ComCon

iSeries Navigator for Programmers

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He is also an award winning speaker who speaks regularly at US Common conferences and the renowned RPG World conferences.
Session Agenda

Overview

iSeries Navigator

- Basic Operations
- File Systems
- Netserver
- Databases
  - Libraries and Schemas
  - Tables
  - Views
  - Run SQL Scripts
  - Database Navigator
**What is iSeries Navigator?**

**iSeries Navigator is a GUI interface to OS/400.**
- Used by Operators and System Administrators to configure, manage and monitor OS/400.
- Used by Developers to develop and administer the database.
- Offers a more familiar style interface for those used to a windows environment.
- Only runs on Windows.

**iSeries Navigator is being developed a lot more then green screen.**
- Certain functions are only available through iSeries Navigator.
  - e.g. configuring DNS.

**iSeries Navigator is part of iSeries Access**
- It is a base component i.e. it is not chargeable and is considered part of the base operating system.

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*iSeries Navigator* is a Windows based GUI interface to OS/400. It is installed as part of *iSeries Access for Windows*. Navigator is part of base OS/400 - it is part of the "no charge" portion of *iSeries Access*.

Prior to V5R2 of OS/400 *iSeries Navigator* was known as *Operations Navigator* and *iSeries Access for Windows* was known as *Client Access Express for Windows*.

*iSeries Navigator* is receiving a lot more development dollars then traditional green screen and some new system functions may only be configured through *Navigator*.
This is *iSeries Navigator*!

This example shows a connection to an iSeries named *as400.midcs.com*.

You can define connections to more than one iSeries.
Starting Navigator

iSeries Navigator can be started from
- a desktop icon
- the iSeries Access Group

As you would expect from any Windows application, it can be accessed from a program group (folder or Start Menu) or an icon on the desktop.
Panes

By default, navigator consists of three panes:-
- The hierarchy tree displays the sub-components and functions that are installed and available for Management Central and iSeries connections.
- The detail pane displays the contents of the function selected in the hierarchy tree.
- The taskpad pane displays a customizable list of tasks and, optionally, a list of tasks available for the function selected in the hierarchy tree.

As with any Windows application, it is primarily mouse driven. One mouse button (left or right depending on your orientation) to select an item and the other to get a context menu.

The hierarchy tree displays the sub-components and functions that are installed and available for Management Central and iSeries connections. The tree will have a node for each connection (iSeries) which expands into the list of Navigator functions.

The detail pane displays the contents of the function selected in the hierarchy tree.

The Taskpad pane displays a customizable list of tasks and, optionally, a list of tasks available for the function selected in the hierarchy tree. As you become familiar with Navigator you may decide to have a list of your favorite or common functions listed in this pane.

Display of the tasks pane is set from the View menu and the content of the tasks pane can be set by the Customize Taskpad option on the View Menu.

Navigator is a standard "explorer" style interface.

Functions are available from:-
- Toolbar menu
- Toolbar icons
- Context (or Pop up) menus (right click on an item)
- Taskpad pane

Notes
Functions

iSeries Navigator offers the following functions:-

- Management Central
- For every configured connection
  - Basic Operations
  - Work Management
  - Configuration and Service
  - Network
  - Security
  - Users and Groups
  - Databases
  - File Systems
  - Backup
  - Application Development
  - AFP Manager

You have full control over which functions are available to which users.

iSeries Navigator is primarily used by Operators and System Administrators, so most of these functions are of little interest to the programmer.

Compare this to signing on to the main menu on a 5250 display. There are options available for many items but most of them hold little interest for you.

In this session we will be concentrating on the functions for Basic Operations, File Systems and Databases.
Basic Operations
As the title implies, Basic Operations provides functions for basic operations. They are:-

• Messages. Send and display messages. Provides the equivalent of DSPMSG, SNDMSG and SNDBRKMSG.

• Printer Output. Manage printer output. Provides the equivalent of WRKSPLF and WRKOUTQ.

• Printers. Manage printers. Provides the equivalent of WRKWTR.

• Jobs. Manage jobs. Provides the equivalent of WRKUSRJOB.
Printer Output works on the same basic principles as Messages.

