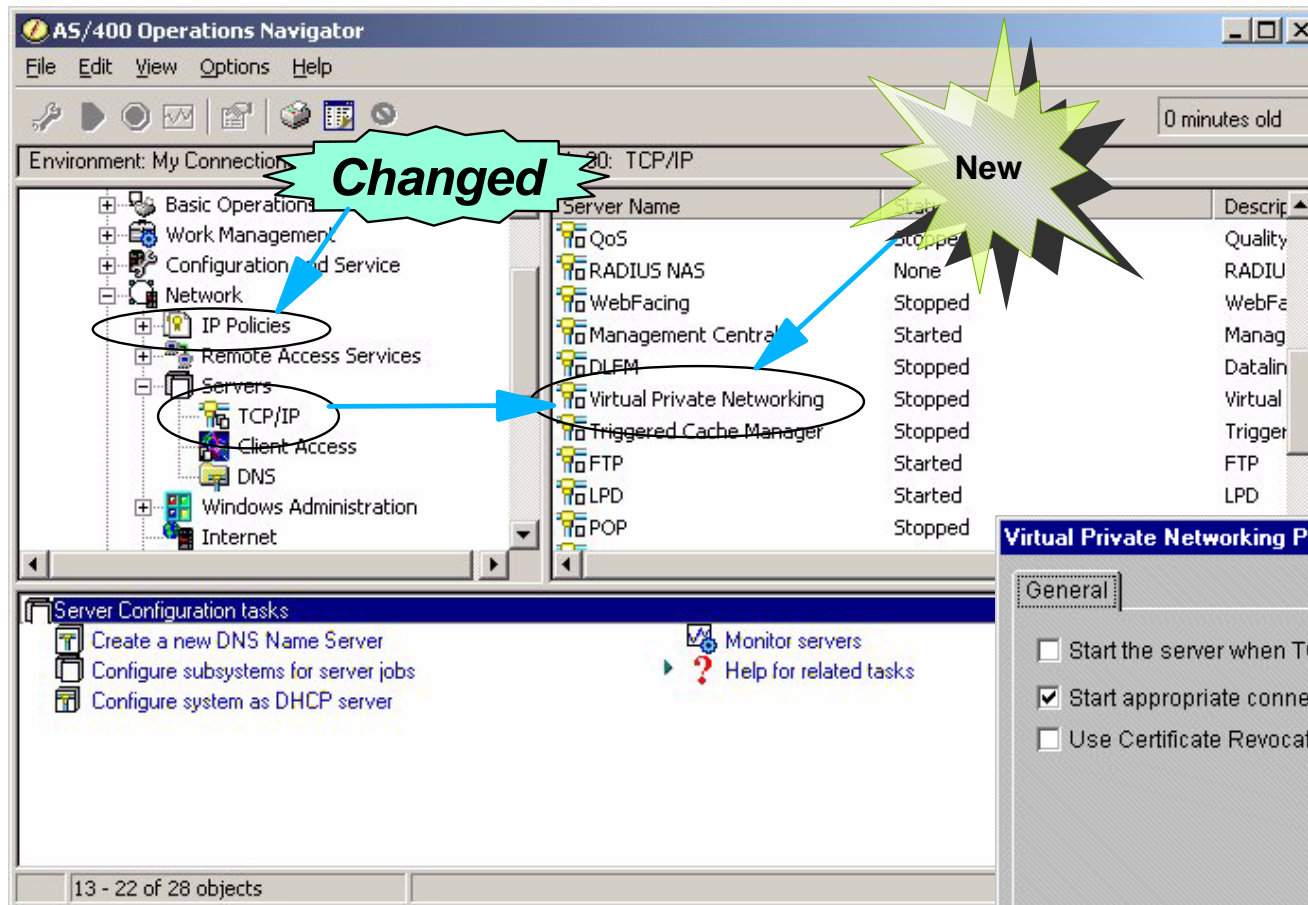
- **Masterswitch for VPN connection autostart**
  - ▶ Checkbox in server properties

Notes: VPN Configuration GUI
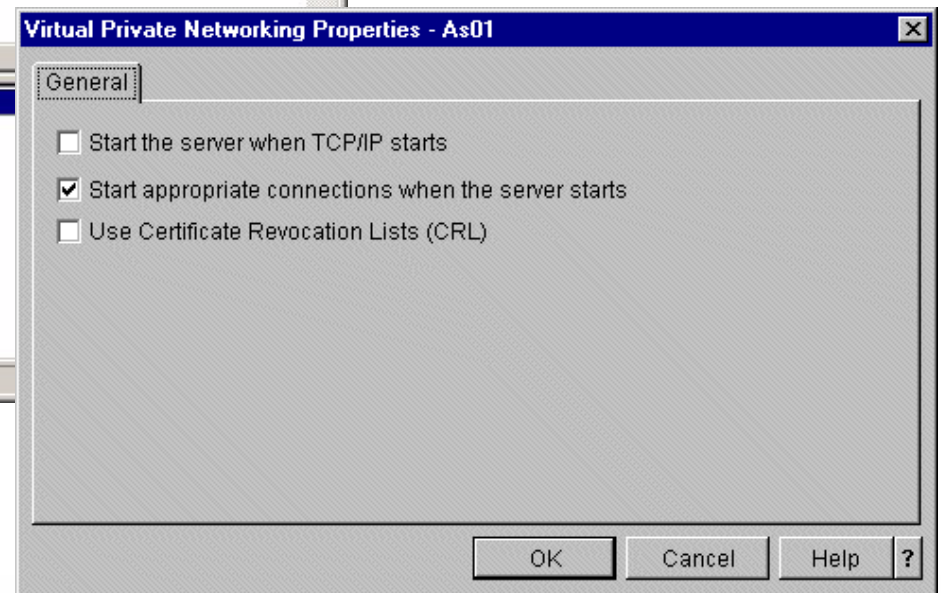
In V5R1, the Virtual Private Network (VPN) configuration interface is now fully integrated in OS/400 Operations Navigator. The navigation is done via the main navigation panel rather than a separate window as in Version 4.

You can now start and stop the VPN server from the TCP/IP servers view.

