



How's That Work? a Focus on WLM Goal Mode STC Workloads

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Other SHARE Sessions



- **This session (2543) discusses only STC Workloads**
- **The companion session is Tuesday at 11:00 am:**
 - 2542- How's that Work? A Focus on WLM Goal Mode Batch Workloads**

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Introduction



This session discusses various aspects of Started Task Workloads in Workload Manager Goal Mode. You will see how these Workloads originate, guidelines for setting up, options for qualifying them, and best practices for defining the associated Service Classes.

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Agenda



- **Started Task Origins**
- **Starting a Started Task**
- **Categories**
- **Prioritizing Started Tasks**
- **System Address Spaces (SPM)**
- **Recommended Service Classes**
- **Qualifying Started Tasks**
- **Other Work That Looks Like STCs**

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Started Task Origins



- **Operator Consoles, SDSF, EMCS, SMCS**
- **Automation Packages**
- **PARMLIB Concatenation during IPL process (IEACMD00, COMMNDxx)**
- **WLM Application Environments**
- **Other Started Tasks**
- **UserID or Ownership is propagated from Security Package or from Jobcard**

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Started Task Commands



➤ From MSTJCLxx in PARMLIB Concatenation

```
■ //I EFPDSI DD DI SP=SHR, DSN=SYS2. WI ZP. PROCLI B
// DD DI SP=SHR, DSN=SYS2. WI ZPPLEX. PROCLI B
// DD DI SP=SHR, DSN=SYS1. PROCLI B
■ //I EFJOBS DD DI SP=SHR, DSN=SYS2. WI ZP. STCJOBS
// DD DI SP=SHR, DSN=SYS2. WI ZPPLEX. STCJOBS
```

- Members in IEFPDSI contain Started Task PROC JCL
- Members in IEFJOB contain JES Jobcard, JCCLLIB statement, INCLUDE statement or JOB JCL

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Issuing the START Command



from IEFJOBS

```
SYS2.WIZPPLEX.STCJOBS(PROC1)
//PROC1 JOB (Q0123456789ABCDEFG, ROOM2004),
// MSGCLASS=X, PERFORM=20
/*ROUTE PRINT LOCAL
//JCL JCLLIB ORDER=(SYS2. WI ZPPLEX. PROCLI B)
//STEP1 EXEC PROC1
//@PROC1 INCLUDE MEMBER=@PROC1
```

from IEFPDSI

```
SYS2.WIZP.PROCLIB(PROC1)
//PROC1 PROC
//I EFPROC EXEC PGM=PGM1
//SYSPRINT DD SYSOUT=*
```

- START PROC1, JOBNAME=JOB1
- START PROC1, JOBACCT=(00987654)
- START PROC1, PERFORM=22

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Started Task Categories



- **System Address Spaces – Subsystem ParaMeter (SPM)**
 - High Dispatch Priority System Tasks assigned to the *SYSTEM* Service Class
 - Privileged Dispatch Priority Task or System Tasks assigned to the *SYSSTC* Service Class
 - None of the previous
- **Other Address Spaces**
 - Data Management (dfHSM, etc.)
 - Network Management (FTP, WEB, etc.)
 - Operations Management (Automation, Schedulers, Spoolers, Print/Archival packages, etc.)
 - Performance Management (Monitors, SMF processing)
 - DBMS (DB2 DBMs, DB2 SPAS, IMS DBCTL, IMS DBRC, IDMS, etc.)
 - Transaction/Onlines (CICS TOR/AOR/FOR/ROR/TSOR, CPSM, IMS CNTL/MPRs/DLI, MQ CHIN, etc.)

