IBM Software Group

IMS11

IMS Control Center for Distributed IMS Operations through DB2

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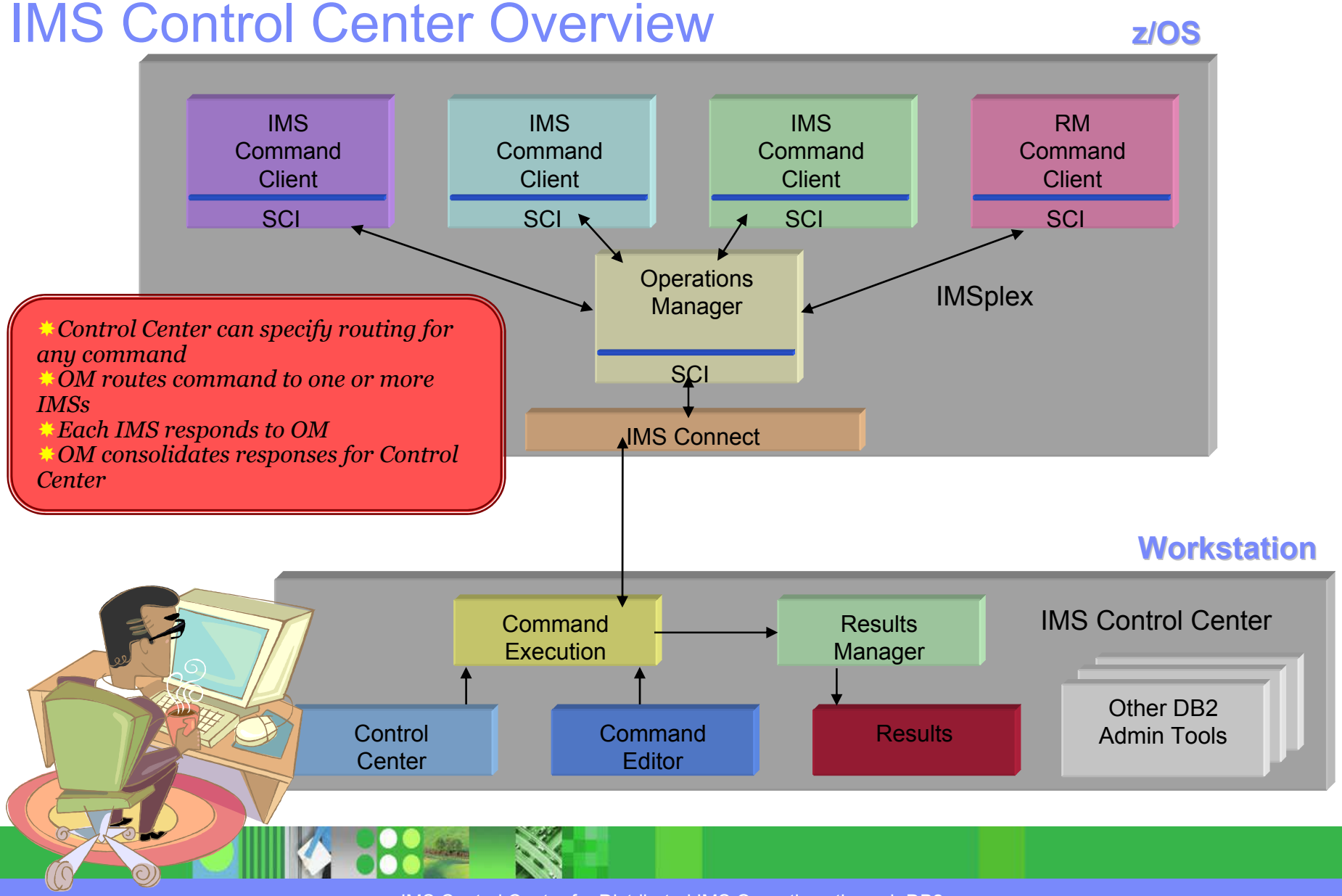
Benefits of using the IMS Control Center

- Simplify IMS Administration and Problem Determination
- Consistency and integration of IBM user interfaces
- Provide a platform for modernization of the IMS systems' management user interface
- Provide an easy to use GUI for the Common Service Layer Operations Manager
- Reduce skill level required for IMS administration with an *easy to use* GUI
- Make IMS administration an attractive skill for new administrators

Context of IMS Control Center

- Within the scope of the resource types addressed in IMS V8 (and now IMS V9) systems management
- DB2 Control Center as the IBM solution for system administration

IMS Control Center Overview

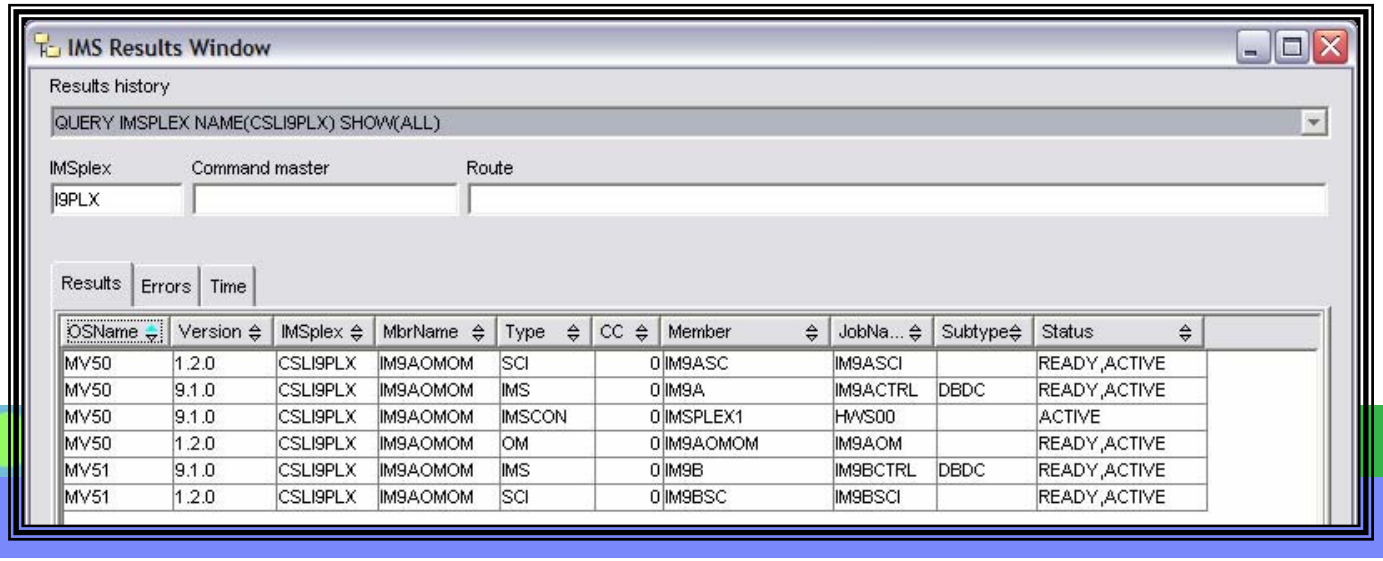


The IMS Common Service Layer

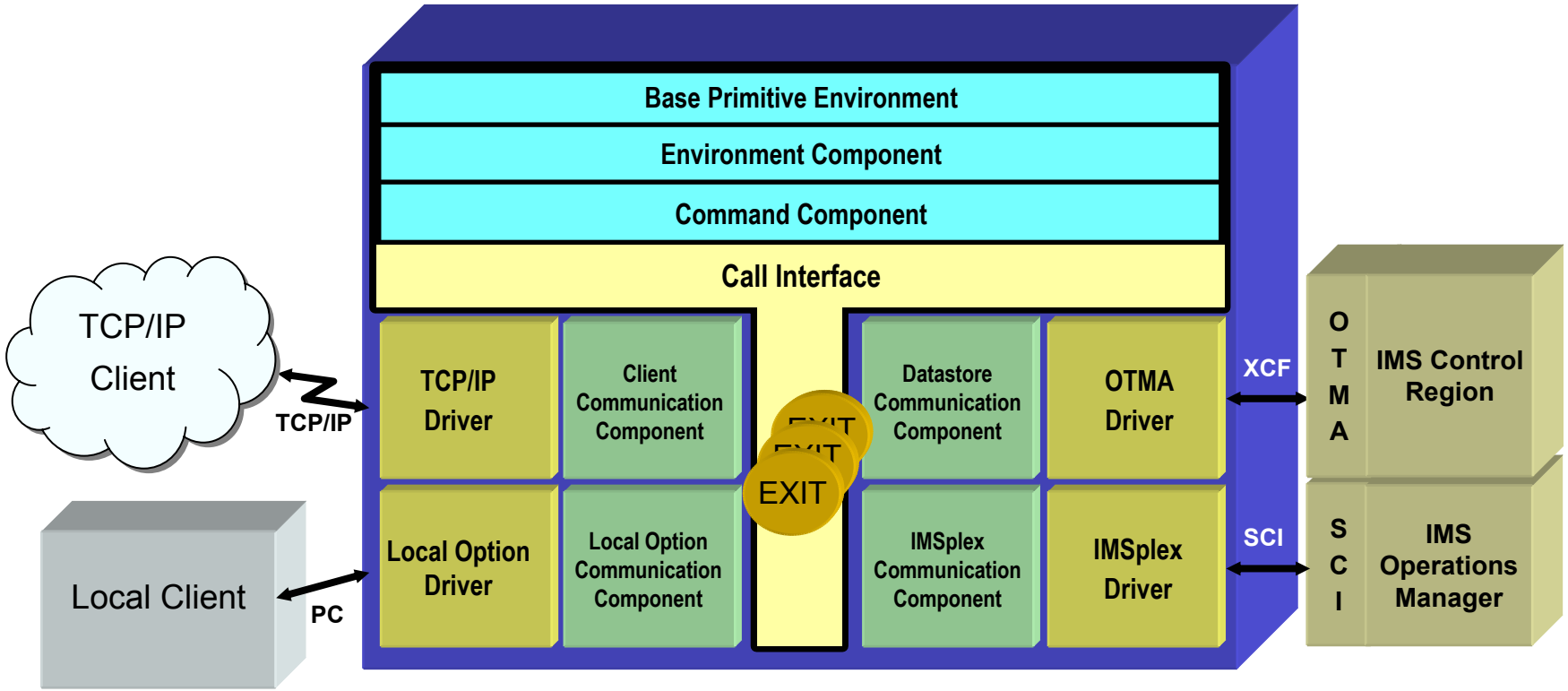
- Common Service Layer (CSL)
  - ***An architecture***, not an address space
  - **Optional** in IMS V8 and IMS V9
- Three new address spaces built on the Base Primitive Environment (BPE)
  - **Structured Call Interface** (SCI)
  - **Operations Manager** (OM)
  - **Resource Manager** (RM)
- Purpose
  - Infrastructure for system management tasks in one or more IMS systems within an IMSplex
  - Foundation for future IMS architecture and Parallel Sysplex enhancements

Terminology - The "IMSplex"

- A set of one or more IMS address spaces that ***work together as a unit***
  - Typically these address spaces:
    - Share either databases or resources or message queues (or any combination of these)
    - Run in an OS/390 or z/OS sysplex environment
    - Include an **IMS Common Service Layer**
  - The address spaces in an IMSplex are referred to as ***IMSplex components***
  - All IMSplex components within one IMSplex share the same IMSplex name
    - Specified by **IMSPLEX=** in a proclib member for each address space



IMS Connect Support of Operations Manager

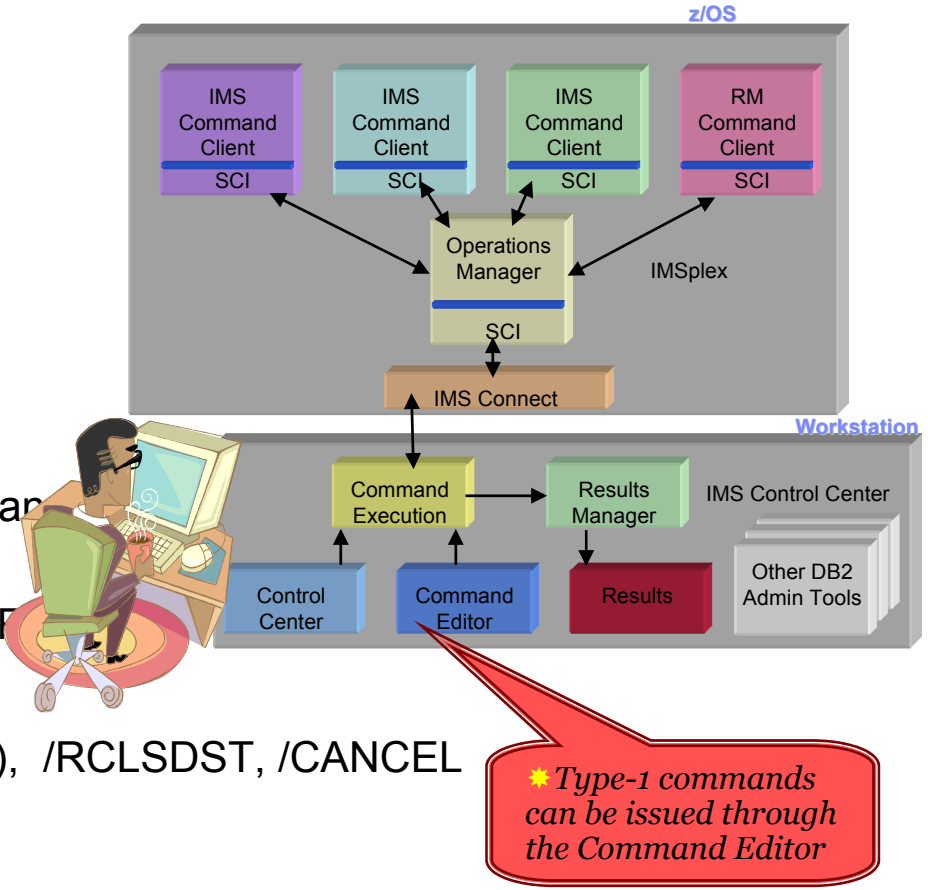


Commands in IMS from V8 onwards

Two "types" of Commands:

- **Type-1 Commands**
  - In original "pre-IMS V8" command syntax
  - For example
    - /DISPLAY ACT
  - Most type-1 IMS commands (/DBD, etc.) can as through the “traditional” methods)
    - IMS commands specific to an input LTER
      - For example:

        /FORMAT, /EXIT (without keywords), /RCLSDST, /CANCEL



Type-2 Commands

- **New** from IMS V8 onwards
- Can ***ONLY*** be issued through the OM API

Type-1 Commands

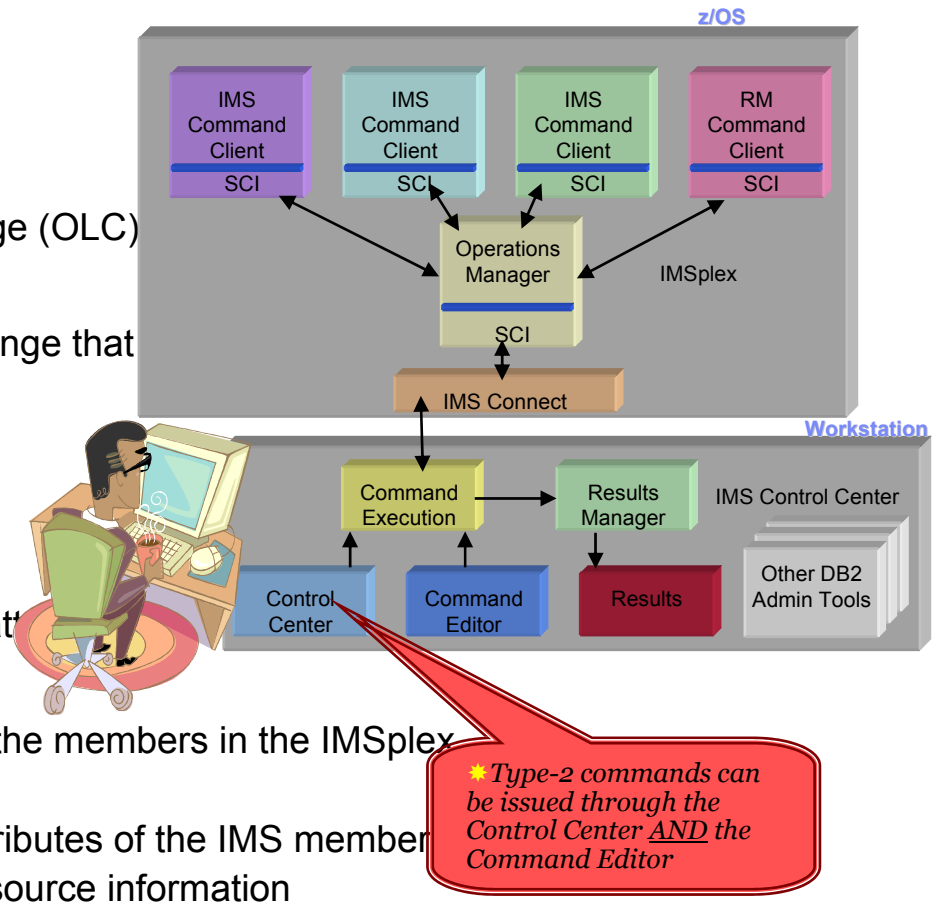
- IMS command **verbs** and certain **primary keywords** can be issued through the OM API
  - **Command verb** can be in ***long*** form or ***short*** form
  - For example:
    - **DIS**
    - **DISPLAY**
  - Only one format of the **primary keywords** is supported
    - For example the following are ***not*** supported:
      - DIS **ACTIVE,** DIS **A**
    - For example the following ***are*** supported:
      - DIS **ACT,** DISPLAY **ACT**

Command (long form)	Command (short form)	Primary Keywords
/ACTIVATE	/ACT	LINK, NODE
/ASSIGN	/ASS	CLASS, CPRI, INPUT, LCT
/BROADCAST	/BRO	ACT, LINE, LTERM, MASTER, NODE, PTERM, USER
/DISPLAY	/DIS	ACT, AFFIN, AOITKN, APPC, AREA, ASMT, CCTL, CONV, CPLOG, CQS, DB, DBD...etc.

- See IMS Version 9 Command Reference, SC18-7814, Chpt. 1, IMS Command Language, "Commands Supported by the OM API" for a detailed table.

Type-2 Commands

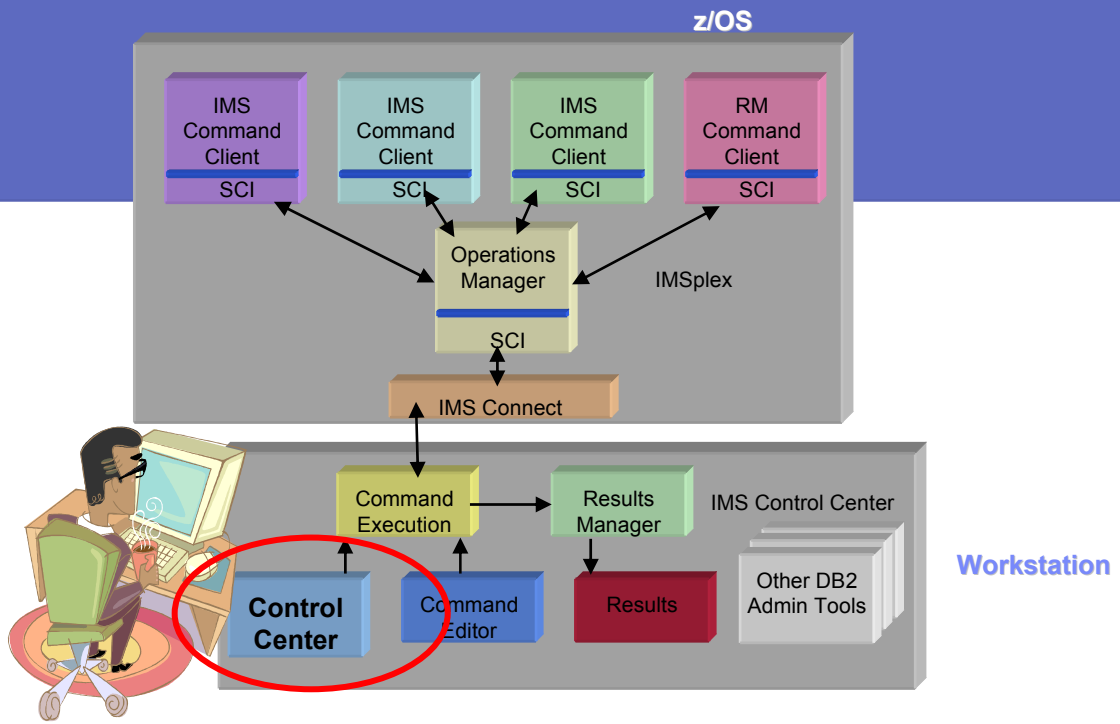
- **INIT (INITiate process)**
  - INIT OLC - starts a global online change (OLC)
- **TERM (TERMinate process)**
  - TERM OLC - stops a global online change that
- **DEL (DELete resource)**
  - DEL LE - deletes runtime LE options
- **UPD (UPDate resource)**
  - UPD LE - updates runtime LE options
  - UPD TRAN - updates selected TRAN att
- **QRY (QueRY resource)**
  - QRY IMSPLEX - returns the names of the members in the IMSplex
  - QRY LE - returns runtime LE options
  - QRY MEMBER - returns status and attributes of the IMS member
  - QRY OLC - returns OLC library and resource information
  - QRY TRAN - returns TRAN info similar to /DIS TRAN
  - QRY STRUCTURE - returns structure information of the RM resource structure



New Type-2 Commands in IMS V9

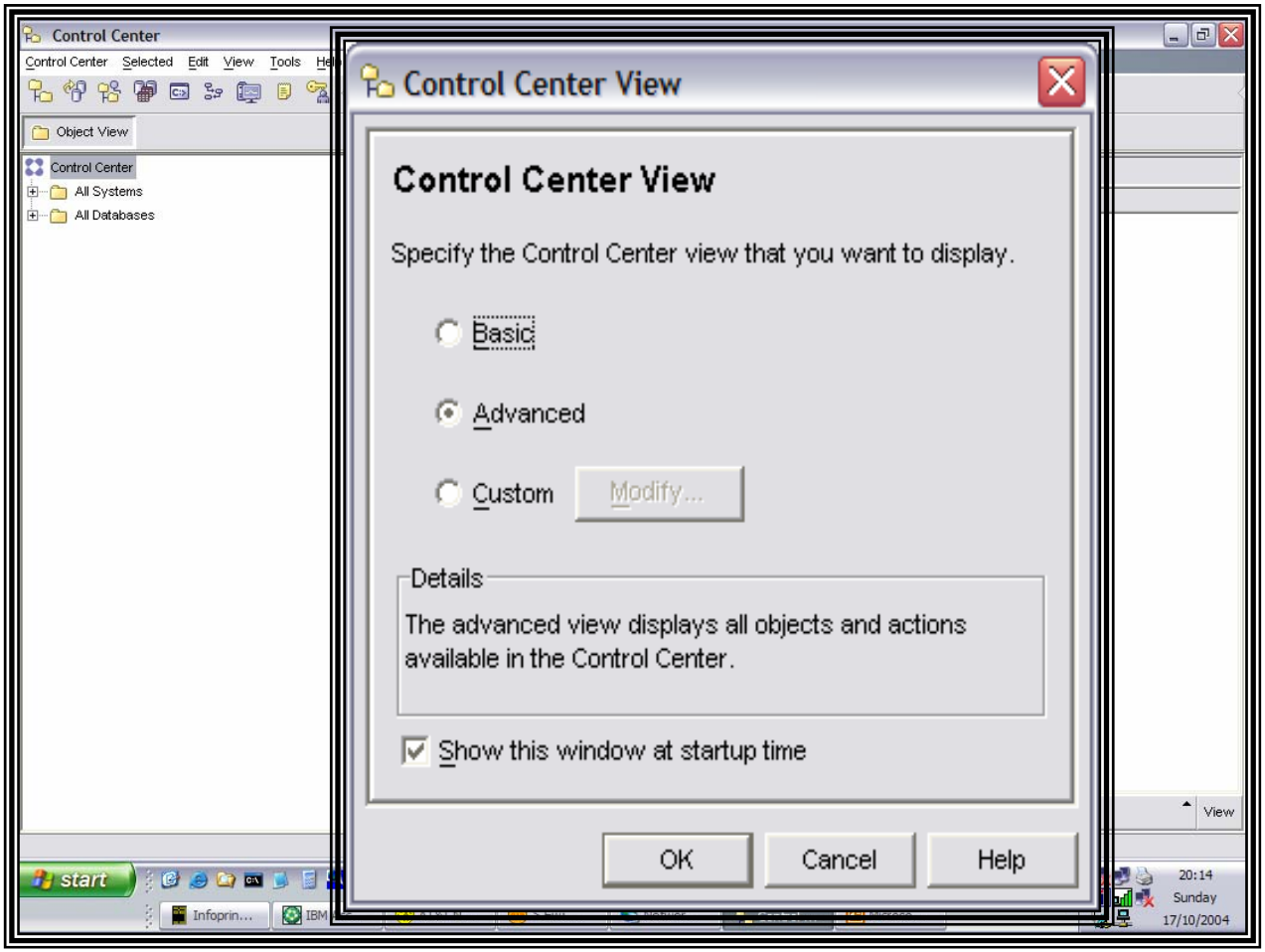
- **INIT (INITiate process)**
  - INIT OLREORG - starts an Online Reorganization (OLR) for HALDB, or reinitiates a suspended OLR
- **TERM (TERMinate process)**
  - TERM OLREORG – suspends an OLR
- **UPD (UPDate resource)**
  - UPD DB – similar to /DBD DB, /DBR DB, /LOCK DB, UNLOCK DB, /START DB, /STOP DB
  - UPD AREA – similar to /DBR AREA, /START AREA, /STOP AREA
  - UPD DATAGRP – similar to /DBR DATAGROUP, /START DATAGROUP, /STOP DATAGROUP
  - UPD OLREORG – modify OLR in progress
- **QRY (QueRY resource)**
  - QRY DB - similar to /DIS DB, /DIS STATUS DB
  - QRY AREA – similar to /DIS AREA
  - QRY OLREORG – query OLRs in progress

IMS Control Center



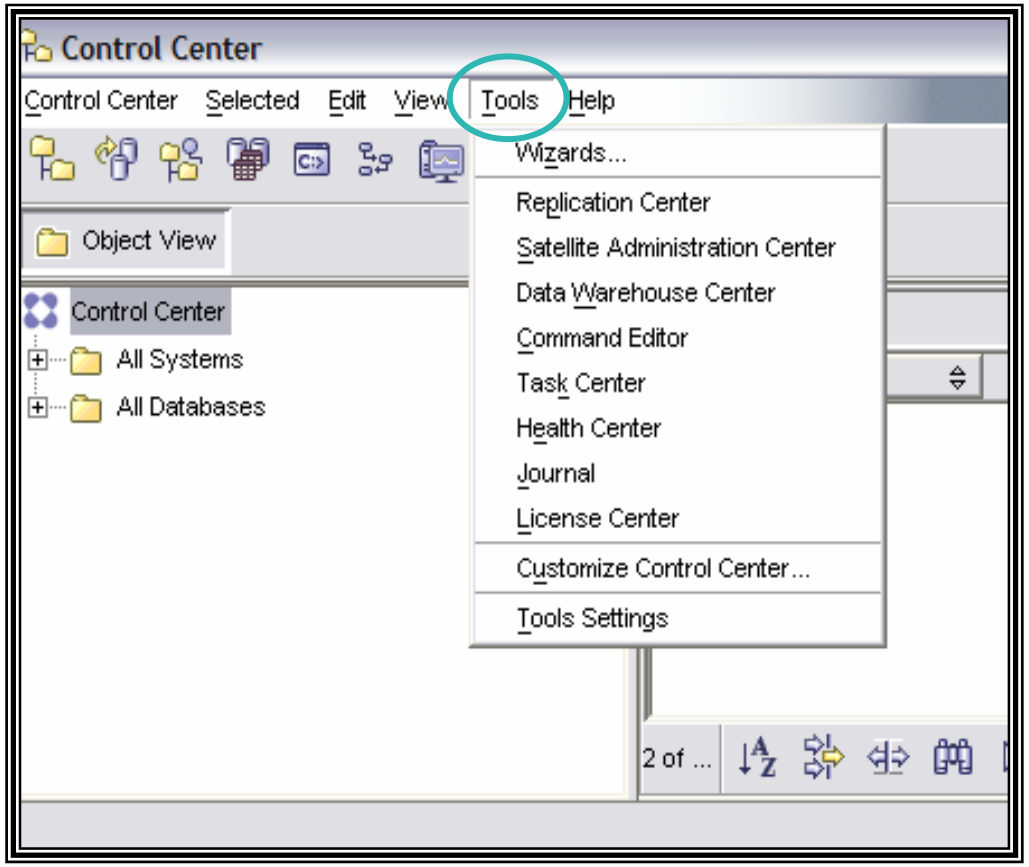
IMS Control Center Overview …

Start->Programs->IBM DB2->General Administration Tools->Control Center.