Masterswitch (Checkbox "Start appropriate connections when the server starts")

Select this if you want connections that were marked 'Start when the VPN Server starts (autostart)' or 'Start when datagram is sent (on-demand)' to start when the VPN server starts.

This option overrides all individual connections with autostart or on-demand attributes assigned to them. Deselecting this option allows a user to start the VPN server to test a connection or set of connections without having the autostart and on-demand connections attempting to start.

If you do select this option, when the VPN server starts, the autostart and on-demand connections will start.

VPN OnDemand Connections

- ■ **Prepares all components for a VPN connection**
  - ► Connection goes in an OnDemand State
- ■ **Start VPN connection when traffic is detected**
- ■ **Start OnDemand connection is set by default**
  - ► Can be changed in Operations Navigator checkbox "Start on-demand"

Notes: VPN OnDemand
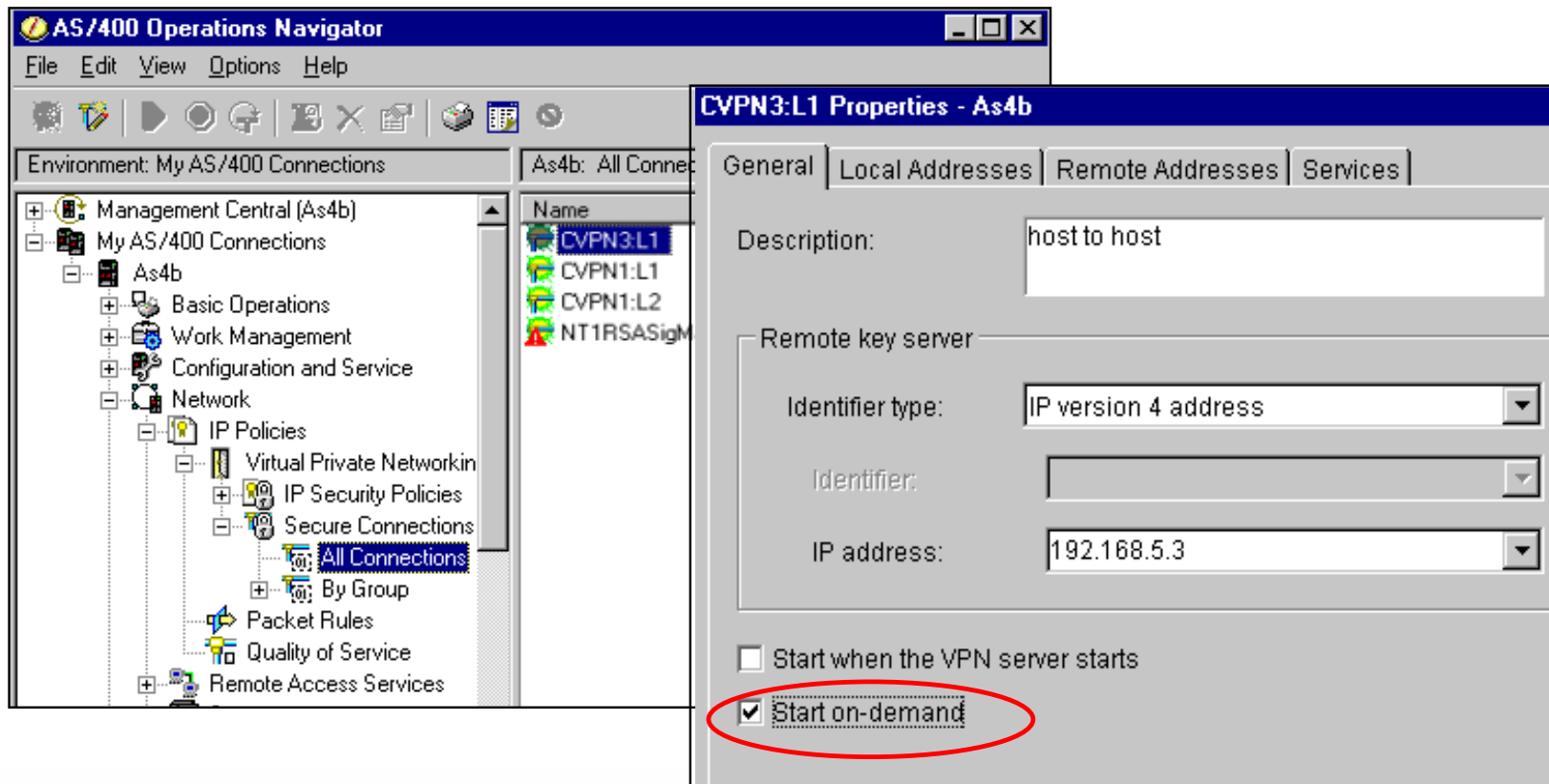
Checkbox "Start when the VPN server starts"

Select this if you want the connection to start automatically when either the VPN server starts or an associated interface, with its filters loaded, starts.

Checkbox "Start when datagram is sent" (OnDemand)

Select this if you want the connection to start automatically when data that requires its protection is sent from/to your system. Connections with this attribute are referred to as on-demand.

When data stops flowing through the connection, and no data passes through the connection since the last SA refresh cycle, it automatically returns to its on-demand state.

VPN Changes from V4 to V5R1

V4 (hard to find)

