9 Years of i Can

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IBM i Blogs You Must Read

- [IBM Systems Magazine Blogs](#)

You and i *IBM i Trends and Strategies*

[You and i](#)

Steve Will, IBM i Chief Architect

Open Your i

[Open Your i](#)

Jesse Gorzinski, IBM i Open Source Business Architect

iDevelop *Application Development for IBM i*

[iDevelop](#)

Jon Paris and Susan Gantner

Other IBM i Blogs You Must Read

Db2 for i
Mike Cain, IBM Systems Lab Services

Db2 Web Query for i
Doug Mack, IBM Systems Lab Services

Scott's iLand
Scott Klement

IBMi.org - Bart's Blog

And More!

- iTech Solutions Group Blog

- HelpSystems Blog

- …. and more …..

iTech
Solutions Group, LLC

iTech Solutions Group Blog

i Can

i Can *Technical Tips for i*

Displaying results 1-10 (of 358)

|< < 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 > >|

For a simple list of all blogs on one page:

"i Can" Blog of Blogs

IBM.biz/iCanBlog

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i Can Blog of Blogs

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This page is a listing of all the "i Can" blogs in chronological order (oldest at the bottom).

Watches and Job Log Messages

The QDFTSVR Job Description

Managing Prestart Server Jobs by Remote IP address

QSYS2.ACTIVE_JOB_INFO Service Enhancements: QTEMP_SIZE and Much More

IBM i Access Client Solutions - IFS Properties

Work with Active Prestart Jobs

Prestart Jobs and Server Jobs

Subsystem Configuration for Prestart Jobs

Display Active Prestart Jobs

Prestart Job Configuration Settings

IBM i System Supplied Prestart Job Entries

Introduction to Prestart Jobs

Search the Job Log of an Active Job

IBM i QSYS2.Services_Info() and Navigator for i

Improved Temporary Storage Tracking for IBM i (Part 9)

Copy Performance Data using ACS IFS Tasks

Editing a File in the IFS with Navigator for i

Working with the IFS: Access Client Solutions vs Navigator for i

How to Save 5250 Configurations as Default Profile

Workload Groups and Performance Considerations

Blog Themes

- IBM i Systems Management Topics

  - Work management

  - Performance tools and performance management

  - Navigator for i

  - ACS

  - IBM i Services

- Guest Bloggers from the IBM i development team on other topics

  - Networking

  - Application Development

  - ... and more ....

IBM i Services Blogs

- [QSYS2.ACTIVE_JOB_INFO Service Enhancements: QTEMP_SIZE and Much More](#)

- [Route More Work to Subsystems by User Profile](#)

- [IBM i QSYS2.Services_Info() and Navigator for i](#)

- [STACK_INFO() IBM i Service](#)

- [IBM i Services for Function Usage Information](#)

- [IBM i Services](#)

- [Integration Between Navigator and Access Client Solutions](#)

Interfaces to Manage IBM i

- IBM i has a rich set of tools to manage the system

  - Navigator for i graphical interface

  - Access Client Solutions

    - 5250

    - Printer output

    - IFS

    - Database

    - …. and much more

  - Commands

  - APIs

  - Administration Runtime Expert

  - and increasingly, IBM i services

IBM i Services

- IBM i Services are delivered in the Db2 for i Group PTF

    - 7.3 – SF99703

    - 7.2 – SF99702

- Documentation can be found at:
    - IBM i developerWorks – SQL Services

    You are in: IBM i Technology Updates > IBM i Technology Updates > DB2 for i - Technology Updates > DB2 for i - Services

    DB2 for i - Services

    - IBM i Knowledge Center – IBM i Services

    IBM IBM Knowledge Center

    Home > IBM i 7.3 > Database > Performance and query optimization >

    IBM i Services

The Power of SQL

- SQL is easy to learn

- SQL has powerful capabilities to access and organize data

  - Select the data you want

  - Organize it how you want

  - Combine data from different tables (services)

  - Limit the data to only top contributors

  - … and more …

- Keep the SQL Reference handy

QSYS2.ACTIVE_JOB_INFO Service Enhancements: QTEMP_SIZE and Much More

http://www.ibmsystemsmag.com/Blogs/i-Can/Archive/qtemp-temporary-or-permanent-storage/
http://www.ibmsystemsmag.com/Blogs/i-Can/March-2017/Determining-the-Size-of-QTEMP/

QSYS2.ACTIVE_JOB_INFO Service to find the size of any job's QTEMP

```
SELECT JOB_NAME, AUTHORIZATION_NAME, QTEMP_SIZE
  FROM TABLE (QSYS2.ACTIVE_JOB_INFO(DETAILED_INFO => 'QTEMP'))
  ORDER BY QTEMP_SIZE DESC LIMIT 10;
```

JOB_NAME	AUTHORIZATION_NAME	QTEMP_SIZE
642654/QUSER/QZDASSINIT	DAWNM	18
622688/QUSER/QNPSERVS	QUSER	1
622689/QUSER/QNPSERVS	QUSER	1
622690/QUSER/QNPSERVS	QUSER	1
621970/QUSER/QNPSERVR	QUSER	1
640932/QTMHHTTP/QHTTP	QTMHHTTP	1
631188/QUSER/QNPSERVS	QUSER	1
631189/QUSER/QNPSERVS	QUSER	1
621898/QSYS/QDBSRVXR2	QSYS	1
622669/QSYS/DAWNMAY	QSYS	0

Route More Work to Subsystems by User Profile

- IBM i Service to route work to subsystems by the requesting user profile

  - QSYS2.SET_SERVER_SBS_ROUTING()

    - To create the configuration

  - QSYS2.SERVER_SBS_ROUTING

    - To review the configuration

QSYS2.SET_SERVER_SBS_ROUTING()

- IBM i Service to route work requests to subsystems by user profile

- Supported for the following servers:
  - Central Server - QZSCSRVS
  - Database Server - QZDASOINIT
  - Dataqueue Server - QZHQSSRV
  - DDM/DRDA Server - QRWTSRVR
  - File Server - QPWFSERVSO
  - Network Print Server - QNPSERVS
  - Remote Command Server - QZRCSRVS

- This is not supported for the secure servers (SSL)

Route More Work to Subsystems by User Profile

QSYS2.SET_SERVER_SBS_ROUTING() - Allow Rollover Support

- Allow Rollover allows you to control the behavior when the specified subsystem is not active

  - NO

    - If the alternate subsystem cannot be used, the connection request will fail

  - YES

    - If the alternate subsystem cannot be used, the connection request will succeed by using a batch immediate job in the default subsystem

  - If this parameter is not specified, the default is YES

- Requires:

  - IBM i 7.3

  - IBM i 7.2 SF99702 Level 11 or later

QSYS2.SET_SERVER_SBS_ROUTING()

- SQL Procedure to configure your subsystem routing information

- Specify

  - Authorization name

    - User profile name

    - Can be a group or supplemental group profile

  - Server name

  - The subsystem to route to

  - Allow rollover - yes or no

    - The specified subsystem is not active, should the request roll over to the default subsystem?

```
CALL QSYS2.SET_SERVER_SBS_ROUTING('DAWNM','*ALL','DAWNMAY','NO');
```

All DAWNM's server jobs will be routed to subsystem DAWNMAY
If subsystem DAWNMAY is not active, the connection is rejected

QSYS2.SERVER_SBS_ROUTING

```sql
SELECT * FROM QSYS2.SERVER_SBS_ROUTING;
```

AUTHORIZATION_NAME
DAWNM

QRWTSRVR_SUBSYSTEM	QZDASOINIT_SUBSYSTEM	QZRCSRVS_SUBSYSTEM	QZHQSSRV_SUBSYSTEM
DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY

QZSCSRVS_SUBSYSTEM	QNPSERVS_SUBSYSTEM	QPWFSERVSO_SUBSYSTEM
DAWNMAY	DAWNMAY	DAWNMAY

QRWTSRVR_ROLLOVER	QZDASOINIT_ROLLOVER	QZRCSRVS_ROLLOVER	QZHQSSRV_ROLLOVER
NO	NO	NO	NO

QZSCSRVS_ROLLOVER	QNPSERVS_ROLLOVER	QPWFSERVSO_ROLLOVER
NO	NO	NO

IBM i Access Client Solutions Blogs

- IBM i Access Client Solutions - IFS Properties

- Working with the IFS: Access Client Solutions vs Navigator for i

- Copy Performance Data Using the ACS IFS Tasks

- How to Identify Your Active 5250 Session

- How to Save 5250 Configurations as Default Profile

- Integration Between Navigator and Access Client Solutions

- Application Administratio with Access Client Solutions

- Access Client Solutions - A Better 5250 Emulator

- Client Special Registers

IFS Features

- Support for accessing the IFS was added in July of 2016

- Major features include:

  - View files, permissions, properties

  - Upload and download files, copy and paste files

  - Send files to multiple IBM i partitions

  - View content of files

- IFS file cabinet icon from 5250 session
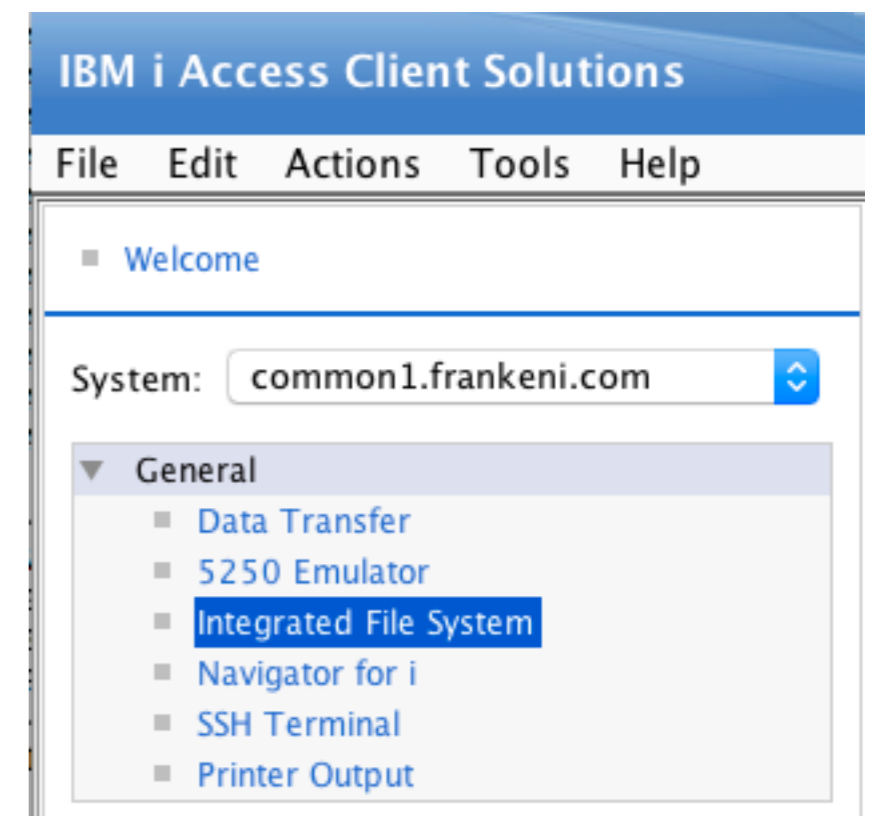
IFS Preferences

- Specify your
  - Download location
  - Home directory
  - View
    - Detailed messages
      - Control display of messages
    - Show all directories and files
      - Turn on to see hidden files

Name
.bash_history
.config
.npm
.pm2
.python_history
.vi_history

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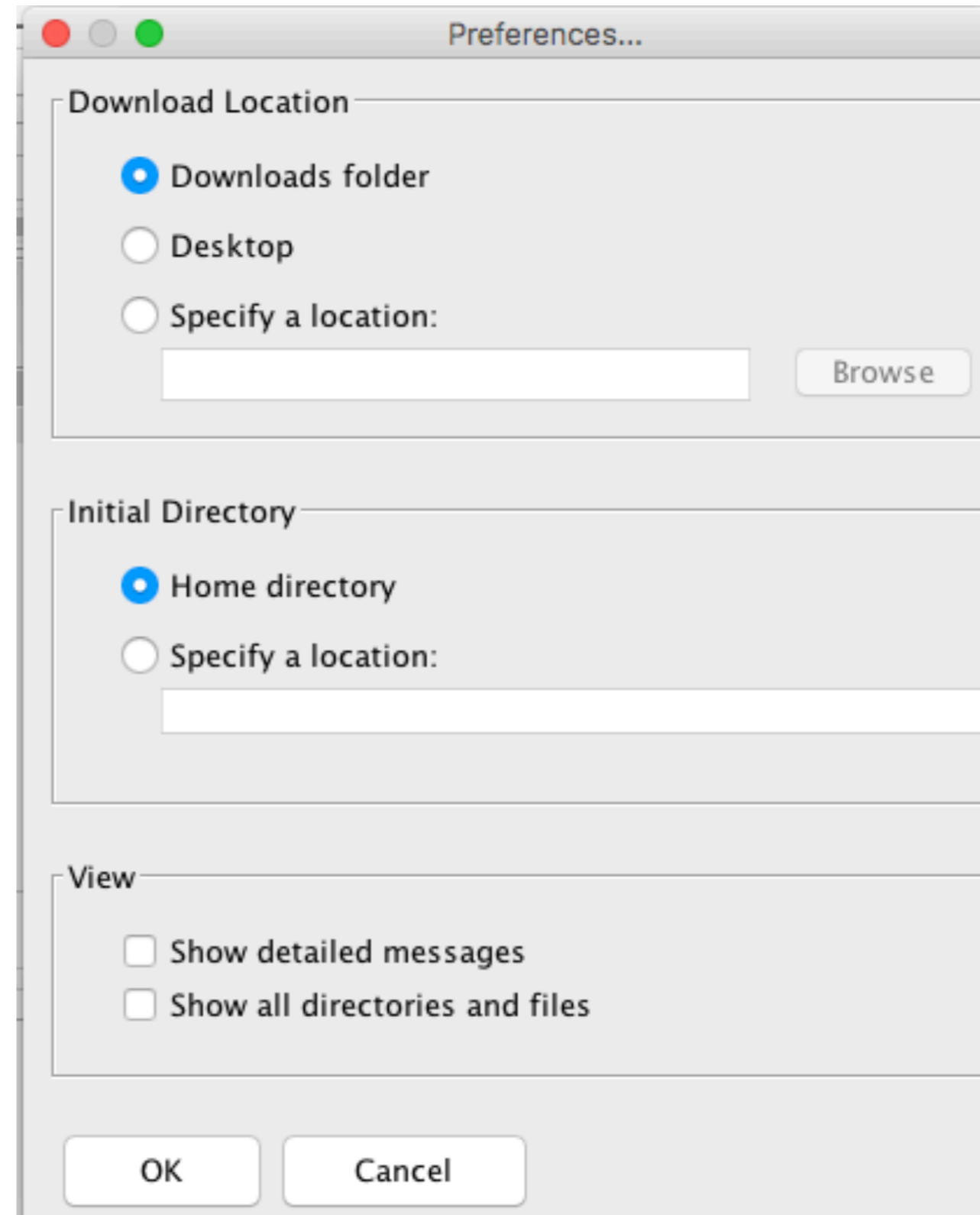
Options for files

- Note you can only view files, not edit them

Permissions

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Send

- Send files to other IBM i partitions

- ACS makes sending Save Files very easy!

  - No need to know the magic steps needed when using FTP

- Can send to multiple IBM i partitions

- Can copy & paste / drag & drop between IBM i partitions

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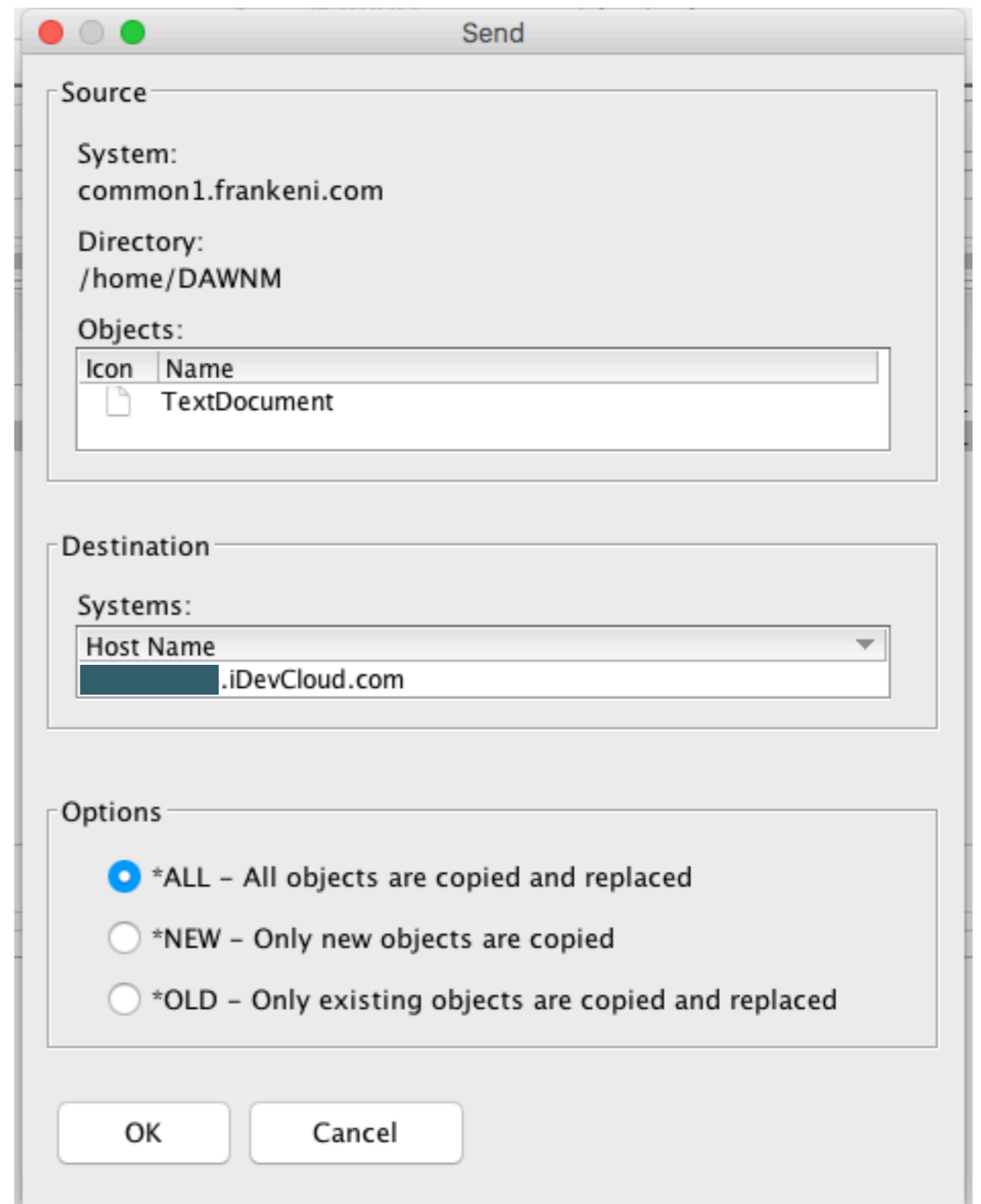
IFS and Sending Files

