

WMCPA Spring Conference

Everything you ever wanted to know about subsystems

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Everything about subsystems

- Ground Rules
 - Please set cell phones to 'Stun'
 - Feel Free to ask questions
 - If you must take/make a call please exit room

Everything about subsystems

- Speaker Bio
 - 27 years on the machine (S/38-i)
 - IBM Certified ILE specialist
 - Specialize in:
 - JDE
 - Global installations
 - Performance

Everything about subsystems

Agenda

- Purpose of subsystems
- What is a subsystem
- Components of a subsystem
- Putting it all together
- Further Information

Everything about subsystems

Agenda

- **Purpose of subsystems**
- What is a subsystem
- Components of a subsystem
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- Further Information

Everything About Subsystems

Purpose of Subsystems

- Method of partitioning work
 - Allows you to isolate resources
 - Memory
 - CPU Priority
 - Allows setting of limits on resource usage
 - Max CPU
 - Max Temporary Storage
 - Number of users
 - Maximum number of jobs

Everything About Subsystems

Purpose of Subsystems

- Allows custom login screens
- Allows automatic allocation of resources
 - Displays
 - Display types
 - Communication lines

Everything About Subsystems

Purpose of Subsystems

- Allows the execution of setup jobs as the subsystem starts
- Allows you to start jobs in anticipation of work to come
- Properly configured you can almost view a subsystem as a virtual machine

Everything about subsystems

Agenda

- Purpose of subsystems
- **What is a subsystem**
- Components of a subsystem
- Putting it all together
- Further Information

Everything About Subsystems

What is a Subsystem

- A subsystem is a construct of AS/400 objects, and entries, that allow you to partition work. It consists of the following parts:
 - IBM i Objects:
 - Subsystem description (*SBSD)
 - Class (*CLS)
 - Job Queues (*JOBQ)
 - Display File

Everything About Subsystems

What is a Subsystem

- It also consists of the following non-object parts:
 - Routing Entries
 - Job Queue Entries
 - Communication Entries
 - Work Station Entries
 - Work Station Type Entries
 - Auto Start Job Entries
 - Prestart Job Entries
 - Memory Pools

Everything about subsystems

Agenda

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- What is a subsystem
- **Components of a subsystem**
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Everything About Subsystems

Components of a Subsystem

- Menus
 - There are several menus that are very useful
 - GO CMDSBS – Commands for working with subsystems
 - GO CMDSBSD – Commands for working with subsystem descriptions
 - GO CMDAJE – Austostart job entry commands
 - GO CMDCMNE – Communications entry commands
 - GO CMDJOBQE – Job queue entry Commands
 - GO CMDPJE – Prestart jobs entry commands
 - GO CMDWSE – Work station entry commands

Everything About Subsystems

Components of a Subsystem

- The Subsystem Description
 - Defines attributes of subsystem
 - Memory
 - Maximum Jobs
 - Sign-on display
 - Subsystem Library

Everything About Subsystems

What is a Subsystem

- A subsystem is a construct of AS/400 objects that allow you to partition work. It also consists of the following non-object parts:
 - Routing Entries
 - Communication Entries
 - Work Station Entries
 - Work Station Type Entries
 - Auto Start Job Entries
 - Prestart Job Entries
 - Memory Pools

Everything About Subsystems

Components of a Subsystem

- The Subsystem Description
 - Defines attributes of subsystem
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 - Maximum Jobs
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Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Create Subsystem Description (CRTSBSD)
Type choices, press Enter.
Subsystem description . . . . . _____ Name
Library . . . . . _____ *CURLIB Name, *CURLIB
Storage pools:
Pool identifier . . . . . _____ 1-10
Storage size . . . . . _____ Number, *BASE, *NOSTG...
Activity level . . . . . _____ Number
+ for more values _____
Maximum jobs . . . . . _____ *NOMAX 0-1000, *NOMAX
Text 'description' . . . . . _____ *BLANK