V5R1 All in one
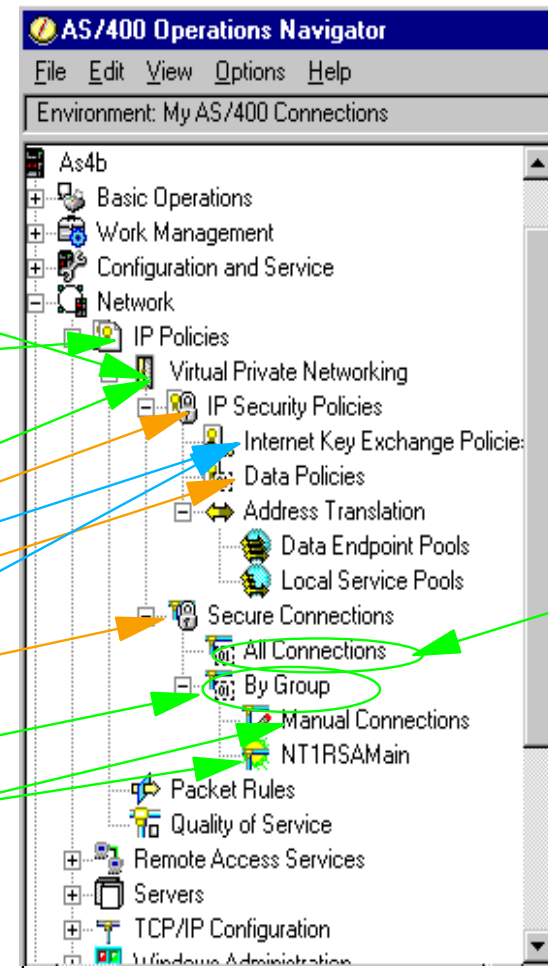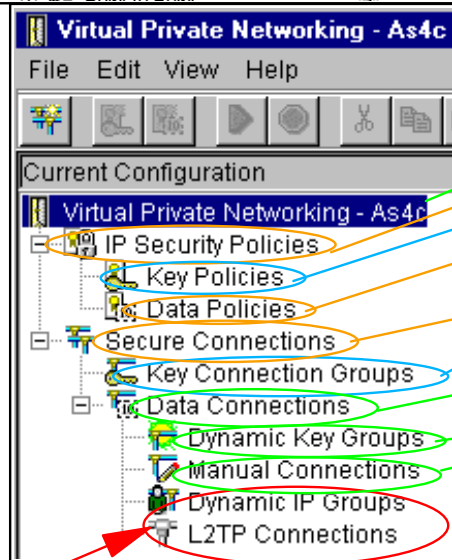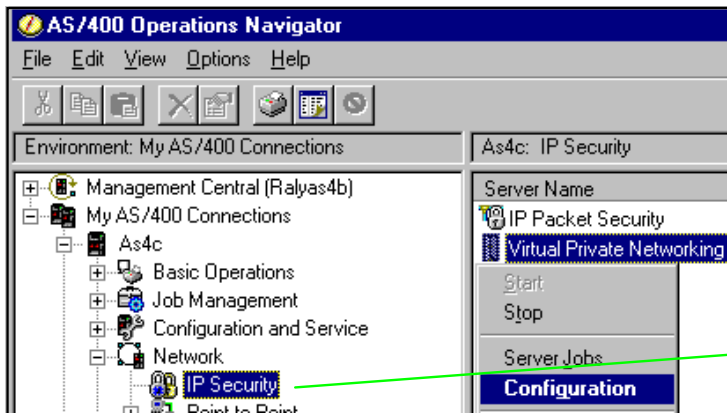
Locally
defined
or remotely
initiated
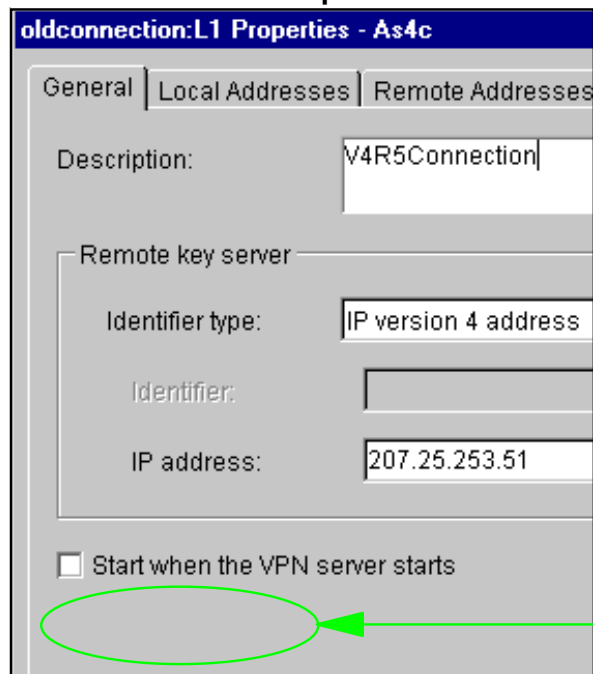
disappeared

■ Removed from GUI (integrated into Dynamic Key Groups)   ■ Remains the same   ■ ■ Changed/Merged

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New VPN Connection Wizard

New Connection on Virtual Private Network or Secure Connections starts the New Connection Wizard

VPN Operations Navigator Compatibility

Operations Navigator for V5R1 with previous releases
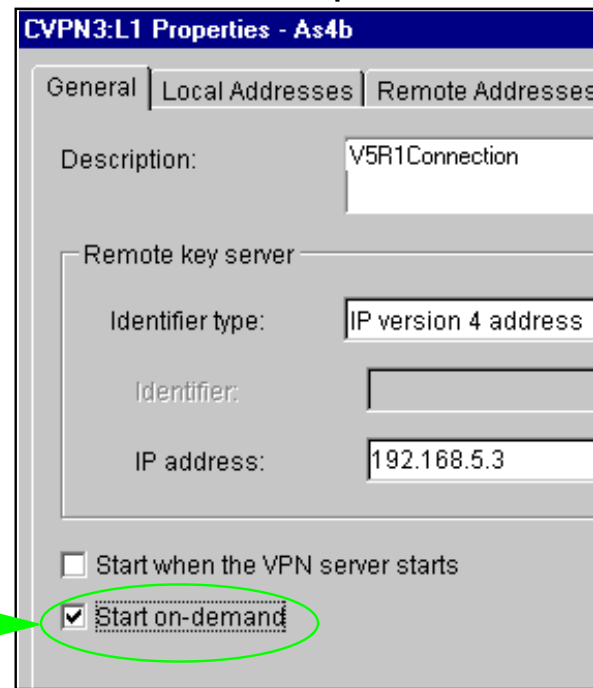
- Functions not supported in previous releases are grayed out or are not shown in the Operations Navigator windows
- However, the new OpNav GUI "look" is also used to configure VPN connections for V4 systems

Connection Properties V4R5   Connection Properties V5R1

VPN Diagnostic Tools

IBM server iSeries

Server Jobs

- Connection Manager Job Log...
- Key Manager Server Job Log...