- IFS tasks use QFileSvr.400 file system to copy or send objects from one IBM i partition to another

- User profile and password on both partitions must match

- Partitions must have the same password level system value (QPWDLVL)

- The Integrated File System support requires authority to use the following CL commands:

  - CPY

  - CPYFRMSTMF

  - CPYTOSTMF

  - CRTDIR

  - CRTLIB

  - CRTSAVF

  - RMVDIR

  - RST

  - SAV

  - SETASPGRP

> Read the "GettingStarted" document for more information

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Access Client Solutions – A Better 5250 Emulator

- Tabbed windows

- Mouse wheel support

- Water mark support

- Default session configuration

- Screen history
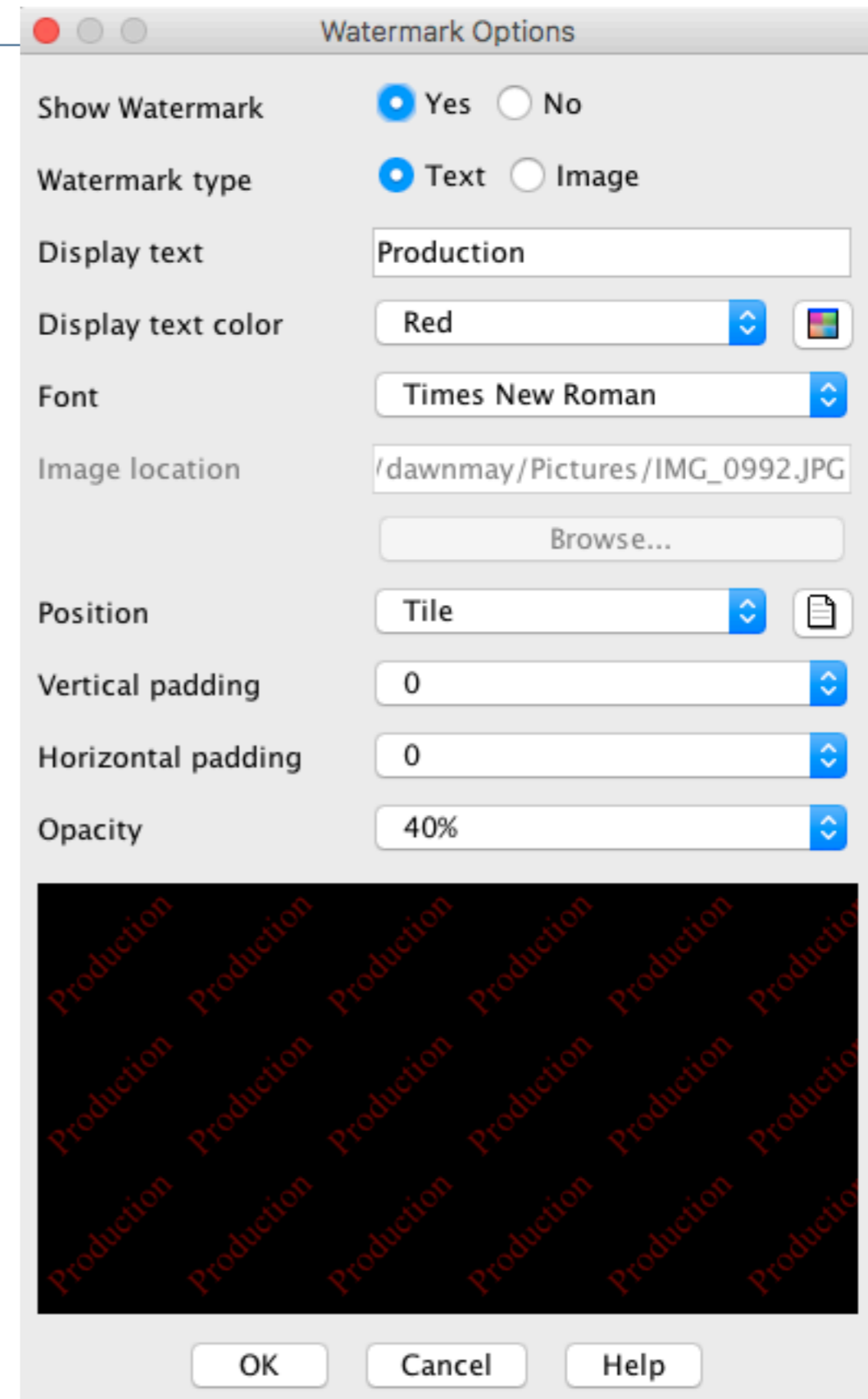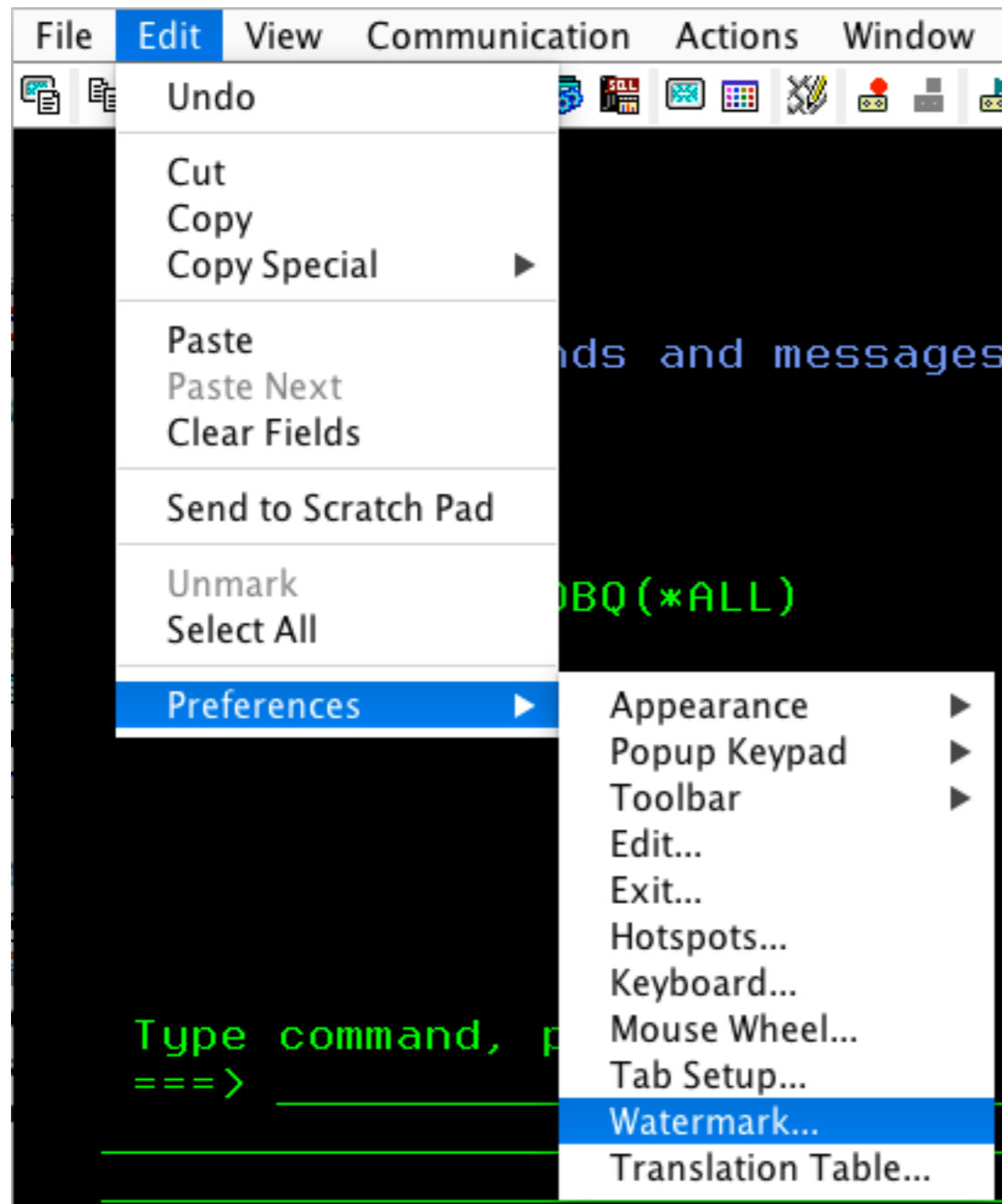
- Scratch pad

Tabbed Windows
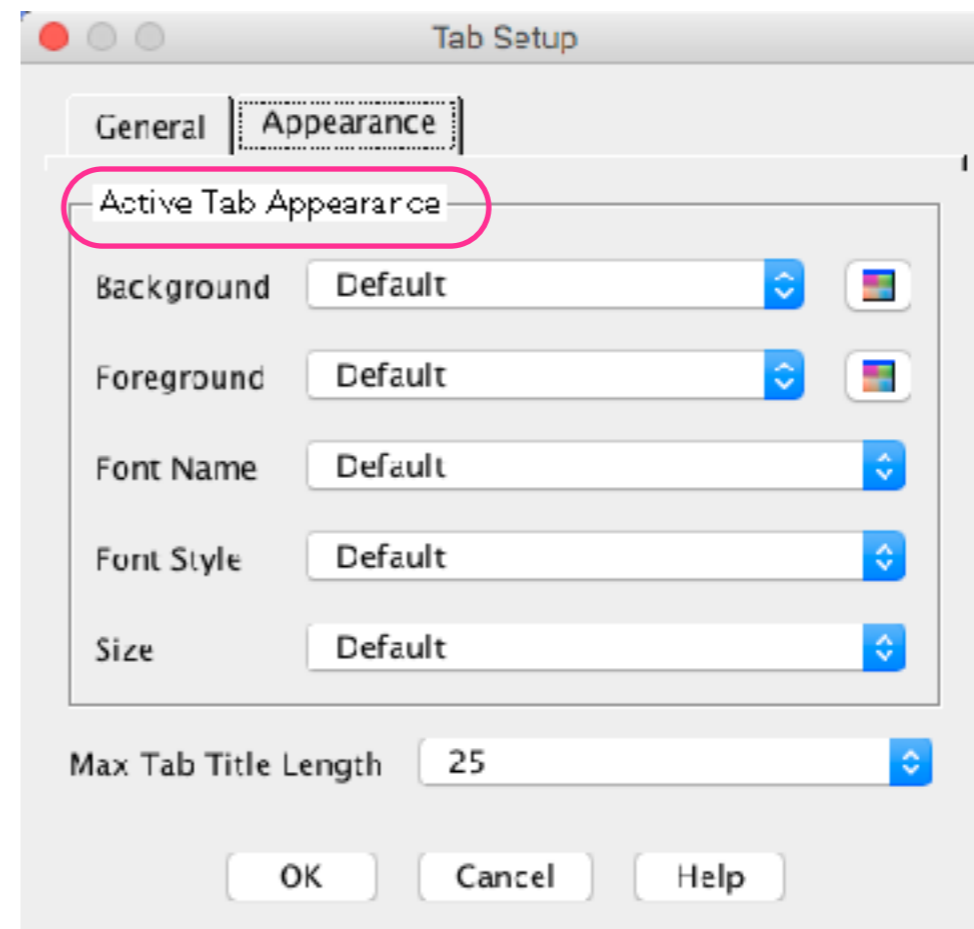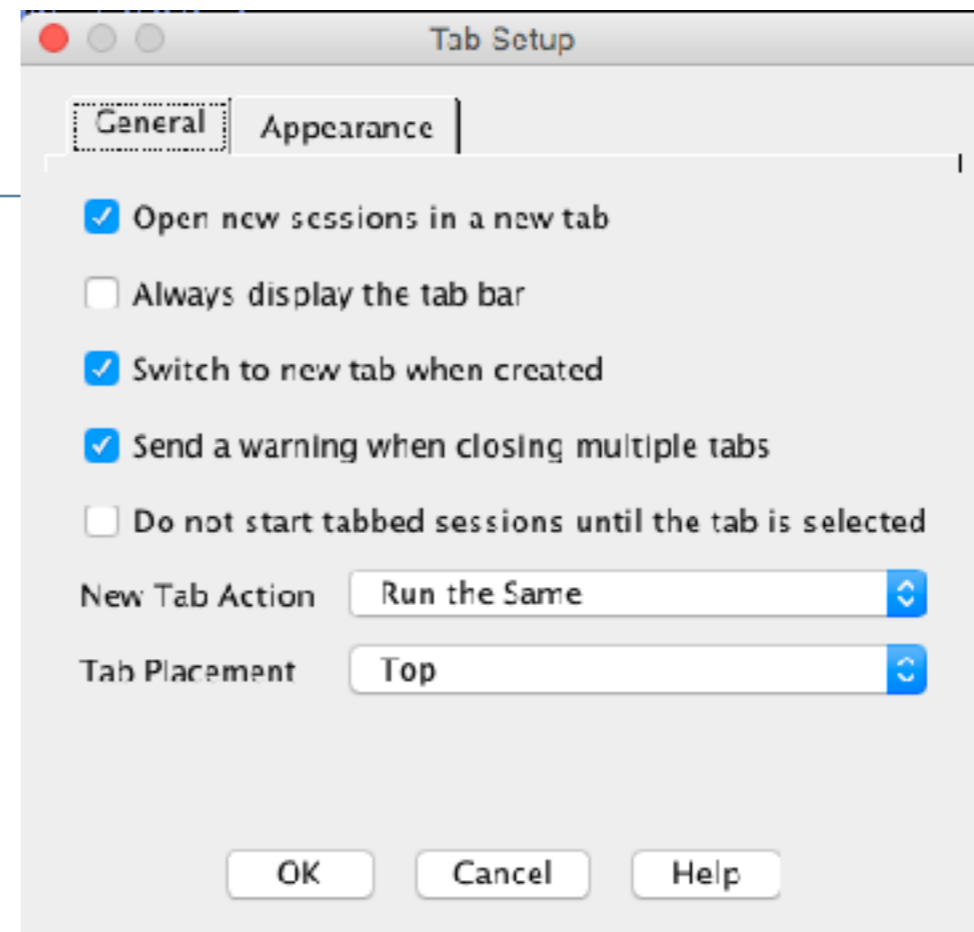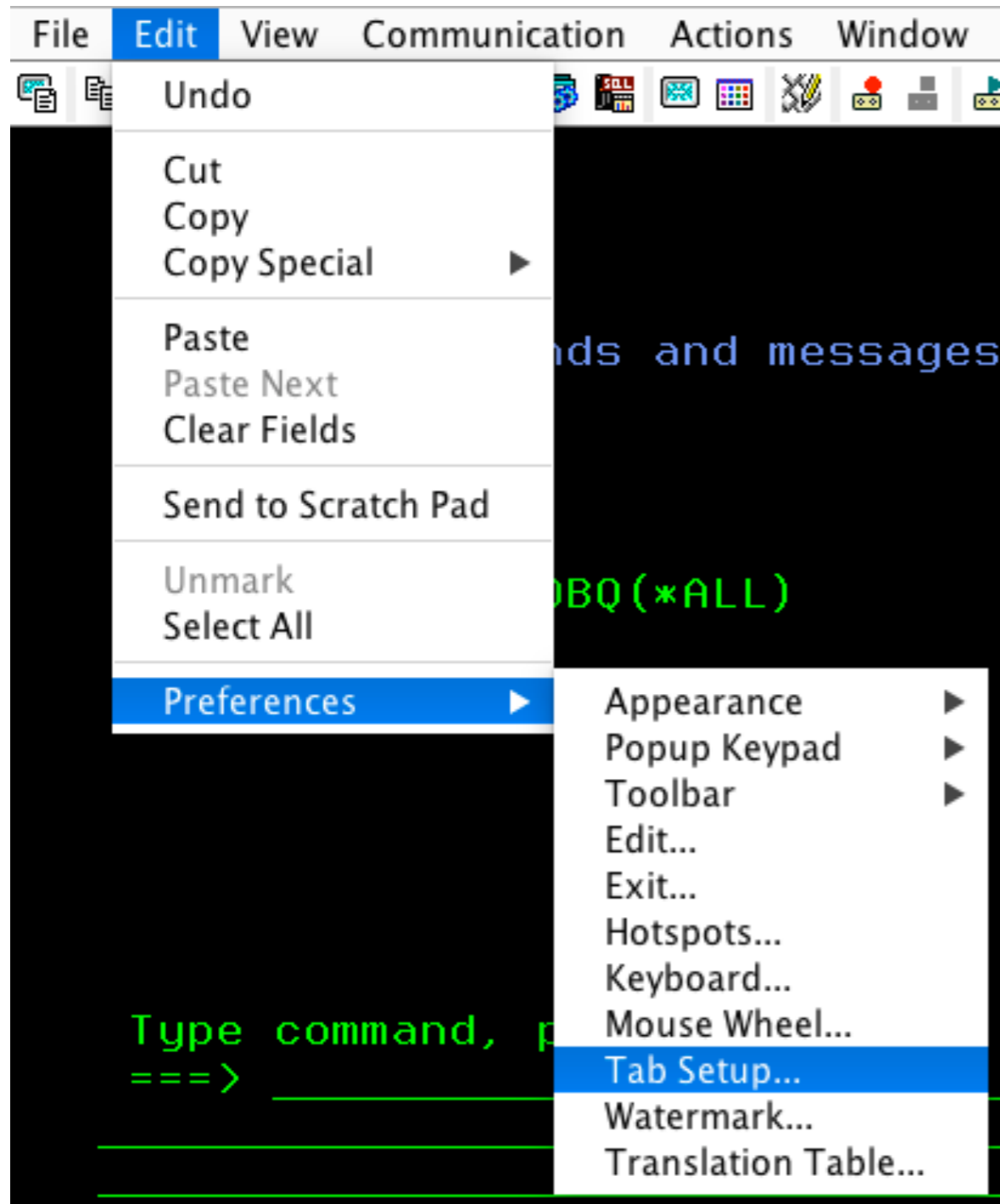
Tabbed Windows - Inactive sessions
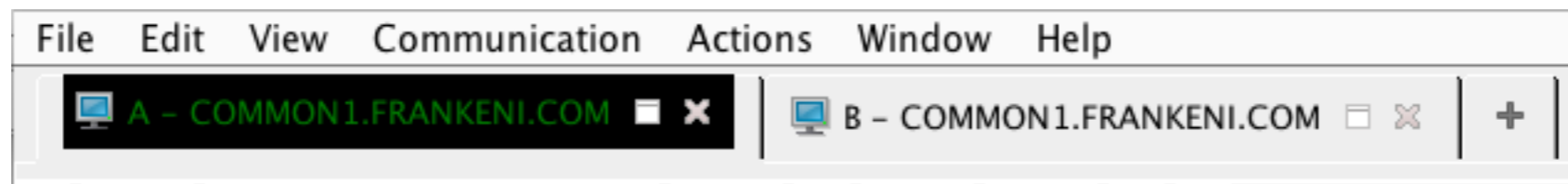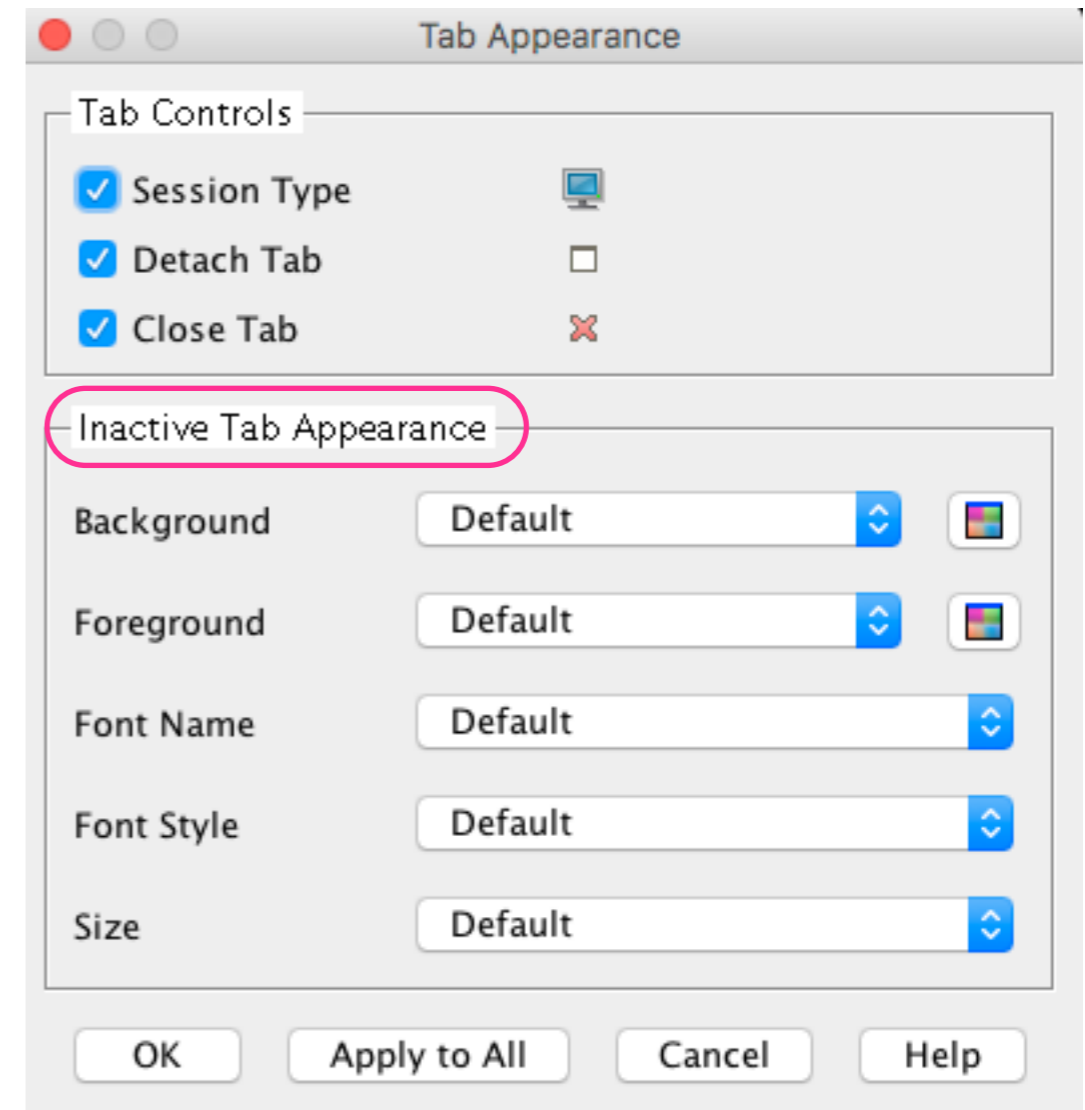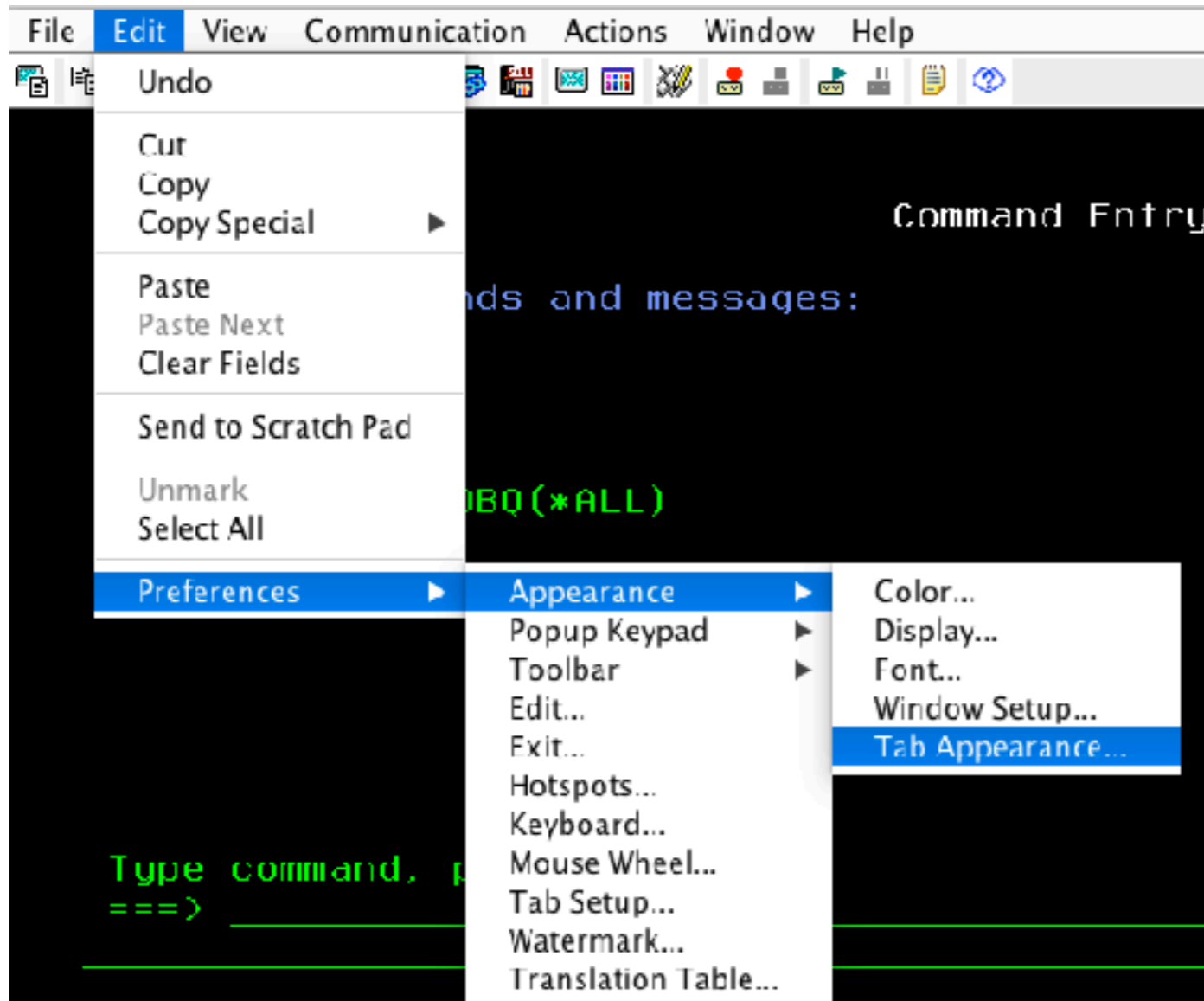
Manipulate tabbed windows