Additional Parameters
Sign-on display file . . . . . _____ *QDSIGNON Name, *QDSIGNON
Library . . . . . _____ Name, *LIBL, *CURLIB
Subsystem library . . . . . _____ *NONE Name, *NONE
More...
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
MA a
05/037
1902 - Session successfully started Home Color Lazer on 192.168.1.245
```

Everything About Subsystems

Components of a Subsystem

- Class
 - Defines attributes of jobs within the subsystem
 - Run priority
 - Time slice
 - Default wait time
 - Job maximums
 - CPU
 - Temporary storage
 - Threads

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Create Class (CRTCLS)
Type choices, press Enter.
Class . . . . .
Library . . . . . *CURLIB
Run priority . . . . . 50
Time slice . . . . . 2000
Eligible for purge . . . . . *YES
Default wait time . . . . . 30
Maximum CPU time . . . . . *NOMAX
Maximum temporary storage . . . . . *NOMAX
Maximum threads . . . . . *NOMAX
Text 'description' . . . . . *BLANK
Name
Name, *CURLIB
1-99
Milliseconds
*YES, *NO
Seconds, *NOMAX
Milliseconds, *NOMAX
Kilobytes, *NOMAX
1-32767, *NOMAX
Additional Parameters
Authority . . . . . *LIBCRTAUT
Name, *LIBCRTAUT, *CHANGE...
Bottom
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
MA a 05/037
1902 - Session successfully started Home Color Lazer on 192.168.1.245
```

Everything About Subsystems

Components of a Subsystem

- Job Queue
 - Defines an entry point for jobs to enter the subsystem
 - Who can control jobs in the queue
 - If control is limited, what users can do

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
[Icons]
Create Job Queue (CRTJOBQ)
Type choices, press Enter.
Job queue . . . . . _____ Name
Library . . . . . *CURLIB Name, *CURLIB
Text 'description' . . . . . *BLANK
-----
Additional Parameters
Operator controlled . . . . . *YES *YES, *NO
Authority to check . . . . . *OWNER *OWNER, *DTAUT
Authority . . . . . *USE Name, *USE, *ALL, *CHANGE...
Bottom
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
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```

Everything About Subsystems

Components of a Subsystem

- Routing Entries
 - Sequence determines order in which processed
 - Determines the following:
 - Job attributes (class)
 - Initial program
 - Which memory pool to use
 - Maximum number of jobs that can use this entry simultaneously
 - Thread affinity
 - Only pertinent for mutli-threaded jobs
 - Allows you to force threads in same job to use same processor

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Add Routing Entry (ADDRTGE)
Type choices, press Enter.
Subsystem description . . . . . _____ Name
Library . . . . . _____ *LIBL Name, *LIBL, *CURLIB
Routing entry sequence number . _____ 1-9999
Comparison data:
Compare value . . . . . _____
Starting position . . . . . 1_____ 1-80
Program to call . . . . . _____ Name, *RTGDTA
Library . . . . . _____ *LIBL Name, *LIBL, *CURLIB
Class . . . . . _____ *SBSD Name, *SBSD
Library . . . . . _____ Name, *LIBL, *CURLIB
Maximum active routing steps . . _____ *NOMAX 0-1000, *NOMAX
Storage pool identifier . . . . . 1_____ 1-10
Bottom
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
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```

Everything About Subsystems

Components of a Subsystem

- Job Queue Entries
 - Sequence determines priority which jobs enter the subsystem
 - Determines the following:
 - Maximum number of jobs active from this job queue
 - If you use job queue priorities, also determines how many of each priority are allowed in the mix

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Add Job Queue Entry (ADDJOBQE)
Type choices, press Enter.
Subsystem description . . . . .
Library . . . . . *LIBL
Job queue . . . . .
Library . . . . . *LIBL
Maximum active jobs . . . . . 1
Sequence number . . . . . 10
Max active priority 1 . . . . . *NOMAX
Max active priority 2 . . . . . *NOMAX
Max active priority 3 . . . . . *NOMAX
Max active priority 4 . . . . . *NOMAX
Max active priority 5 . . . . . *NOMAX
Max active priority 6 . . . . . *NOMAX
Max active priority 7 . . . . . *NOMAX
Max active priority 8 . . . . . *NOMAX
Max active priority 9 . . . . . *NOMAX
Name
Name, *LIBL, *CURLIB
Name
Name, *LIBL, *CURLIB
0-1000, *NOMAX
1-9999
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
0-99, *NOMAX
Bottom
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```

Everything About Subsystems

Components of a Subsystem

- Communications entries
 - Allows you to assign communications devices (or type of device) to a subsystem
 - Assign a remote location name
 - Job description used for jobs initiated by this entry
 - User ID to use for requests with no security info
 - The mode used for the request
 - The maximum # of jobs that can be processed