Server Trace

Notes: VPN Diagnostic Tools

V5R1 of Operations Navigator now provides three new diagnostic tools. Right click on Virtual Private Networking and then click on Diagnostic Tools shows

- Servers
  - Connection Managers Job log
  - Key Manager Joblog
- Server Trace

The Connection Manager Joblog takes you directly to the VPN Connection Manager job (QTOVMAN) on the System. This job resides under the QSYSWRK Subsystem. The Tool takes you directly into the TOVMAN job on the system and then you could work with this job by going into the joblog.

The Key Manager Joblog takes you directly to the Key Manager job (QTOKVPNIKE) on the System. This job resides under the QSYSWRK Subsystem. The Tool takes you directly into the the QTOKVPNIKE job on the system and then you could work with this job by going into the joblog.

Virtual Private Networking Trace (Server Trace)

Use this page to configure, start, stop, and view the Connection Manager and Key Manager server traces. This is similar to using the Trace TCP/IP Application (TRCTCPAPP *VPN) command from the 5250 CL, except that you can view the trace while it is active.

Operations Navigator: Remote Access Service

Remote Access Services

- Point-to-Point folder renamed to Remote Access Service
  - Originator Connection Profiles
  - Receiver Connection Profiles
  - Modems
- DHCP WAN Client
- RADIUS
- Virtual line (L2TP) connection type renamed to L2TP
  - Remote dial
  - Remote dial-on-demand (compulsory tunnel)
  - Initiator-on-demand (voluntary tunnel)
  - Multi-hop initiator

New

When two systems are physically connected, it is typically referred to as a point-to-point connection or link. Several different protocols, such as TCP/IP Point-to-Point Protocol (PPP), Serial Line Internet Protocol (SLIP), X.25, and frame relay, are viewed as point-to-point protocols. However, PPP and SLIP offer a lower cost, more efficient connection alternative to X.25 and frame relay. Support for PPP and SLIP is included on your AS/400 as part of Wide Area Network (WAN) connectivity.

For V5R1, the Point-to-Point folder under Operations Navigator has been renamed to Remote Access Services. Remote Access Services is a more widely recognized term and is used in the industry to denote the functions that support point-to-point wide area network connections.

For V5R1, the Remote Access Services folder will contain the following three folder objects:

- Originator Connection Profiles (new folder object).
- Receiver Connection Profiles (new folder object).
- Modems (existing folder object).
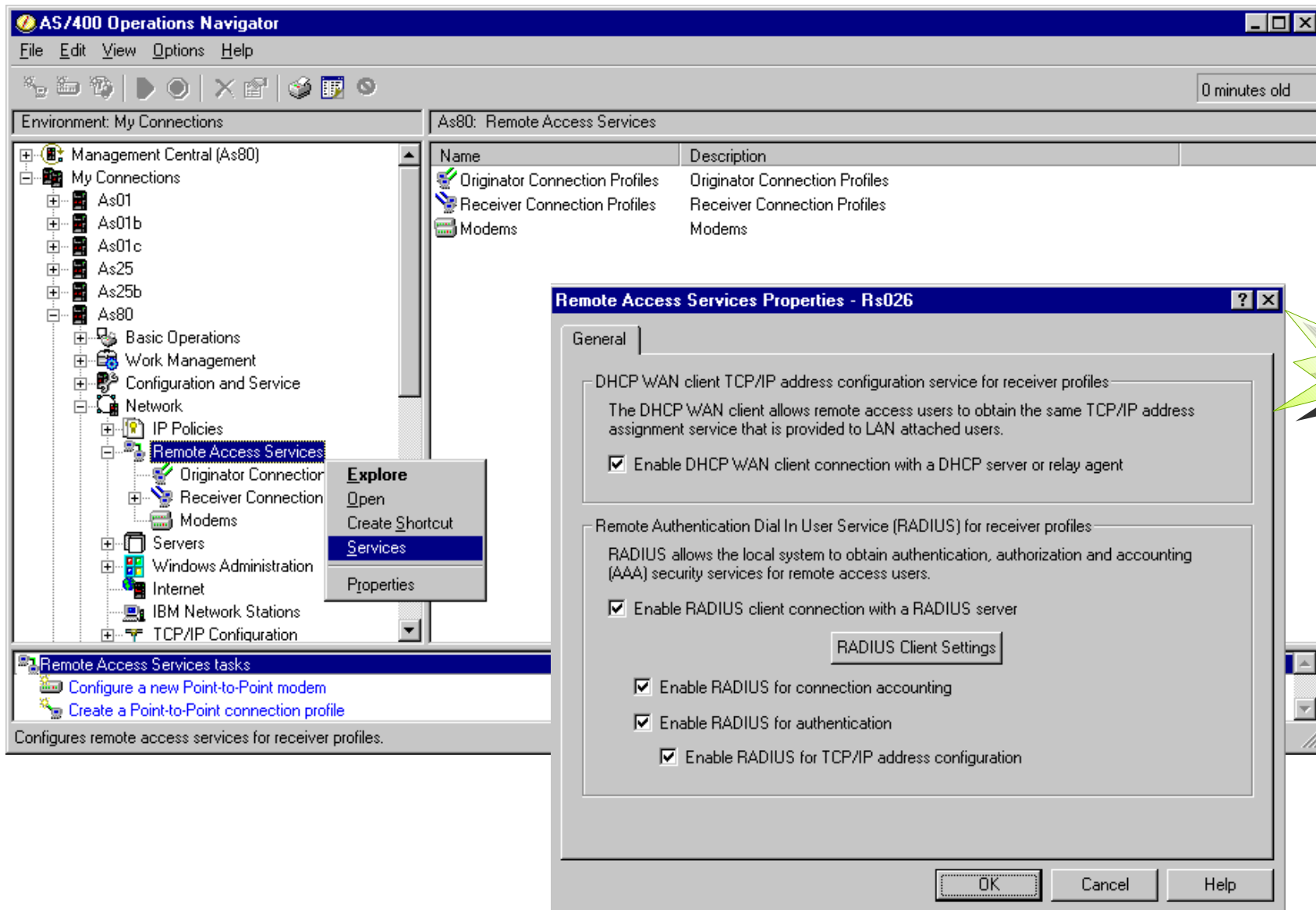
The previous Connection Profiles folder were removed and replaced by two new folder objects: Originator Connection Profiles and Receiver Connection Profiles. The Modems folder remain unchanged. Outbound point-to-point connections are now managed by functions available under the Originator Connection Profiles folder object. Inbound point-to-point connections are managed by functions available under the Receiver Connection Profiles folder object

The Remote Access Services folder also provides a property sheet with selections for enabling two new services to be supported in V5R1:

The DHCP (Dynamic Host Configuration Protocol) proxy or WAN client provides a service that allows the DHCP server to assign TCP/IP addresses to remote access users. The DHCP WAN client communicates directly with a DHCP server or indirectly via a DHCP relay agent.