Mouse Wheel Support

Watermark

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Tiled Text

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Watermark Image

How to Save 5250 Configurations as Default Profile

- You set up all your perfect customizations

- Now you want to save that configuration to be your default profile for all new sessions
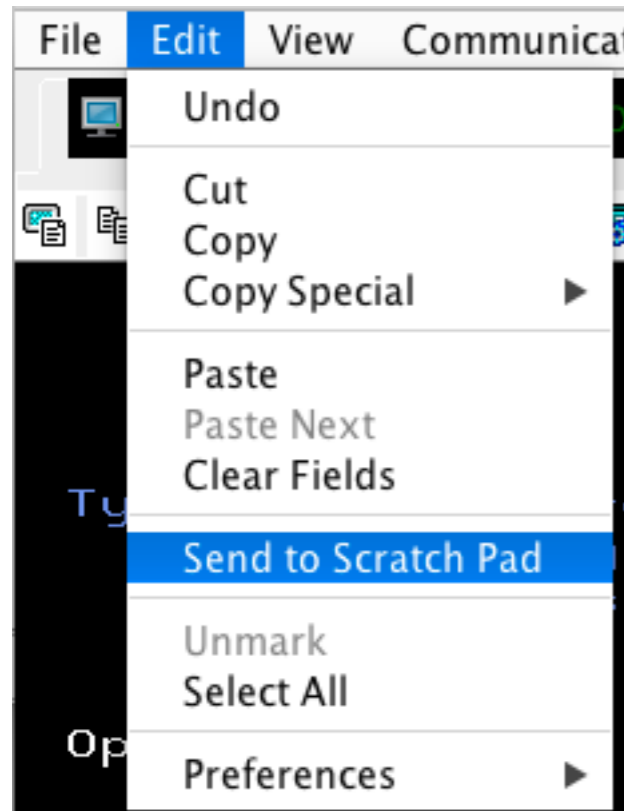
- It's easy.
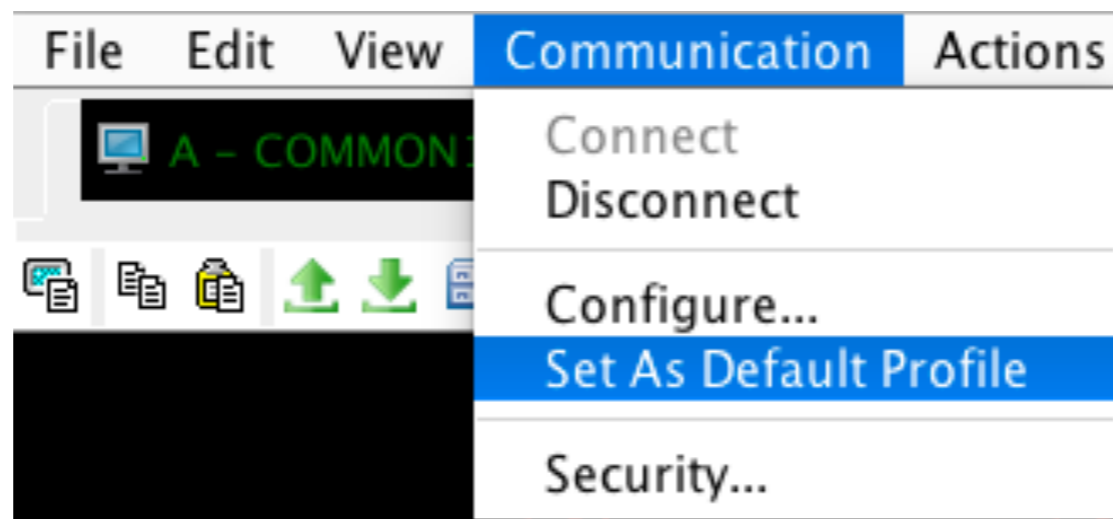
Screen History

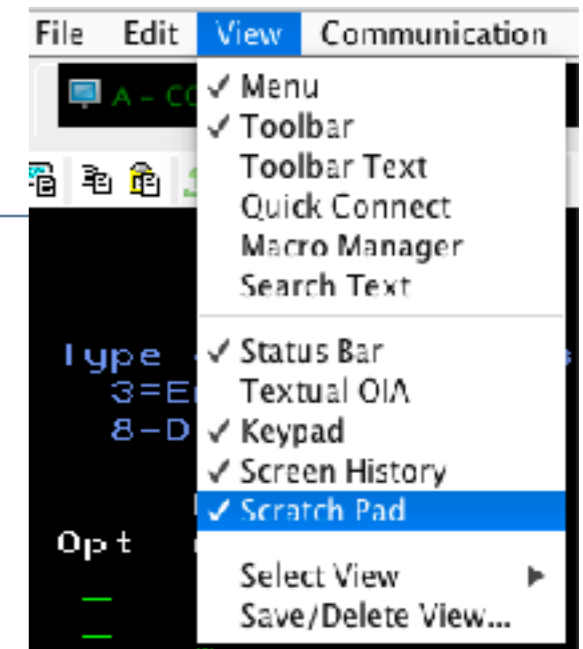- Screen history
  - Limited to 15 screens
- Screen history archive
  - Screens are saved to disk
  - Can save a screen history archive as a .txt file

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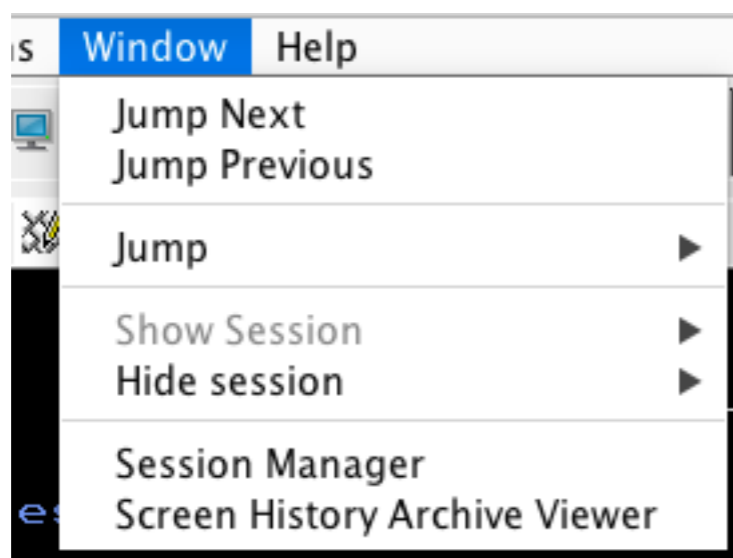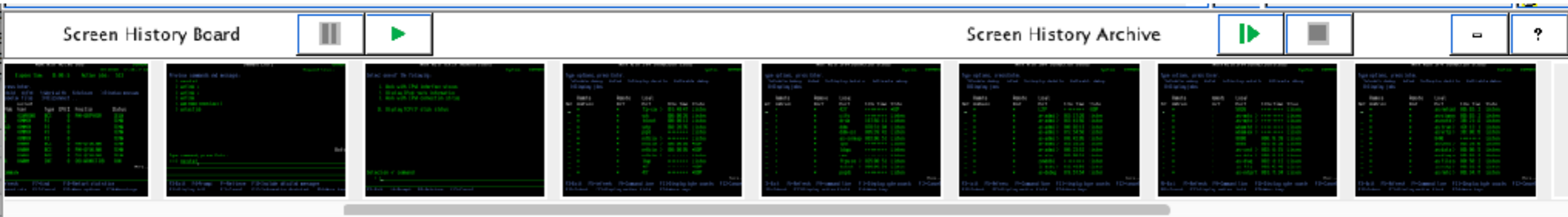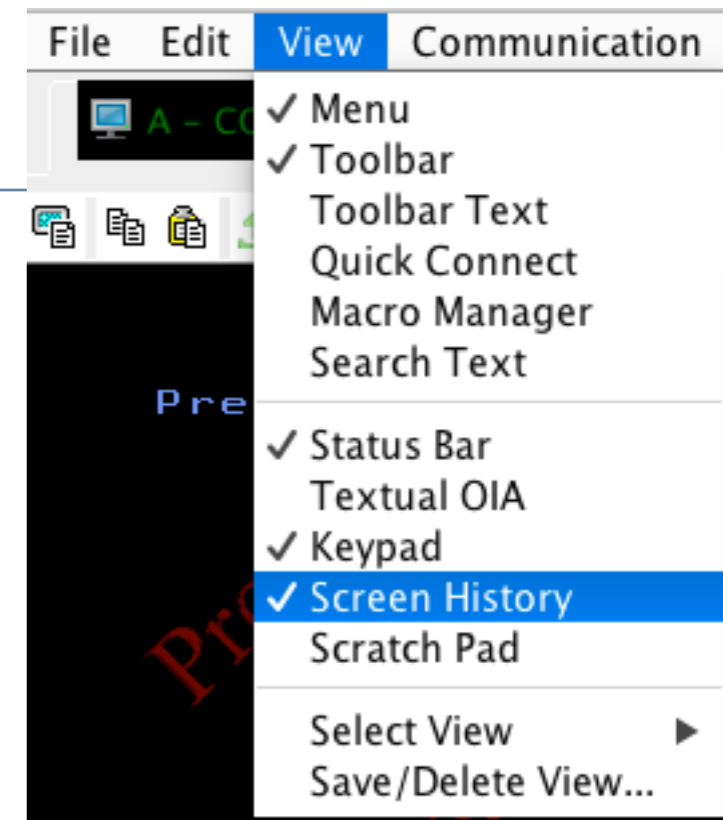
Scratch Pad