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Add Communications Entry (ADDCMNE)
Type choices, press Enter.
Subsystem description . . . . .
Library . . . . . *LIBL
Device . . . . .
Remote location . . . . .
Job description . . . . . *USRPRF
Library . . . . .
Default user profile . . . . . *NONE
Mode . . . . . *ANY
Maximum active jobs . . . . . *NOMAX
Name
Name, *LIBL, *CURLIB
Name, generic*, *ALL...
Name
Name, *USRPRF, *SBSD
Name, *LIBL, *CURLIB
Name, *NONE, *SYS
Name, *ANY
0-1000, *NOMAX
Bottom
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
MA a 05/037
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```

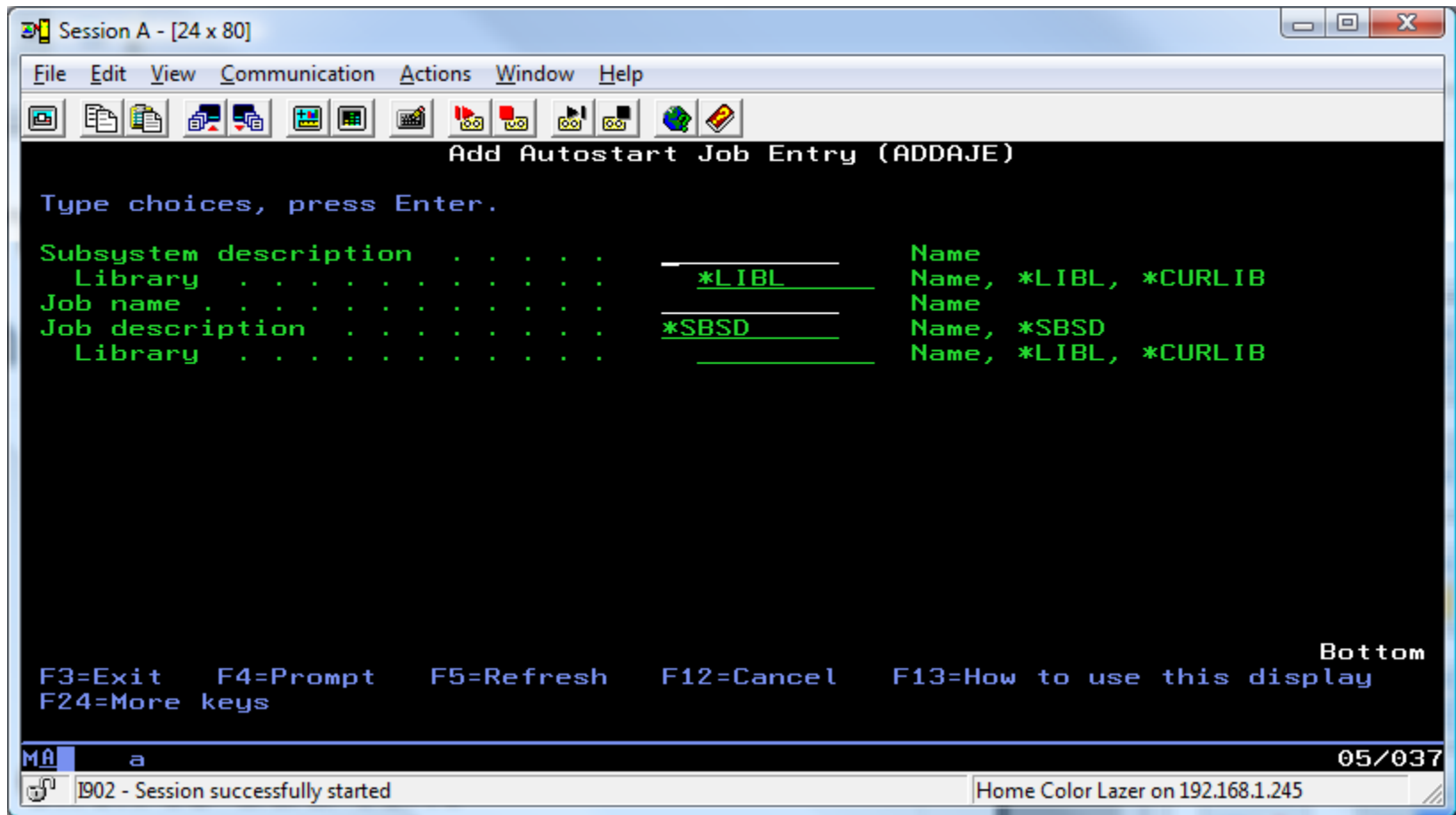
Everything About Subsystems

Components of a Subsystem

- Auto start entries
 - Defines jobs that will kick off when the subsystem starts
 - You can define a job name and the job description to use