Let's start by looking at the *Columns* option.
Isn't this a lot easier then pressing F11 on WRKSYPLF?

As you would expect, you can select the columns you want displayed.

Navigator will remember your selection. So when you exit Navigator and start it again, it will remember your selection.

The following page shows the result of this selection.
You can sort the detail list by clicking on the relevant column heading. The first click will sort the list in ascending sequence and a second click will sort it in descending sequence.
You can specify a more complex sort by selecting *Customize this view/Sort* from the context menu.
Select the sort sequence of columns

Simply select the sequence in which you want the columns sorted. In this example we want them sorted by Output Name and then by Pages Per Copy.
Printer Output After Sort

This is the result of the sort selected on the previous page.
The Include option for Printer Output is extremely powerful. You will be presented with a selection prompt.
You can base the list on a selection of **User, Printer, Output Queue, Form Type, User Specified Data, Status and Job Name**. You can get lists of Users, Printers or Output Queues by selecting the ellipse next to the relevant box.

The default selections (shown here) will give you the equivalent of a WRKSPLF for your own profile.

It is possible to list multiple Users, Printers and Output Queues. i.e. it is possible to combine more then one user, printer or queue in the list.

Selecting all users and specifying an output queue would be the equivalent of a WRKOUTQ.
For the most part the context menu for spool files is akin to the options available on the WRKSPFLF display, with a couple of notable exceptions.

- **Open.** Display the Spool File (option 5 in WRKSPFLF).
- **Reply.** Reply to a message (option 7 in WRKSPFLF).
- **Hold.** Hold the spool file on the queue (option 3 in WRKSPFLF).
- **Release.** Release a held spool file (option 6 in WRKSPFLF).
- **Print Next.** Move the spool file to the top of the queue.
- **Send.** Send Networked Spool File.
- **Convert to PDF.** Convert the Spool File to a PDF document.
- **Cut.**
- **Copy.**
- **Move.** Move Spool File to another Output Queue.
- **Delete.** Delete the Spool File (option 4 in WRKSPFLF).
- **Properties.** Display/Change the properties of the Spool File (options 2 and 8 in WRKSPFLF).
The major advantage of this viewer is that it is WYSIWYG. You get to see blanks lines. Also, you can customize the display.

The major disadvantage is that the complete report must be copied to your PC, so it may take a while for a large report to open.
Cut, Copy, Paste, Drag and Drop

You can use standard windows features to move or copy spool files.

- Cut or Copy a spool file and Paste in a different queue!
- Drag and Drop a spool file to your desktop!
The context menu for a job presents options for displaying and controlling a job. Basically, it provides the same options as the Display Job (DSPJOB) and/or Change Job (CHGJOB) commands.

- Monitors (discussed later).
- Printer Output.
- Job Log.
- Details.
  - Call Stack
  - Library List
  - Locked Objects
  - Open Files
  - Threads
  - Transactions
  - Elapsed Performance Statistics
  - Last SQL Statement
- Reply.
- Hold.
- Release.
- Move.
- Delete/End.
- Properties.
Job - Printer Output

Printer Output lists all spool files that have been generated from a job.
Job Log displays the job log for the job. Note that the most recent entries are at the top of the list.
These examples show the *Call Stack* and *Library List* windows for a job.

You can see further details on any item by double clicking on it or by selecting *Properties* from the context menu.

The Library List has a nice *Search Library List* option on its context menu.
This example shows the Locked Objects window for a Job.

You can see further details on any item by selecting Properties from the context menu.

You can get a list of all jobs that have a lock on an object by double clicking on it or by selecting Lock Holders from the context menu.
This example shows the Open Files window for a Job.

You can see further details on any item by double clicking on it or by selecting Properties from the context menu.
Are you missing your green screen yet? Do you feel the need to run a command?

Well you can, if you select Run Command from the context menu for the server.
Run Command Options

The Run Command option presents you with a window where you can enter the iSeries command to run. You simply enter the required command. You also have two buttons available, Prompt and Previous Commands, which we will discuss on the next page.

You must be careful about the commands you try to run. There is no point in trying to run an interactive command because you are not on a 5250 screen. Therefore, running the command WRKSPLF will not display a list of spool files that you can page up and down through, but it will create a spool file with all relevant information - although this is very dependent on the command you run.