- Basic text editor
- Can send 5250 screen contents to the Scratch Pad

Typed text and text from the screen

Help
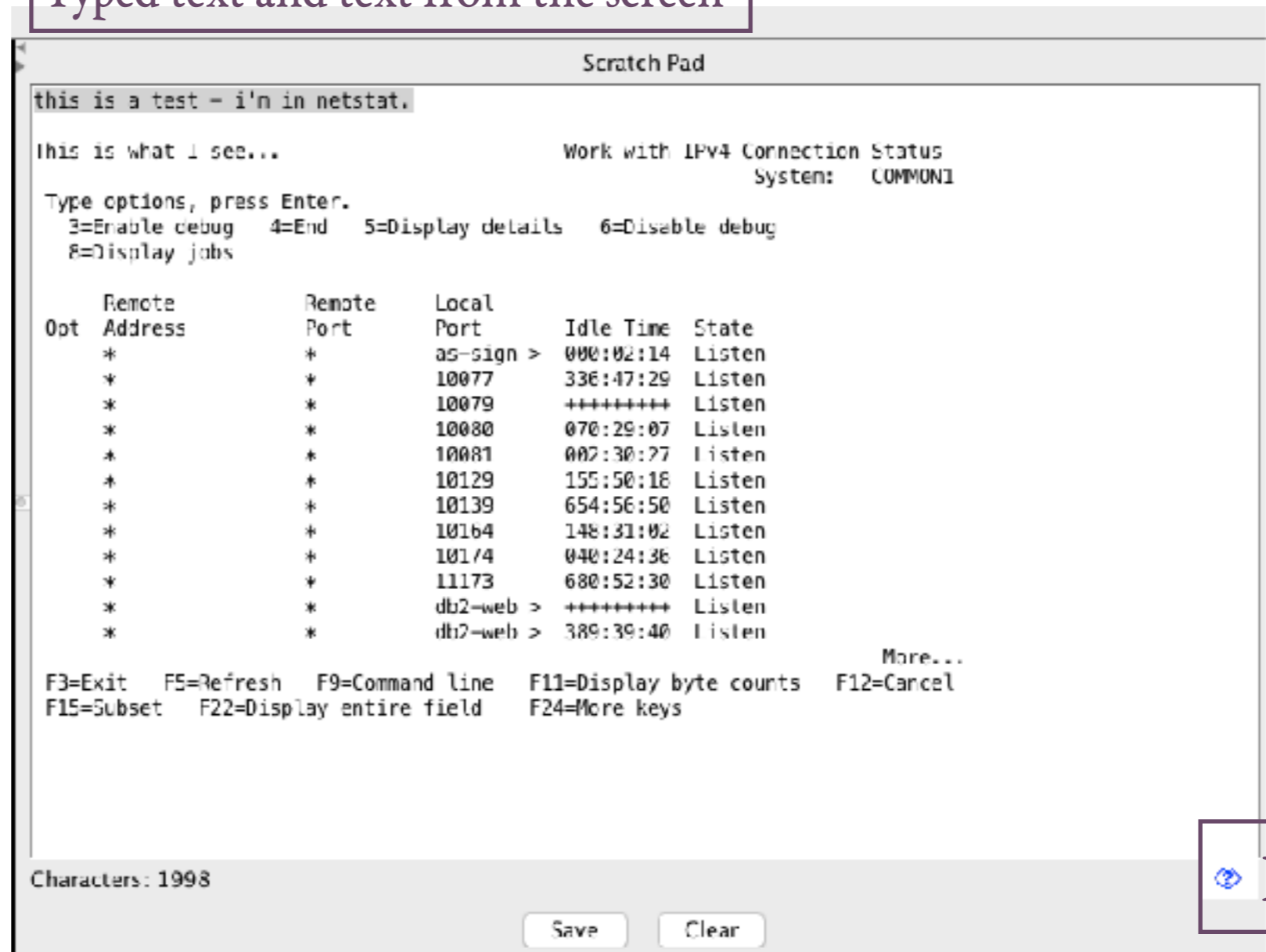
Client Special Registers

- ACS uses Client Special Registers when using Run SQL Scripts

Client Special Registers

- When using SQL Performance Center, SQL Details for Jobs, you can also see the Client Special Registers associated with that job

- Consider using client special registers to aid in identifying who is running that SQL statement

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ACS and Application Administration

- Blogs

  - [IBM i Services for Function Usage Information](#)

  - [New Function Usage IDs](#)

  - [Functional Usage Capabilities](#)

  - [Functional Usage Capabilities, Part 2](#)

- Other articles

  - [Granular Security Control with Functional Usage](#)

  - [IBM i Function Usage IDs](#)

Application Administration

- Controlled with Navigator restrictions

  - Printer Output

  - Integrated File Systems

  - Database tasks (Run SQL Scripts and SQL Performance Center)

- Application Administration for Client Applications are:

  - 5250 emulator

  - Data Transfer

ACS and Application Administration

- The user will still see the functions within the ACS interface unless you hide them

- An error will be received when attempting to use them

- For example, attempting to use the SQL Performance Center:
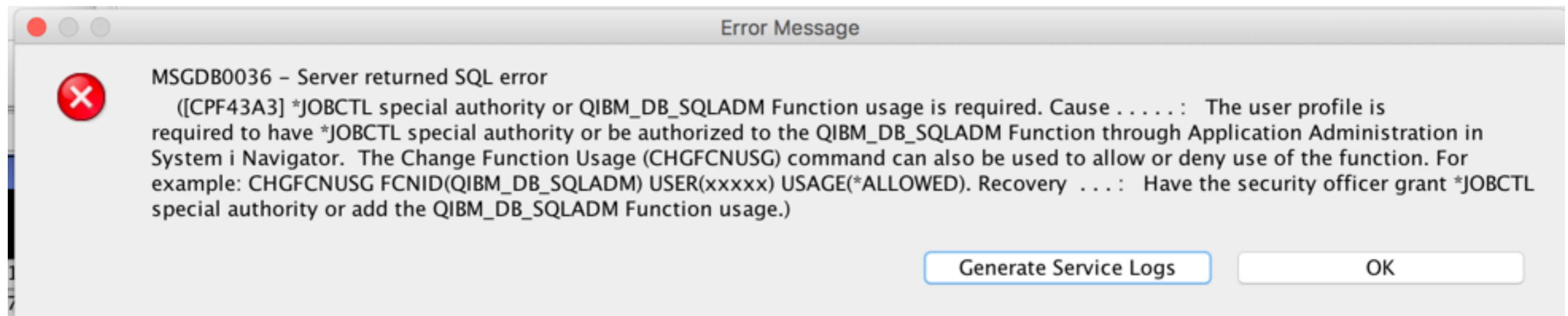
Error Message

MSGDB0036 – Server returned SQL error
([CPF43A3] *JOBCTL special authority or QIBM_DB_SQLADM Function usage is required. Cause . . . . . : The user profile is required to have *JOBCTL special authority or be authorized to the QIBM_DB_SQLADM Function through Application Administration in System i Navigator. The Change Function Usage (CHGFCNUSG) command can also be used to allow or deny use of the function. For example: CHGFCNUSG FCNID(QIBM_DB_SQLADM) USER(xxxxx) USAGE(*ALLOWED). Recovery . . . : Have the security officer grant *JOBCTL special authority or add the QIBM_DB_SQLADM Function usage.)

Generate Service Logs   OK

WRKFCNUSG FCNID(QIBM_XE1*)

Client Applications

- If you do not see any applications under the "Client Applications" tab, use the Applications button to add them

Client Applications

Integration Between Navigator and Access Client Solutions

- ## Launch Navigator
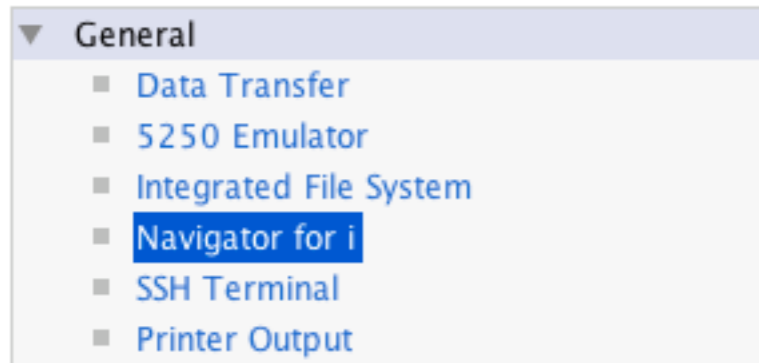
- ## Listen for Navigator requests

  - ### Allows Navigator to use ACS for features such as Run SQL Scripts
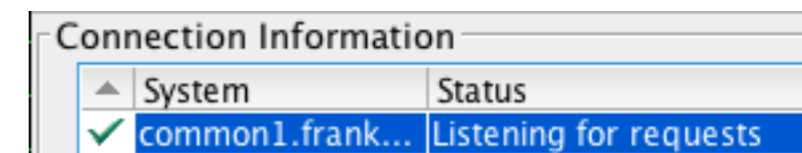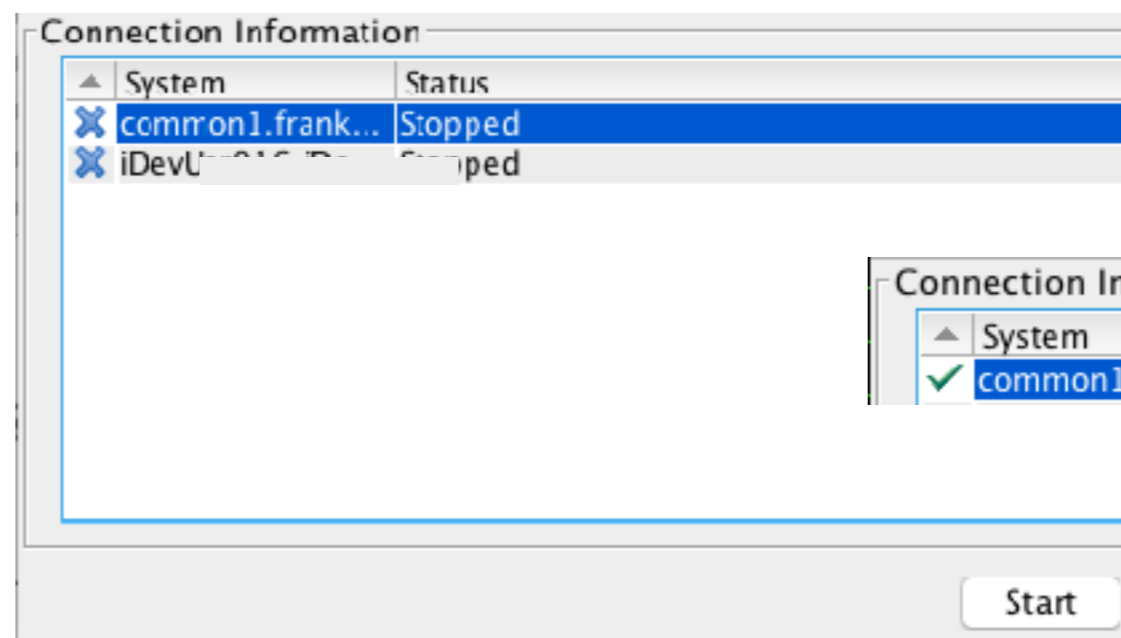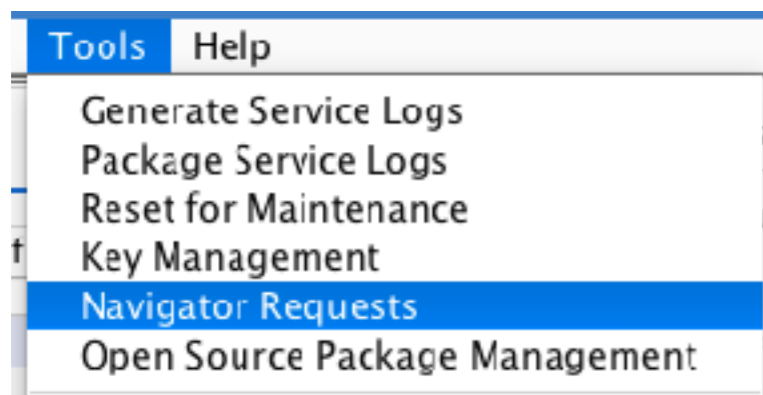
IBM i 7.2 Temporary Storage Tracking

- 7.2 Improved Temporary Storage Tracking

  - Part 1 – Overview and operating system enablement

  - Part 2 – 7.2 temporary storage at the system-level

  - Part 3 – 7.2 temporary storage at the job-level

  - Part 4 – 7.2 Collection Services enablement

  - Part 5 – Setting limits and notification

  - Part 6 – using SYSTMPSTG storage services

  - Part 7 - Temporary Storage and the database, part 1

  - Part 8 - Temporary Storage and the database, part 2

  - Part 9 - Temporary Storage and the database, part 3

- Understand Disk Space Usage

Temporary and Permanent storage

- Temporary storage

  - Called 'unprotected storage' (pre-7.2 WRKSYSSTS)

  - Temporary storage is reclaimed on each IPL of the operating system

  - Temporary storage has been "charged" at a job level

  - Temporary storage can also be shared across multiple jobs

- Permanent storage

  - Storage for all permanent objects in libraries and directories

  - Persists across an IPL of the operating system

  - Permanent storage is charged to the user profile that owns the object

  - Note: All objects shown by DSPLIB are permanent objects

    - Objects in QTEMP are permanent objects

Challenges with Temporary storage

- Hard to find largest consumers of temp storage

  - Tedious to find which job has used the most temporary storage

- Totals could be inaccurate or misleading

  - If job A allocates shared memory and job B deallocates the shared memory, the storage for the shared memory is deducted from job B, not job A

  - Some temporary storage usage not "charged" to any job

  - Temporary storage designed to be shared across jobs

7.2 Temporary storage buckets

- Define "buckets" to account for temporary storage usage

- Buckets created for:
  - Temporary storage scoped to the job
  - Temporary storage shared by multiple jobs

  - Temporary storage scoped to the system
    - Examples are temporary UDFS and POSIX shared memory objects

  - Temporary storage that is not scoped to the job or system
    - "No charge" allocations
    - Used by Licensed Internal Code tasks or other system services

  - Temporary storage allocations that persist after a job ends

- New interfaces to show all temporary storage buckets in use
  - Total of all buckets will match the temporary storage total reported by System Status
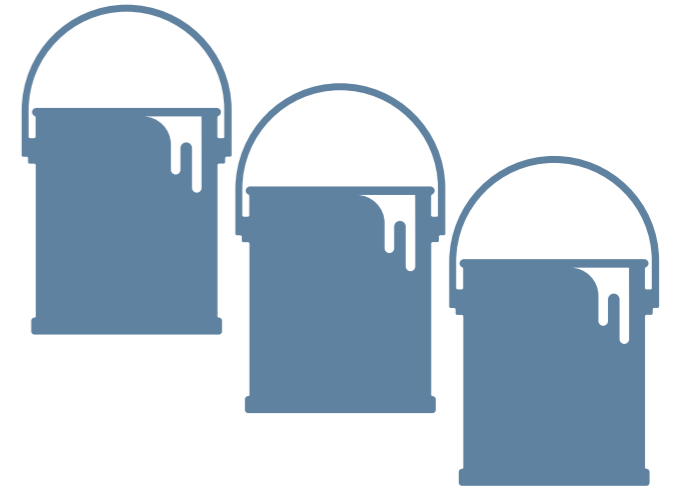
Active Jobs – *Temporary Storage Used*

Active Jobs - Common1.frankeni.com

Refresh Elapsed time: 01:09:57

Actions ▼   Search

No filter applied

	Job Name	Detailed Status	Current User	Type	CPU %	Run Priority	Thread Count	Temporary Storage Used (MB)
	Admin2	Waiting for thread	Qlwisvr	Batch immediate	1.2	25	126	949
	Admin4	Waiting for thread	Qwebadmin	Batch immediate	0.0	25	118	222
	Admin5	Waiting for thread	Qlwisvr	Batch immediate	0.0	25	89	172
	Http2demo	Waiting for signal	Qtmhhttp	Batch immediate - Server	0.0	25	107	172
	Admin1	Waiting for thread	Qlwisvr	Batch immediate	0.0	25	89	157
	Admin3	Waiting for thread	Qlwisvr	Batch immediate	0.0	25	70	153
	Qusrdir	Waiting for signal	Qdirsrv	Batch - Server	0.0	50	12	149
	Qypsjsvr	Waiting for signal	Qypsjsvr	Batch - Server	0.0	10	51	72
	Qypspfrcol	Waiting for dequeue	Qsys	Batch	0.0	1	29	65
	Qinavmnsrv	Waiting for thread	Qlwisvr	Batch immediate - Server	0.0	50	44	62
	Zenddbid	Waiting for select	Mysql	Batch immediate	0.0	30	26	60
	Qsrvmon	Waiting for dequeue	Qsecofr	Batch immediate	0.0	50	36	53

WRKACTJOB – *Sequence: *TMPSTG*

```
                    Work with Active Jobs (WRKACTJOB)

Type choices, press Enter.

Output . . . . . . . . . . . . . .      *                *, *PRINT

                    Additional Parameters

Reset status statistics  . . . .      *NO              *NO, *YES
Subsystem  . . . . . . . . . .        *ALL             Name, *ALL
              + for more values
CPU percent limit  . . . . . . .      *NONE            .1-99.9, *NONE
Response time limit  . . . . . .      *NONE            .1-999.9 seconds, *NONE
Sequence . . . . . . . . . . . . >    *TMPSTG          *SBS, *AUXIO, *CPU...
Job name . . . . . . . . . . . .      *ALL             Name, generic*, *ALL, *SYS...
Automatic refresh interval . . .      *PRV             5-999 seconds, *PRV
```