Everything About Subsystems

Components of a Subsystem



Everything About Subsystems

Components of a Subsystem

- Prestart jobs
 - Jobs that are automatically started that will process incoming requests
 - Requests get here via iSeries Nav setup

Everything About Subsystems

Components of a Subsystem

- Prestart jobs, continued
 - You define the following:
 - Initial program (server program)
 - User it runs under
 - When to start
 - How many to start
 - Initially
 - Maximum
 - Threshold for new jobs
 - Job name
 - Job description

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Add Prestart Job Entry (ADDPJE)
Type choices, press Enter.
Subsystem description . . . . . *LIBL Name
Library . . . . . *LIBL Name, *LIBL, *CURLIB
Program . . . . . *LIBL Name
Library . . . . . *LIBL Name, *LIBL, *CURLIB
User profile . . . . . QUSER Name
Start jobs . . . . . *YES *YES, *NO
Initial number of jobs . . . . . 3 1-9999
Threshold . . . . . 2 1-9999
Additional number of jobs . . . . . 2 0-999
Maximum number of jobs . . . . . *NOMAX 1-9999, *NOMAX

Additional Parameters

Job name . . . . . *PGM Name, *PGM
Job description . . . . . *USRPRF Name, *USRPRF, *SBSD
Library . . . . . Name, *LIBL, *CURLIB
More...
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
MA a 05/037
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```


Everything About Subsystems

Components of a Subsystem

- Prestart jobs, continued
 - You define the following:
 - Number of times job can be used
 - The memory pool
 - You can assign two classes and how many jobs may run under each class
 - Thread attributes

Everything About Subsystems

Components of a Subsystem

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Add Prestart Job Entry (ADDPJE)
Type choices, press Enter.
Maximum number of uses . . . . . 200          1-1000, *NOMAX
Wait for job . . . . . *YES       *YES, *NO
Pool identifier . . . . . 1           1-10
Class:
  Class . . . . . *SBSD          Name, *SBSD
  Library . . . . .          Name, *LIBL, *CURLIB
  Number of jobs to use class . . . . . *CALC      0-32766, *CALC, *MAXJOBS
  Class . . . . . *NONE          Name, *NONE, *SBSD
  Library . . . . .          Name, *LIBL, *CURLIB
  Number of jobs to use class . . . . . *CALC      0-32766, *CALC, *MAXJOBS