The RADIUS (Remote Authentication Dial-In User Service) client provides a connection to one or more RADIUS servers that provide services for authenticating remote clients, for assigning TCP/IP addresses to remote clients and for auditing the time a remote client is connected. When these services are enabled, they will be globally available to all receiver connection profiles and group access policy definitions.

DHCP WAN Client and RADIUS

Notes: DHCP WAN Client

The Dynamic Host Configuration Protocol (DHCP) WAN client enables wide area network remote access users to obtain the same IP address services as do LAN attached network DHCP clients. When the DHCP WAN client service is enabled, the local host system will request TCP/IP addresses to be dynamically assigned to remote access dial-in and L2TP tunnel users.

For the DHCP WAN client service to be enabled, the following is required:

- If the DHCP WAN client is to communicate directly with a DHCP server, the DHCP server configuration file must be configured with the IP address or addresses of the local system interface(s).
- If the DHCP WAN client is to communicate indirectly with a DHCP server via a DHCP relay agent, the DHCP relay agent configuration file must be configured with the IP address or addresses of the local interface(s). Because the DHCP relay agent simply relays TCP/IP packets to the DHCP server, the DHCP server at the final destination must also be configured to recognize the IP address or addresses of the local system interface(s).

In order to enable the DHCP WAN client service, Operations Navigator will try to determine whether a DHCP server or a DHCP relay agent is running and configured with the local interface IP address of the client system. For the DHCP WAN client service to be enabled, the following steps are required:

- When the user enables the DHCP WAN client, a dialog is launched requesting the user to specify the IP address(es) of the local interface(s) to be used for the connection to the DHCP server or relay agent. Operations Navigator will then try to determine whether a DHCP server or relay agent is running on the system.
- If the DHCP server is running, operations navigator will search the DHCP server IFS configuration file /**QIBM/UserData/OS400/DHCP/dhcpsd.cfg** for a subnet range that contains the IP address of the local interface.
- If the IP address of the local interface is found, operations navigator will set a flag in the /**QIBM/UserData/OS400/TCPIP/RAS/ras.cfg** to show the DHCP WAN client as enabled and as using a DHCP server.
- If the IP address of the local interface is not found, operations navigator will pop up a message box informing the user that the DHCP server must be configured to use the DHCP WAN client service. It will be the responsibility of the user to configure the DHCP server on the target system correctly.

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Notes: DHCP WAN Client

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- If the DHCP relay agent is running, Operations Navigator will search the DHCP relay agent IFS configuration file /QIBM/UserData/OS400/DHCP/dhcprd.cfg for the IP address of the local interface.
- If the IP address of the local interface is found, operations navigator will set a flag in the /QIBM/UserData/OS400/TCPIP/RAS/ras.cfg to show the DHCP WAN client as enabled and as using a DHCP relay agent.
- If the IP address of the local interface is not found, Operations Navigator will launch the DHCP relay agent interface dialog which allows the user to define the IP address of the local interface and the IP address of the DHCP server to which TCP/IP packets are to be relayed. The assumption is that a DHCP server resides somewhere on the network configured with the IP address of the local system. When the user closes the interface dialog, operations navigator will stop and restart the DHCP relay agent and will set a flag in the /QIBM/UserData/OS400/TCPIP/RAS/ras.cfg to show the DHCP WAN client as enabled and as using a DHCP relay agent.

- If neither the DHCP server or relay agent is running, Operations Navigator will launch the DHCP relay agent interface dialog to allow the user to define the IP address of the local interface and the IP address of the DHCP server to which TCP/IP packets are to be relayed. The assumption is that a DHCP server resides somewhere on the network configured with the IP address of the local system. When the user closes the interface dialog, the GUI code will stop and restart the DHCP relay agent and will set a flag in the /QIBM/UserData/OS400/TCPIP/RAS/ras.cfg to show the DHCP WAN client as enabled and as using a DHCP relay agent. If the DHCP server is running, Operations Navigator will search the DHCP server IFS configuration file

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RADIUS - Remote Authentication Dial-In User Service

- RADIUS is the a widely used standard in the industry for user authentication, authorization, and accounting
- Defined in RFC #2058.
- Centralizes secure access for remote clients