WRKACTJOB – *Temporary Storage (F11)*

```
                                Work with Active Jobs
                                                          04/20/18  14:39:51
  CPU %:        3.7      Elapsed time:    02:20:32      Active jobs:    223


  Type options, press Enter.
    2=Change    3=Hold    4=End      5=Work with    6=Release    7=Display message
    8=Work with spooled files    13=Disconnect ...
                                                                    Temporary
  Opt   Subsystem/Job   User        Number   Type   CPU %   Threads   Storage
        QBATCH          QSYS        091121   SBS      .0       2         3
        QCMN            QSYS        091124   SBS      .0       2         3
        QCTL            QSYS        091097   SBS      .0       2         3
        QHTTPSVR        QSYS        091200   SBS      .0       2         3
          ADMIN         QTMHHTTP    094748   BCH      .0       1        13
          ADMIN         QTMHHTTP    094749   BCI      .0       1         8
          ADMIN         QTMHHTTP    094755   BCI      .0      12        19
          ADMIN1        QLWISVR     094758   BCI      .0      30       162
          ADMIN2        QLWISVR     094930   BCI      .0      80       792
                                                                          More...
  Parameters or command
  ===>

  F3=Exit    F5=Refresh    F7=Find    F10=Restart statistics    F11=Display status
  F12=Cancel    F17=Top    F18=Bottom    F23=More options    F24=More keys
```

WRKACTJOB – *Temporary Storage*

```
                         Work with Active Jobs
                                              04/20/18   14:43:14
CPU %:      3.7      Elapsed time:    02:23:54      Active jobs:    223


Type options, press Enter.
  2=Change    3=Hold    4=End     5=Work with    6=Release    7=Display message
  8=Work with spooled files    13=Disconnect ...

                                                          Temporary
Opt   Subsystem/Job   User        Number   Type   CPU %   Threads   Storage
      Q1ACPDST        QBRMS       091196   PJ       .3        1       1326
      ADMIN2          QLWISVR     094930   BCI      .0       80        792
      QYPSPFRCOL      QSYS        091160   BCH      .0       30        207
      QYPSJSVR        QYPSJSVR    091207   BCH      .0       45        203
      ADMIN4          QWEBADMIN   094757   BCI      .0       36        185
      ADMIN5          QLWISVR     094756   BCI      .0       28        165
      ADMIN1          QLWISVR     094758   BCI      .0       30        162
      ADMIN3          QLWISVR     094929   BCI      .0       27        155
      QUSRDIR         QDIRSRV     091192   BCH      .0       12        147
                                                                    More...
Parameters or command
===>
F3=Exit    F5=Refresh    F7=Find    F10=Restart statistics    F11=Display status
F12=Cancel    F17=Top    F18=Bottom    F23=More options    F24=More keys
```

Display Temporary Storage Details

System Status – Disk space tab

   Button to display the temporary storage buckets
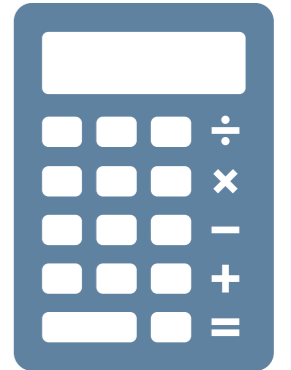
Temporary Storage Details

Sort on Bucket Current Size

Bucket Number	Global Bucket Name	Job Name	Job User Name	Job Number	Bucket Current Size	Bucket Limit Size	Bucket Peak Size	Job Status
9	*DATABASE SQE Heap				5,200,130,048		6,978,285,568	
65711	-	QYPSPFRCOL	QSYS	228,982	3,188,359,168		3,188,383,744	*ACTIVE
14	*DATABASE DSI SQE MTI	-	-		1,847,902,208		3,544,465,408	-
1	*MACHINE	-	-		1,534,607,360		1,744,994,304	-
8	*DATABASE Segment Cache	-	-		1,208,344,576		1,448,259,584	-
66545	-	ADMIN2	QLWISVR	231,452	712,462,336		877,588,480	*ACTIVE
66539	-	ADMIN4	QWEBADMIN	230,871	204,214,272		204,214,272	*ACTIVE
65772	-	ADMIN1	QLWISVR	230,869	191,451,136		191,451,136	*ACTIVE
66527	-	ADMIN3	QLWISVR	231,045	169,570,304		169,570,304	*ACTIVE
65818	-	TEST	QDIRSRV	229,088	160,194,560		160,751,616	*ACTIVE
65819	-	QUSRDIR	QDIRSRV	229,089	159,232,000		159,510,528	*ACTIVE
65622	-	QTCPWRK	QSYS	228,897	151,506,944		151,560,192	*ACTIVE

1 - 100 of 386 items   5 | 10 | 25 | 50 | **100** | All   1 2 3 4

Collection Services Support for Temporary Storage

New fields in QAPMJOBMI

- Temporary storage information for the job
  - Current
  - Peak
  - Maximum allowed (*MAXTMPSTG)
  - Storage allocated/deallocated since the start of the thread (4K units)

New fields in QAPMSYSTEM

- Current temporary storage allocated for non database operations

- Current temporary storage allocated for database operations

- Current temporary storage charged to active jobs

- Current temporary storage charged to ended jobs

- Current user temporary storage – the user temporary storage not charged to any job is accounted for here.

Performance Data Investigator
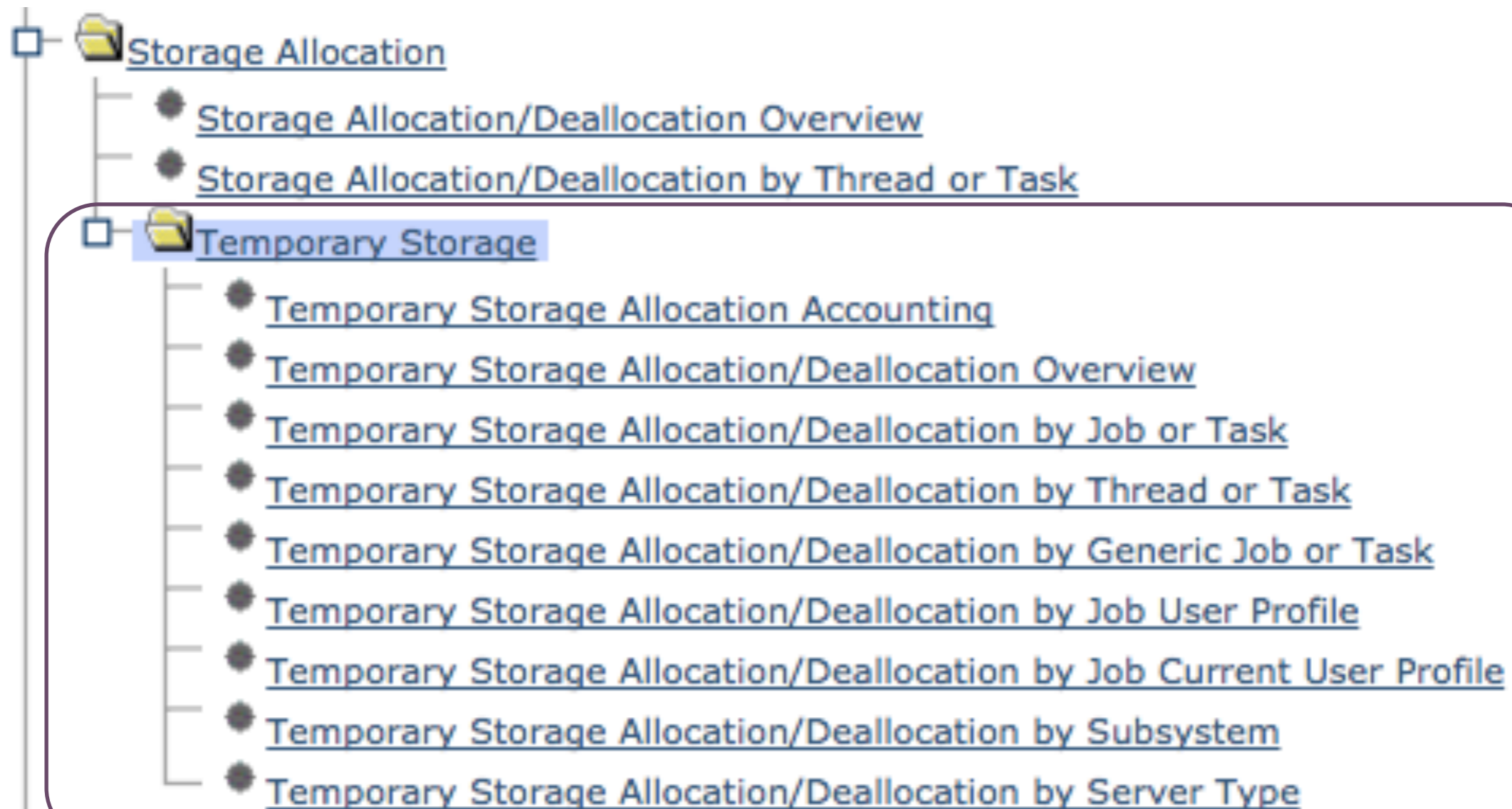
- Expand Collection Services
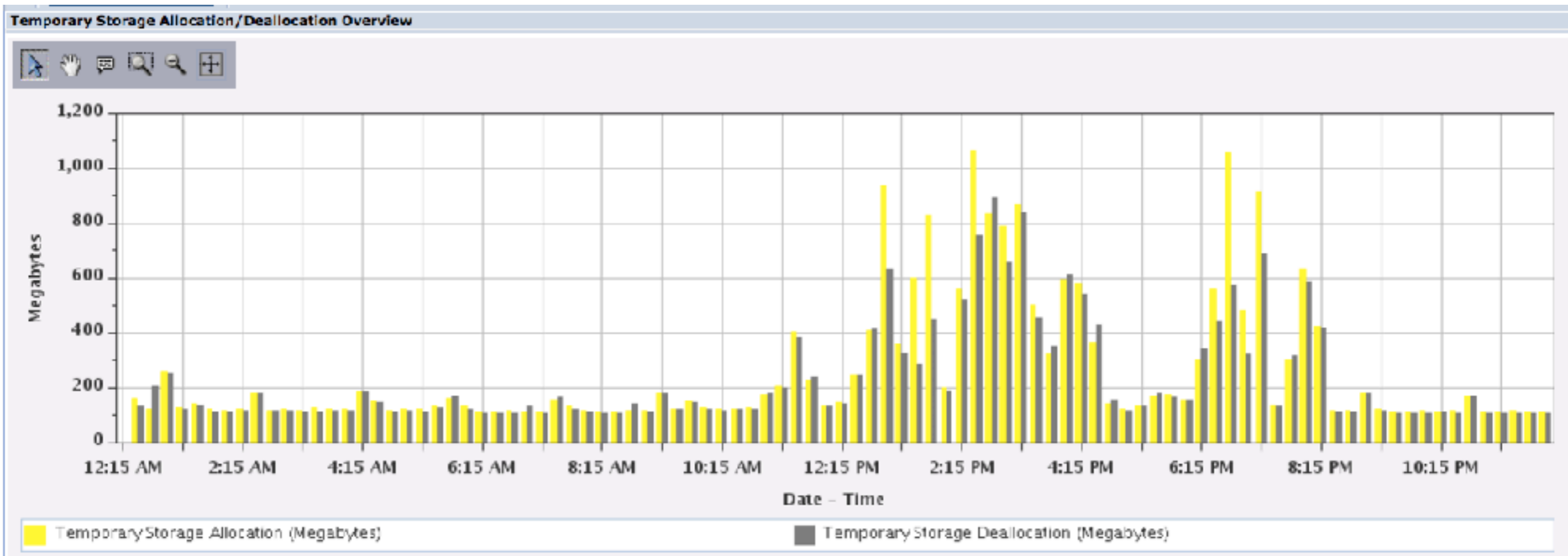
Selection

Name
  Temporary Storage

Description
  Chart and table views over a variety of temporary storage related performance statistics.

Default Perspective

☐ 📁 Storage Allocation

  ● Storage Allocation/Deallocation Overview

  ● Storage Allocation/Deallocation by Thread or Task

☐ 📁 Temporary Storage

  ● Temporary Storage Allocation Accounting

  ● Temporary Storage Allocation/Deallocation Overview

  ● Temporary Storage Allocation/Deallocation by Job or Task

  ● Temporary Storage Allocation/Deallocation by Thread or Task

  ● Temporary Storage Allocation/Deallocation by Generic Job or Task

  ● Temporary Storage Allocation/Deallocation by Job User Profile

  ● Temporary Storage Allocation/Deallocation by Job Current User Profile

  ● Temporary Storage Allocation/Deallocation by Subsystem

  ● Temporary Storage Allocation/Deallocation by Server Type
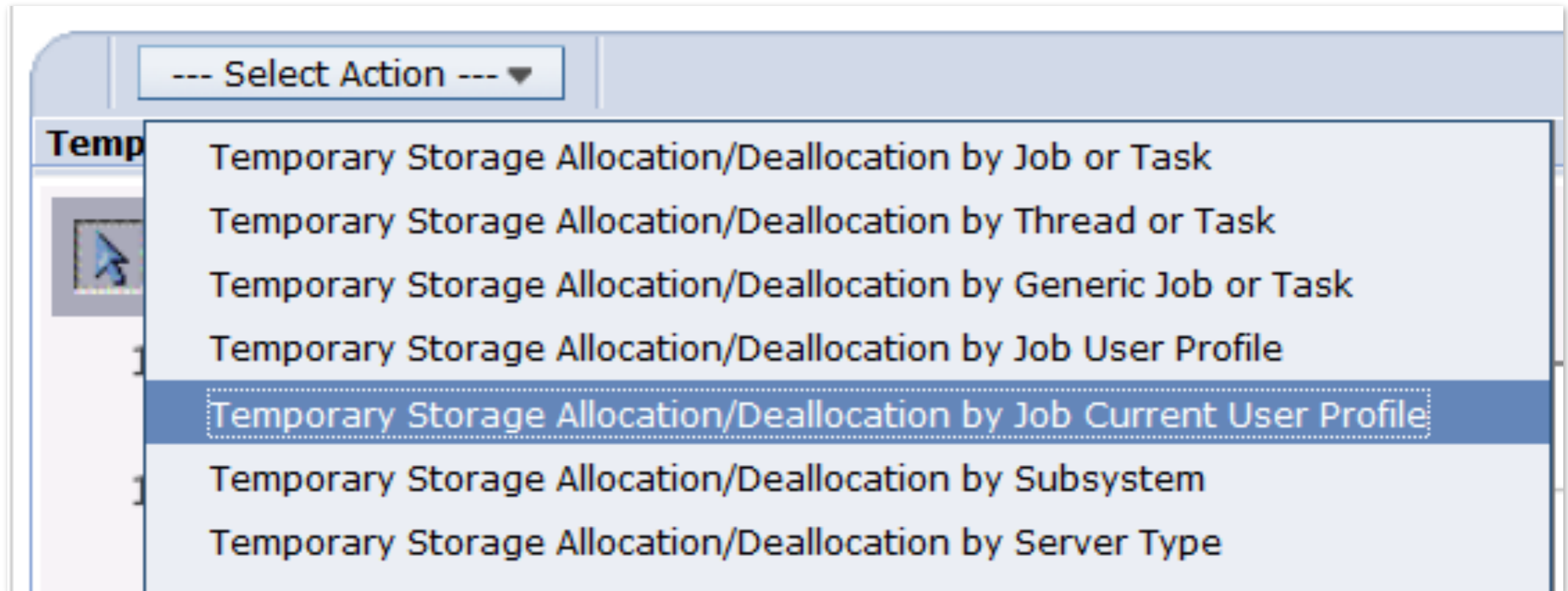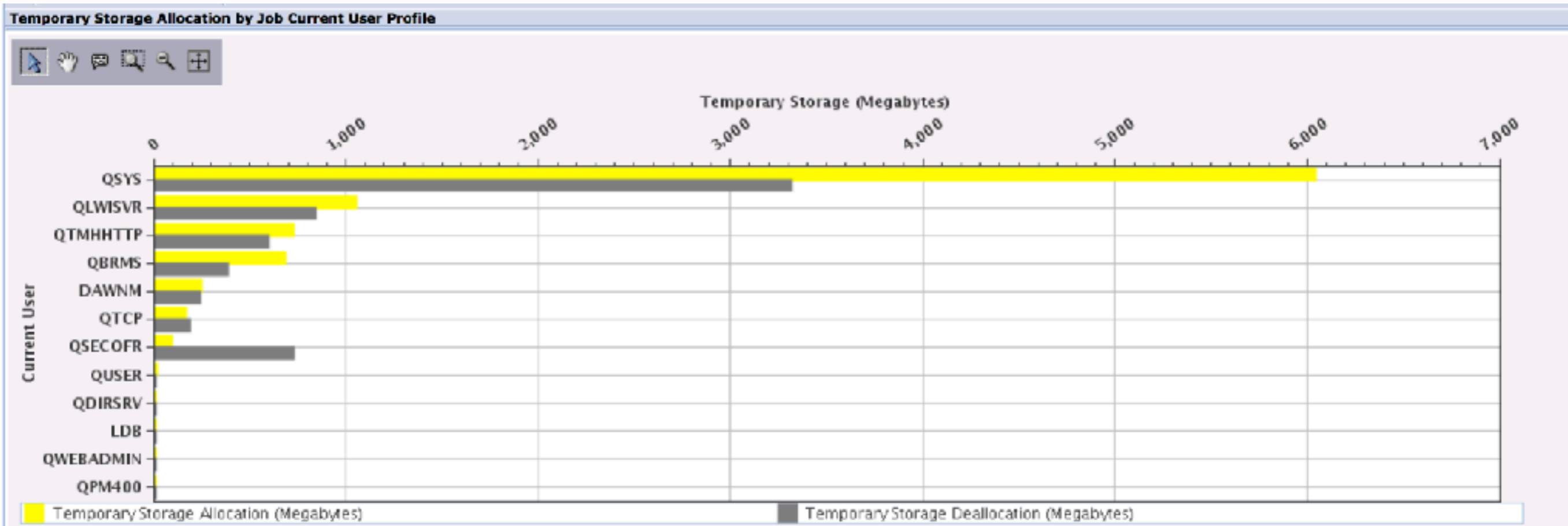
Temporary Storage - Allocation / Deallocation Overview

From an overview perspective, drill down to more detail

Temporary Storage Allocation - by Job Current User Profile

Storage Services

These views provide storage information.

SYSDISKSTAT
The SYSDISKSTAT view contains information about disks.

SYSTMPSTG
The SYSTMPSTG view contains one row for every temporary storage bucket that is tracking some amount of temporary storage across the system.

USER_STORAGE
The USER_STORAGE view contains details about storage by user profile.