F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
Messages pending on other displays.
MA a
Bottom
1902 - Session successfully started
Home Color Lazer on 192.168.1.245
05/037
```

Everything About Subsystems

Components of a Subsystem

- Memory Pools
 - Two types
 - Fixed
 - Dedicated memory, can not change paging attributes
 - Shared
 - Set up via the WRKSHRPOOL or iSeries Nav screens
 - Very little reason not to use shared pools
 - More flexible
 - You get 60 of them

Everything about subsystems

Agenda

- Purpose of subsystems
- What is a subsystem
- Components of a subsystem
- **Putting it all together**
- Further Information

Everything About Subsystems

Putting it all together

- Subsystem initiation
 - Subsystem job starts in memory pool 1
 - Memory pools are allocated
 - Work station entries are processed, and allocated
 - Must have allocation set to *SIGNON
 - User can not be signed on

Everything About Subsystems

Putting it all together

- Subsystem initiation
 - Work station type entries are processed, and allocated
 - Must have allocation set to *SIGNON
 - User can not be signed on
 - Autostart jobs are submitted
 - Prestart jobs are started
 - Start jobs must be set to *YES

Everything About Subsystems

Putting it all together

- Job initiation
 - Batch Jobs (Including autostart)
 - Job is placed on Job Queue
 - Routing data is compared to routing entries
 - Routing step # is compared to maximum allowed on entry, if greater job is terminated
 - Class is selected from routing entry and job run attributes are set
 - Memory pool is set
 - Initial program is called

Everything About Subsystems

Putting it all together

- Job initiation
 - Workstations (green screen)
 - User enters login information and presses ENTER
 - Job description is retrieved
 - From WSE
 - From *USRPRF
 - From *SBSD
 - If less than maximum number of jobs, then continue, otherwise end job

Everything About Subsystems

Putting it all together

- Job initiation
 - Workstations (green screen), continued
 - Routing data is compared to routing entries
 - Routing step # is compared to maximum allowed on entry, if greater job is terminated
 - Class is selected from routing entry and job run attributes are set
 - Memory pool is set
 - Initial program is called

Everything About Subsystems

Putting it all together

- Job initiation