Corporate Network

RADIUS Server

RADIUS
Network Access Server

RADIUS
Network Access Server

PPP
Dialup

PPP
Dialup

RADIUS
Network Access Server

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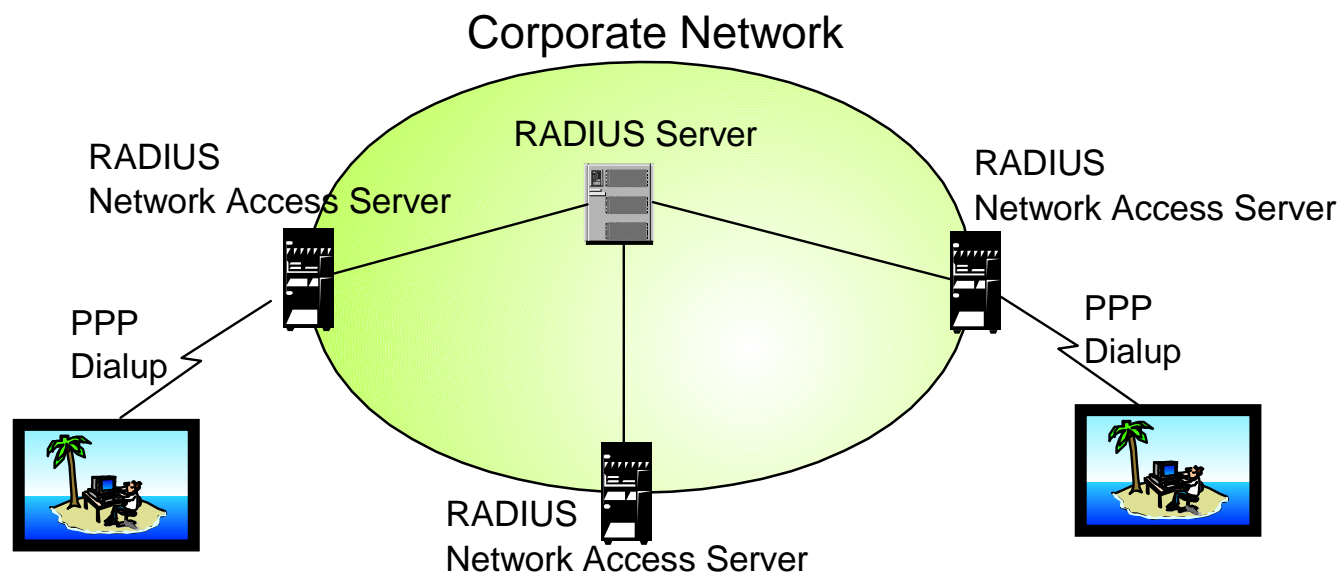
RADIUS, Remote Authentication Dial-In service is a distributed security system developed by Lucent Technologies InterNetworking Systems. RADIUS was designed based on a previous recommendation from the IETF's Network Access Server Working Requirements Group.

RADIUS is the de facto industry standard for user authentication, authorization, and accounting.

For detailed information refer to **RFC #2058.** The following provides summary level information on RADIUS:

The Remote Authentication Dial-In User Service (RADIUS) is a distributed network security system. Security information is stored on a central system known as the RADIUS server. A RADIUS client system can be configured to communicate with a RADIUS server in order to provide remote access services for a local system. The RADIUS server is usually installed on a central computer at the customer's site while RADIUS clients are distributed around the network. In this way, security information can be stored in a central location rather than being scattered throughout the network on different systems. When configured and enabled, the local RADIUS client system communicates with the RADIUS server to provide the following services:

- Authenticate users for dial-in remote access.
- Assign an IP address to the remote access dial-in or tunnel user.
- Permit system administrators to track dial-in and tunnel usage which is often used for billing and accounting purposes.

The RADIUS configuration parameters will be saved to and retrieved from the **/QIBM/UserData/OS400/TCPIP/RAS/RADIUS_NAS.cfg** file using IFS file APIs.

Enable RADIUS client connection with a RADIUS server: Specifies whether the services of a RADIUS server should be used for remote access user authentication, configuration or accounting support.

RADIUS Client Settings button: Allows the user to display or modify the settings for the local RADIUS client system
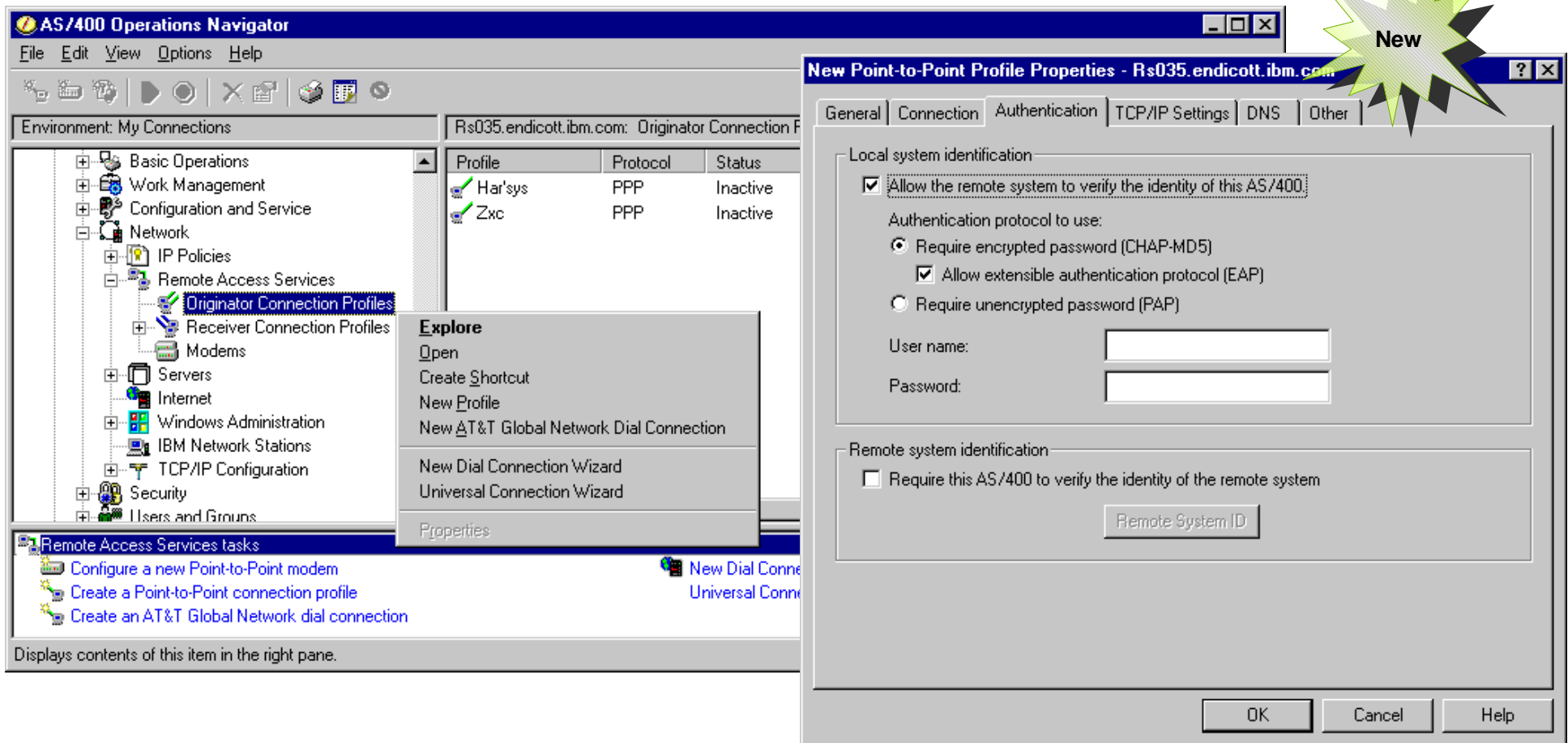
Enable RADIUS for connection accounting: Enable the use of the RADIUS server function that tracks dial-in remote access and/or tunnel usage often required for billing purposes

Enable RADIUS for authentication: Enable the use of the RADIUS server function that authenticates remote access dial-in and/or tunnel users.