This SYSTMPSTG article has a nice write-up on the storage buckets

https://www.ibm.com/support/knowledgecenter/ssw_ibm_i_73/rzajq/rzajqviewsystmpstg.htm

>STRSQL
>select * from qsys2.SYSTMPSTG

```
Display Data
                                                          Data width . . . . .
    . :      224
Position to line  . . . . .                        Shift to column  . . . .
    . .
....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10....+...
   11....+....12....+....13.
BUCKET_NUMBER     GLOBAL_BUCKET_NAME            JOB_NAME    JOB_USER_NAME  JOB_NUMBER        BUCKET_CURRENT_SIZE
           1     *MACHINE                      -           -              -                     7,494,250,496
           3     *PASE                         -           -              -                        88,932,352
           4     *NOTRACK    User              -           -              -                           978,944
           5     *NOTRACK    System            -           -              -                        66,187,264
           6     *IFS        VNODE             -           -              -                        24,420,352
           7     *IFS        File System Buffer -          -              -                         9,265,152
           8     *DATABASE   Segment Cache     -           -              -                       195,035,136
           9     *DATABASE   SQE Heap          -           -              -                       578,064,384
          11     *DATABASE   DS SQE LOB        -           -              -                            16,384
          14     *DATABASE   DSI SQE MTI       -           -              -                         1,531,904
          15     *IFS        Directory Buffer  -           -              -                         2,097,152
       4,096     *OS                           -           -              -                        71,507,968
       4,097     *CMD                          -           -              -                        10,747,904
       4,098     *ACTJOB                       -           -              -                        67,588,096
       4,099     *IPC                          -           -              -                     1,131,474,944
       4,101     *WM                           -           -              -                        81,289,216
       4,102     *SR                           -           -              -                           327,680
      65,537     -                             SCPF        QSYS           000000                    48,308,224
      65,538     -                             QSYSARB3    QSYS           009413                       618,496

   More...
```

>STRSQL
>select * from qsys2.SYSTMPSTG order by Bucket_Current_Size DESC

```
Display Data
                                                                    Data width . . . . .
     . :        224
  Position to line  . . . . .                                       Shift to column  . . . .
     . .
  ....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10....+...
     11....+...12....+...13.
  BUCKET_NUMBER     GLOBAL_BUCKET_NAME            JOB_NAME     JOB_USER_NAME   JOB_NUMBER    BUCKET_CURRENT_SIZE
              1     *MACHINE                      -            -               -                   7,494,676,480
         66,354     -                             ADMIN2       QLWISVR         010225              1,747,103,744
          4,099     *IPC                          -            -               -                   1,131,474,944
              9     *DATABASE   SQE Heap          -            -               -                     577,536,000
         66,403     -                             SERVER       AAGOOD          120761                344,268,800
         66,431     -                             SERVER       AAGOOD          120787                342,892,544
         66,263     -                             ADMIN4       QWEBADMIN       010134                246,910,976
         66,559     -                             IBMARE       QLWISVR         010492                241,369,088
         66,259     -                             ADMIN1       QLWISVR         010130                210,567,168
         66,268     -                             ADMIN3       QLWISVR         010139                204,800,000
              8     *DATABASE   Segment Cache     -            -               -                     194,519,040
         65,916     -                             Q1ACPDST     QBRMS           110061                186,494,976
         65,896     -                             QUSRDIR      QDIRSRV         009779                161,882,112
         65,722     -                             QTCPWRK      QSYS            009602                152,686,592
         65,927     -                             QYPSJSVR     QYPSJSVR        009798                142,913,536
         65,824     -                             QSRVMON      QSYS            009707                112,091,136
         66,175     -                             QTOCRUNPRX   QSRVAGT         010046                107,180,032
         66,336     -                             SERVER       QNOTES          110300                 97,288,192
         66,468     -                             SERVER       QNOTES          110297                 97,239,040

  More...
```

IBM i ACS Example - *System Temporary Storage*

Storage – Temporary storage consumption, by active jobs

```
-- description:  Storage - Temporary storage consumption, by active jobs
--
-- Which active jobs are the top consumers of temporary storage?
--
SELECT bucket_current_size, bucket_peak_size, RTRIM(job_number) concat '/'
concat
    RTRIM(job_user_name) concat '/' concat RTRIM(job_name) AS q_job_name
    FROM QSYS2.SYSTMPSTG
    WHERE job_status = '*ACTIVE'
    ORDER BY bucket_current_size DESC;
```

BUCKET_CURRENT_SIZE	BUCKET_PEAK_SIZE	Q_JOB_NAME
1231085568	1314521088	096933/QLWISVR/ADMIN2
246480896	445775872	096932/QWEBADMIN/ADMIN4
186347520	414859264	096934/QLWISVR/ADMIN5
181035008	181035008	097113/QTMHHTTP/HTTP2DEMO
178876416	440360960	096935/QLWISVR/ADMIN3
172797952	300179456	096931/QLWISVR/ADMIN1
157179904	157261824	096872/QDIRSRV/QUSRDIR
150691840	150704128	096721/QSYS/QTCPWRK
84127744	84127744	097537/QTMHHTTP/ZENDPHP7
79044608	79044608	097547/QTMHHTTP/ZENDPHP7
76705792	80838656	096894/QYPSJSVR/QYPSJSVR
76279808	161316864	097045/QLWISVR/QINAVMNSRV
71561216	73138176	096790/QSYS/QYPSPFRCOL
70385664	88547328	102405/QUSER/QZDASOINIT

Database Global Buckets Honor MAXTMPSTG

- The *DATABASE global buckets now honor a job's MAXTMPSTG setting

  - *DATABASE Segment Cache

  - *DATABASE SQE Heap

  - *DATABASE DS SQE LOB

  - *DATABASE DSI SQE MTI

- Only activated for SQE temporary storage once the amount of free space in *SYSBAS falls below the auxiliary storage lower limit (QSTGLOWLMT) system value

  - After 7.3, this restriction will be removed

- You will NOT see the contribution of the *DATABASE global buckets reflected in the job's temporary storage usage value

  - PTFs for 7.2 and 7.3

- http://ibmsystemsmag.com/blogs/i-can/april-2018/improved-temporary-storage-tracking-for-ibm-i-(par/

- https://www.ibm.com/developerworks/ibmi/library/i-temp-storage-3/

- https://www.ibm.com/support/knowledgecenter/en/ssw_ibm_i_73/rzaq9/rzaq9osdbSQEstg.htm

Blogs on Navigator

- Editing a File in the IFS with Navigator

- Active Memory Pools with Navigator for i

- Application Administration with Navigator for i

- Latest Navigator for i Enhancements

- Displaying Open Files for a Job with Navigator

- Navigator for i – Dashboard

- IBM Navigator for i System Monitors: Collection Interval

- Graph History: New in 7.3 IBM Navigator for i

- Navigator Target Systems and Groups

- Manage PTFs with Navigator

- Navigator for i Enhancements are Available

- IBM i 7.2 – Navigator Monitors

- Navigator Favorites

- Navigator Search

- Work with System Status – the Navigator Way

- Display Locks with Navigator

- IBM Navigator for i – Work Management Integration with Performance Tasks

Blogs on Performance

- Copy Performance Data using ACS IFS Tasks

- Workload Groups and Performance Considerations

- IBM i Performance Frequently Asked Questions Revisited

- Visualizing Database Performance Data with the Performance Data Investigator

- Collecting Database Performance Data with the Performance Data Investigator

- Why You Should be Using Expert Cache

- SQL CPU Utilization

- IBM i Selfie

- Health Indicators in the Performance Data Investigator

- IBM i Performance Analysis

- View Memory Pools and Faulting with the Performance Data Investigator

- View Job Level SQL Metrics with the Performance Data Investigator

- Performance Reports with the Performance Data Investigator

- Commands to Manage Performance Collections

- Performance Data Investigator

- Performance Data Collectors in IBM i

- Job Performance Information

- CPF1240 and CPF1241 Messages Contain Summary Performance Information

- Analyze Command Performance

- Measure Disk Response Times

- Display CPU Utilization for All Partitions

IBM i Performance Frequently Asked Questions Revisited

http://www.ibm.com/common/ssi/cgi-bin/ssialias?
subtype=WH&infotype=SA&appname=STGE_PO_PO_USEN&htmlfid=POW03102USEN&attachment=POW03102USEN.PDF

IBM Power Systems Performance

IBM i on Power – Performance FAQ
October 9, 2018

Health Indicators in the Performance Data Investigator

Investigate Data - Performance Data Investigator

Perspectives

- Health Indicators
  - System Resources Health Indicators
  - CPU Health Indicators
  - Disk Health Indicators
  - Memory Pools Health Indicators
  - Response Time Health Indicators
  - Database Health Indicators

System Resources Health Indicators

System Resources Health Indicators (7.2+)

Intervals Distribution (Percent)

- Legend: Percentage of intervals with values under defined thresholds
- Percentage of intervals with values above Warning threshold
- Percentage of intervals with values above Action threshold

Performance Data Investigator

Performance Reports with the Performance Data Investigator

Sep 24, 2018 7:35:45 PM

Performance data report definition:
Dawn Demo Report
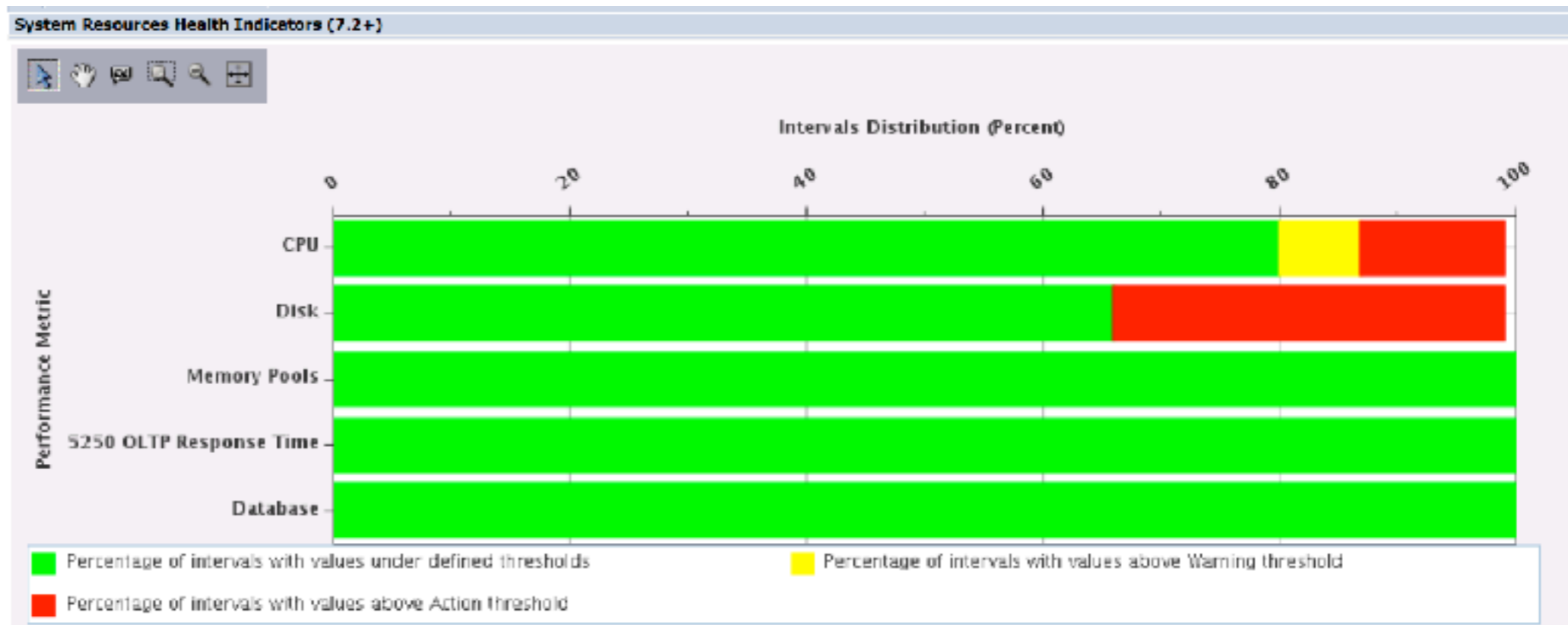
Perspectives included in report:
CPU Utilization and Waits Overview
Memory Pool Sizes and Fault Rates
Page Faults Overview

Library/Collection used for report:
Dawnm/Q143000002
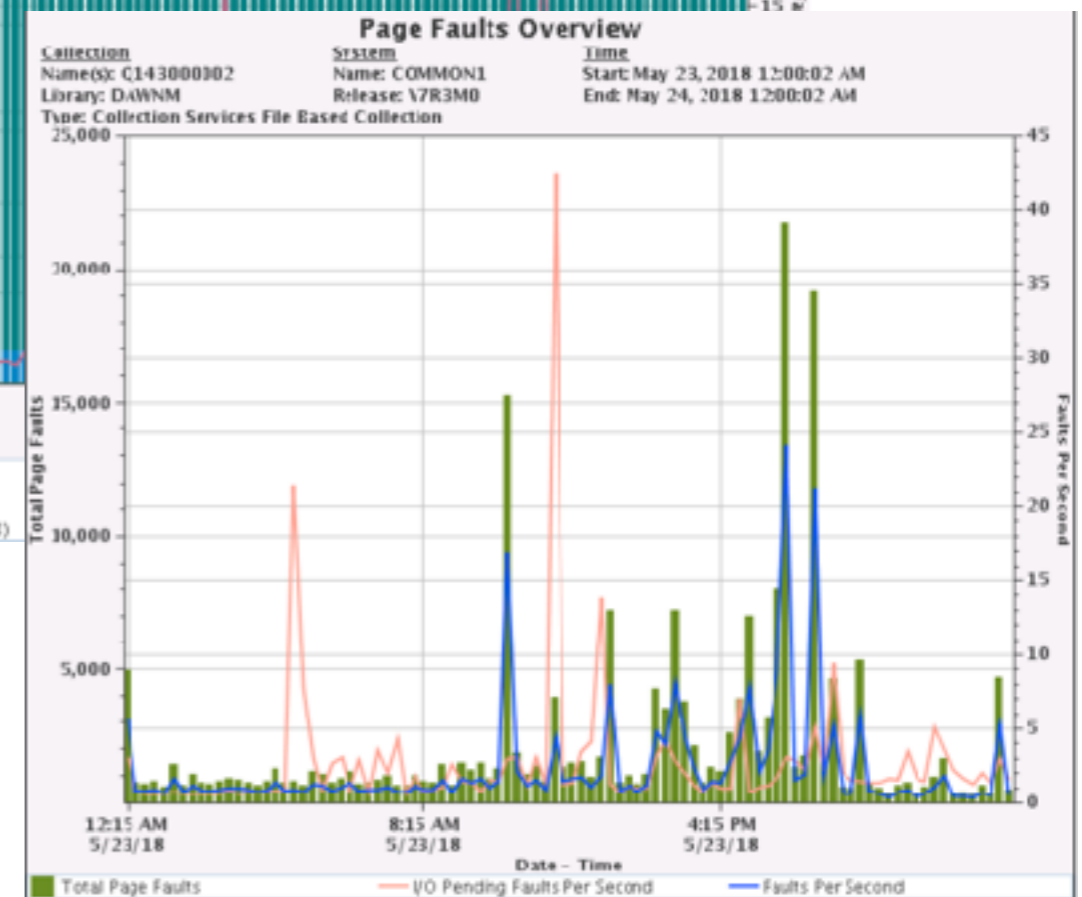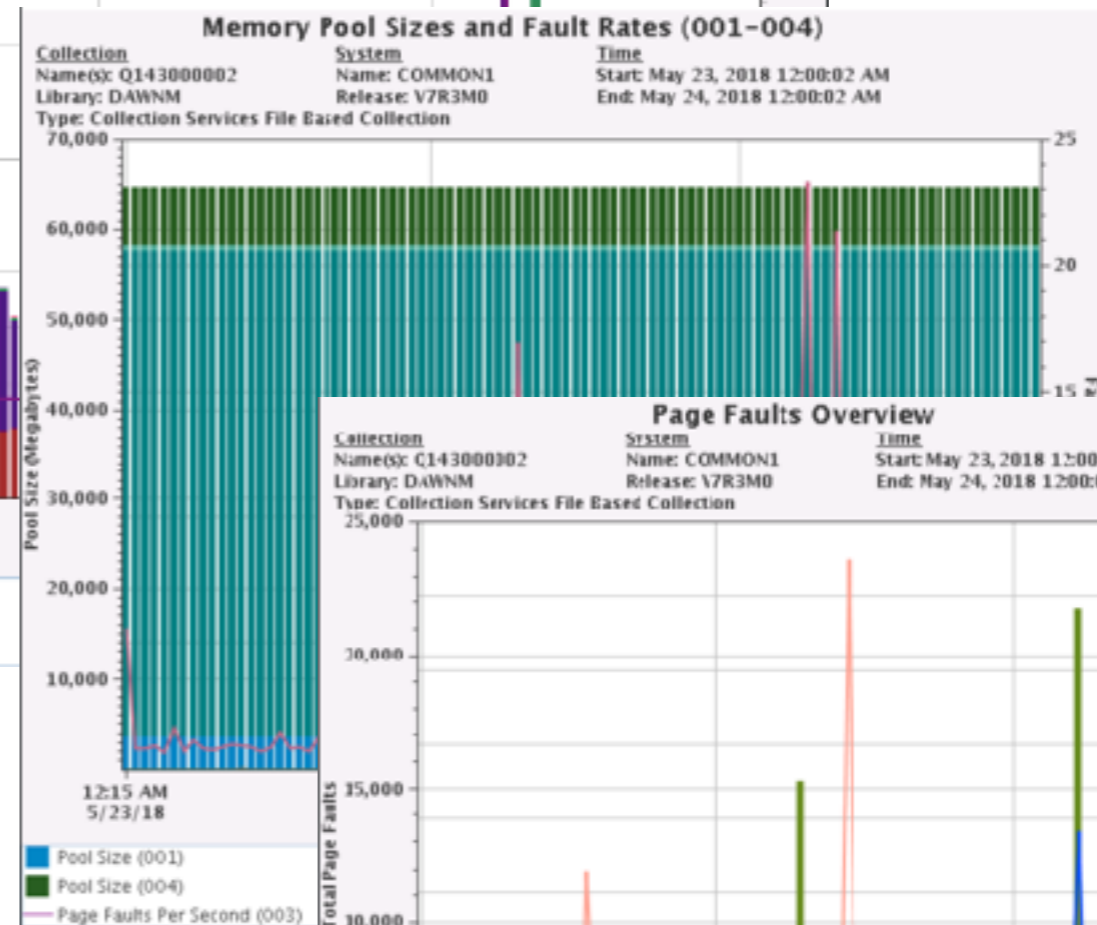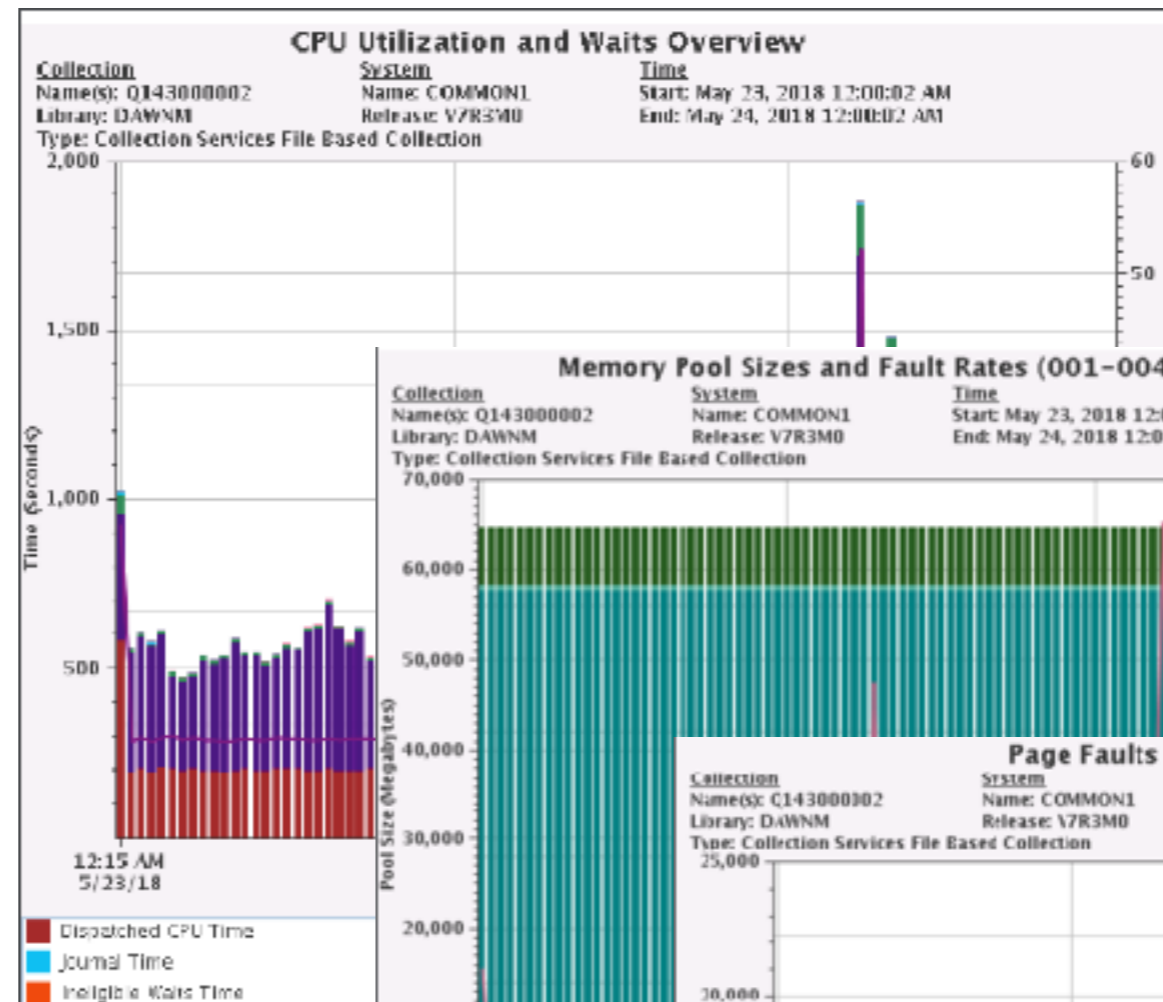
The report may be downloaded, open in a new tab, or open in a new window, depending upon your browser settings