System Address Spaces



- Subsystem Qualification only needed if assigning to a Report Class
- Subsystem ParaMeter (SPM) may be used as a failsafe from inadvertently assigning System Tasks in other parts of STC Classification Rules

SYSTEM Service Class

MASTER	ALLOCAS	ANTMAIN	CATALOG
CONSOLE	DUMPSRV	GRS	IEFSCHAS
IOSAS	IXGLOGR	JESXCF	MIMGR
MMS	OMVS	RASP	RRS
SMF	SMSVSAM	SMXC	WLM
XCFAS			

System Address Spaces



SYSSTC Service Class

ANTAS%%%	APPC	ASCH*	BPXAS
BPXOINIT	DLF	GPMSERVE	HSC
ICSF	IEECMDPF	IEEVMP CR	IXFP
JES%	JES%AUX	LLA	OAM
OMVSKERN	OPS*	OSASF	OTIS*
PCAUTH	PORTMAP	RESOLVER	RMF
SLS0	SMS	SYSBMAS	SYSV*
TCPIP	TNF	TRACE	TSO
VLF	VMCF	VTAM/NET	%%%%%%%%DIST
%%%%%%%%IRLM	%%%%%%%%MSTR		

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Started Tasks SPM Qualification



```

Subsystem-Type Xref Notes Options Help
-----
Command ==> Modify Rules for the Subsystem Type Row 1 to 24 of 32
                SCROLL ==> CSR

Subsystem Type . : STC          Fold qualifier names? Y (Y or N)
Description . . : Started Tasks Subsystem

Action codes:  A=After      C=Copy      M=Move      I=Insert rule
                B=Before    D=Delete row R=Repeat   IS=Insert Sub-rule
                More ==>

Action  -----Qualifier-----
Type   Name      Start
-----
1 TN    ALLOCAS  ___
1 TN    CONSOLE  ___
1 TNG   TNG_SYSH ___
1 SPM   SYSTEM   ___
1 TN    BPXOINIT ___
1 SPM   SYSSTC   ___
1 TNG   TNG_SYSM ___
1 TNG   TNG_SYSL ___
1 TNG   TNG_PERF ___
1 TNG   TNG_OPSH ___
1 SPM   *        ___

-----Class-----
Service Report
DEFAULTS: STC_LO  RC_STCUK
           SYSTEM RC_SYSH
           SYSTEM RC_SYSH
           SYSTEM RC_SYSH
           SYSTEM RC_SYSH
           SYSSTC  RC_SYSM
           SYSSTC  RC_SYSM
           SYSSTC  RC_SYSM
           STC_MD   RC_SYSL
           SYSSTC  RC_PERF
           SYSSTC  RC_AUTOM
           STC_LO   RC_OTHER
    
```

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Suggested Started Task Service Classes



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Service Class	Imp	Goal	Description
SYSTEM	-	System Goal	OS System Components (not specified)
SYSSTC	-	System Goal	OS System Components, Subsystems, and High-Priority System and Operator Support Tasks
STC_HI	2	V=50%	High-Priority System Support and Operator Support Tasks
STC_MD	3	V=40%	Medium-Priority System Support and Operator Support Tasks
STC_LO	4	V=30%	Low-Priority System Support and Operator Support Tasks
SYSOTHER	-	Discretionary	Unclassified Work (not specified)

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Data Management STCs



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- Data Management Packages tend to be “spikey” types of work. Many require aggressive goals; some can be segmented into different requirements
- dfSMS is usually placed in Service Class SYSSTC
- dfHSM is usually placed in Service Class SYSTC. If HSM tasks have been divided into multiple tasks, or functions spread across Systems in the Sysplex, then lower priority functions, such as Re-orgs and other less critical work can be placed in Service Class STC_MD or even STC_LO. Recall processes should remain in SYSSTC
- Tape Management Packages (CA1, RMM) should be placed in Service Class SYSSTC
- Image Processing and Automated Tape Management Packages (OAM, OTIS, SLS0, HSC, etc.) should be placed in Service Class SYSSTC
- Hardware Management Products (OSASF, IXCF, etc.) are not large resource consumers and should be placed in Service Class SYSSTC
- Other Data Management Products (ANTAS*, LLA, VLF, DLF) should be placed in Service Class SYSSTC

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Network Management STCs



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- Network Access Products tend to be a high resource consumer and typically require High Priority to perform well
- Place Network Access Products and components (VTAM/NET, TCPIP, VMCF, PORTMAP, RESOLVER, TNF) into Service Class SYSSTC
- Network Data Mover Products (FTP, NDM, etc.) and Software Delivery Products tend to be “spikey” types of work
- Place the Network Data Mover Products into Service Class STC_MD or STC_LO, including those parts in UNIX System Services (OMVS)