Control Center – DB2 System Tree

- Manage DB2 workstation systems / instances
- Manage DB2 for z/OS subsystems
- Create databases and related objects
- Explorer-style tree structure for navigation
- Wizards and simple dialogs for ease of use
- Launch the other GUI admin tools
  - Command Editor
  - Health Center
  - Task Center and Journal
  - Data Warehouse Center
  - License Center
  - Satellite Admin Center
  - Replication Center



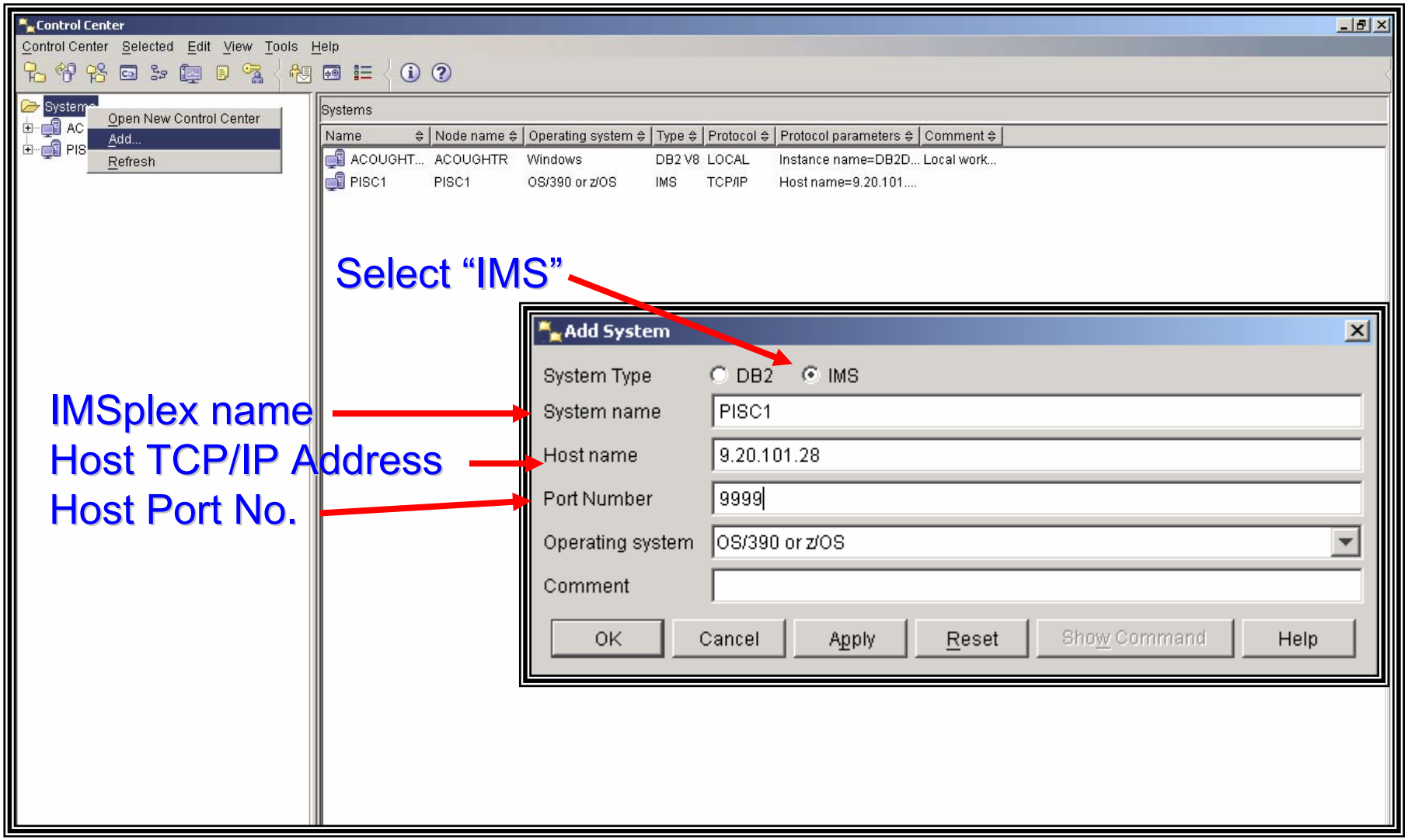
Control Center Overview …

- Control Center supports IMS V8 and later versions
- Allows you to issue ***type-2*** commands from either:
  - Command windows or
  - Wizards
    - Provide more guided assistance
- Results displayed in IMS Results window

Control Center – Add IMSplex System

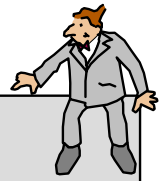
- Add an IMSplex from a pop-up menu of the Systems root of the Control Center tree
- Specify the **IMSplex name**
  - as specified in CSLSIxxx proclib member
- Specify the **z/OS host IP address**
- Specify the **port** where IMS Connect is listening

Control Center – Add IMSplex



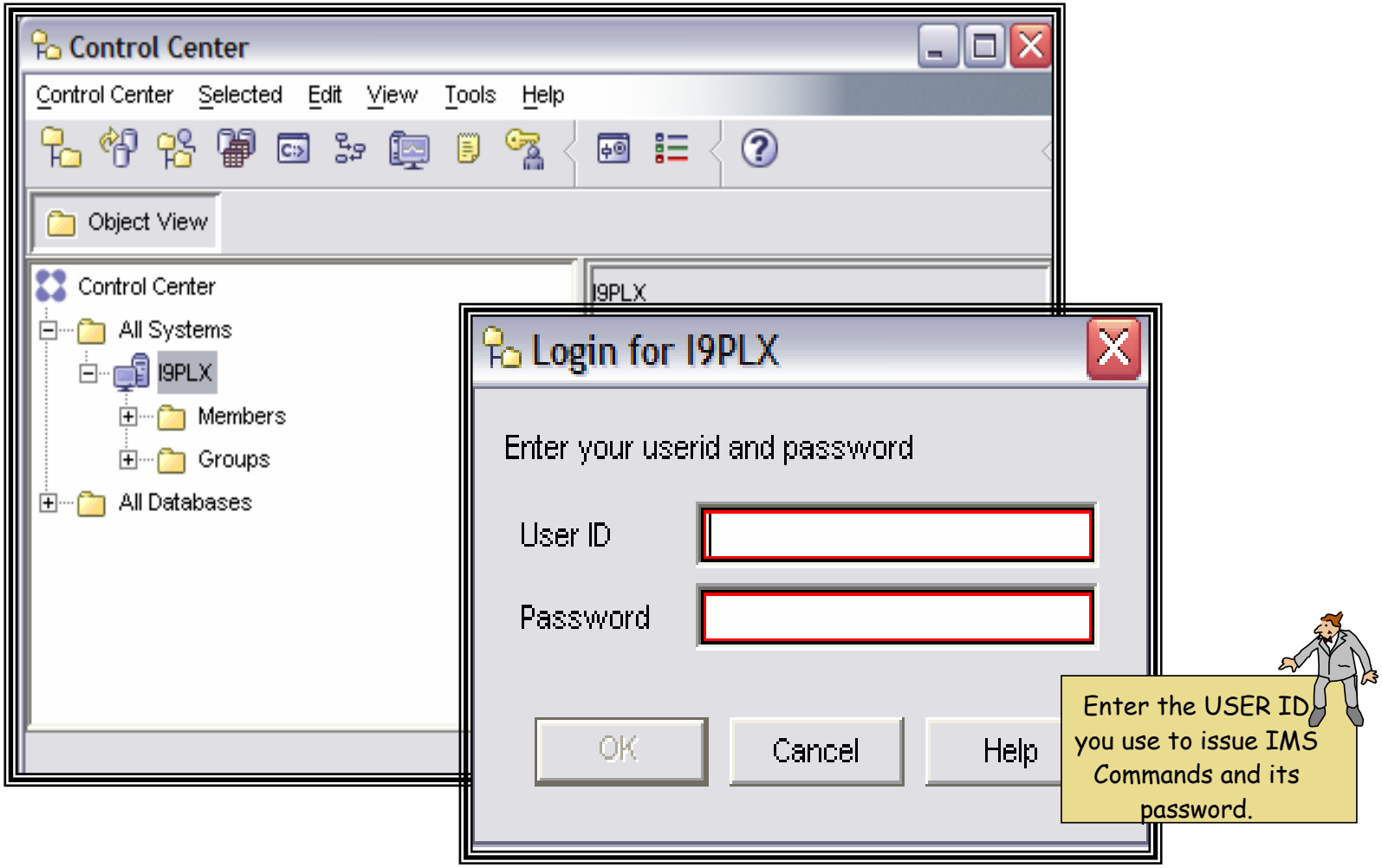
IMSplex Login

- Security provided on z/OS by RACF or equivalent security tool
- **User ID** and **Password** entered on client
- Login required for every session before active members become visible



Login is to establish connection to IMS Connect, which in turns registers with SCI to enable the communication to members (e.g., OM, IMSs) in the IMSplex.

Control Center – IMSplex Login



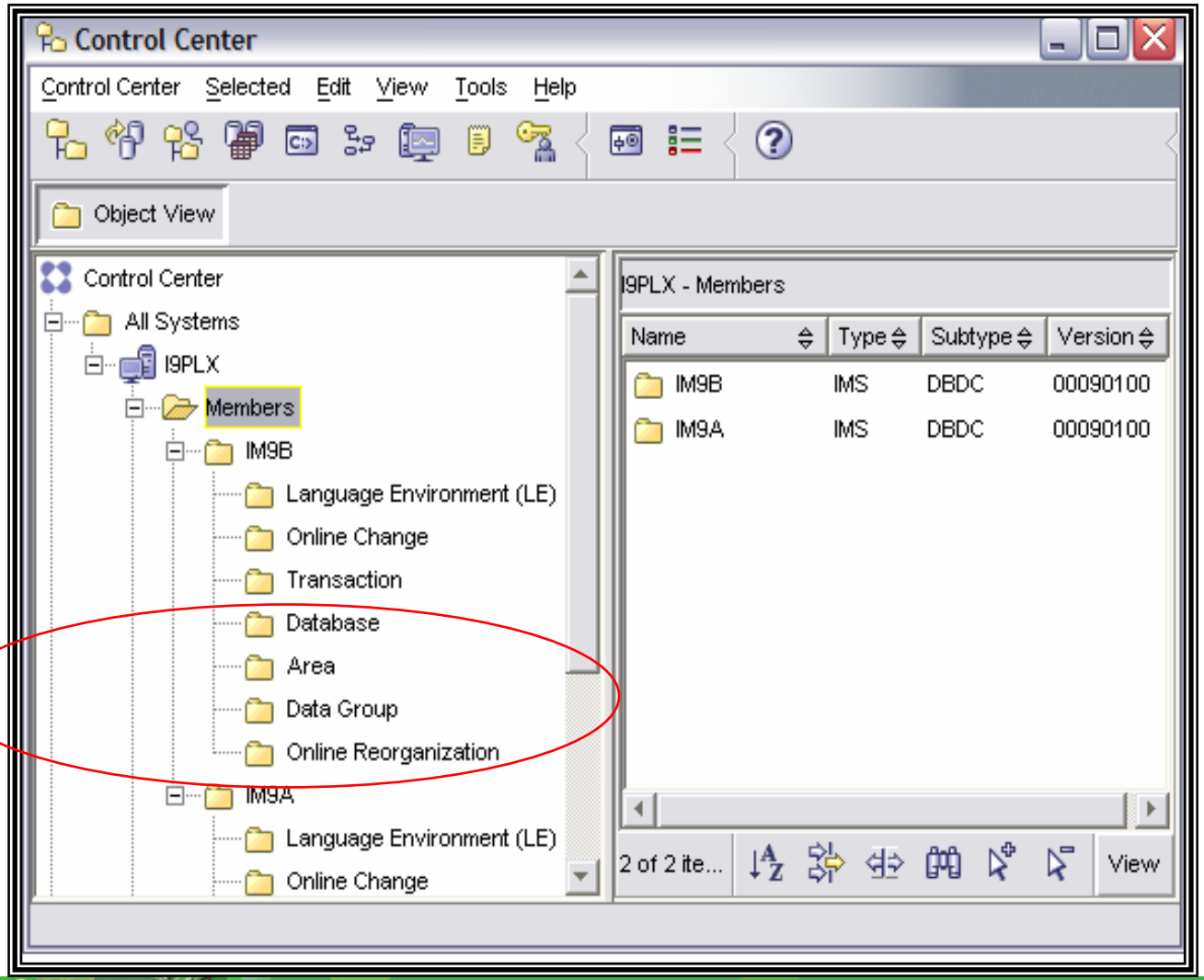
IMSplex Tree

- Lists the IMSplexes you have added
- Lists active IMSplex command client members (in V8, IMS and RM type members)
- Lists resource types for each member

- During a session, the list of members can be updated using **Refresh** from the IMSplex menu
- All IMSplex members can be listed using **Query…** from the IMSplex pop-up menu

Control Center – IMSplex and Members

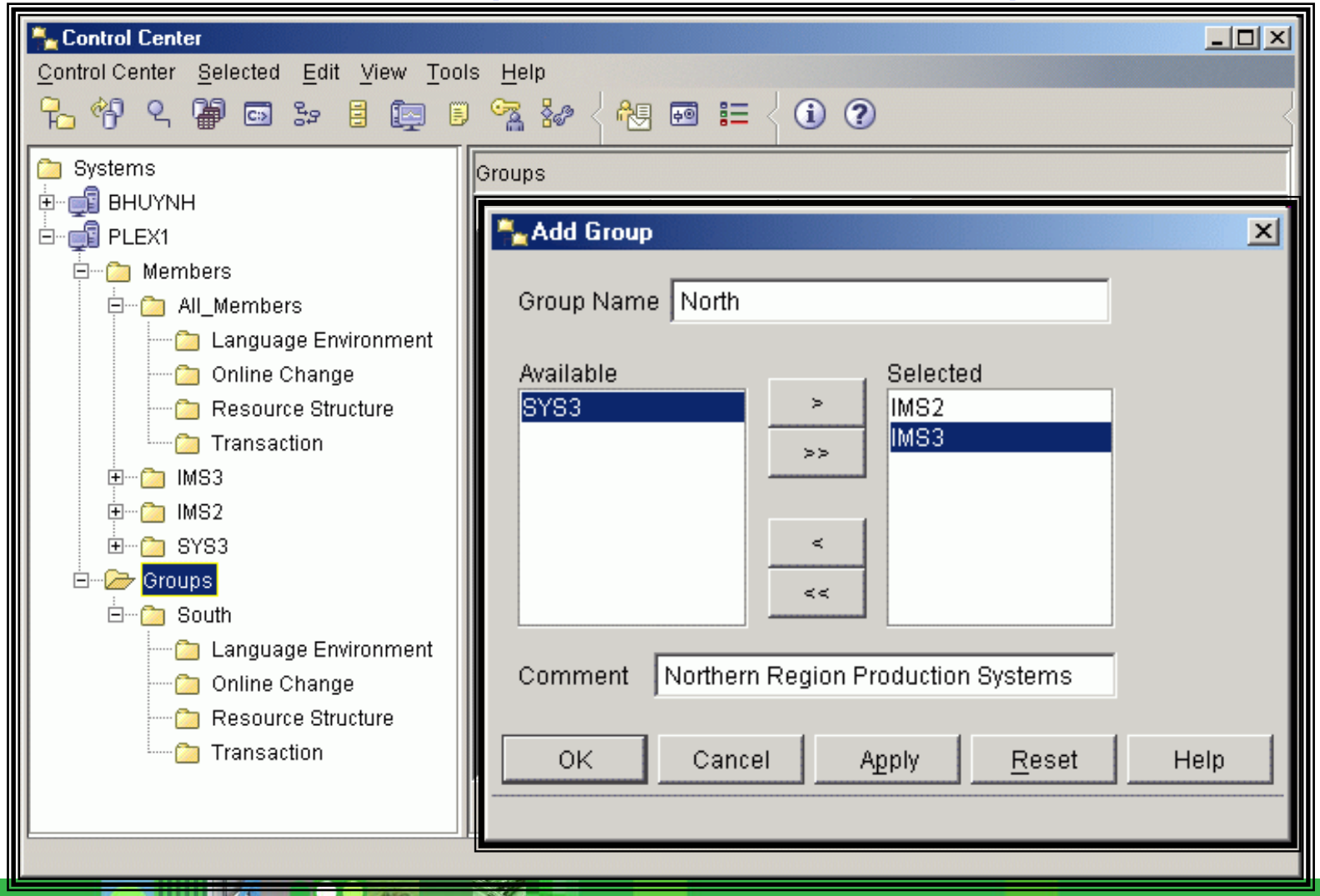
IMS V9 Resources



IMSplex Member Groups

- Named groups for any subset of members
- All_Members group provided as the single-point-of-control (SPOC)
- A command sent to a group is sent to ***all members*** of that group
- OM gathers all member responses before returning results to the Control Center

Control Center – IMSplex Member Groups



Type-2 Commands

- In IMS V8:
  - Query IMSplex
  - Query Member
  - Query LE
  - Update LE
  - Delete LE
  - Initiate Online Change
  - Query Online change
  - Terminate Online change
  - Query Structure (Resource Structure)
  - Query Tran
  - Update Tran

- Additionally in IMS V9:
  - Query Database
  - Update Database

  - Query Area
  - Update Area
  - Update Data Group

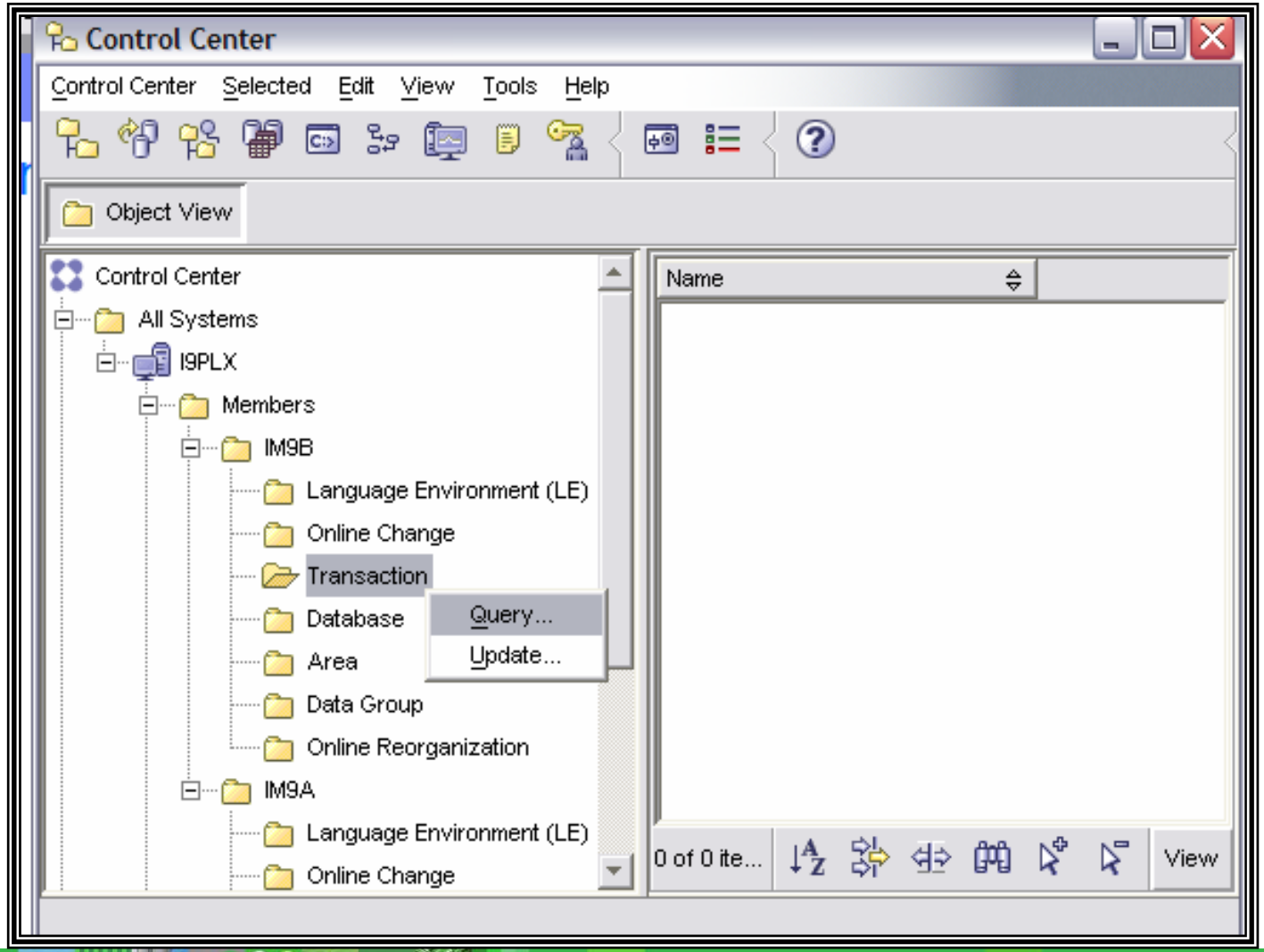
  - Initiate Online Reorganization
  - Query Online Reorganization
  - Terminate Online Reorganization

"Wizards" can be launched for the more complex commands, giving step-by-step prompts and instructions