Display CPU Utilization for All Partitions

Collection Services has the ability to collect high-level cross-partition processor performance metrics for all logical partitions on the same single physical server, regardless of operating system. When this data is available, it can be viewed via several perspectives found under "Physical System".

Physical System
- Logical Partitions Overview
- Donated Processor Time by Logical Partition
- Uncapped Processor Time Used by Logical Partition
- Virtual Shared Processor Pool Utilization
- Physical Processors Utilization by Physical Processor
- Dedicated Processors Utilization by Logical Partition
- Physical Processors Utilization by Processor Status Overview
- Physical Processors Utilization by Processor Status Detail
- Shared Memory Overview
- Full System I/O Architecture
- All 12X Loops
- All PCIe Gen2

Partition Properties   etc0t2

General | Hardware | Virtual Adapters | Settings | Other

Name: + etc0t2
ID: 22
Environment: IBM i
State: Running
Attention LED: Off

Resource configuration: Configured
OS version: IBM i Licensed Internal Code 7.2.0-410.1
Current profile: default
System: 7998-61X*10065FA

☑ Allow performance information collection
Sync current configuration Capability Sync Turned OFF

OK   Cancel   Help

HMC option "Allow performance information collection" must be turned on for the IBM i partition to collect the data

Logical Partitions Overview

SQL CPU Utilization

- Allows you to see how much of your CPU utilization is due to SQL work

Partition level
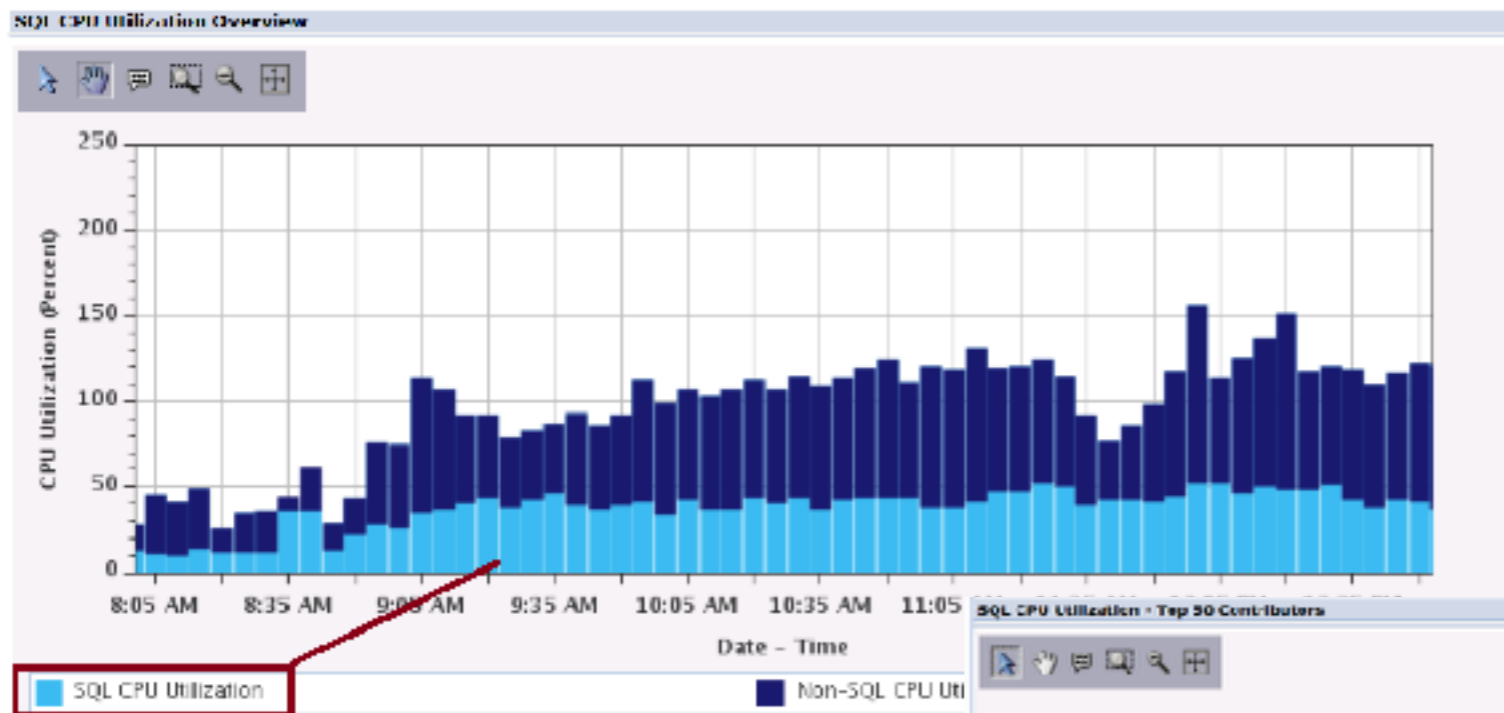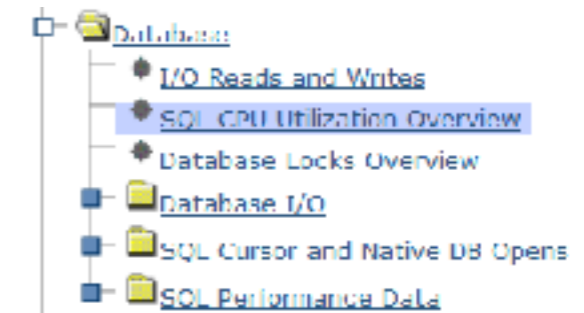
Job level
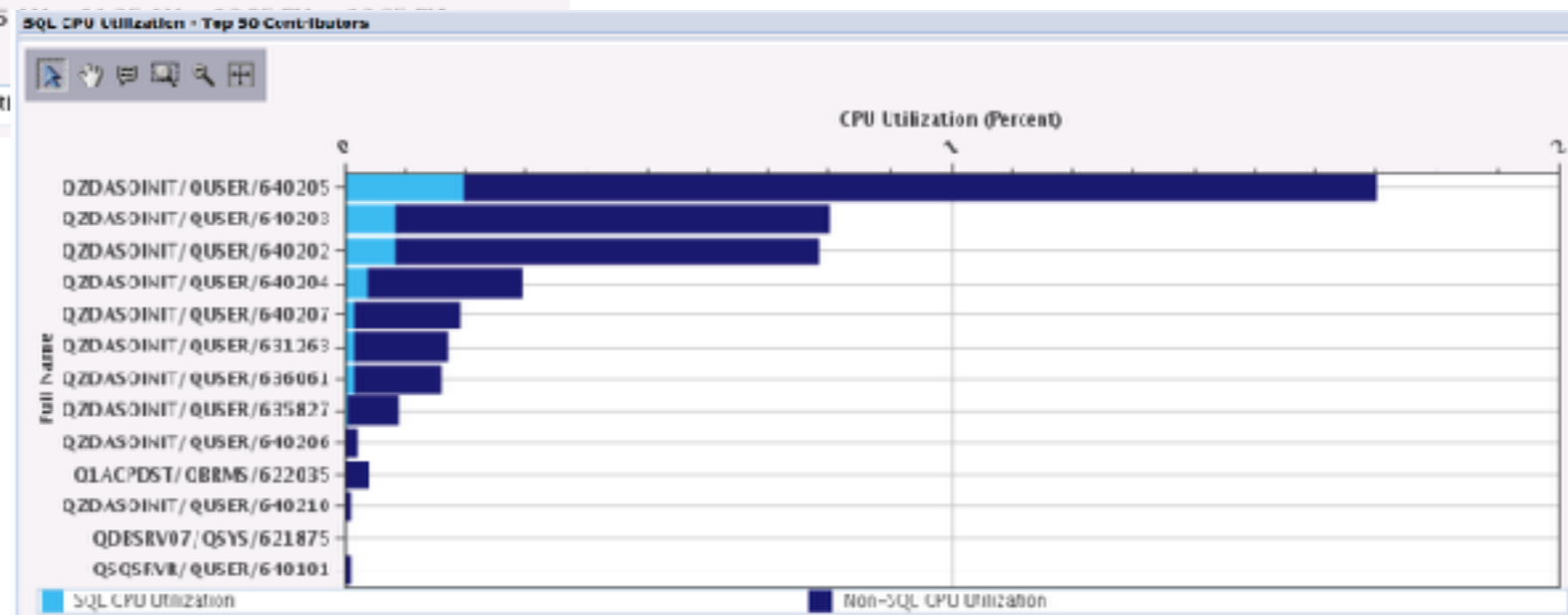
Measure Disk Response Times

- A very easy way to determine if you have slow disk response times
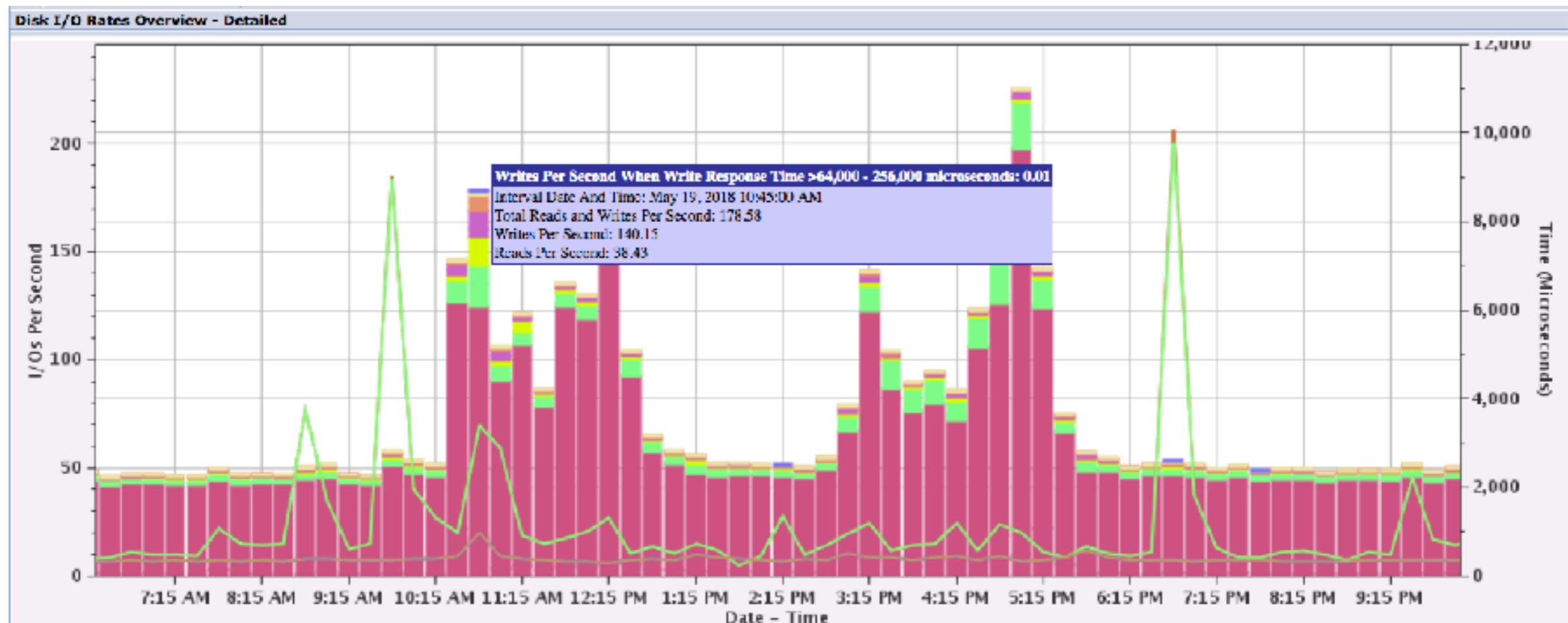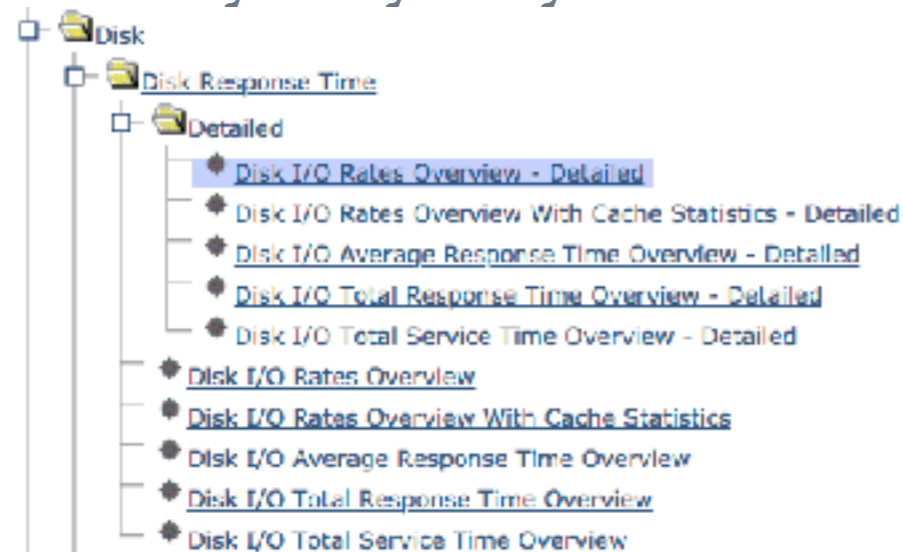
View Memory Pools and Faulting with the Performance Data Investigator

- In a graphical view!

- Note the change in pool sizes.