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Operations Management STCs



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- Automation Products tend to be “spikey” types of work
- Place the Automation Products into Service Class SYSSTC, including those parts in UNIX System Services (OMVS)
- Scheduling Packages and Restart Managers typically act like Online Regions when Administrators interact with the product and like Automation Product when performing its tasks
- Place Production versions of Scheduling Packages and Restart Managers into a Service Class similar to a High-Priority Online Region (example: STC_HI)
- Spoolers and Print/Archival Packages tend to be “spikey” types of work

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Operations Management STCs



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- Place Production versions of Spoolers and Print/Archival Packages in Service Class STC_MD; place the Online component in Service Class STC_HI
- FSS Printers tend to need an aggressive goal to avoid “hardware clutching”
- Place FSS Printers into Service Class STC_HI for those with hardware dependencies; or STC_MD for those with less stringent requirements
- Ad-Hoc Operations Tasks (Tapemaps, Tape INIT, LOGREC/EREP reporting, etc.) can be placed into Service Class STC_MD

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Performance Management STCs



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- Performance Monitors tend to be “spikey” types of work. Well behaved Monitors should not consume more than 5% of the system
- Place the actual Monitors into Service Class SYSSTC
- Place the Archival, Data Store Switching, Log Switching Tasks into a High-Priority STC Service Class (example: STC_MD IMP=3 or IMP=4 V=40% or V=50%)
- SMF Dump Tasks can be placed in Service Class SYSSTC or another Very High-Priority Service Class
- Place SMF Archival, Data Consolidation Tasks into a High-Priority STC Service Class

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Data Base Management STCs



- **DB2 Subsystems and other DBMs (IMS DBCTL, IDMS) should be placed in a Service Class with an aggressive goal**
- **DBMs are typically Server types of work**
- **Suggested Goal: Service Class DBMP_HI
IMP=2 V=55% or V=60%**
- **Assign DB2MSTR, DB2IRLM, DB2DIST to
SYSSTC**

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Data Base Management STCs



- **Assign DB2DBM1, DB2SPAS, DM2WLM* to
DBMP_HI**
- **Non-Production Subsystems may be
assigned to less aggressive goals.**
- **Suggested Goal: Service Class DBMD_HI
IMP=3 V=35% or V=40%**
- **Multiple Service Classes may be defined for
different levels of work (Prod vs.
Warehouse, System level work vs. less
important work)**

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Transaction/Online STCs



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- CICS/IMS Regions should be placed in a Service Class with an aggressive goal. Regions not being managed to Transaction Goals will be managed to Region Goals
- CICS Regions are typically both Server and Client types of work
- Several Service Classes may be needed for:
 - CICS CPSM, CICS Temp Stor Regions, IMS Shared Queue Regions
 - CICS TORs, IMS CNTL Regions
 - CICS AORs, CICS RORs, CICS QORs, IMS MPRs, IMS DLI/SAS
- Suggested Goal: Service Class ONLP_VH IMP=1 V=55% or V=60%
- Suggested Goal: Service Class ONLP_HI IMP=2 V=50% or V=55%

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Transaction/Online STCs



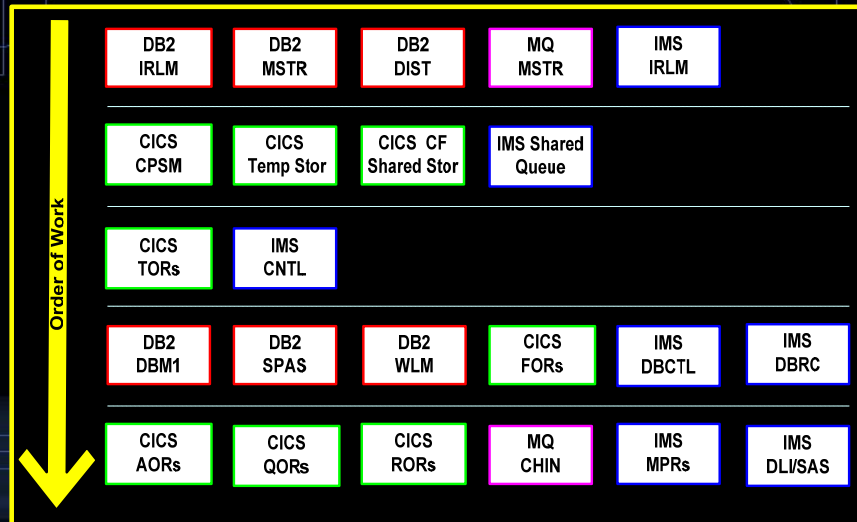
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- Suggested Goal: Service Class ONLP_MD IMP=2 or IMP=3 V=45% or V=50%
- Create additional Service Classes for less important regions (Print Owing Regions, for example) that may have long-running work that looks like Batch
- Non-Production Subsystems may be assigned to less aggressive goals.
- Suggested Goal: Service Class ONLD_HI IMP=3 V=35% or V=40%
- Multiple Service Classes may be defined for different levels of work (Prod vs. Development, AOR vs. MRO Regions)