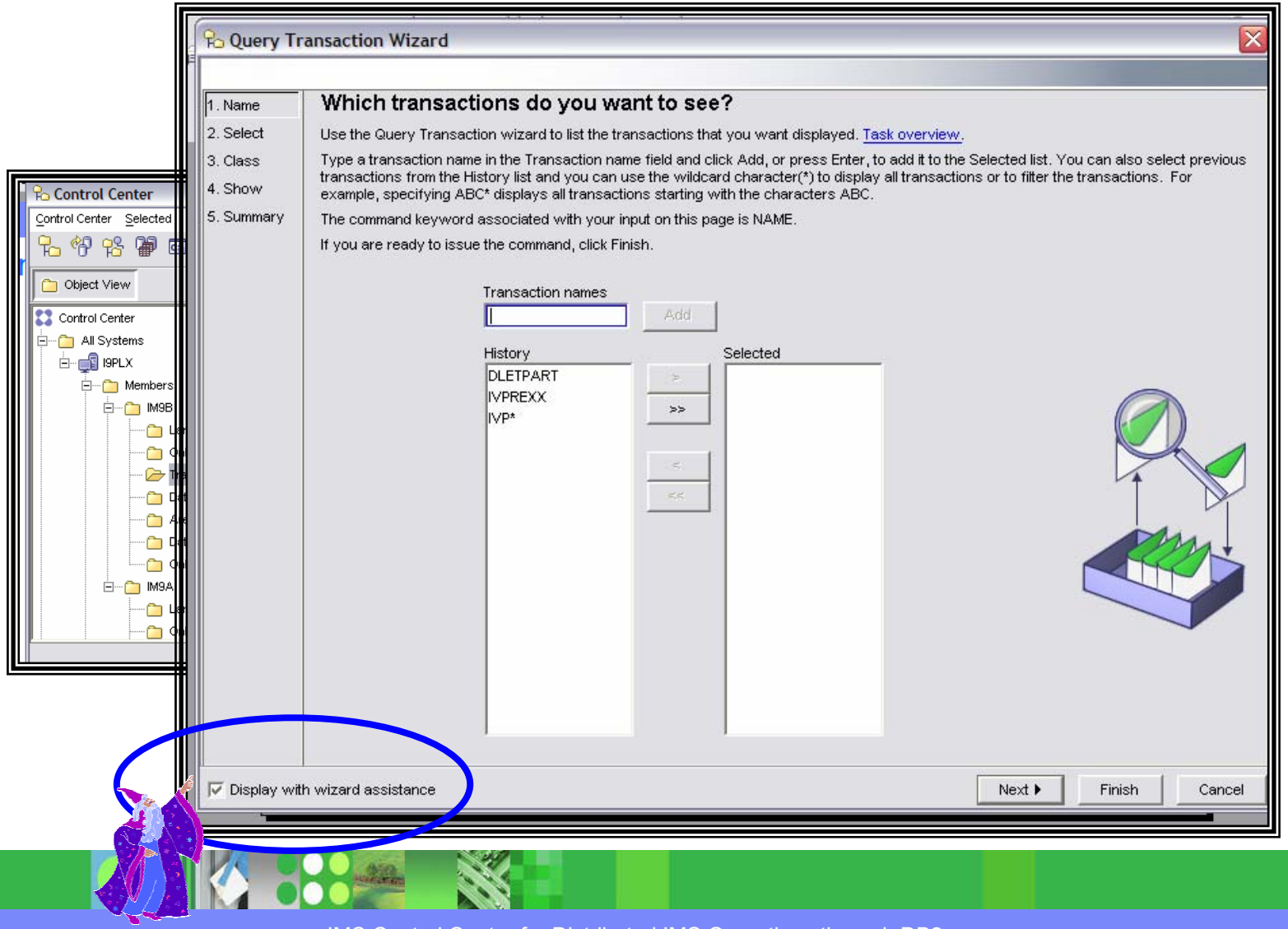
Command Wizards

- Wizards for the more complex commands
- Query wizards displayed automatically when clicking on a resource type folder
- Launched from pop-up menus in Control Center or objects in Results window
- Provide step-by-step prompts and instructions
- Previous names remembered in history list

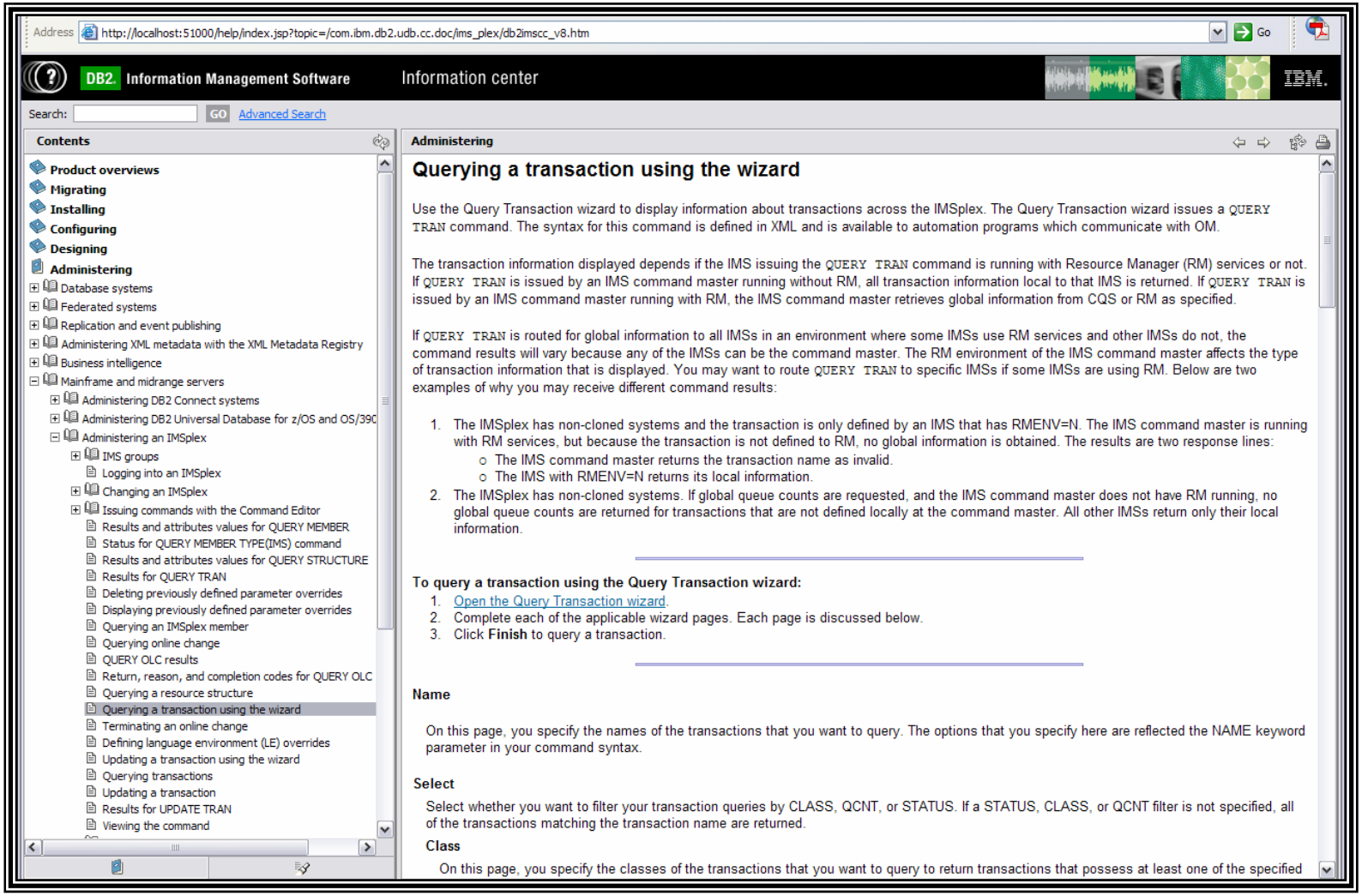
Control Center – Type-2 Commands



Command Wizards



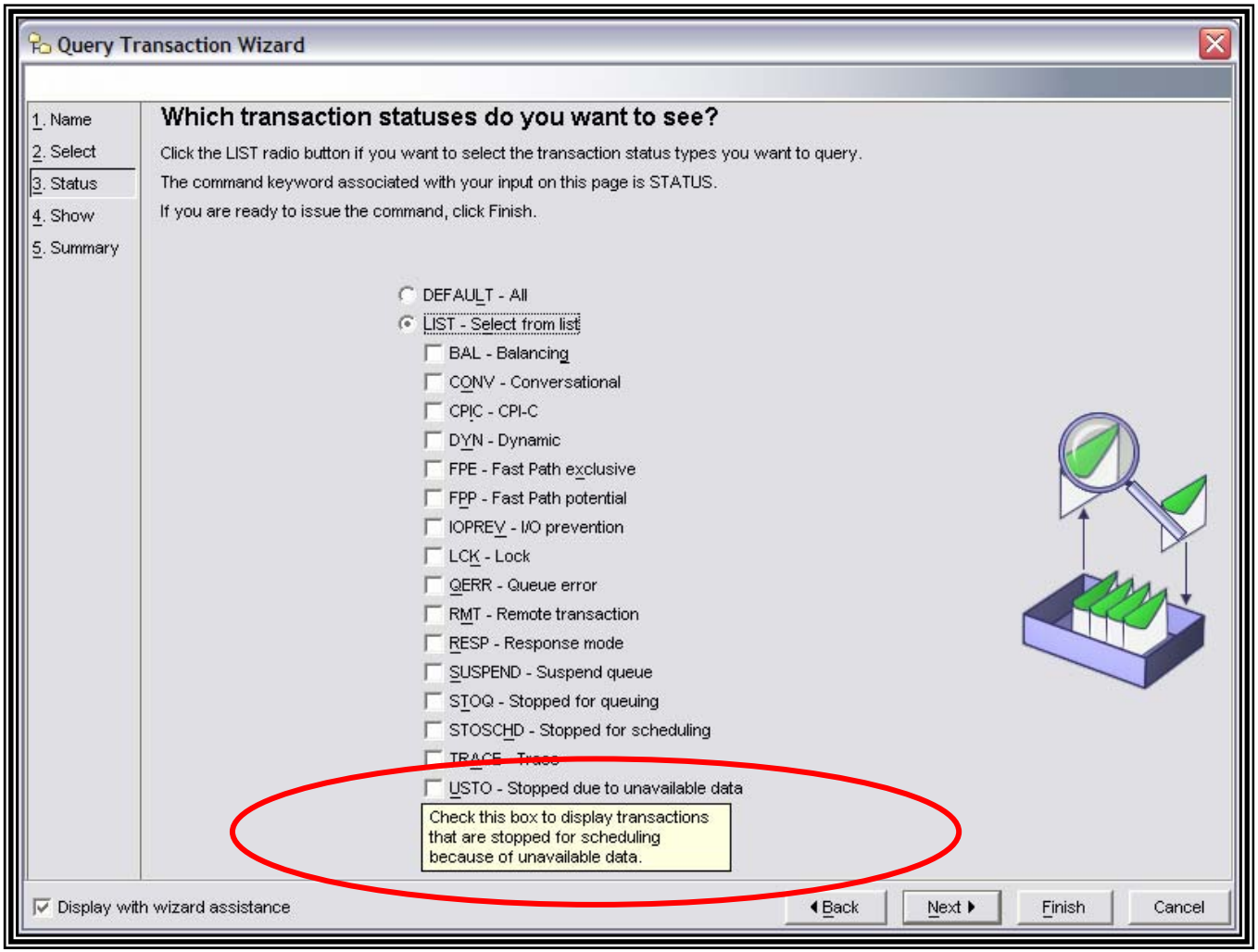
Task Overview



Wizard Help for Command Options

- Select command options from lists
- Help pop-ups for each option
- Option keywords listed for learning commands

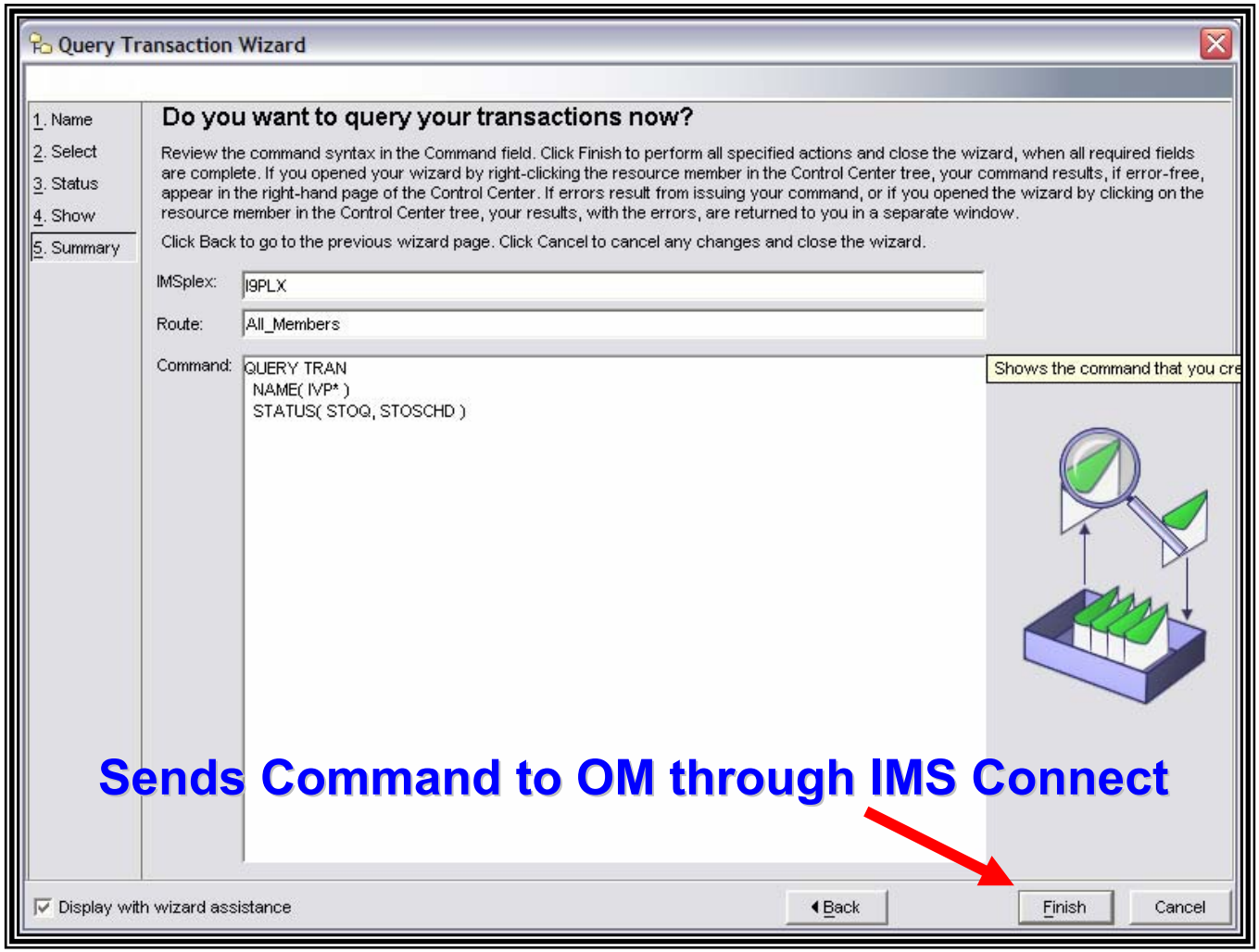
Wizards – Help Selecting Options



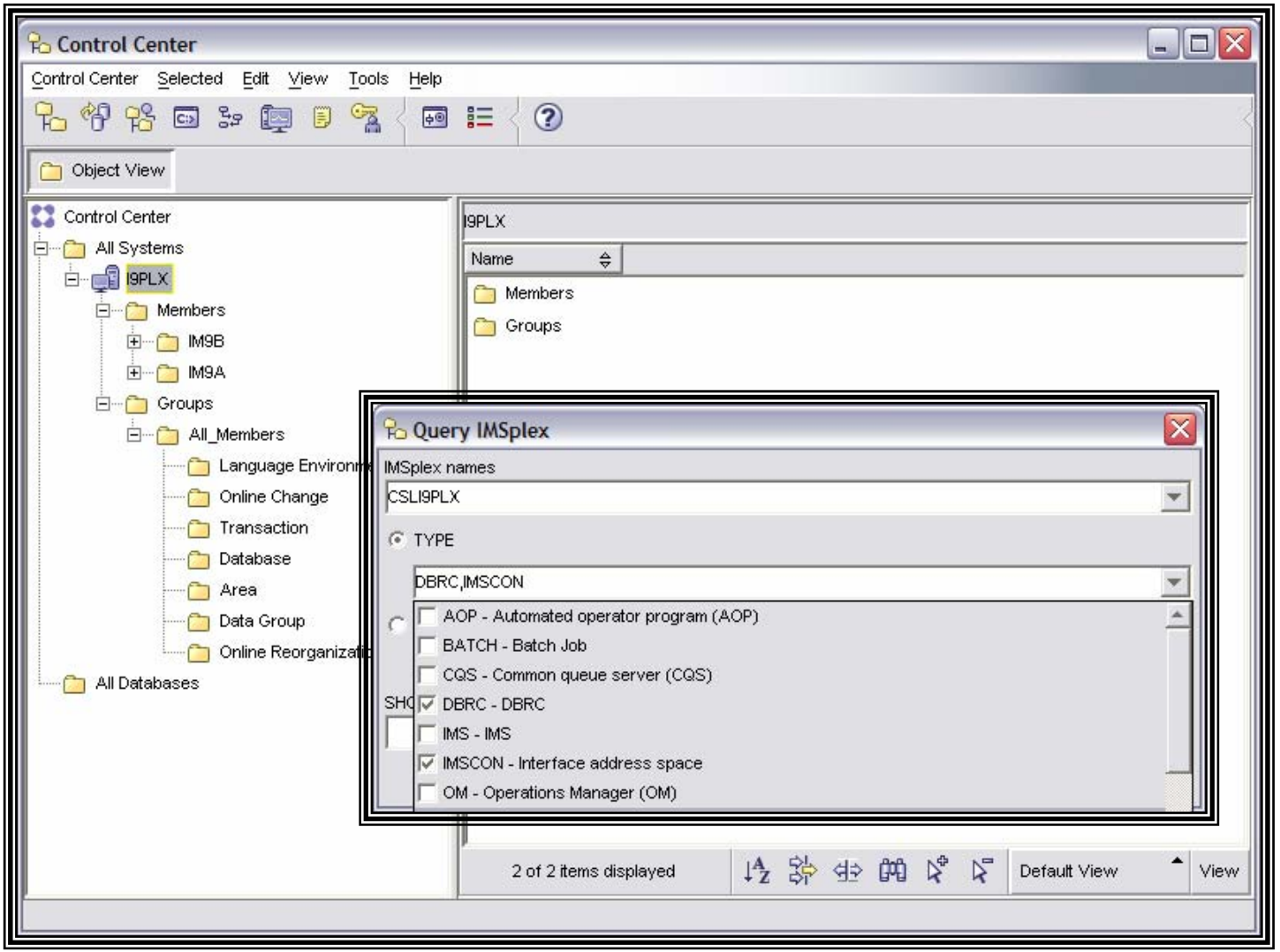
Wizard Generated Command

- Command generated by user selections is displayed on the **Summary page**
- IMSplex and Route are also displayed
- **Finish** button sends command to OM through IMS Connect

Wizards – Generated Command



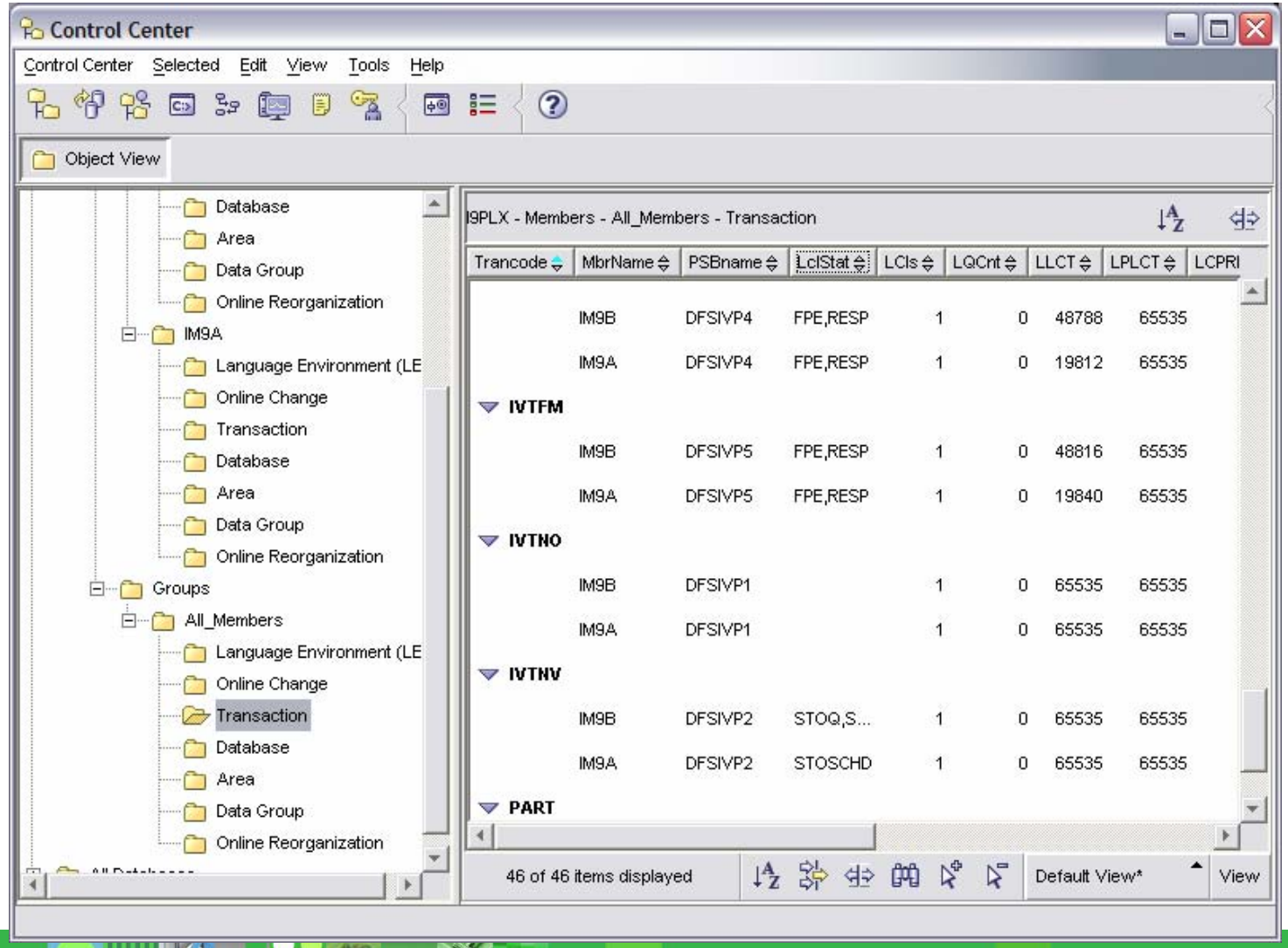
Command Window



Displayed Resources in Control Center

- Resources displayed as the contents of the resource type folder
- Resources displayed in a tabular format
- Resources ordered by member as they were returned by OM
- Columns can be reordered by drag and drop or using the customize columns dialog
- “Find” enables search for specific values

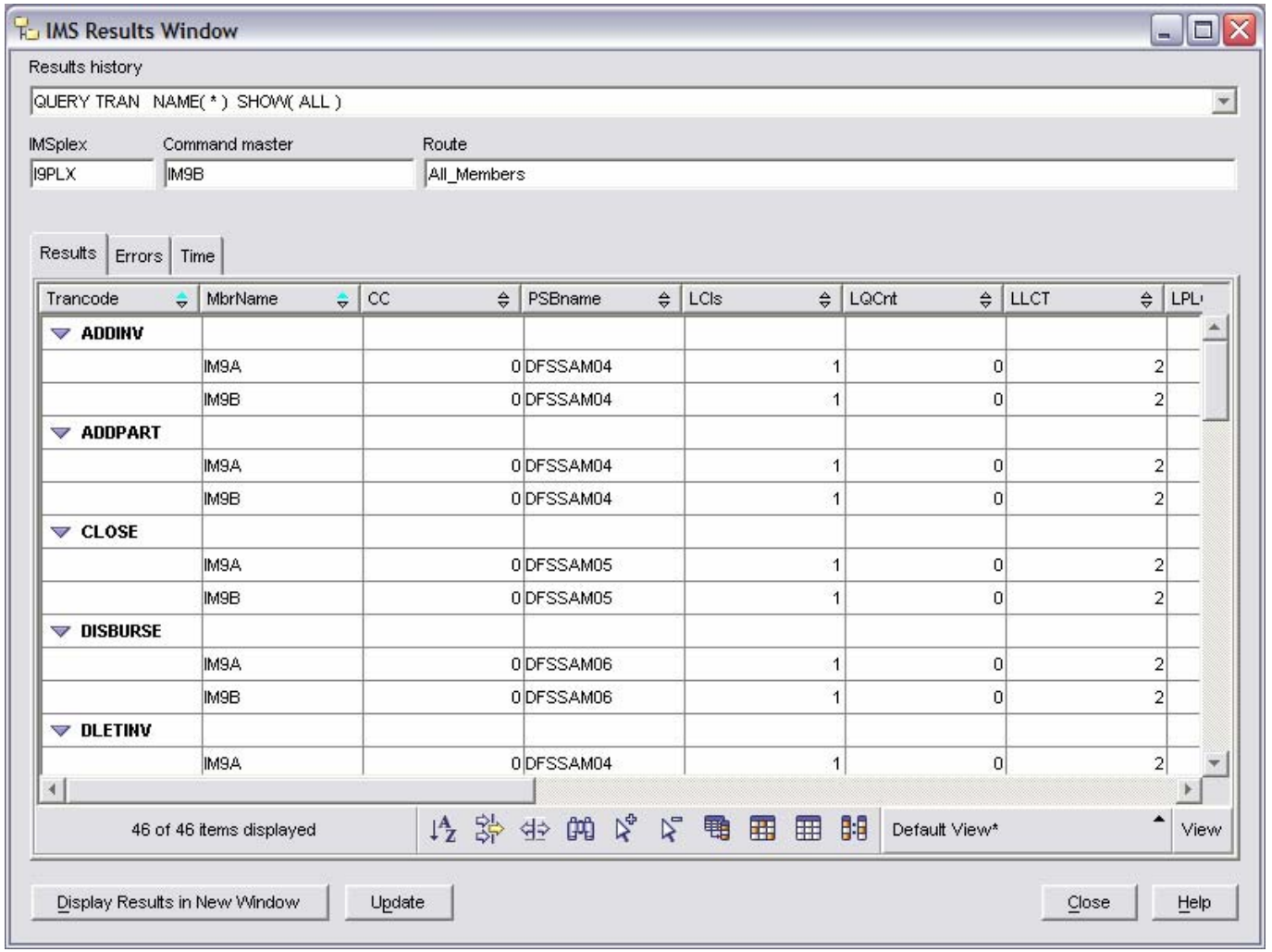
Control Center – Displayed Transactions



Command Results Sorting

- Resources can be sorted on any column by clicking on the column header
- Click again to reverse ascending/descending
- Sort dialog available from view toolbar enables multi-level sorting and grouping