  - QPFRADJ is on.
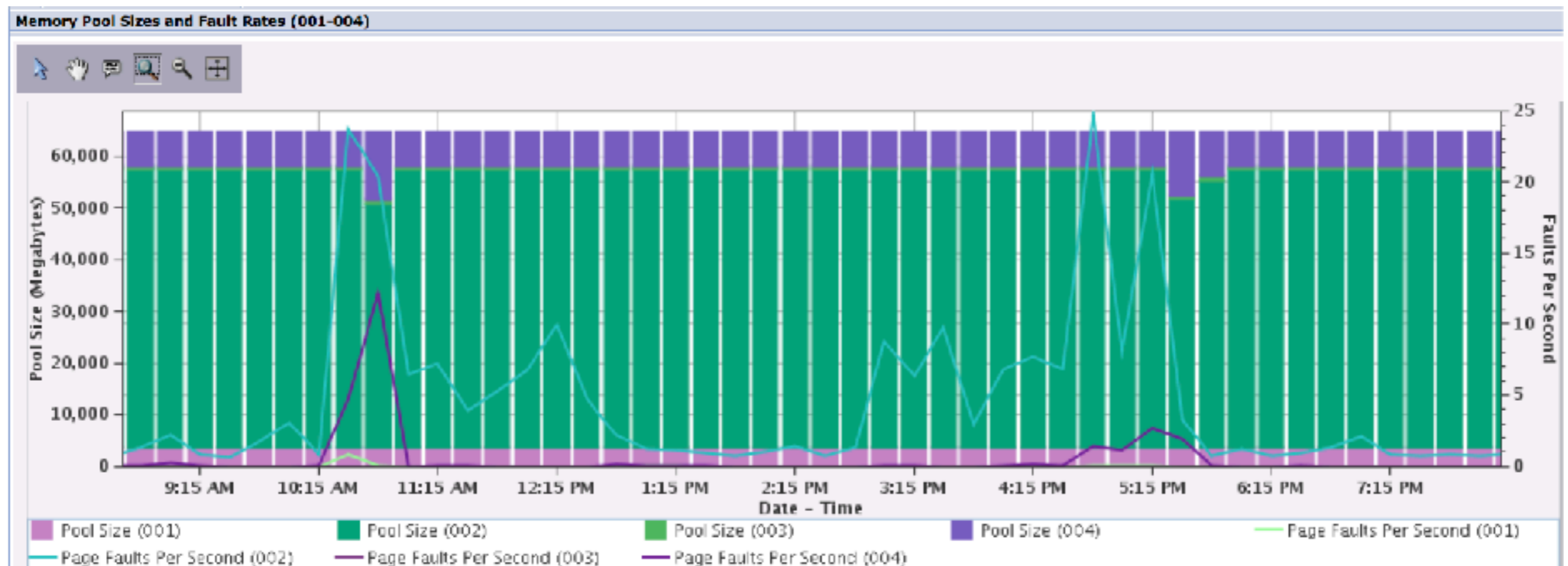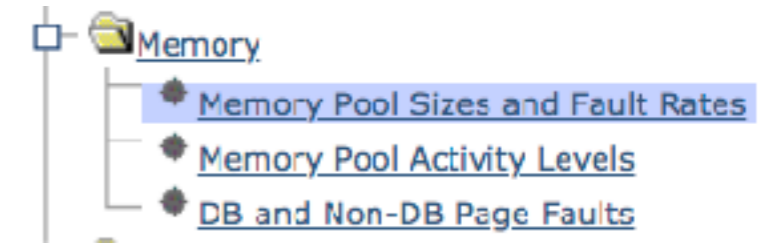
Memory - Drill-down

- Find the jobs that are faulting
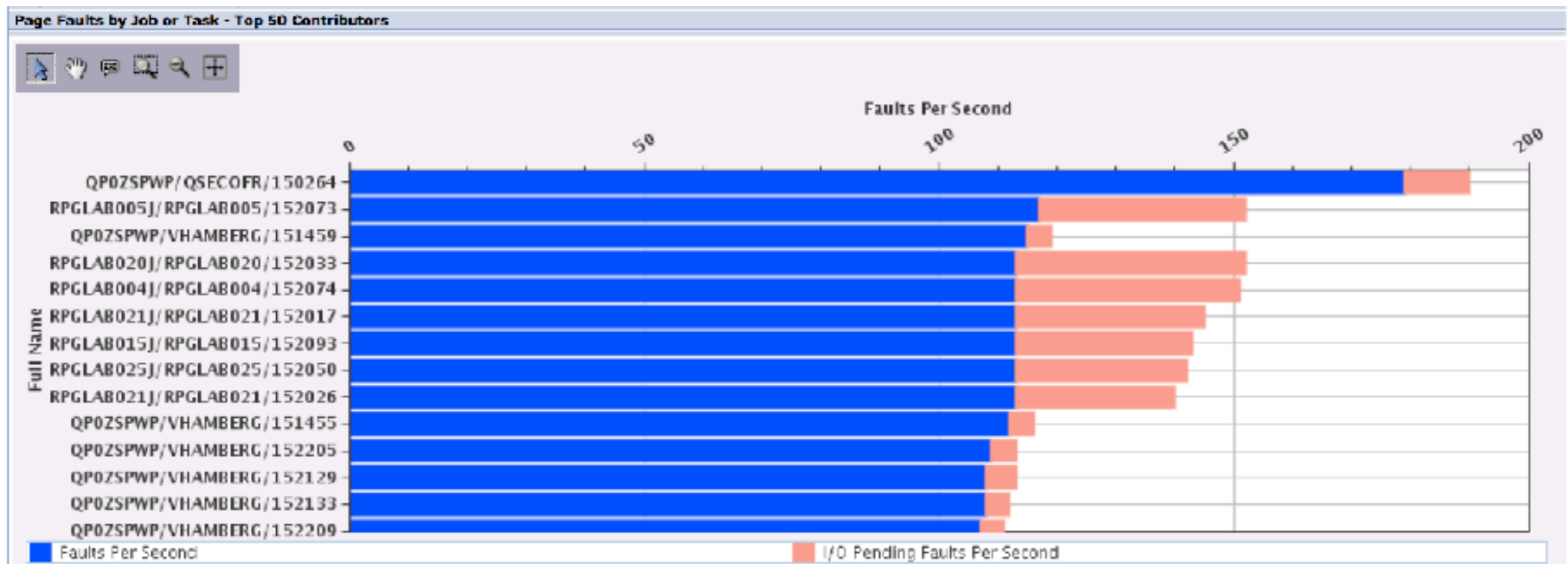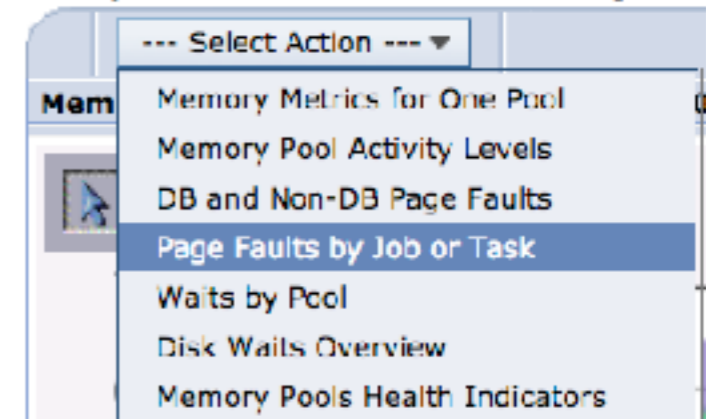
Blogs on Subsystem Topics

- Subsystem Management with Navigator for i, Part 2

- Active Memory Pools with Navigator for i

- End Subsystem Options

- Route FTP and SMPT Workloads to their own Subsystem

- Subsystem Configuration Documentation

- Subsystem Management with Navigator for i

- Route More Work to Subsystems by User Profile

- Route Remote Command Requests to a Specific Subsystem

- Routing Work to Subsystems

- Route DB2 Requests to a Specific Subsystem

- Run an HTTP Server in its own Subsystem

- Subsystem Configuration for SQL Server Mode Jobs

Subsystem Configuration Documentation

- Subsystem configuration documentation used to exist as *experience reports*

- With IBM i 7.3, this documentation is now part of the Knowledge Center

IBM i 7.3

— Work management

    PDF file for Work management

    What's new for IBM i 7.3

    + Introduction to work management

    + Concepts

    — Managing work

        Calling a special IPL recovery program

    + Monitoring system activity

    + Managing jobs

    + Managing job scheduling

    — Managing subsystems

        + Common subsystem tasks

        + Creating a subsystem description

        + Changing a subsystem description

        + Deleting a subsystem description

        + Configuring an interactive subsystem

        + Configuring a server subsystem

        Creating a controlling subsystem

Subsystem Management with Navigator for i

- Subsystem configuration support was added to Navigator with the December 2016, October 2017, and December 2017 updates

- December 2016:
    - Subsystem descriptions and "work" entries
        - AJEs, PJEs, WSEs, JOBQEs, RTGEs, etc....

- October 2017 added:
    - Job queues
    - Class objects

- December 2017 added:
    - Job descriptions

Subsystems

Subsystem Descriptions – Default Include…. Options

- Use Actions -> include to specify subsystem descriptions to display
  - Similar to WRKSBSD command prompt
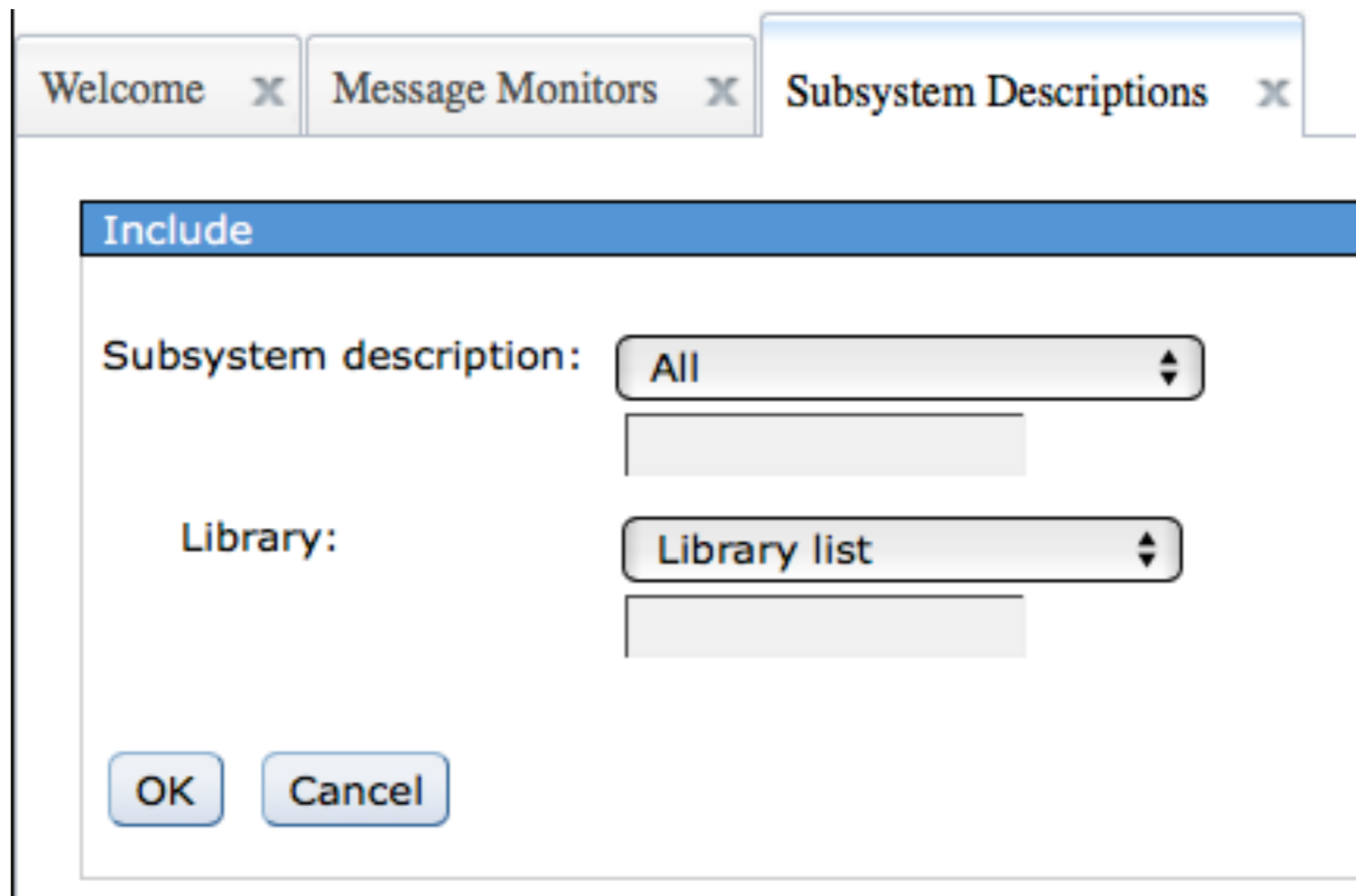
Subsystem Descriptions

Subsystem Descriptions - Common1.frankeni.com

Actions ▾

⇥ ...   No filter applied

☐	Subsystem	Library	Description
☐	Qbase	Qsys	Basic controlling subsystem
☐	Qbatch	Qsys	Batch Subsystem
☐	Qcmn	Qsys	Communications Subsystem
☐	Qctl	Qsys	Controlling Subsystem
☐	Qinter	Qsys	Interactive Subsystem
☐	Qlpinstall	Qsys	Subsystem for LP Install
☐	Qpgmr	Qsys	Programmer Subsystem
☐	Qserver	Qsys	File Server Subsystem
☐	Qsnads	Qsys	SNA Distribution Subsystem
☐	Qspl	Qsys	Spooling Subsystem
☐	Qsyssbsd	Qsys	Backup controlling subsystem
☐	Qsyswrk	Qsys	System subsystem
☐	Qusrwrk	Qsys	User subsystem
☐	Qdsnx	Qgpl	DSNX SUBSYSTEM DESCRIPTION
☐	Qfnc	Qgpl	Finance Subsystem

Subsystem Properties
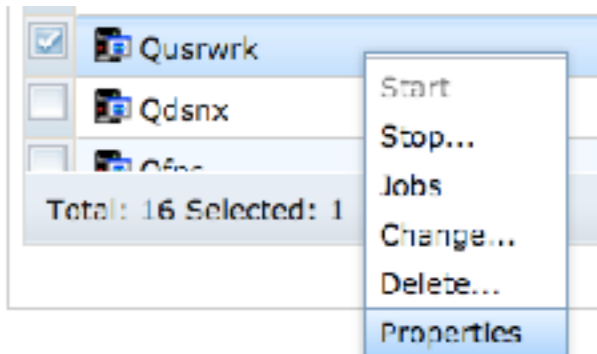
Qsys/Qusrwrk Properties - Common1.frankeni.com

Operational Attributes
Pool Definitions
Autostart Job Entries
Work Station Name Entries
Work Station Type Entries
Job Queue Entries
Routing Entries
Communication Entries
Remote Location Name Entries
Prestart Job Entries

Subsystem: Qusrwrk
    Library: Qsys
Description: User subsystem

Status: Active
Maximum active jobs: No maximum
Sign-on display file: QDSIGNON
    Library: QSYS
System library list entry: None
Auxiliary storage pool group: None
Workload group: None

Active jobs: 83
Subsystem job:
    User:
    Number:

Prestart Job Entries via Navigator

Changing a prestart job entry

Adding a prestart job entry

Subsystem Management with Navigator for i, Part 2

- Job Descriptions

Job Queues

Class Objects

There is not a general interface to display all class objects (like WRKCLS)

Subsystems
- Active Subsystems
- Change Class
- Change Subsystem Description
- Create Class
- Create Subsystem Description
- Subsystem Descriptions

Welcome ✕ | Change Class ✕

Class Information
Please provide the class information for your task.

✦ Class: _____
✦ Library: _____

[OK] [Cancel]

Create Class

✦Class:	[yellow field]	
✦ Library:	✦ Current library ▼	
	[field]	
Text description:	[field]	
Run priority:	50	1-99
Time slice:	2000	0-9999999 ms
Eligible for purge:	Yes ▼	
	[field]	
Default wait time:	Use entry from below ▼	0-9999999 s
	30	
Maximum CPU time:	No maximum ▼	1-9999999 ms
	[field]	
Maximum temporary storage:	No maximum ▼	1-2147483647 mb
	[field]	
Maximum threads:	No maximum ▼	1-32767
	[field]	
Authority:	Library create ▼	
	[field]	

[OK] [Cancel]

Subsystem Configuration Options

- There are many ways to specify which subsystems jobs should run in

- Traditional work management
  - Routing entries, job queue entries, workstation entries, communications entries, prestart job entries, autostart job entries, etc...

- Server job configuration
  - Specify the subsystem for server jobs by IP address
    - Host servers, DDM/DRDA server

- Route requests based upon user profile (7.1 and later)
- Configure the subsystem for the HTTP server (7.1 and later)
- Configure the subsystem for the QSQSRVR jobs (introduced in V5R4)
- Configure the subsystem for the SSH jobs (introduced in V5R4)
- Configure the subsystem for the FTP and SMTP servers (introduced in V5R1)

Run HTTP Servers in Their Own Subsystem

- You can now <u>configure the subsystem</u> in which your HTTP Server will run

- Allows you to take advantage of the traditional work management features for web serving work

- Configuration directives to modify to enable this support:
  - HTTPRoutingData – specifies the user defined routing data for HTTP server jobs
  - HTTPStartJobDesc – specifies the user created job description that defines how HTTP server jobs should be run
  - HTTPStartJobQueue – specifies the user created job queue to which the HTTP server jobs will be submitted
  - HTTPSubsystemDesc – specifies the user created subsystem that the HTTP server runs in

- <u>IBM Support Document</u>

Prestart Jobs Blog Series

- New blog series that will continue for the next year....

  - At least 25 total blog articles

  - Watches and Job Log Messages
  - The QDFTSVR Job Description
  - Managing Prestart Jobs by IP Address
  - Work with Active Prestart Jobs
  - Prestart Jobs and Server Jobs
  - Subsystem Configuration for Prestart Jobs
  - Display Active Prestart Jobs
  - Prestart Job Configuration Settings
  - IBM i System Supplied Prestart Job Entries
  - Introduction to Prestart Jobs

www.ibm.com/power/i

About Dawn May

Photo Credit: David Bowman
@ IBM // Rochester, MN
January 2018

Dawn May Consulting, LLC

Customized on-site education
- General IBM i
- Systems Management
- Performance tools and management
- Work management

Performance Consulting
- System performance review
- Recurring performance assessments
- Performance diagnostics

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DawnMayi.com

https://twitter.com/DawnMayiCan
@DawnMayiCan

https://www.linkedin.com/in/dawnmay/

http://ibmsystemsmag.com/blogs/i-can/

Thank You!

For the servers and services used for these presentations and demos!

The following have donated servers and services to the IBM i Community for demonstration, demo and educational uses:

- iInTheCloud, LLC
  - Pete Massiello and Larry Bolhuis
  - www.iInTheCloud.com
  - Hosting and network services

- Frankeni Technology Consuling, LLC
  - Larry Bolhuis
  - www.frankeni.com
  - Server components, licensing, and support services

- FRS
  - Carl Novit
  - www.gofrs.com
  - The Power System and server components