Enable RADIUS for TCP/IP address configuration: Enable the use of the RADIUS server function that assigns TCP/IP addresses to remote access dial-in and tunnel users

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Originator Connection Profiles

IBM **e** server *iSeries*

- Contains only Originating Profiles
- Delete Profile Enhanced
- Connection Details

- Migrates a SLIP over ASYNC profile to a SLIP over PPP profile.
- Extensible Authentication Protocol (EAP)

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Notes: Originator Connection Profiles

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The Originator Connection Profiles folder object is new for V5R1 and contains all of the profile types that can be created to support point-to-point connections that originate from the local system. The Originator Connection Profiles folder object is compatible with connection profiles defined for host AS/400 systems at the V4R3 or higher release levels. For each host system release level, the following table shows the profile types that can be contained in the Originator Connection Profiles folder object.

Protocol Type	Connection type	Operating Mode	Conditions
SLIP	Switched line	Dial	Available if V4R3 or higher host system.
SLIP	Leased line	Initiator	Available if V4R3 or higher host system.
PPP	Switched line	Dial	Available if V4R3 or higher host system.
PPP	Switched line	Dial-on-demand (dial only)	Available if V4R4 or higher host system.
PPP	Switched line	Dial-on-demand (answer enabled dedicated peer)	Available if V4R4 or higher host system.
PPP	Switched line	Dial-on-demand (remote peer enabled)	Available if V4R5 or higher host system.
PPP	Switched line	Dial - IGN electronic services	Available if V4R5 or higher host system.
PPP	Switched line	Dial - IGN mail exchange	Available if V4R5 or higher host system.
PPP	Switched line	Dial - IGN networking	Available if V4R5 or higher host system.
PPP	Leased line	Initiator	Available if V4R3 or higher host system.
PPP	L2TP	Initiator	Available if V4R4 or higher host system.
PPP	L2TP	Initiator-on-demand (voluntary tunnel)	Available if V5R1 or higher host system.
PPP	L2TP	Multi-hop initiator	Available if V5R1 or higher host system.
PPP	L2TP	Remote dial	Available if V5R1 or higher host system.
PPP	L2TP	Remote dial-on-demand (compulsory tunnel)	Available if V5R1 or higher host system.

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Notes: Originator Connection Profiles

The Delete menu item in V5R1 provides additional options for cleaning up objects created and used by the originator connection profile. If the system is at the V5R1 or higher release level, a pop up message box will be displayed when Delete is selected. The message box will ask if the line associated with the selected profile should also be deleted. If YES, the GUI will execute the new Remove TCP Point-to-Point (RMVTCPPTP) CL command which will clean up any line, NWI or connection list host object associated with the selected profile. If NO, the profile will be deleted using the QTOCPPPU API support provided in previous releases.

For V5R1, a Migrate option is provided for SLIP originator connection profiles defined with ASYNC line types. The Migrate option will force the user to convert the SLIP over ASYNC profile to an originator connection profile that uses a PPP line type. When the Migrate menu item is selected, the originator connection profile property sheet will be launched and initialized with the parameter values associated with the SLIP over ASYNC profile. When the user closes the property sheet, a new originator connection profile that uses a PPP line type will be created and the old SLIP over ASYNC profile will be deleted.

For V5R1, the Connection Details dialog provides additional status information associated with a selected connected user. Detailed status information will allow the user to view if any group policy overrides are in effect, to view if any filter rules are in effect, to view multilink status and to view any other parameters of interest.

Under V5R1 Require encrypted password (EAP) has been added in the Authentication tab under New Point-to-Point Profile Properties to support the new EAP encryption protocol. The PPP Extensible Authentication Protocol (EAP) provides support for Smart Cards.

Two new Wizards are added for V5R1:
- New Dial Connection Wizard
- Universal Connection Wizard

The New IBM Global Network Dial Connection menu item has been renamed to New AT&T Global Network Dial Connection. The function of the New AT&T Global Network Dial Connection menu item is unchanged and will launch the wizard that sets up a connection to the AT&T Global Network (formerly known as the IBM Global Network).

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Receiver Connection Profiles