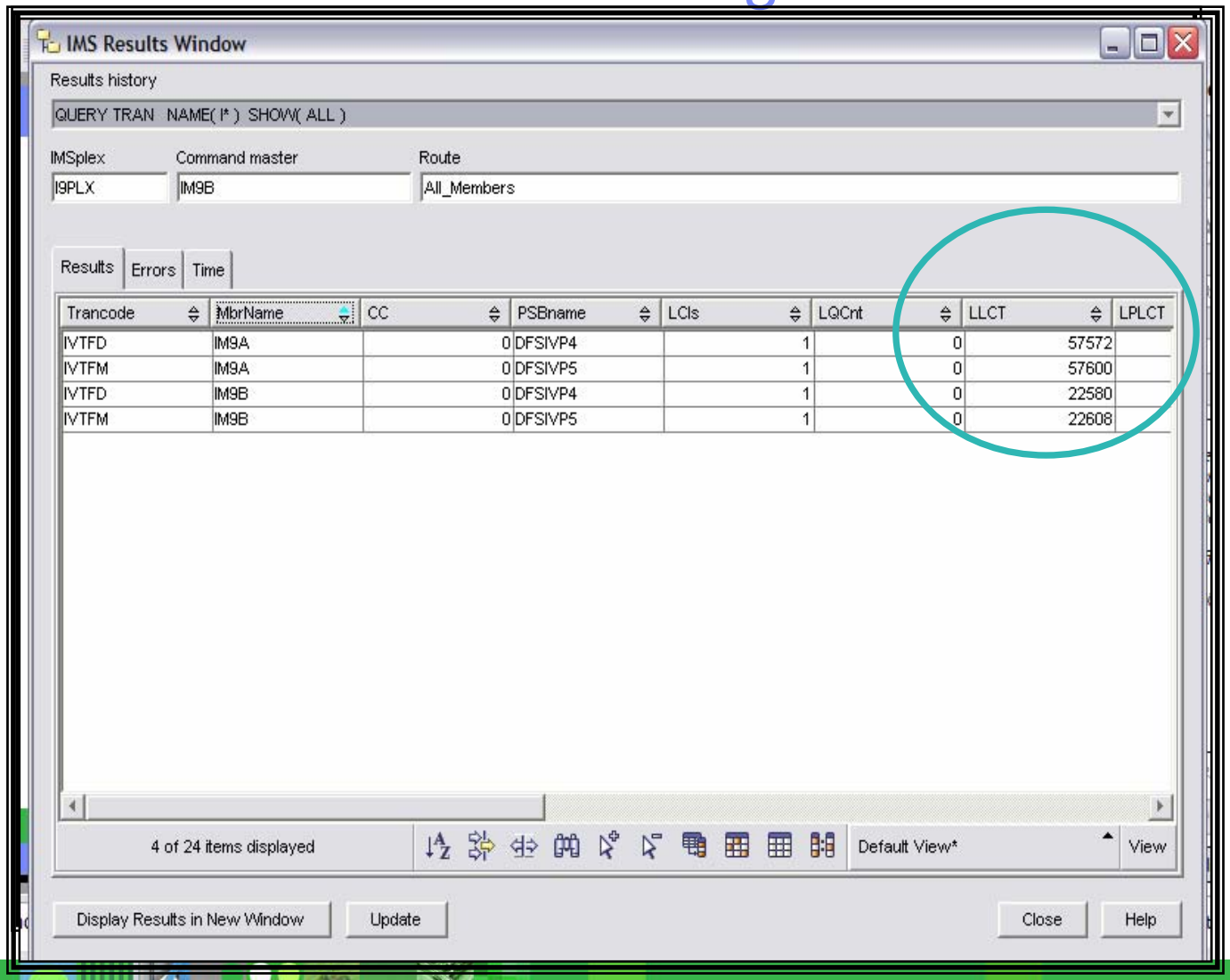
Control Center – Results Sorting



Command Results Filtering

- Filter dialog available from view toolbar
- Filter resources on any columns
- All resource information is saved locally, allows applying any number of successive filters to study data

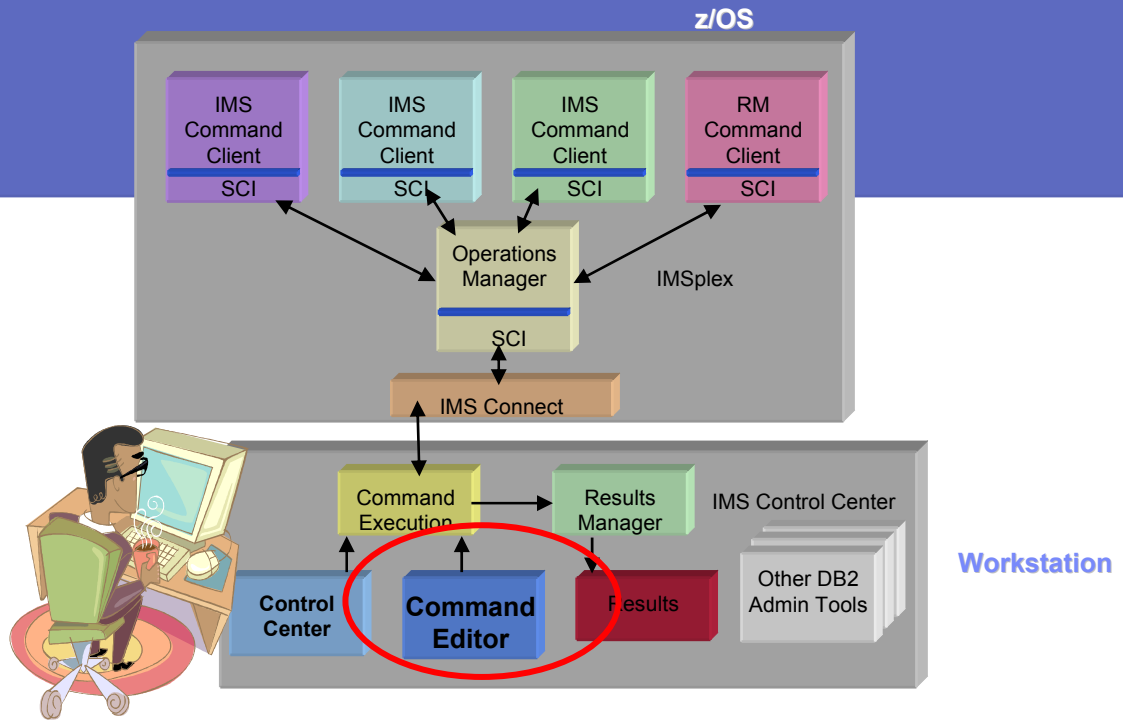
Control Center – Results Filtering



Control Center Summary

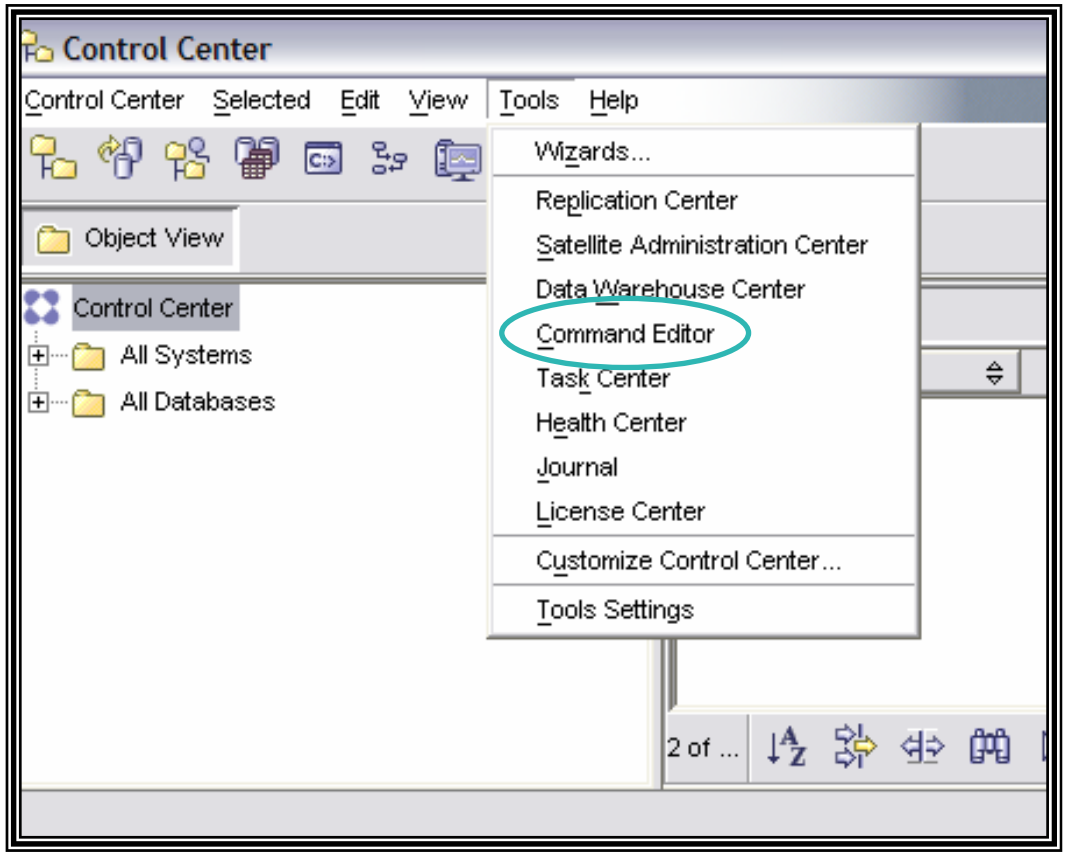
- For type-2 commands only
- Commands are generated through windows and wizards
- Various sorting and filtering available

Command Editor



Command Editor

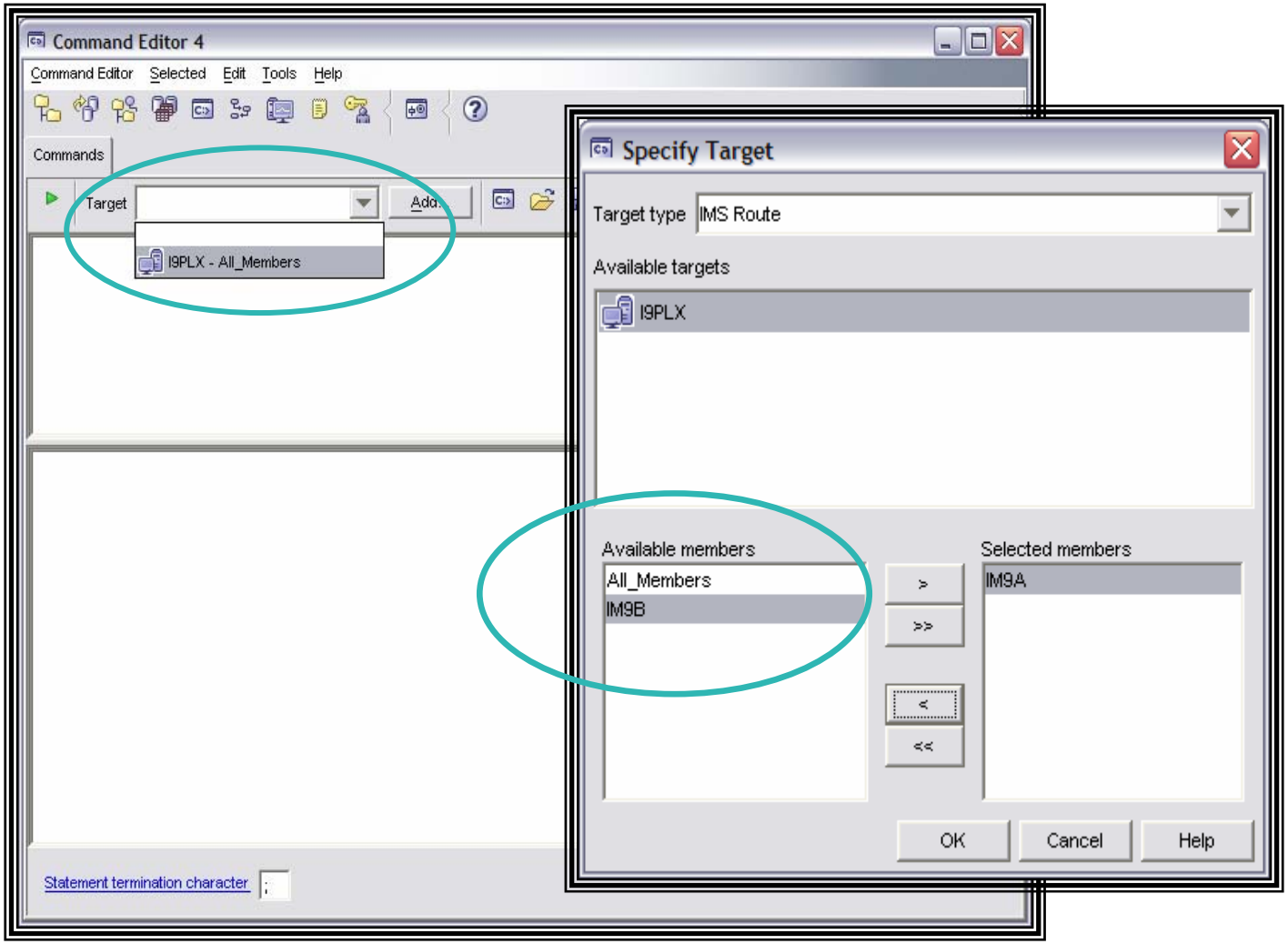
- Command types
  - SQL statements and DB2 commands
  - IMS commands
    - type-1 and type-2
- Command and response log



IMS Commands

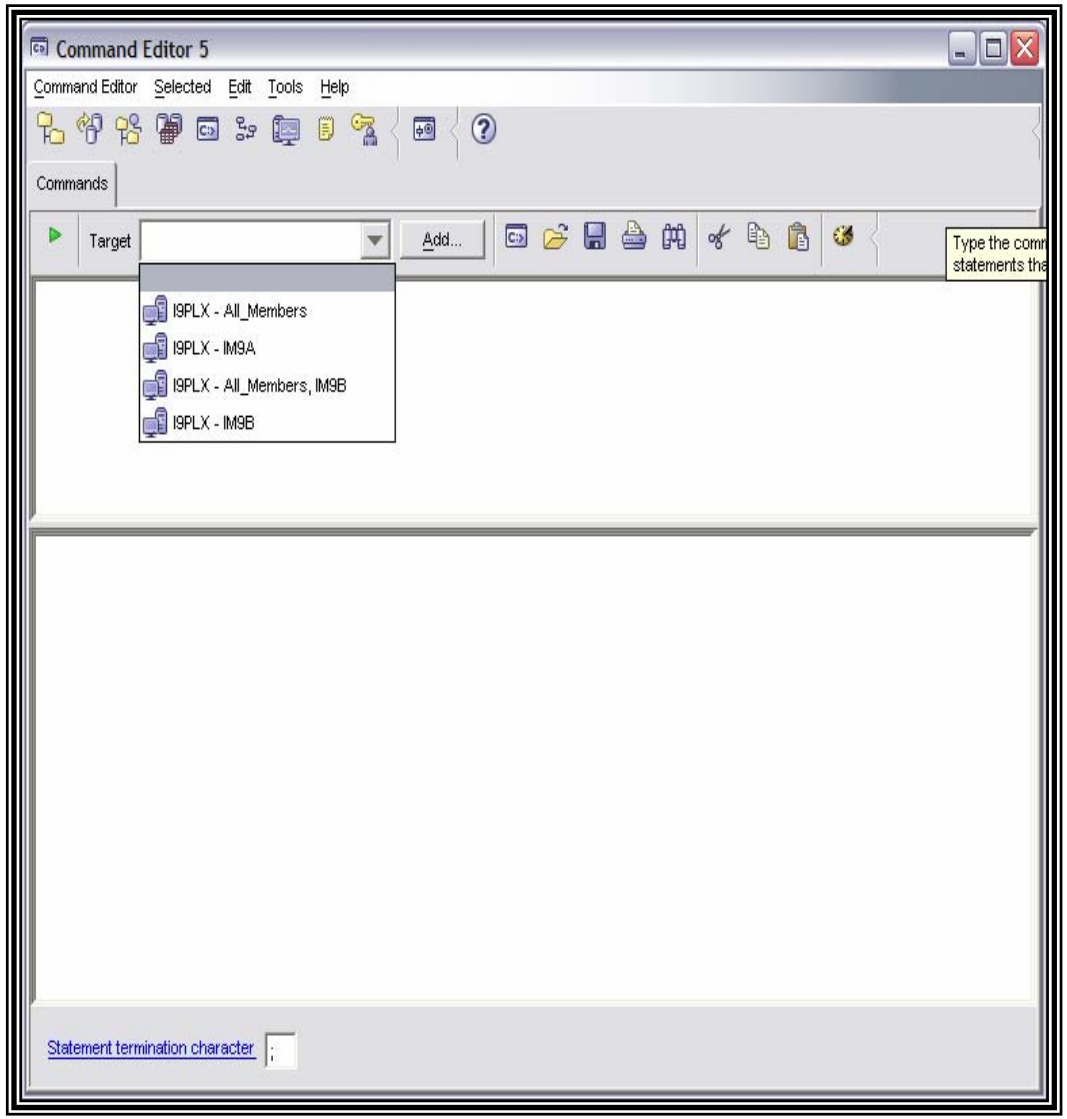
- Select the IMS commands type
- Select **IMSplex** target
- Select **member route**
- Type command or select from history
- Commands executed asynchronously – you do not need to wait for a response before executing the next command

Command Editor – IMS Commands



Member Route

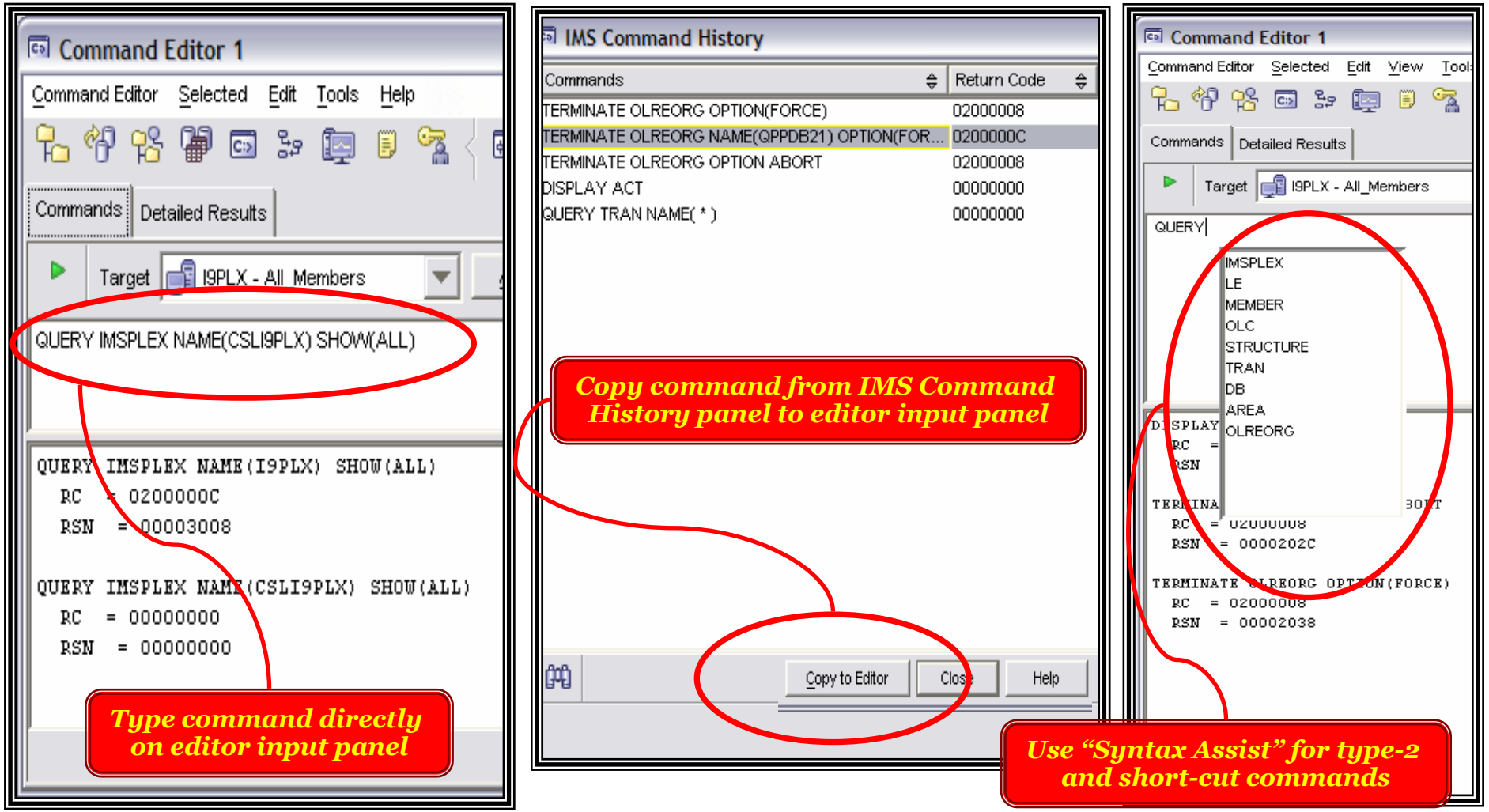
- Route commands to selected members
  - All_members
  - Individual members
  - Defined groups



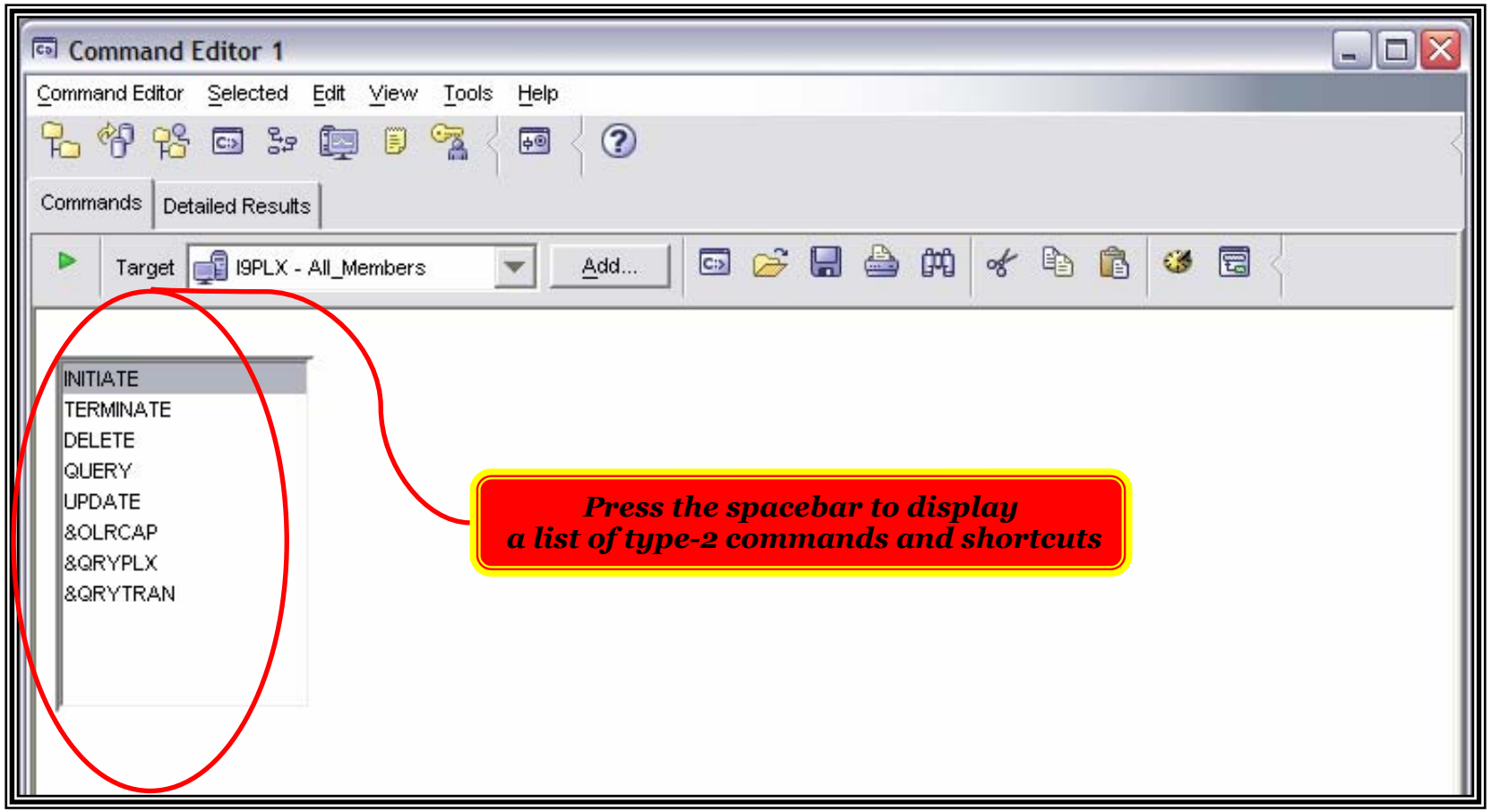
Command Entry

- Command is entered in input area of panel
  - Type command directly
  - Copy command from Command History using “Copy to Editor” button
  - Type-2 commands
    - Type command using “Syntax Assist” if enabled on Tools/IMS panel