The OS/400 Options tab allows you to specify options about job logging and handling Inquiry Messages.

When you click on OK, you receive a confirmation window (you can disable this feature by un-checking the Show this message again box).
These examples show the windows presented when you select the **Prompt** and **Previous Commands** buttons from the Run Command window.

The **Prompt** window will vary depending on the command you are prompting. It presents a GUI representation of an F4 prompt for a command. You have the added benefit of having drop down lists and radio buttons instead of typing in values. In this example we click the radio button for *Print as opposed to typing in *PRINT. The **Prompt** window is available for any iSeries command, even ones you have written yourself.

The Previous Commands window lists the last 20 commands (the default, but you can change it) that you have run through Navigator.
File Systems
File Systems allows you to administer OS/400 file systems and file shares.
File Systems

iSeries Users

Applications, APIs, IFS Commands

Servers (NFS, OS/400, i5OS, Windows etc.)

IFS Interface

Root
QSYS.LIB
QOpenSys
QDLS
QOPT
QFileSvr
UDFS
NFS
QNetWare
QNTC

Notes

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The iSeries supports multiple file systems.

- **Root.** A PC style file system.
- **QOpenSys.** A UNIX style file system. This is the same as a PC style file system except that names are case sensitive.
- **QDLS (Document Library Services).** Shared folders.
- **QSYS.LIB.** The traditional iSeries file system (objects, libraries etc.)
- **QFileSvr.400.** Access to other file systems that reside on remote iSeries servers
- **QOPT.** Optical File System (CD Drive)
- **QNTC.** Access to data and objects that are stored on a server running Windows NT 4.0 or higher. A form of "Network Neighborhood".
- **QNetWare.** Access to local or remote data and objects that are stored on a server that runs Novell NetWare 4.10 or 4.11 or to standalone PC Servers running Novell NetWare 3.12, 4.10, 4.11 or 5.0.
- **UDFs.** User defined file systems.

This is one of the areas where you will definitely want to use the Include option, otherwise you may have a long wait for a list.
The context menu for items in the Integrated File System is fairly standard. The large benefit is that you are using the same interface to access the different file systems.

Compare this to green screen, where you use different commands to work with the different file systems.
The iSeries Netserver allows you to share any directory (or library) and/or printer on a Windows Network.

Simply select the *Sharing* option from the context menu or *Open iSeries Netserver* from the context menu on *File Shares*. 
The **Sharing** options are similar to those in Windows.

You can give the share a name and specify if the share is Read only or Read/Write.
Shared directories can be accessed using the standard Windows mechanism.

In this example we have accessed the iSeries by doing a *Search for Computers* from the context menu on My Network Places.

The log on window requires an iSeries user profile and password. You may want to review iSeries Netserver relating to Disabled User Ids.

You can now use Windows to access (copy, paste, Map Network Drive etc.) directories on the iSeries.
Databases
Databases

SQL is replacing DDS.
- All future database enhancements will be through SQL, not DDS!
- There are already database functions that are only available through SQL.

The standard interface is through the Database Function of iSeries Navigator (part of the base system).
- Provides a "user friendly" interface for SQL’s DDL (Data Definition Language)
- Provides a "Run SQL Scripts" function, to run and test SQL statements.
The Databases option in iSeries Navigator is the new interface for the definition and maintenance of the database.

It is a GUI interface to SQL’s Data Definition Language (DDL).

You select which Schemas (Libraries) to list by selecting **Select Schemas to Display** from the context menu of **Schemas**.
SQL Terminology

<table>
<thead>
<tr>
<th>OS/400</th>
<th>SQL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library</td>
<td>Schema</td>
</tr>
<tr>
<td>Physical File</td>
<td>Table</td>
</tr>
<tr>
<td>Record</td>
<td>Row</td>
</tr>
<tr>
<td>Field</td>
<td>Column</td>
</tr>
<tr>
<td>Keyed Logical</td>
<td>Index</td>
</tr>
<tr>
<td>Non-Keyed Logical</td>
<td>View</td>
</tr>
</tbody>
</table>

Simply different names for what we already have.
- The biggest difference is with Views and Indexes.
SQL Schemas

A Schema is an OS/400 library with additional relational database support information

- Also known as a Collection.
- Contains a Journal and Journal Receiver
  - By default, files created with SQL into a Schema are automatically journaled
- Contains views of the System-wide catalog files
  - Views contain information on the tables or files in this schema
- System-wide catalog files for all libraries are in QSYS and QSYS2.