■ **Contains only Receiver Profiles**
■ **Group Access Policies**
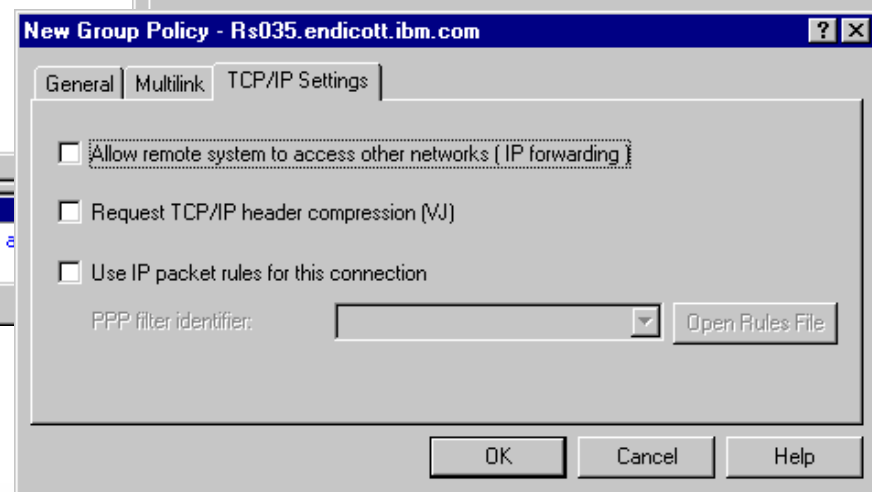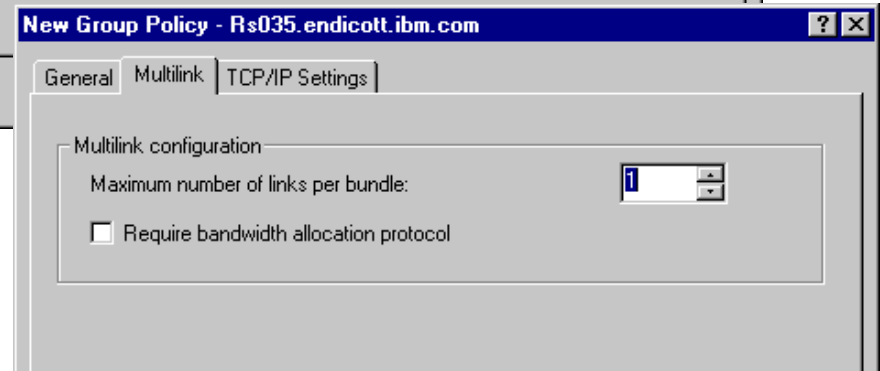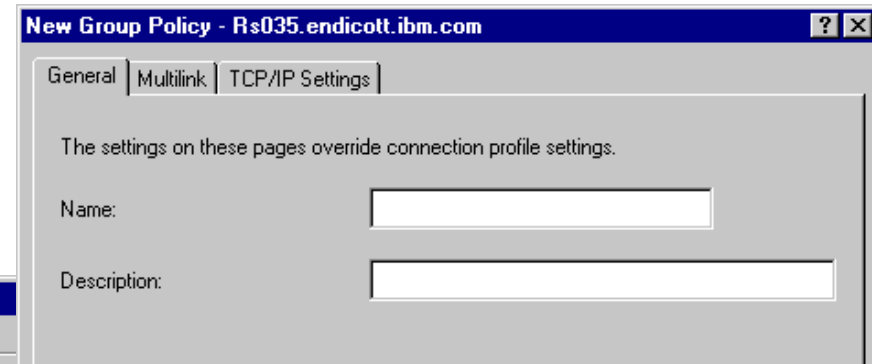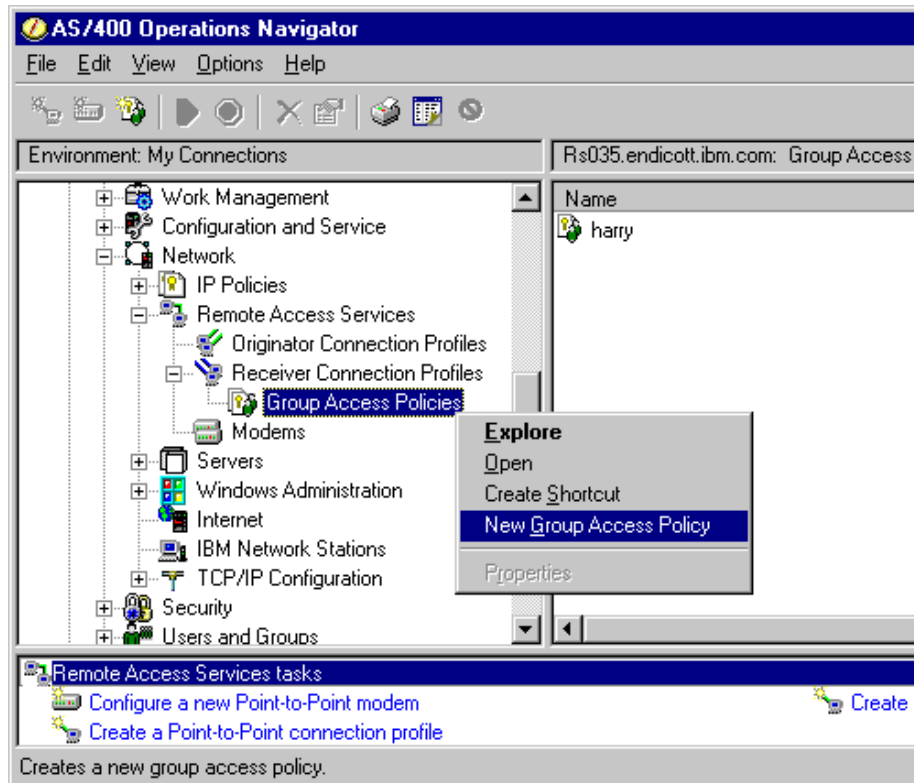
Notes: Receiver Connection Profiles

The Receiver Connection Profiles folder object is new for V5R1 and contains all of the profile types that can be created to receive a point-to-point connection that originates from a remote system. The Receiver Connection Profiles folder object is compatible with connection profiles defined for host AS/400 systems at the V4R3 or higher release level. For each host system release level, the following table shows the profile types that can be contained in the Receiver Connection Profiles folder object.

Receiver Connection Profile Types:

Protocol Type	Connection Type	Operating Mode	Conditions
SLIP	Switched Line	Answer	Available if V4R3 or higher host system.
SLIP	Leased Line	Terminator	Available if V4R3 or higher host system.
PPP	Switched Line	Answer	Available if V4R3 or higher host system.
PPP	Leased Line	Terminator	Available if V4R3 or higher host system.
PPP	L2TP	Terminator (network server)	Available if V4R4 or higher host system.

Group Access Policies

The Group Access Policies folder object is new for V5R1 and contains all of the group policy definitions that can be applied to a remote access user. A group policy is a global definition that overrides the settings associated with an individual receiver connection profile. The Group Access Policies folder object contains all of the group policy definitions that can be globally applied to remote access users associated with any receiver connection profile. The group policy definition parameters are saved and retrieved from the following IFS file using IFS file APIs: **/QIBM/UserData/OS400/TCPIP/PPP/grouppolicy.cfg**

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