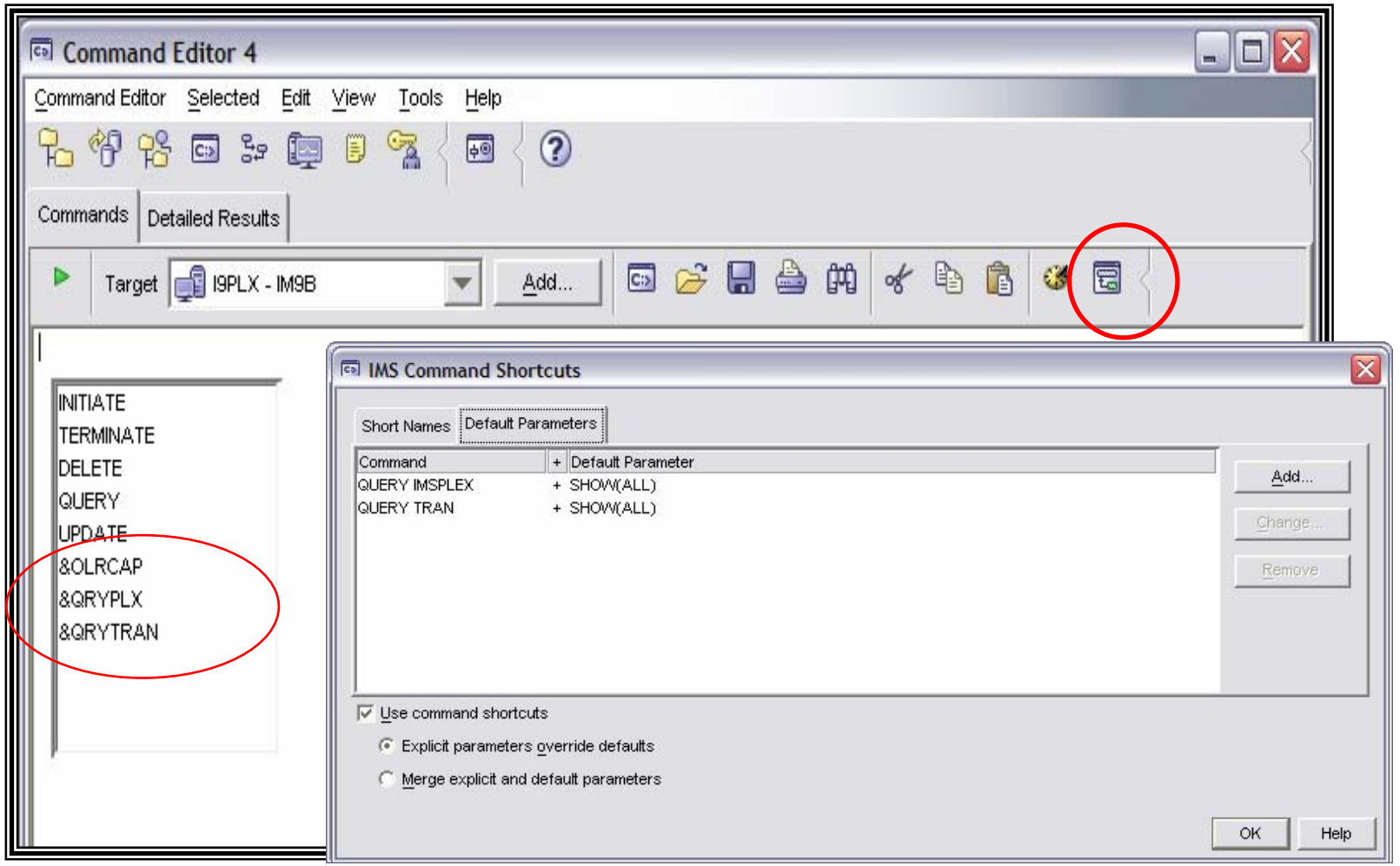
Command Entry



Syntax Assist



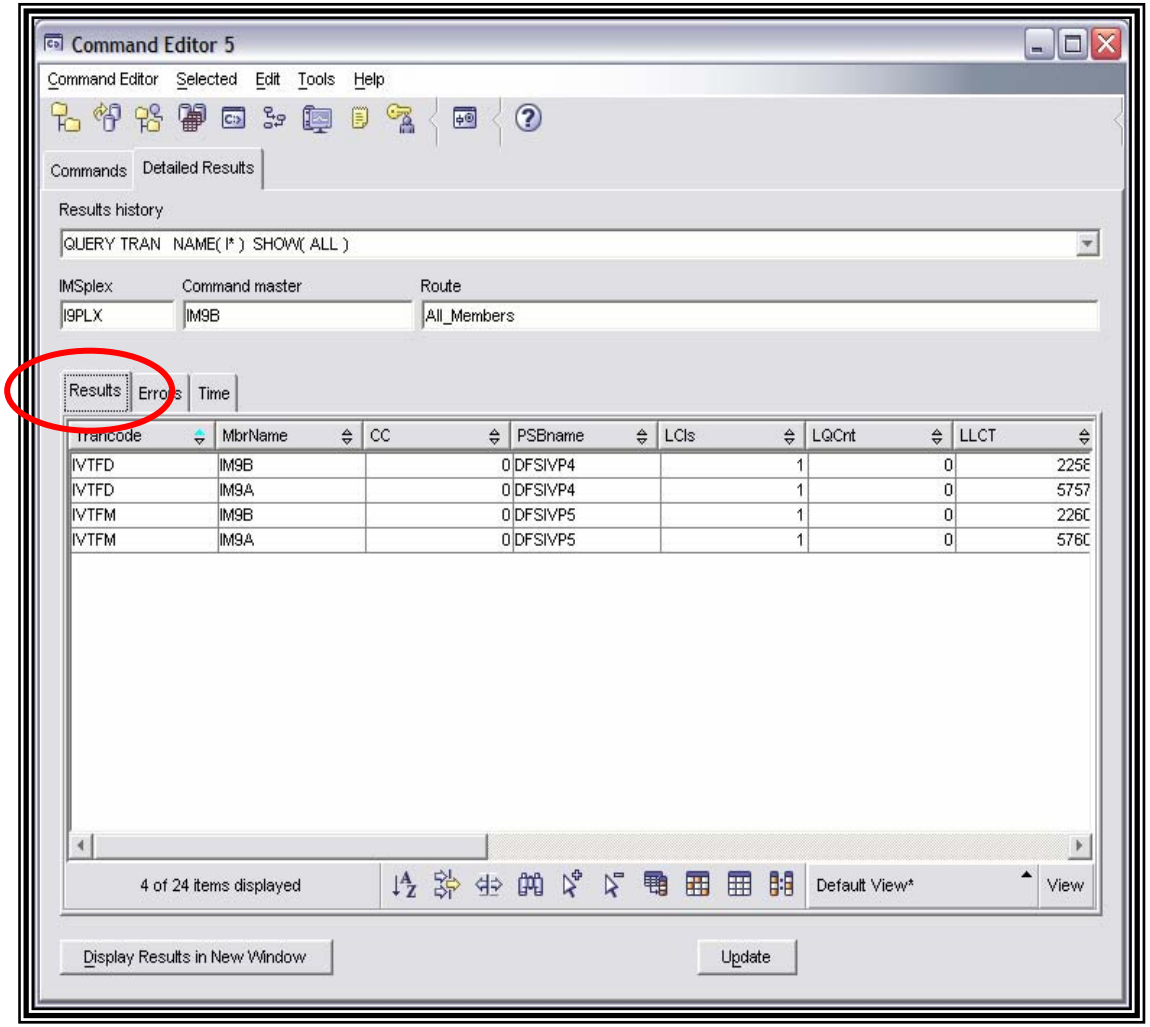
Command Shortcuts



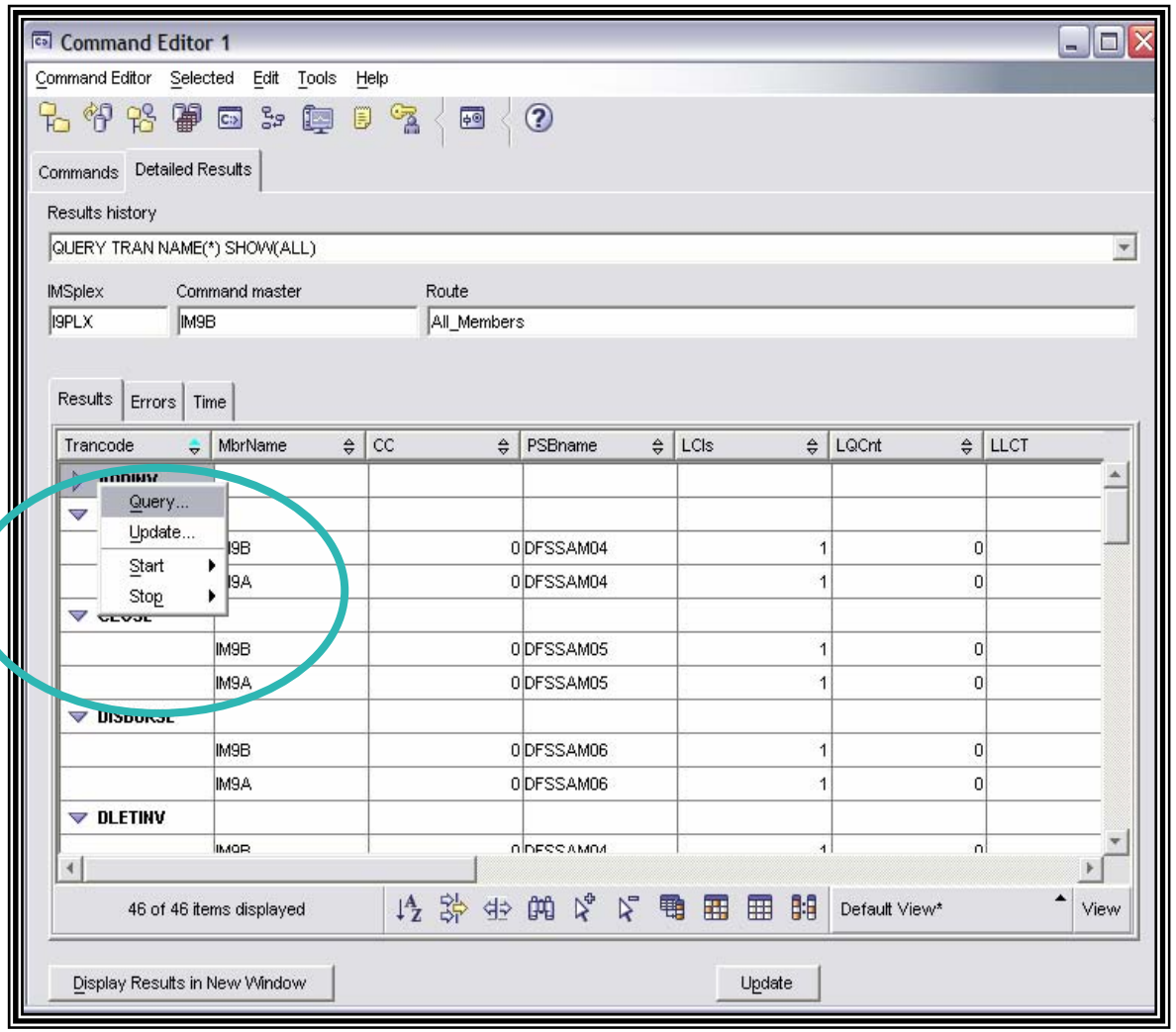
IMS Command Results

- Results tab in the Command Editor
- By default, appears automatically when results are available
- Shows **IMSplex, Command Master,** and **Route**
- Same sorting, grouping, filtering, and column customizing as in the Control Center

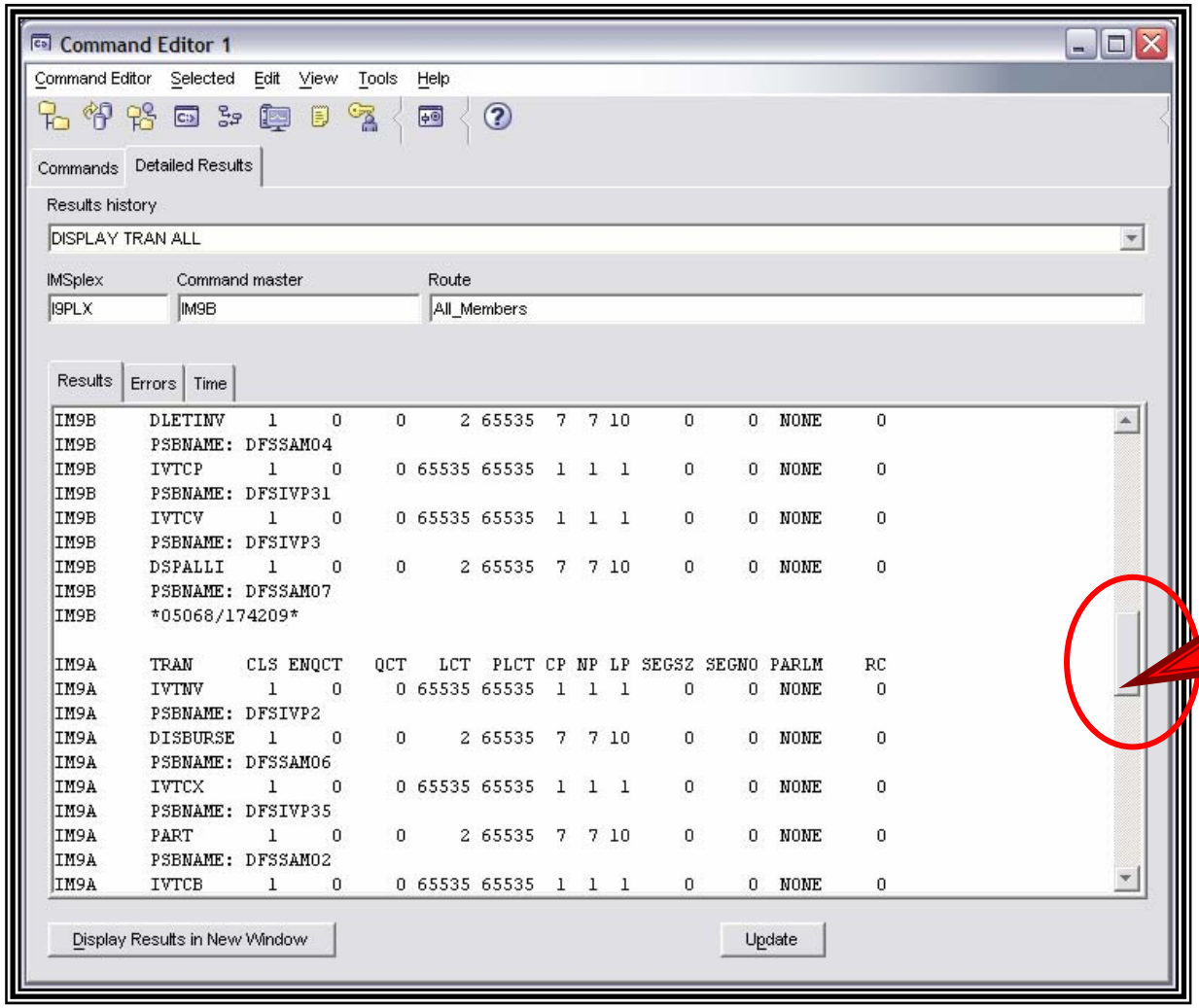
Command Editor – Results Tab



Command Results



Type-1 Command Results

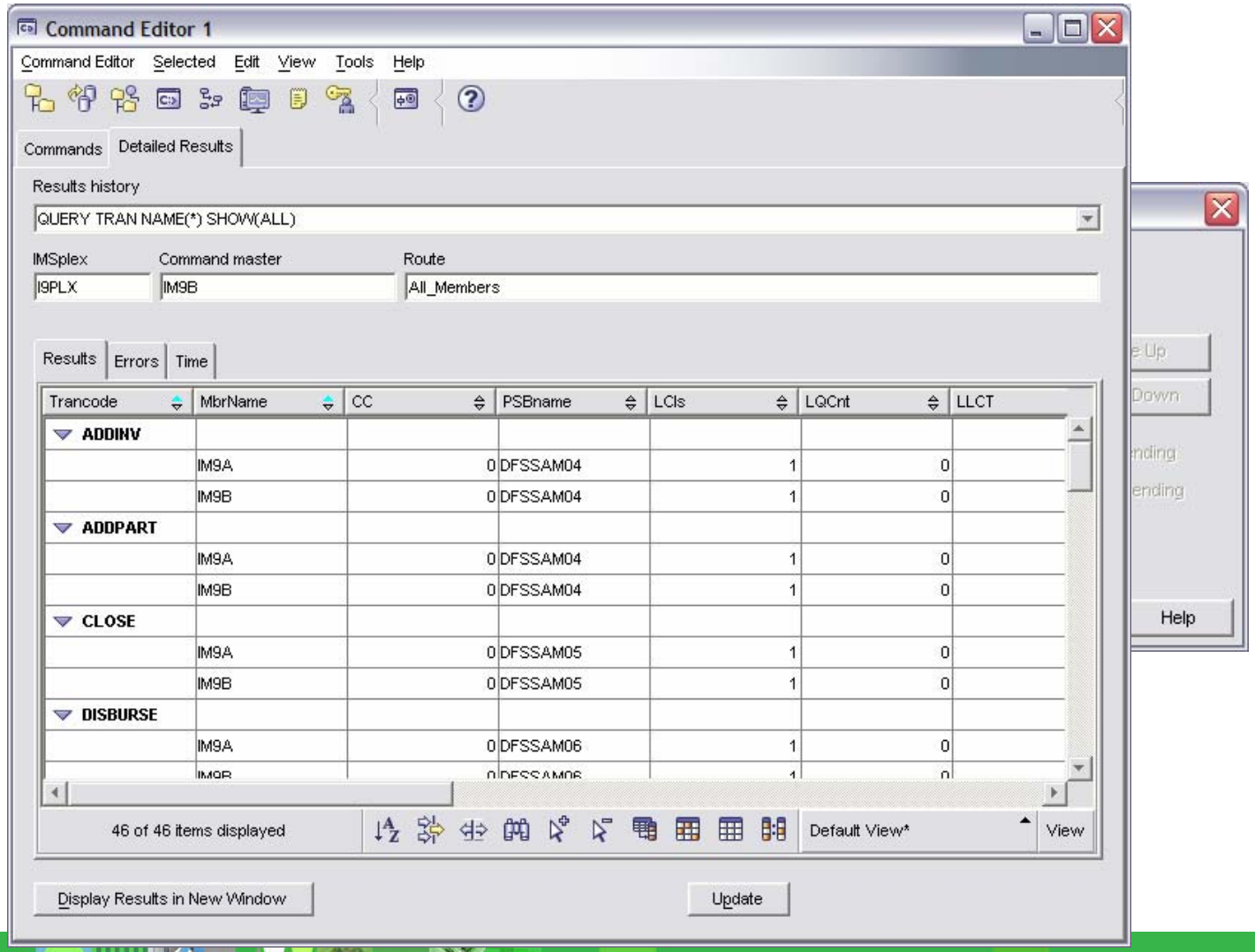


Scrollable text box showing the same command response as a terminal

Results Grouping

- Results can be grouped on any column using the Group checkbox in the Sort dialog
- Combines all rows with the same column value into an expandable roll-up row
- Can be grouped on multiple levels

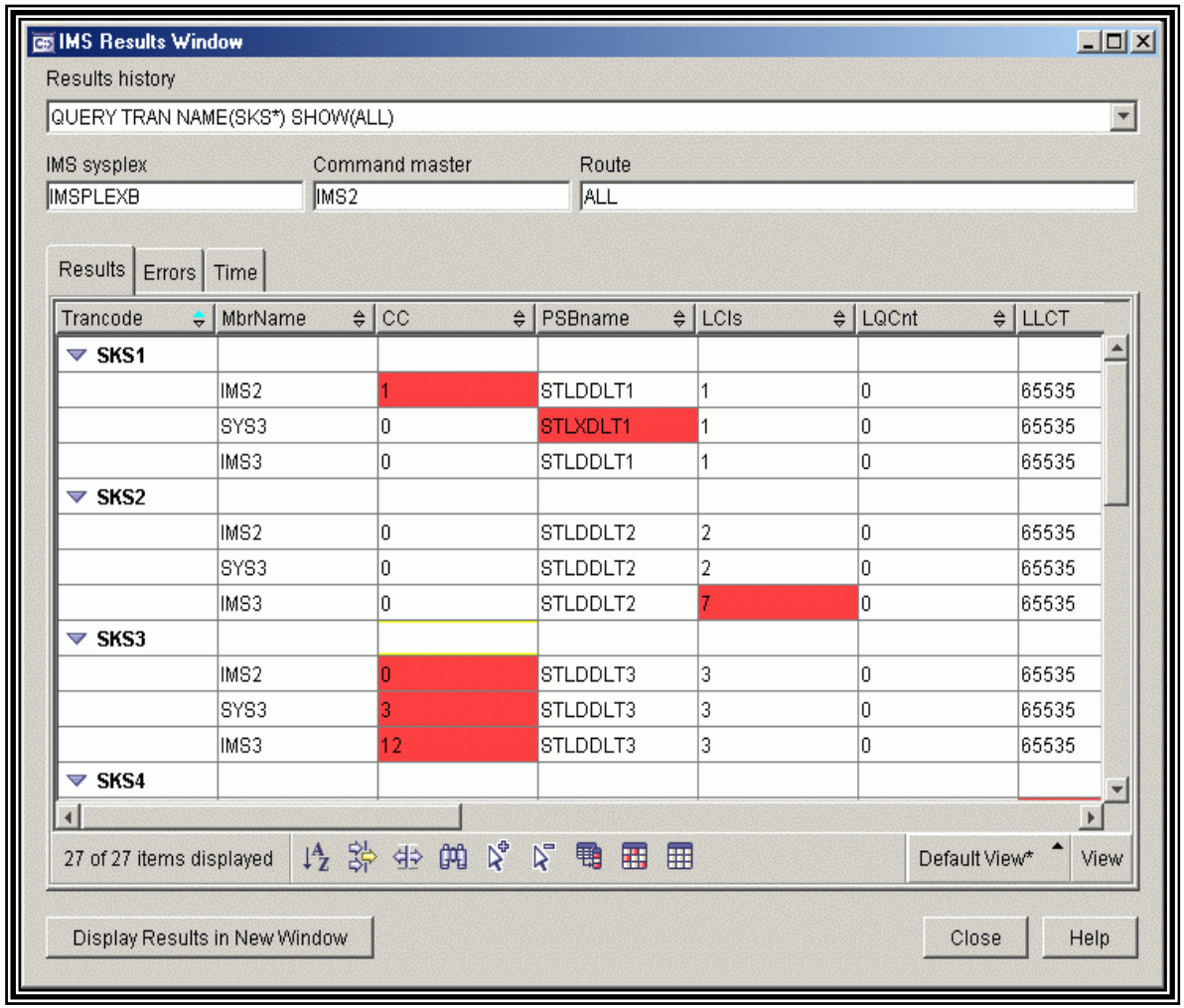
Results Window – Grouping Results



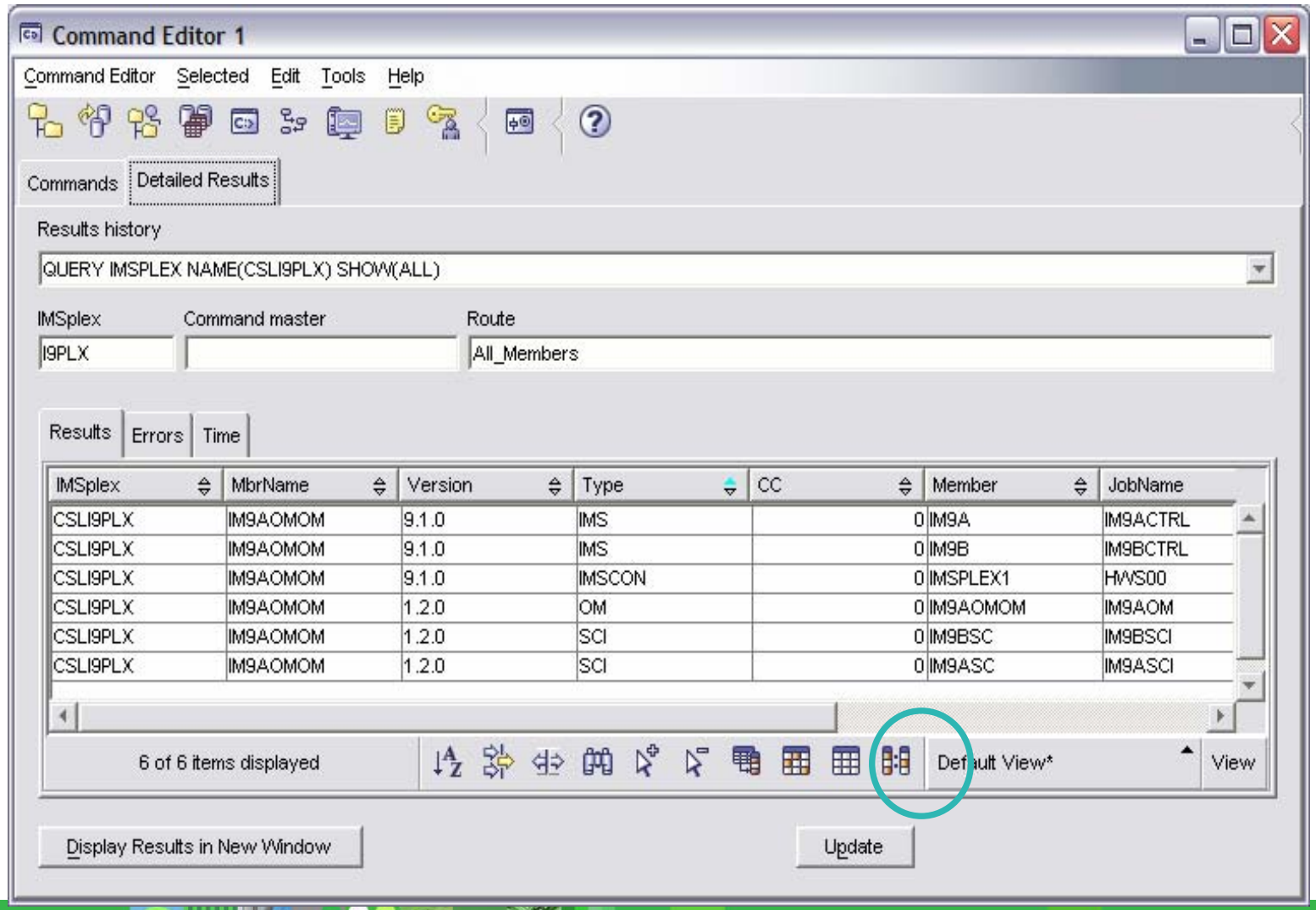
Highlighting Result Differences

- Toolbar buttons
  - Highlight all column differences
  - Highlight selected column differences
  - Clear all highlights
- Groups results by resource name and compares column values across members
- If one cell value is different from the others, that cell is highlighted
- If more than one value differs, all cells in that column for that resource are highlighted