Used to store relational database objects.
Other kinds of objects may be placed in Schemas as well

The System wide catalog files are a set of files, maintained by the database manager, that contain cross reference information for all files, records, fields etc. on the system.

  e.g. The file QSYS/QADBXREF contains a row for each file on the system.

The catalog consists of the following files in QSYS (along with relevant logical views)

- QADBXREF - Cross reference physical file
- QADBPKG - SQL Package physical file
- QADBDEP - Cross reference dependency file
- QADBXRDBD - RDB Directory physical file
- QADBFCST - File Level Constraint Cross Reference
- QADBCST - Constraint Field Usage Information
- QADBIFLD - Cross reference physical file (Fields)
- QADBKFLD - Cross reference physical file (Key Fields)

and the following files in QSYS2 (names are self explanatory):

- SYSJARCONTENTS
- SYSJAROBJECTS
- SQL_LANGUAGES
- SYSPARMS
- SYSROUTINES
- SYSTYPES
Navigator lists the database objects in a Schema but does not list non-database objects.

You can view all database objects in the schema by selecting All Objects or you can choose the type of database objects you want to work with.

You can create new objects by selecting New from the context menu of any object type.
Create a Table

This is a "user-friendly" interface to SQL's CREATE TABLE.

Note the different tabs for the table.

New columns are defined using the Add button.

You will want to override the Short Column Name if the column name is greater then 10 characters. You may also want to un-check the Nullable box.
Key Constraints identify the primary or unique keys for a table. These do not result in an index (or logical file) object but they do result in an access path.

Key constraints are a pre-requisite for Foreign Key Constraints.
Foreign Key Constraints allow you to define referential integrity between two (or more) databases.

This example shows that there is a relationship between this table and the employee file.
Check constraints allow you to define rules for the values of columns.

This example specifies that the employee id and name may not be blank.
An Index is a keyed logical with all fields and records selected.

Define an Index by selecting **New->Index** from the context menu of a table or from the context menu of Indexes.

Select the key fields by simply clicking on them in the required sequence.
A View is a non-keyed logical.

Select the table or tables on which the view is based and drag the required columns to the bottom pane.

If more then one table is selected (a join logical) drag the required key fields between the tables to define the join logic.

The Select Rows button allows you to define the selection criteria for the rows. This offers a lot more variety then DDS.

The Formula button allows you to define a calculation for a column. Again, this offers a lot more flexibility then DDS.
If you want familiarize yourself with SQL, try the Generate SQL option for an existing Physical File that was generated using DDS/CRTPF.

You can select a number of items from which to generate SQL.

This shows you the SQL script required to generate the database.

One of the large differences between SQL and DDS is that SQL always creates a table where the file and record format names are the same - which can be a problem in RPG programs.

The alternatives are to rename the formats in RPG or to create the table with a name that corresponds to the format name and then rename the table.

These SQL scripts may be saved - consider them the equivalent of your DDS.

Of course, the script could contain the SQL for the table, view, indexes, constraints etc.
Run SQL Scripts (from the context menu on the machine id) is the equivalent of STRSQL - but you do not need the SQL development kit.

End each SQL statement with a semi colon.

More then one SQL statement may be run at a time.

Sample SQL statements are available in the drop down box.

The basic SQL statements may be prompted.
Select Show Related from the context menu of a table to see all database objects that are related to it, including Triggers, Constraints and Journals.
Database Navigator draws a map of your database.

This map was generated by selecting Add to Map from the context menu on the table PTH.

The map is customizable - move items about and Navigator will retain the links.

All the items are accessible from their context menus.
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Anything and everything on SQL

Other
- www.midrange.com
In Conclusion

iSeries Navigator is a powerful tool........

Learn to Use It!