 - Communications Jobs
 - Communications device goes active
 - Mode is compared to entry, continue if matches
 - User is set
 - Job description is retrieved
 - If less than maximum number of jobs, continue. Otherwise cancel

Everything About Subsystems

Putting it all together

- Job initiation
 - Communications Jobs, continued
 - Routing data is compared to routing entries
 - Routing step # is compared to maximum allowed on entry, if greater job is terminated
 - Class is selected from routing entry and job run attributes are set
 - Memory pool is set
 - Initial program is called

Everything About Subsystems

Putting it all together

- Job initiation
 - Prestart jobs
 - Only jobs not to use routing entries
 - User is set from PJE
 - Class is selected from prestart entry and job run attributes are set
 - Memory pool is set
 - Initial program is called (from PJE)

Everything About Subsystems

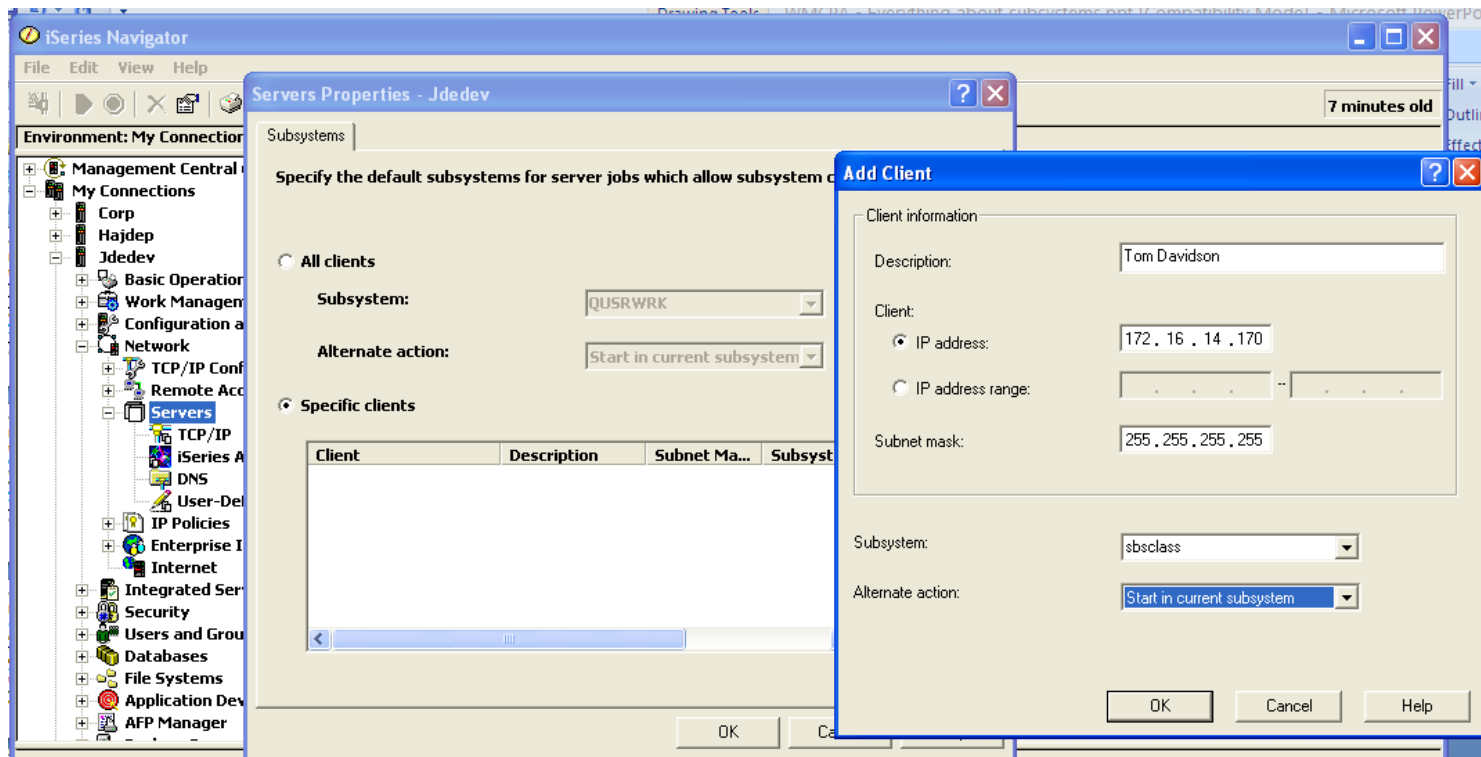
Putting it all together

- How routing entries are processed
 - Processed by sequence number 1-9999
 - First match is used
 - Length of match based on characters in routing entry
 - Start position based on routing entry
 - *ANY in routing entry matches anything
 - There should only be one
 - It's sequence should be 9999

Everything About Subsystems

Putting it all together

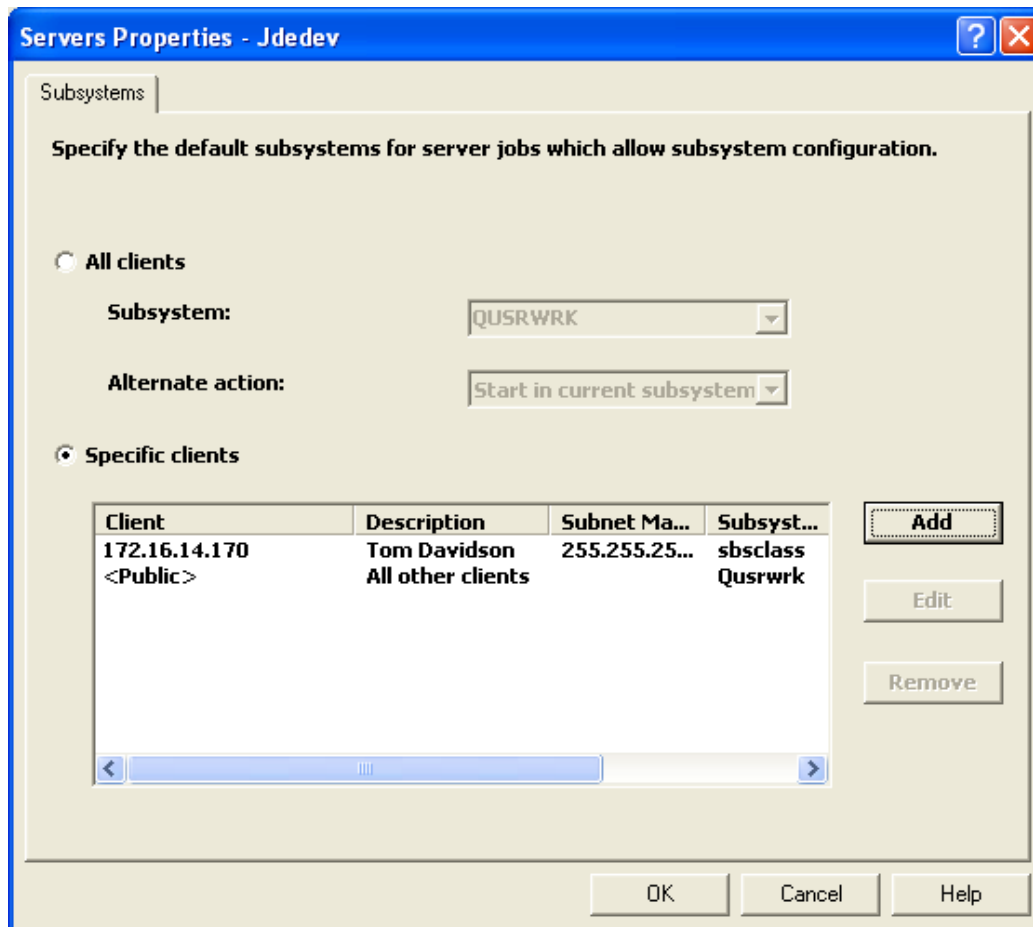
- Attaching jobs to your prestart jobs
 - Done via iSeries Nav (Network/Servers)



Everything About Subsystems

Putting it all together

- Attaching jobs to your prestart jobs (cont)



Everything About Subsystems

Putting it all together

- Changing your sign in screen
 - Remember how things work
 - Only a buffer is passed to the program behind the login screen
 - Any display file that has the same record name, same field names, defined the same, in the same order create the same level id (and the same buffer)
 - Sample source is found at QGPL/QDDSSRC
QDSIGNON
 - *SECADM authority required to change display

Everything About Subsystems

Putting it all together

- Changing your sign in screen
 - Do Not
 - Change the order of I/O/B fields You can add constants and attributes
 - Add I/O/B fields
 - Do
 - Add constants
 - Add/change attributes (PR, HI, ND)
 - Protect and non-display the PROGRAM and MENU fields

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