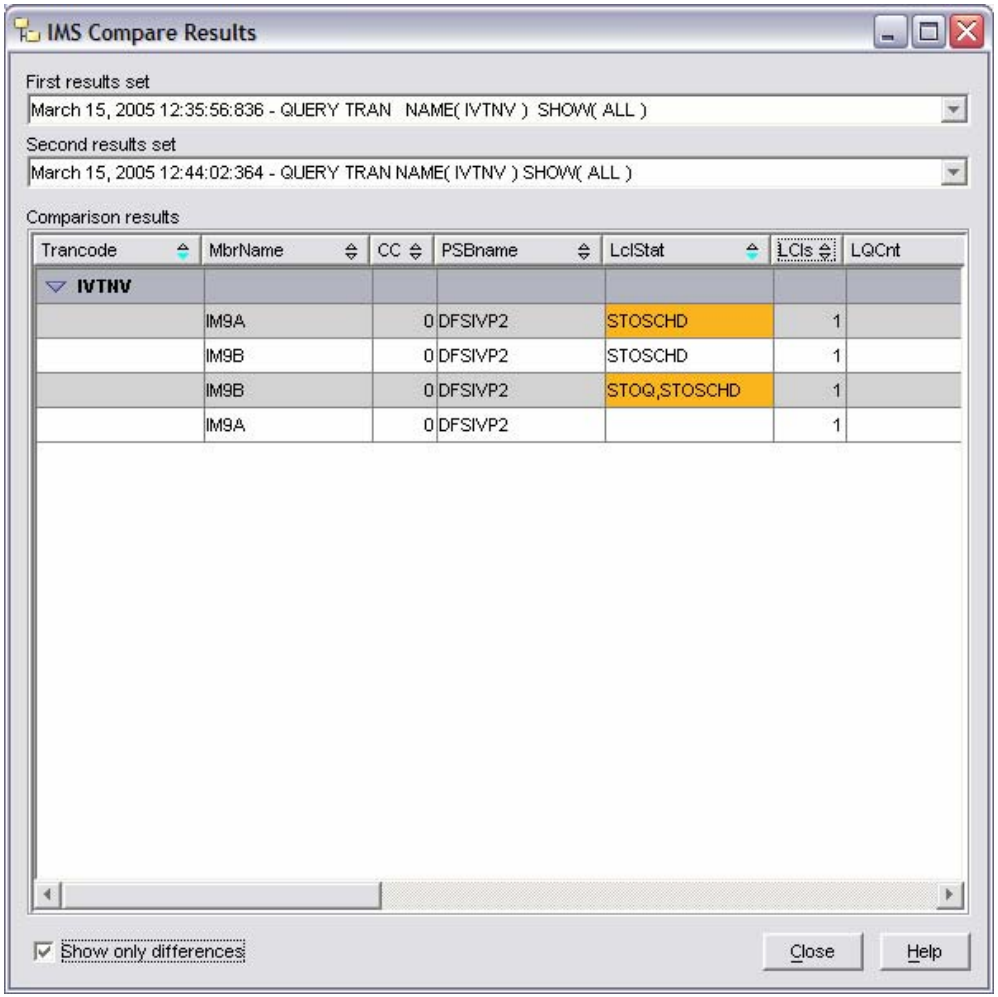
Results Window – Highlighting Differences



Compare Results



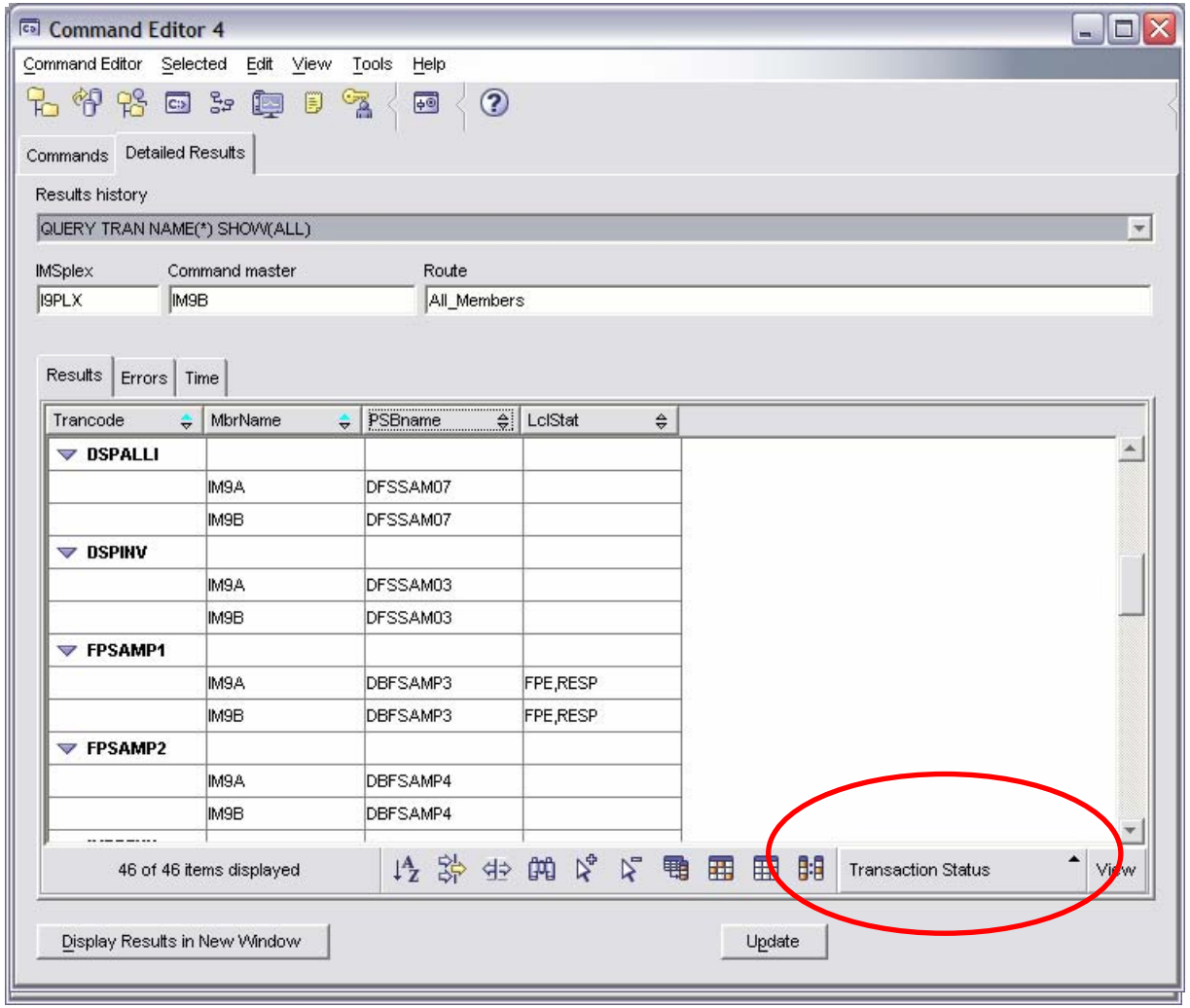
Compare Results



Results Window – Saved Views

- Sort, filter, grouping, and column settings can be saved as a ‘view’
- Views can be applied to any results
- User names a view using the View menu
- View pop-up list enables quick switching

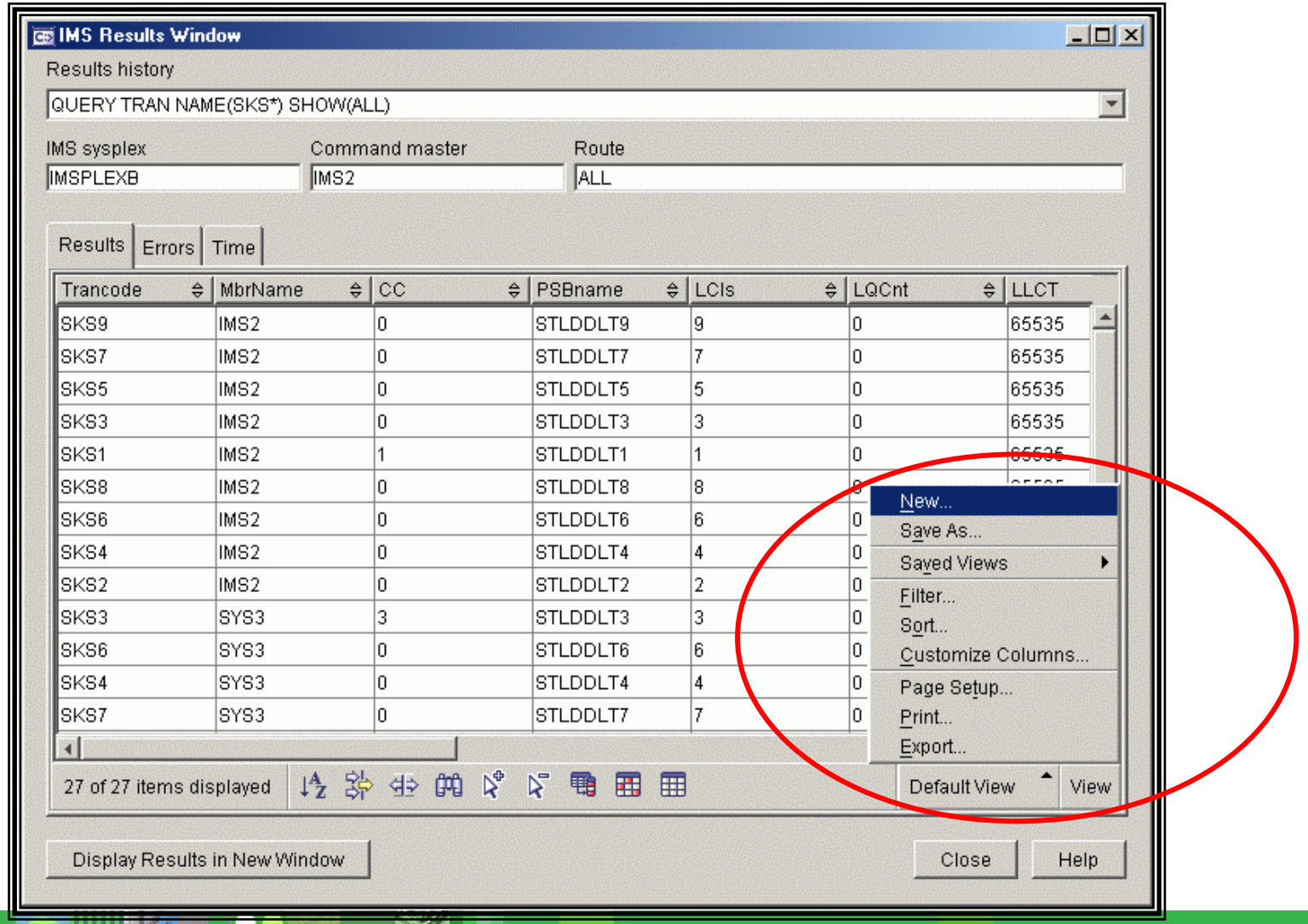
Results Window – Saved Views



Results View Menu

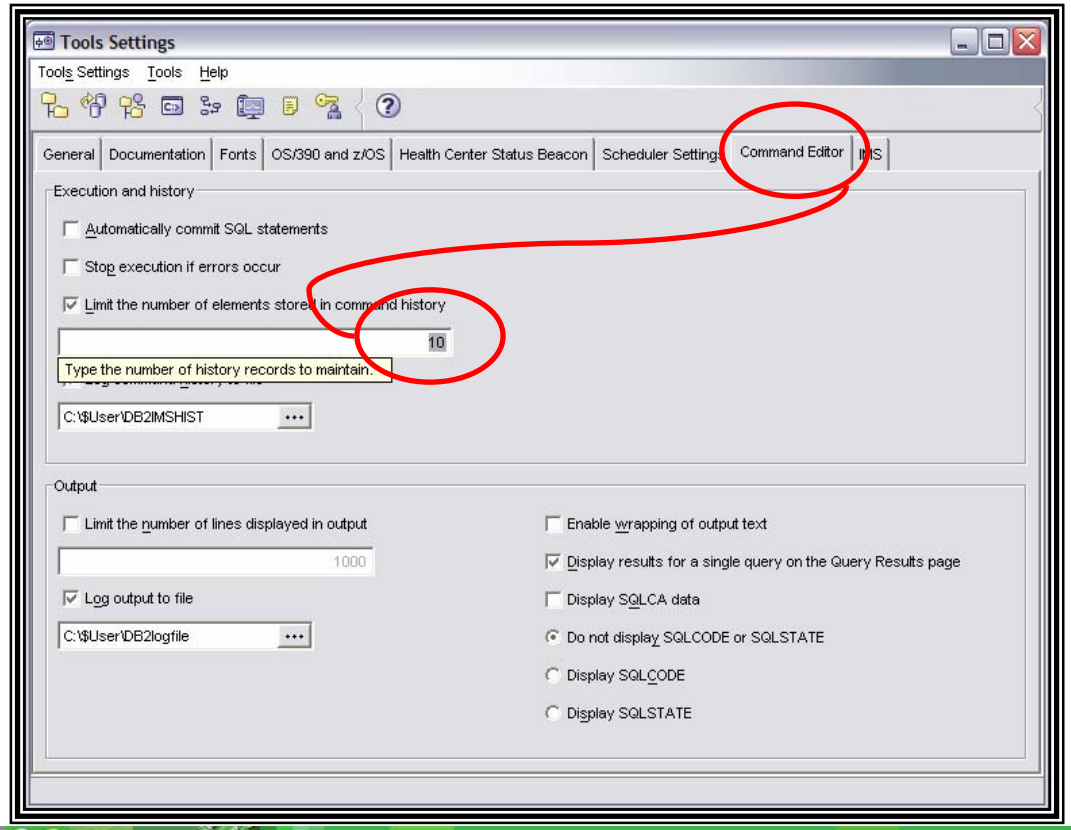
- Enables the naming and saving of views
- Alternative access to the Sort, Filter, Customize Columns dialogs
- Enables print of data as a report
- Enables export to a delimited ASCII file

Results Window – View Menu

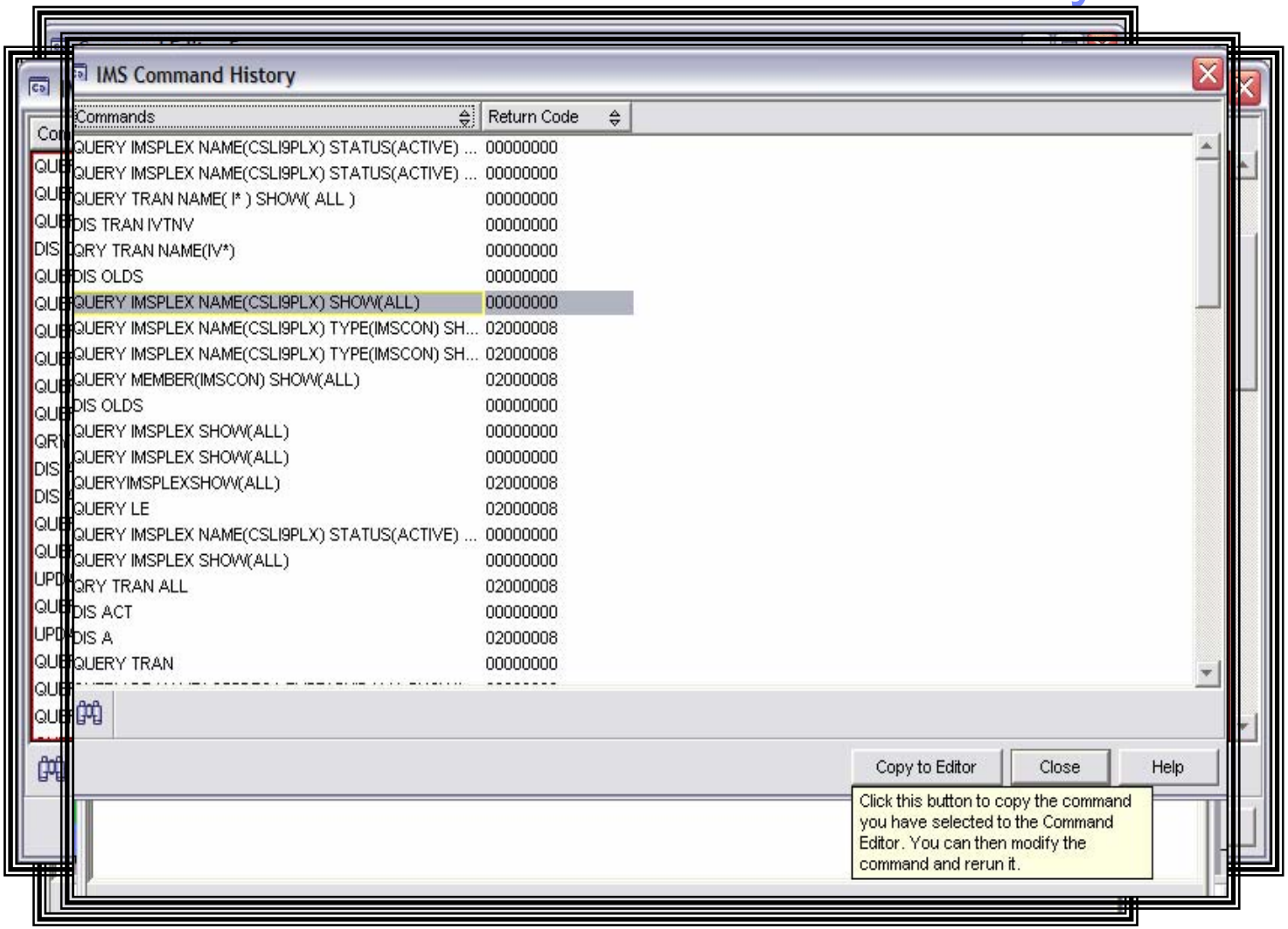


Command History

- Recent commands saved and selectable from the Command history drop-down list
- User can specify the number of commands saved in the Command Editor options

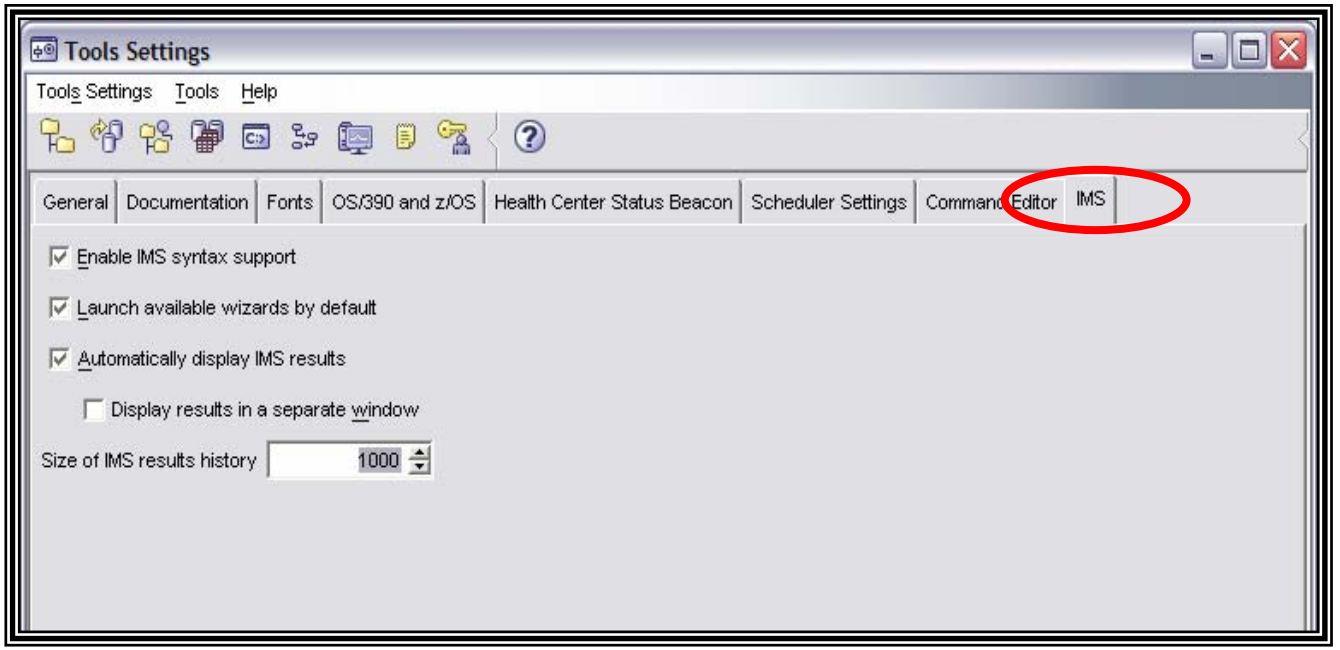


Command Editor – IMS Command History



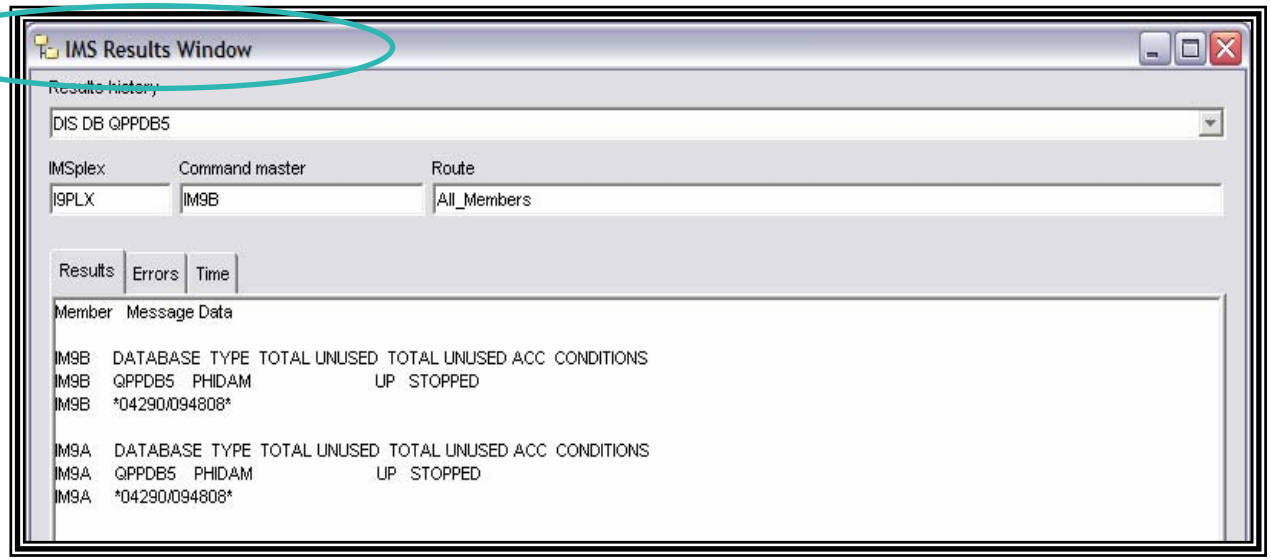
Command Editor Result Options

- Automatically display results
- Display results in a separate results window
- Specify the number of command responses to be saved in the results history

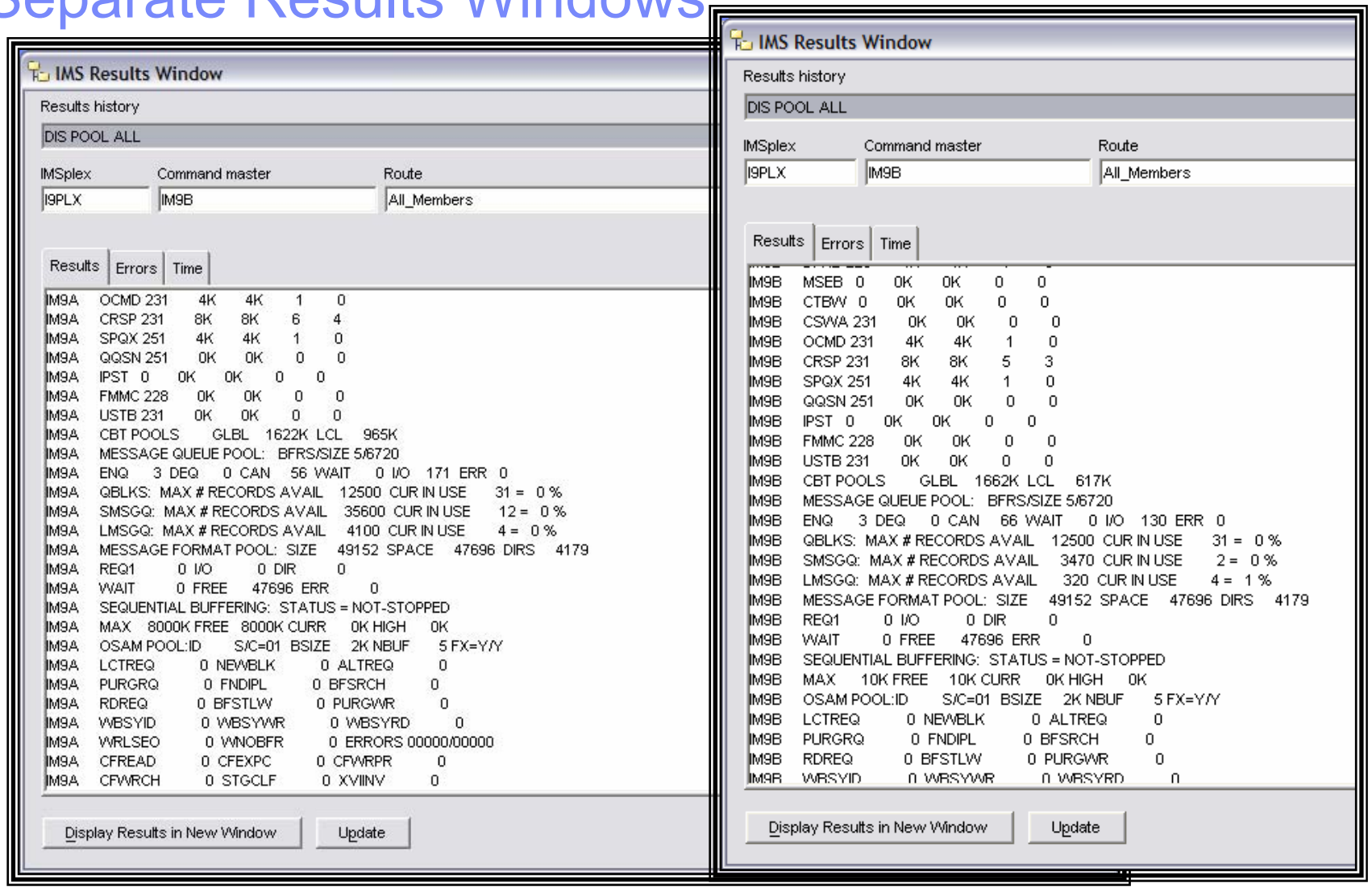


Separate Results Window

- Separate results window displayed for
  - Results from wizards
  - Command Editor when option selected
  - “Display Results in New Window” button
- Multiple windows can be open simultaneously
- Enables side-by-side comparisons

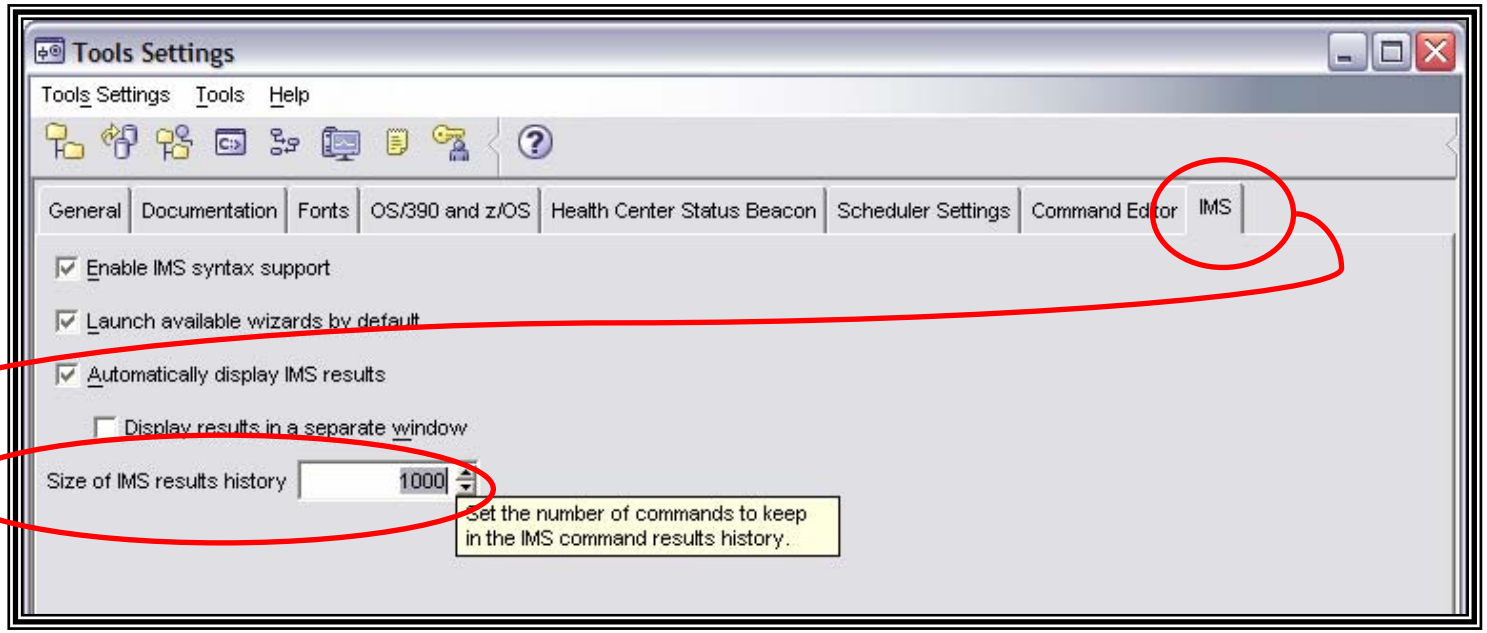


Separate Results Windows

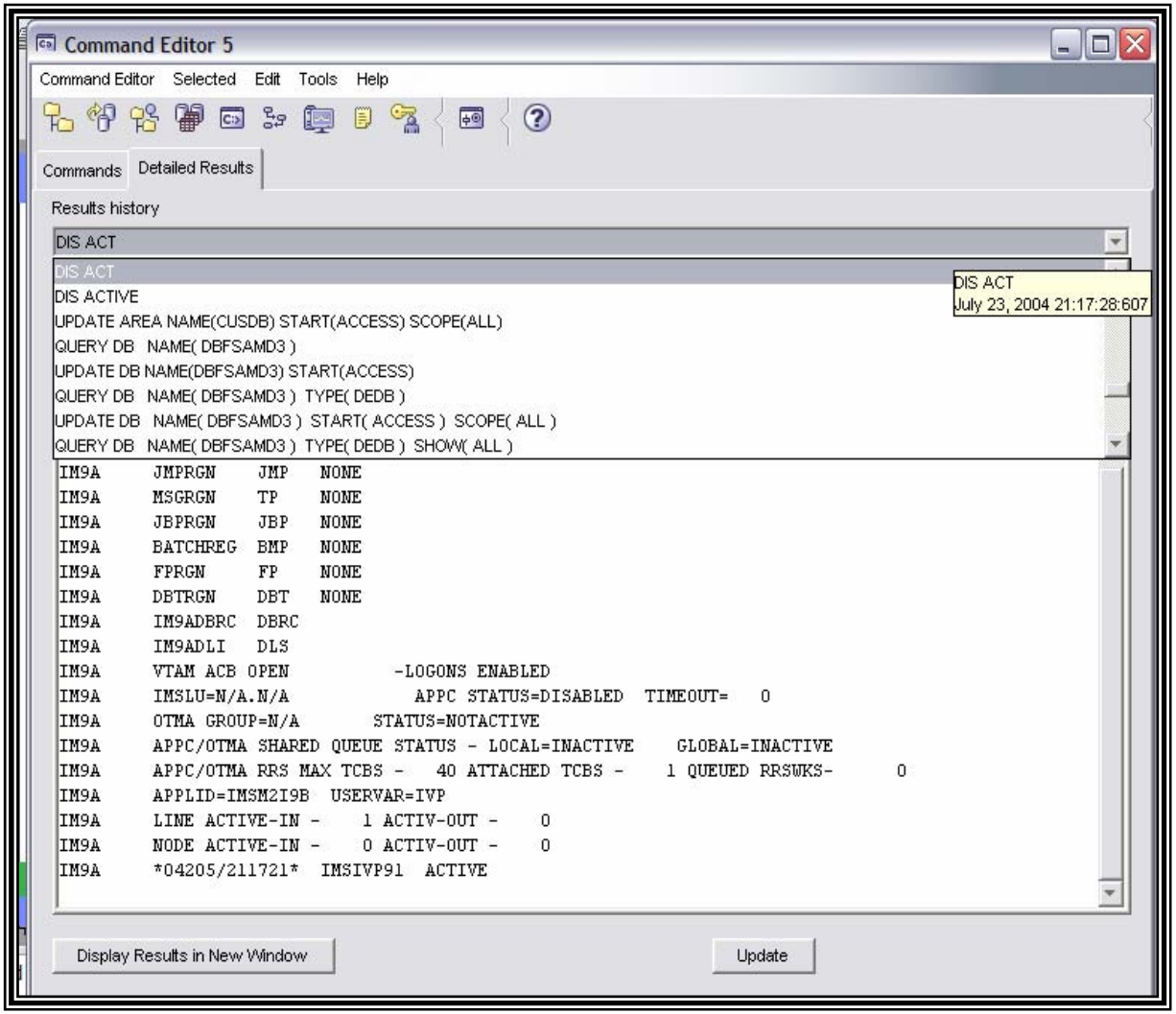


Results History

- Lists up to 1000 previous results by command
- Results include all data, errors, time stamps
- Most recent results at the top
- Pop-up shows complete command and workstation start time to aid identification



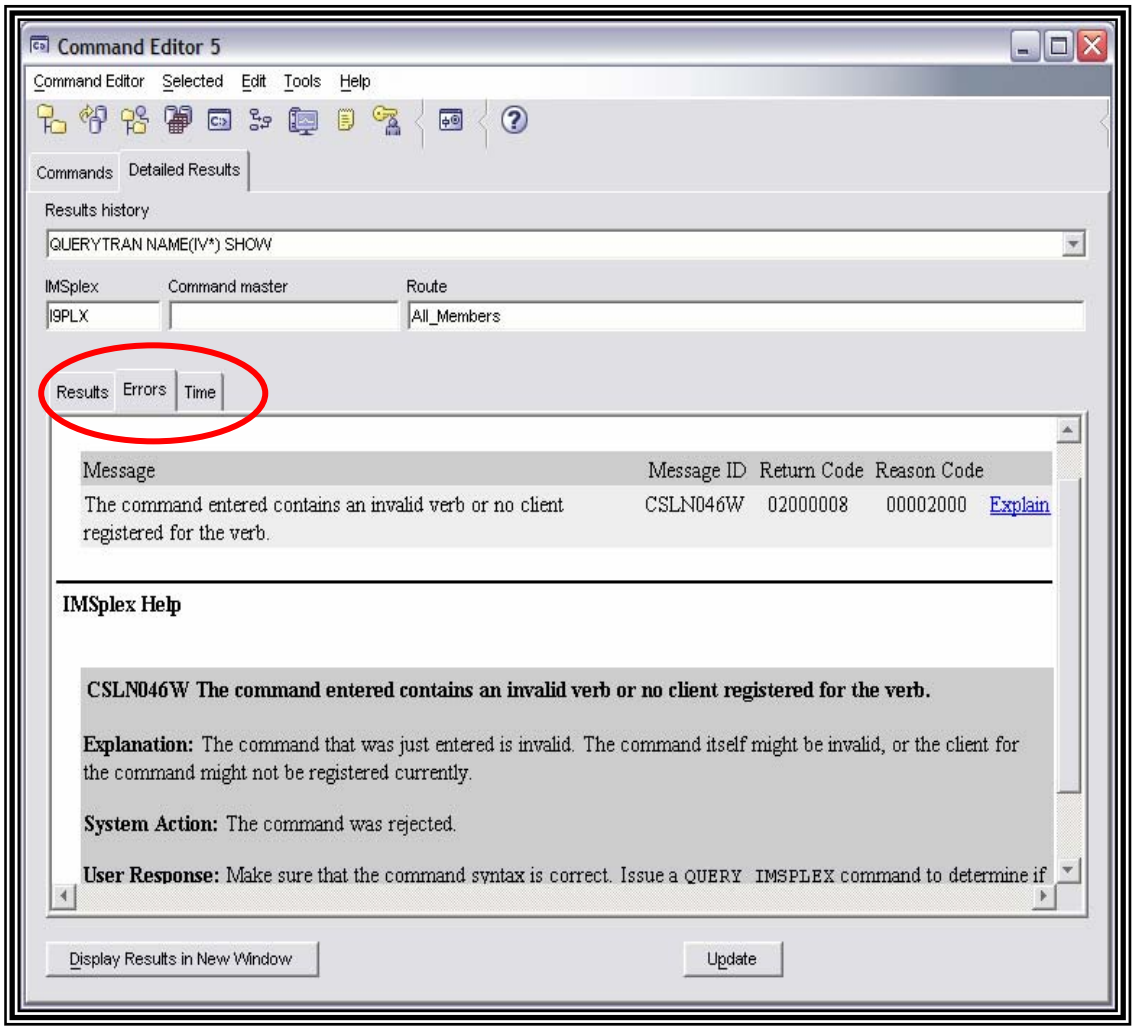
Command Editor – IMS Results History



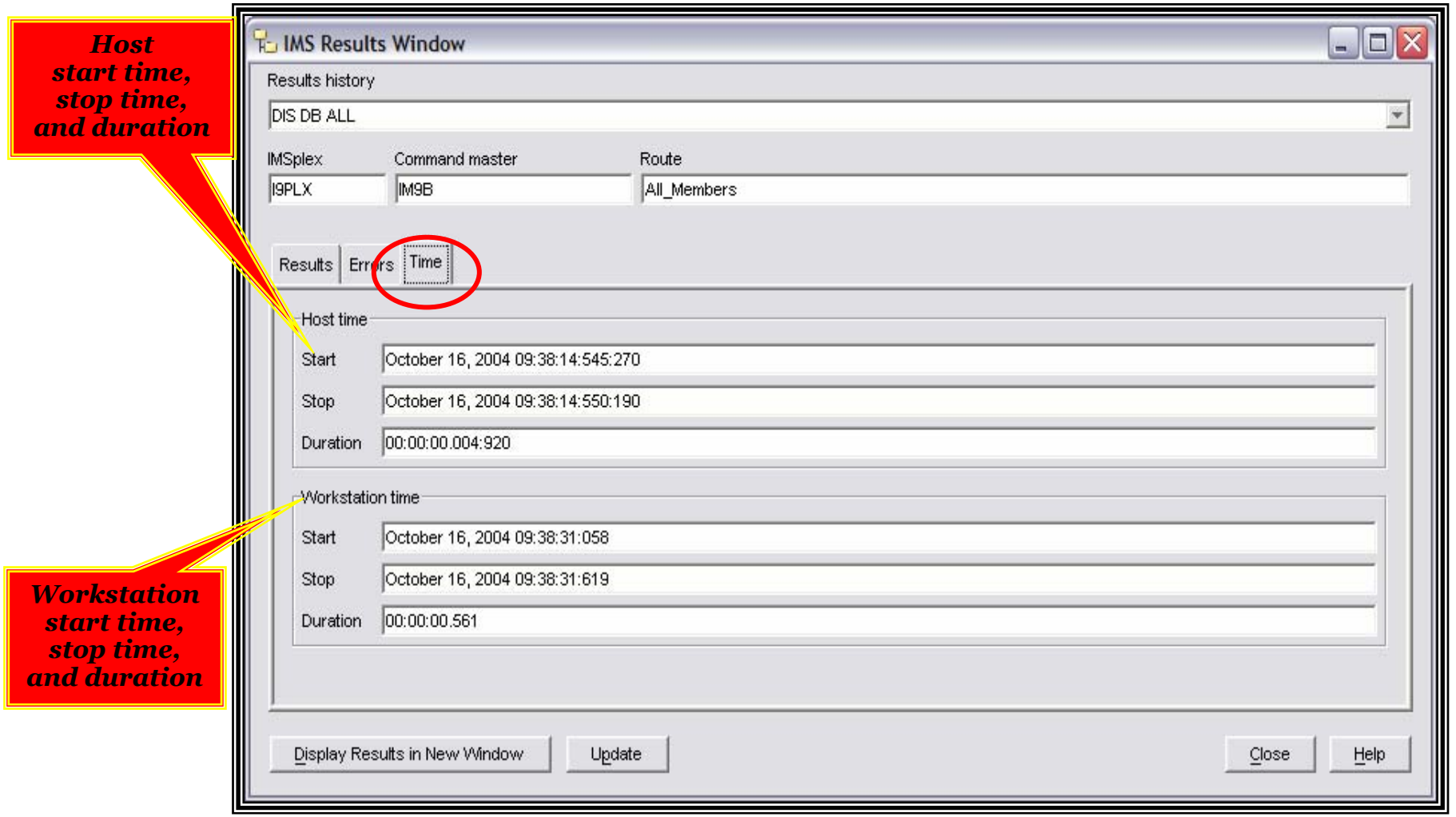
Results Errors

- Displays return and reason codes for IMSplex and each member
- If no errors, all return and reason codes are 0
- If errors occurred, Error tab displays first
- Displays message ID, text, and help from Messages and Codes book

Results Window – Error Messages



Command Time



Online Help

- Information Center article outlines IMS CC
- HTML Help for all tasks and dialog fields
- Wizard task overviews
- IMS Messages and Codes

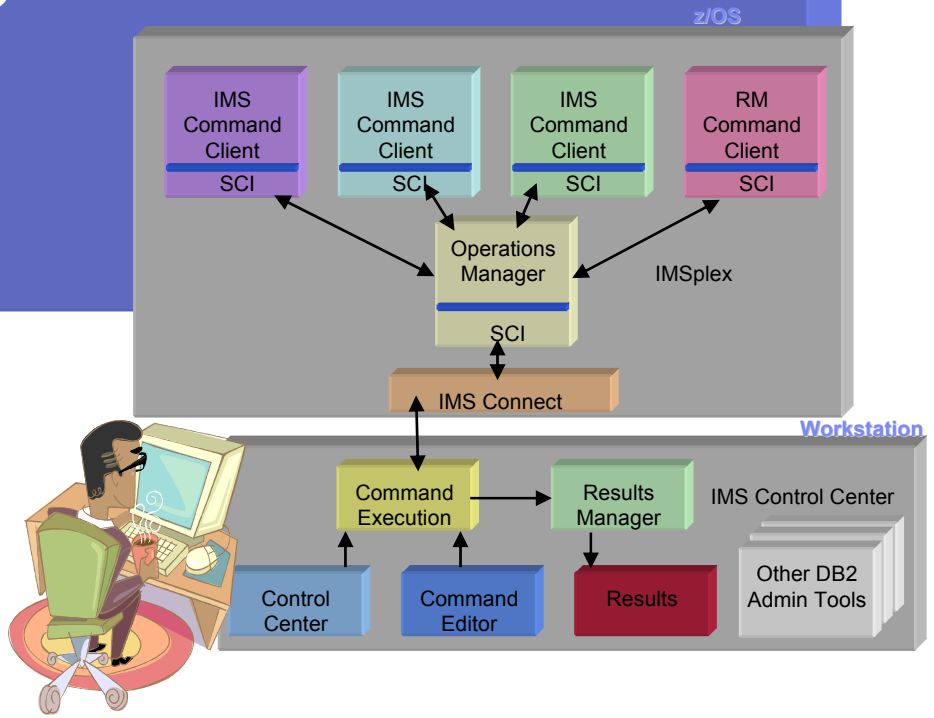
Translation Languages

- IMS Control Center user interface and help translated into the following languages
  - Brazilian
  - Portuguese
  - Norwegian
  - Danish
  - Polish
  - Finnish
  - Russian
  - French
  - Korean
  - Simplified Chinese
  - German
  - Spanish
  - Italian
  - Swedish
  - Japanese
  - Traditional Chinese

Command Editor Summary

- For type-1 and type-2 commands
- Commands can be user entered or from command history
- Command short-cuts, syntax assist
- Results history
- Various sorting and filtering available

Configuration



IMS Control Center Implementation

- For **IMS Version 8**
  - CSL Configured plus PQ69527
  - IMS Connect Version 1.2 (5655-E51) or later
    - Plus PQ62379, PQ67776, PQ70216
- For **IMS Version 9**
  - CSL Configured (can be Enhanced Command Environment)
  - Integrated IMS Connect function installed and configured
  - Plus PQ92398 installed
- Workstation
  - The IMS Control Center features are part of the **IBM DB2 Universal Database (DB2 UDB) Administration Client, Version 8.2**
  - Can be downloaded from the web for ***free***:

    http://www-306.ibm.com/software/data/db2/udb/support/

V810 FixPak 8 for Windows 32-bit was used for this presentation

IMS Control Center Implementation…

- Documentation:
  - IMS Connect Guide and Reference (SC18-7260) available at:

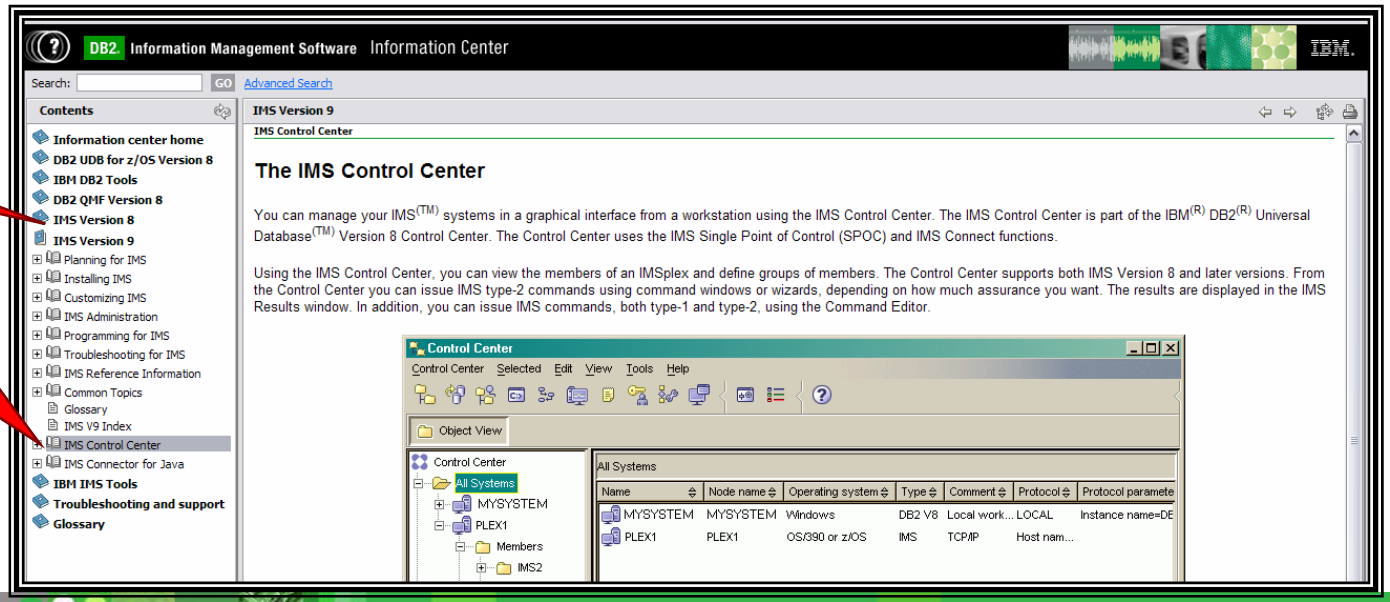
    http://www-306.ibm.com/software/data/db2imstools/imstools/imsconnect.html

    - DB2 Information Management Software Information Center for z/OS Solutions

    http://publib.boulder.ibm.com/infocenter/dzichelp/index.jsp

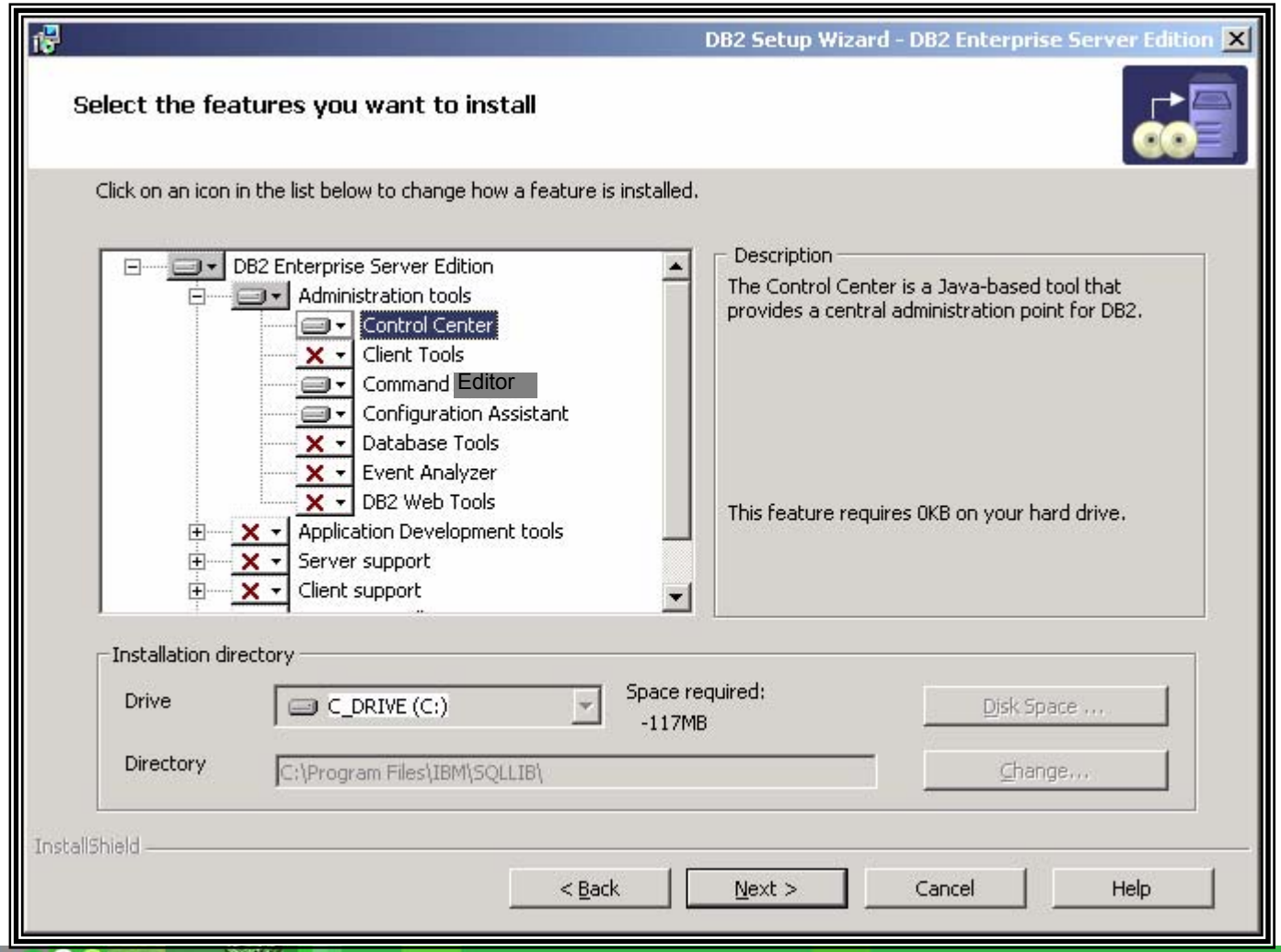
IMS V8 & V9 information is online

IMS CC "Up and Running" information is available

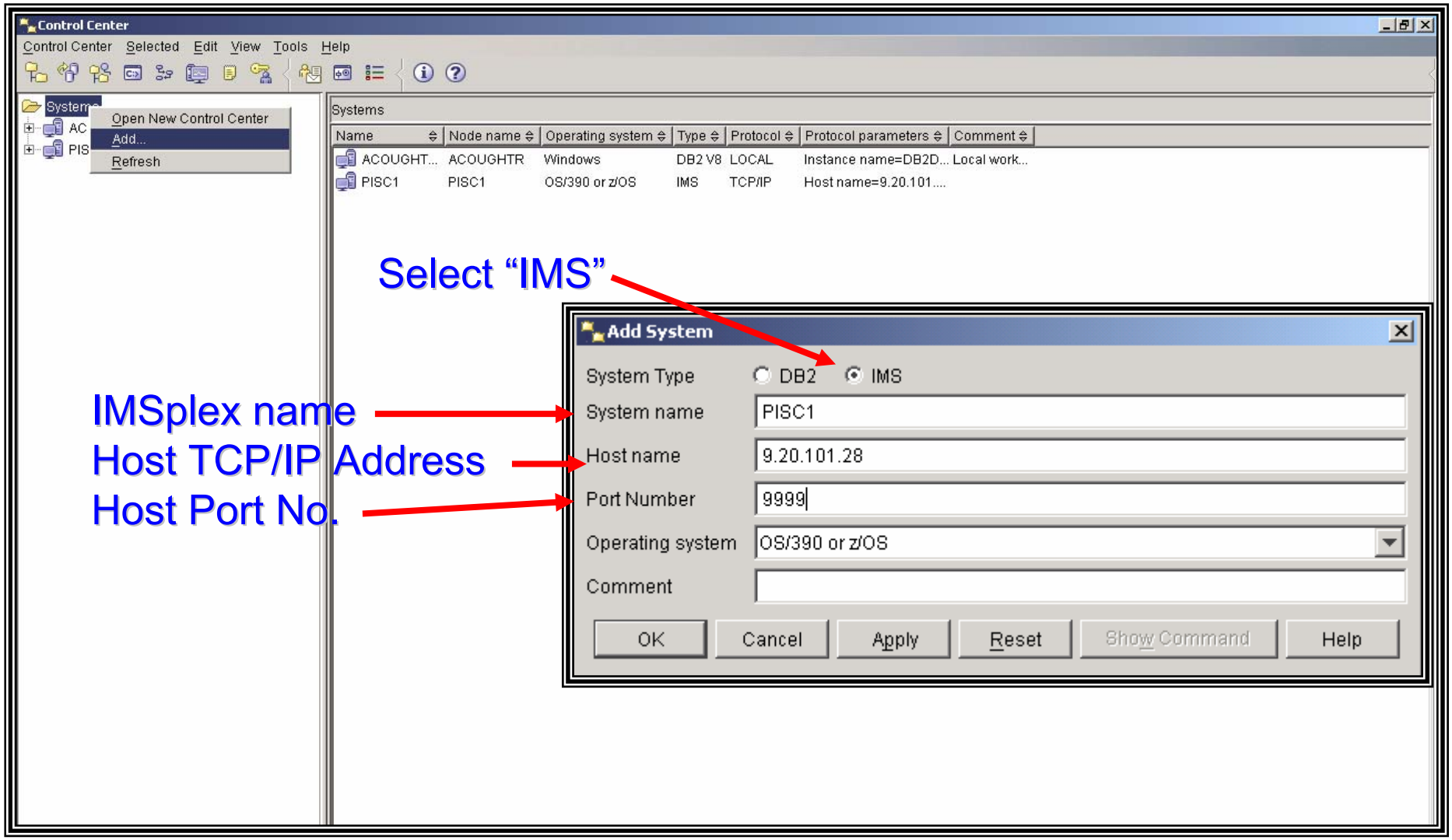


DB2 Control Center Installation

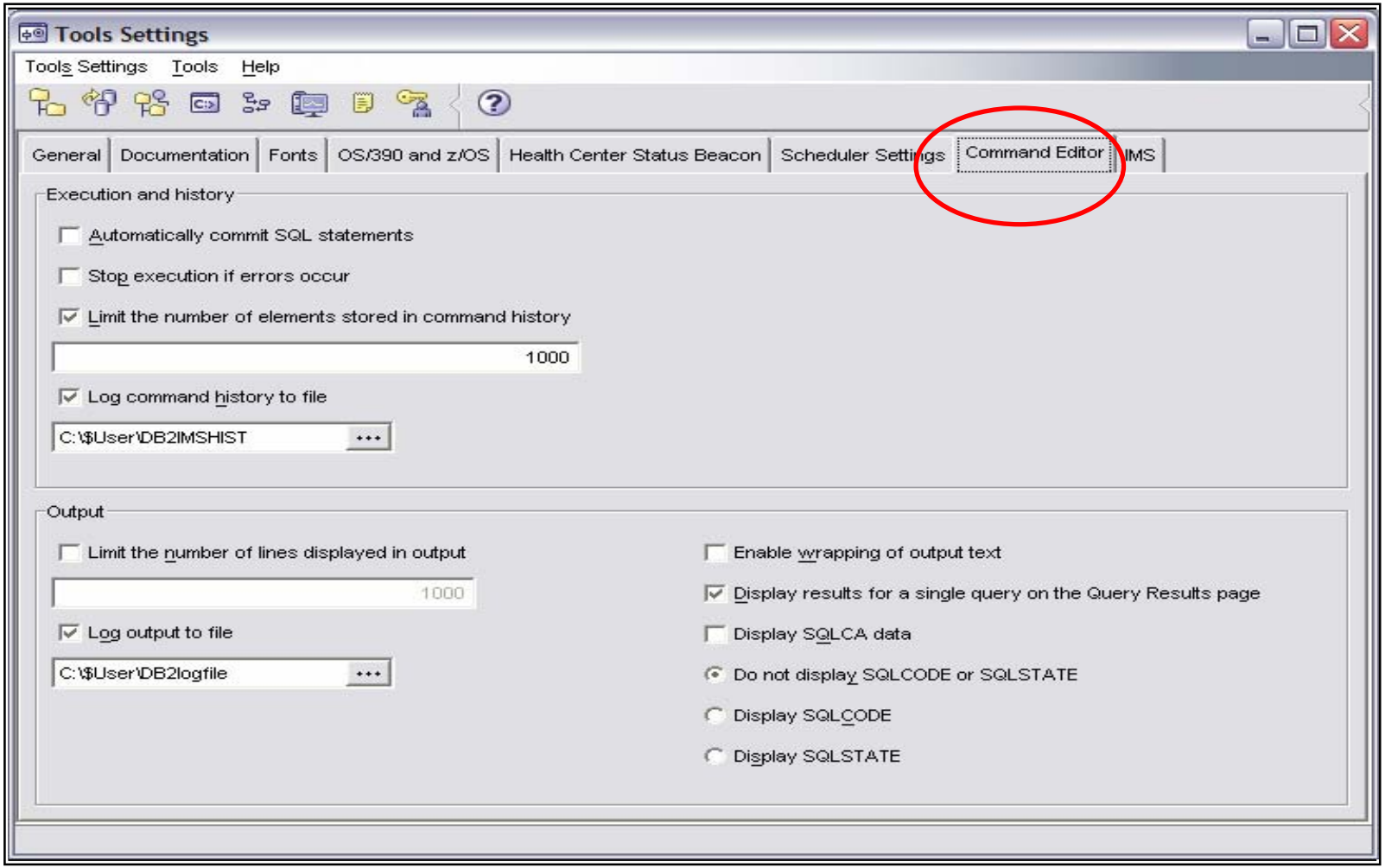
- The following Admin Tools are required:
  - **Control Center**
  - **Command Editor**
  - **Configuration Assistant**
- Any additional features can optionally be installed
- Mark features you **DON'T** want with an **X**



Control Center – Add IMSplex



Tools Settings – IMS & Command Editor



Operations Manager Configuration

- In OM initialization parameters member (CSLOI*xxx*), the IMSplex name ***must be the same*** as specified in IMS member DFSCG*xxx* ***and*** in IMS Connect configuration member (HWSCF*xxx*).

- In CSLOI*xxx* **CMDTEXTDSN** must point to the data set containing the **command syntax translatable text** that was placed in the SDFSDATA library when IMS was installed

```
 Menu  Utilities  Compilers  Help
BROWSE    IMSDATA.IM9A.PROCLIB(CSLOI000) - 01.13     Line 00000000 Col 001 080
******************************** Top of Data ********************************
*-------------------------------------------------------------------*
* OM INITIALIZATION PROCLIB MEMBER - CSLOI000                       *
*-------------------------------------------------------------------*
ARMRST=N,                    /* SHOULD ARM RESTART OM ON FAILURE  */
CMDLANG=ENU,                 /* USE ENGLISH FOR COMMMAND DESC     */
CMDSEC=R,                    /* RACF COMMAND SECURITY             */
OMNAME=IM9AOM,               /* OM NAME                           */
IMSPLEX(NAME=I9PLX)          /* IMSPLEX NAME (CSLI9PLX)           */
CMDTEXTDSN=IMS.V91.DBDC.SDFSDATA /* CMD TEXT DATASET*/
*-------------------------------------------------------------------*
* END OF MEMBER CSLOI000                                            *
*-------------------------------------------------------------------*
****************************** Bottom of Data ******************************
```

Configure IMS Connect

1. IMS **V8 Reslib** must be added to IMS Connect STEPLIB to enable access to SCI
   - For Integrated IMS Connect function with IMS V9, there will be one reslib, e.g. IMSV9.SDFSRESL

2. In configuration member HWSCFGxx, specify the following:
   - The user message exits for IMSplex support (HWSCSLO0 and HWSCSLO1) in the EXIT keyword statement
     - These are OCO
   - Each IMSplex you want to manage in the IMSPLEX keyword statement

```
BROWSE    IMSDATA.IM9A.PROCLIB(HWSCFG00) - 01.23     Line 00000000 Col 001 080
******************************** Top of Data ********************************
HWS (ID=HWS)
TCPIP (HOSTNAME=TCPIP,ECB=Y,PORTID=(1080,LOCAL),TIMEOUT=8880,
EXIT=(HWSCSLO0,HWSCSLO1))
IMSPLEX (MEMBER=IMSPLEX1,TMEMBER=I9PLX)
****************************** Bottom of Data ******************************
```

IMS Connect Startup

- IMS Connect can be started before the SCI address space
  - Will keep trying to connect for 30 minutes
  - After this time, it will require the **OPENIP** command
- If SCI terminates normally or abnormally
  - IMS Connect will **automatically** reconnect to the SCI when it is restarted

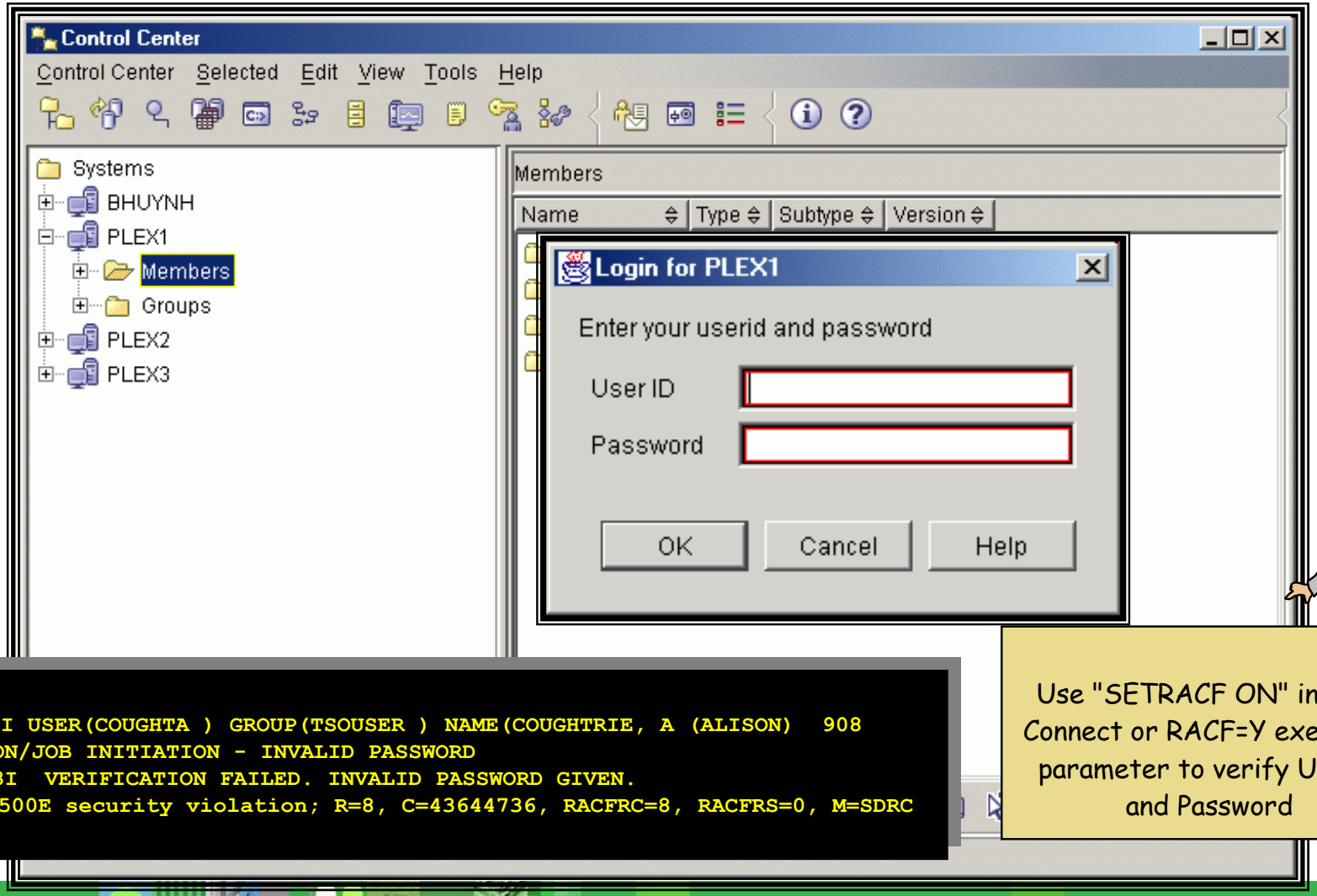
IMS Connect – New Commands

- New IMS Connect Commands introduced by IMSplex support:
  - **STOPIP**
    - Stops communication between IMS Connect and the IMSplex
  - **OPENIP**
    - Starts communication between IMS Connect and the IMSplex
  - **VIEWIP**
    - Displays the current status of the IMSplex and IMS Connect

- The **VIEWHWS** command has been updated to include IMSplex information

```
*96 HWSC0000I *IMS CONNECT READY*  HWS
 R 96,VIEWHWS
 HWSC0001I   HWS ID=HWS      RACF=N
 HWSC0001I     MAXSOC=50  TIMEOUT=8880
 HWSC0001I    RRS=N      STATUS=REGISTERED
 HWSC0001I     VERSION=910 IP-ADDRESS=009.020.101.022
 HWSC0001I    IMSPLEX=I9PLX    STATUS=ACTIVE
 HWSC0001I     MEMBER=IMSPLEX1 TARGET=I9PLX
 HWSC0001I    NO ACTIVE DATASTORES
 HWSC0001I    PORT=1080     STATUS=ACTIVE
 HWSC0001I     NO ACTIVE CLIENTS
```

IMS Control Center – IMS Connect Security



IMS Connect – SCI Security …

- SCI security determines authorization to the IMSplex
  - Security is checked during SCI registration to control which programs can register with SCI
  - SCI issues a RACROUTE REQUEST=AUTH call to determine whether the address space is authorized to register with SCI
  - RACF checks the User ID of the address space (IMS Connect) that issued the request
    - This User ID must have at least **UPDATE** authority to register with SCI
- RACF Definitions
  - Define profiles in the FACILITY class to control registration with SCI
    - The profile names must be of the form CSL.CSLimsplex_name
      - imsplex_name is the name of the IMSplex that is being protected

```
RDEFINE FACILITY CSL.CSLI9PLX UACC(NONE)
 PERMIT CSL.CSLI9PLX CLASS(FACILITY) ID(IMSCREG) ACCESS(UPDATE)
 PERMIT CSL.CSLI9PLX CLASS(FACILITY) ID(COUGHTA) ACCESS(UPDATE)
 SETOPTS CLASSACT(FACILITY)
```

Command Security

- **Choice** of **OM Command Security** (using RACF or equivalent) *or* **IMS Command Security** for type-1 commands
  - **IBM recommends OM Command Security**
    - Perform authorization within OM - before sending to IMS
    - Reduces processing overhead and network traffic
    - Reduces human error. If IMS Command Security is used, it's up to the user to ensure that all IMS systems use the same security profiles and/or user exits
    - Optional User-written command security exit

For Type-2 commands all security checking is performed by OM Command Security (and/or Exit)

Command Security …

- OM Command Security is controlled with the **CMDSEC=** parameter
- If RACF or equivalent security checking has been specified (i.e. CMDSEC=R¦A) OM command security checking uses the **OPERCMDS** resource class
- The resource name format is **IMS.*imsplexname*.*commandverb*.*commandkeyword***
  - verb is the short form of the verb
- For example, the /DISPLAY TRAN command would have the following resource name:

IMS.plxname.DIS.TRAN

See IMS Version 9 Command Reference, SC18-7814, Appendix I, Table 215 lists by IMS command verb and keyword the resource name and authorization that are used for RACF security checking.

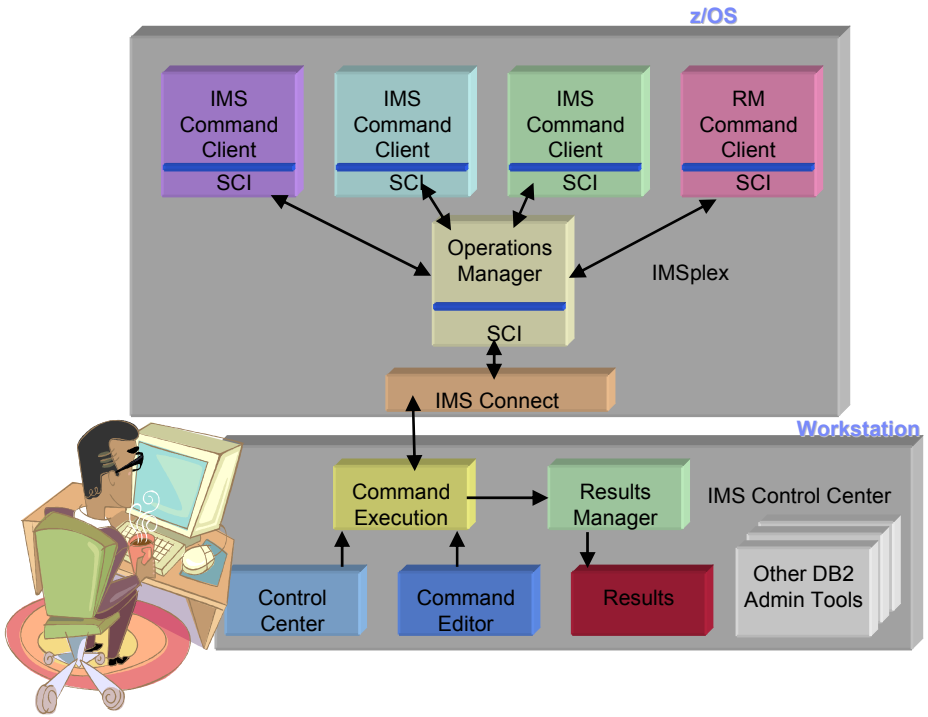
Command Security …

- RACF definitions
  - Define type-1 and type-2 commands
  - Permit users **READ** or **UPDATE** access to commands

```
RDEFINE OPERCMDS  IMS.CSLPLX0.UPD.TRAN  UACC(NONE)
RDEFINE OPERCMDS  IMS.CSLPLX0.STO.DB  UACC(NONE)
RDEFINE OPERCMDS  IMS.CSLPLX1.UPD.TRAN  UACC(NONE)
RDEFINE OPERCMDS  IMS.*.QRY.*  UACC(NONE)
RDEFINE ....
PERMIT      IMS.CSLPLX0.UPD.TRAN  CLASS(OPERCMDS)
            ID(LONNIE)  ACCESS(UPDATE)
PERMIT      IMS.*.QRY.*  CLASS(OPERCMDS)
            ID(KENNY)  ACCESS(READ)
PERMIT      IMS.*.UPD.*  CLASS(OPERCMDS)
            ID(ALISON)  ACCESS(UPDATE)
PERMIT      IMS.CSLPLX0.STO.DB  CLASS(OPERCMDS)
            ID(ALAN)  ACCESS(UPDATE)
PERMIT      ....
SETROPTS    CLASSACT(OPERCMDS)
SETROPTS    RACLIST(OPERCMDS)  REFRESH
```

In Summary IMS Control Center & Command Editor

- Help to **simplify the management** of IMSplex operations and problem determination
  - No need to remember command syntax
- Provides an ***easy to use*** GUI with IMS Connect and CSL in IMS
- Provides a **single user interface** from which you can control both **IMS and DB2**
- Provides a platform for **modernization** of the IMS systems management user interface



Thank
You