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Transaction & DBMs Order of Work



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Started Task Classification



- The Service Class is assigned based on WLM Classification Rules using these Qualifiers:
- Accounting Information (AI)- Not available in JES2 if ACCTFLD=OPTIONAL on JOBDEF Initialization Statement
 - Perform (PF) and PERFORM Group (PFG)
 - Sysplex Name (PX)- Available at OS/390 v2.10 with APAR OW43813
 - SubSystem ParaMeter (SPM)- Available at OS/390 V2.10 with APAR OW43813
 - System Name (SY)- Available at OS/390 v2.10 with APAR OW43813
 - Transaction Name (TN) and Transaction Name Group (TNG)
 - UserID (UI) and UserID Group (UIG)
 - ◆ May not available if STC started by Address Space Create

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Accounting Information Qualification



//PROC1 JOB (00123456ABCDEF00,ROOM2004),'PGMRNAME'

```

Subsystem-Type Xref Notes Options Help
-----
Command ==> Modify Rules for the Subsystem Type Row 1 to 4 of 4
                SCROLL ==> CSR

Subsystem Type . : STC          Fold qual ifier names? Y (Y or N)
Description . . . Started Tasks

Action codes:  A=After      C=Copy      M=Move      I=Insert rule
                B=Before    D=Delete row R=Repeat    IS=Insert Sub-rule
                More ==>

Action  -----Qual ifier-----
Type   Name      Start
-----
1      AI        123456      3
2      AI        ABCD%>%%   9
2      AI        ABC*        9
1      AI        00987654   ___

                -----Cl ass-----
                Servi ce      Report
                STC_LO        RC_SUNKN
                STC_MD        RC_STORM
                STC_MD        RC_STORM
                STC_HI        RC_SYSM
    
```

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UserID Qualification



//PROC1 JOB (00123456ABCDEF00,ROOM2004),'PGMRNAME',USERID=PSYSOP1

```

Subsystem-Type Xref Notes Options Help
-----
Command ==> Modify Rules for the Subsystem Type Row 1 to 4 of 4
                SCROLL ==> CSR

Subsystem Type . : STC          Fold qual ifier names? Y (Y or N)
Description . . . Started Tasks

Action codes:  A=After      C=Copy      M=Move      I=Insert rule
                B=Before    D=Delete row R=Repeat    IS=Insert Sub-rule
                More ==>

Action  -----Qual ifier-----
Type   Name      Start
-----
1      UI        PSYS%1     ___
1      UI        PSYSOP*    ___
1      UIG       UIG_OPS    ___

                -----Cl ass-----
                Servi ce      Report
                STC_LO        RC_STCUK
                STC_MD        RC_PROD
                STC_MD        RC_PROD
                STC_LO        RC_OPSM
    
```

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Performance Group Qualification



//PROC1 JOB (00123456ABCDEF00,ROOM2004),'PGMRNAME',PERFORM=20

```

Subsystem-Type Xref Notes Options Help
-----
                Modify Rules for the Subsystem Type           Row 1 to 3 of 3
Command ==>> _____ SCROLL ==>> CSR

Subsystem Type . : STC           Fold qualifier names? Y (Y or N)
Description . . . Started Tasks

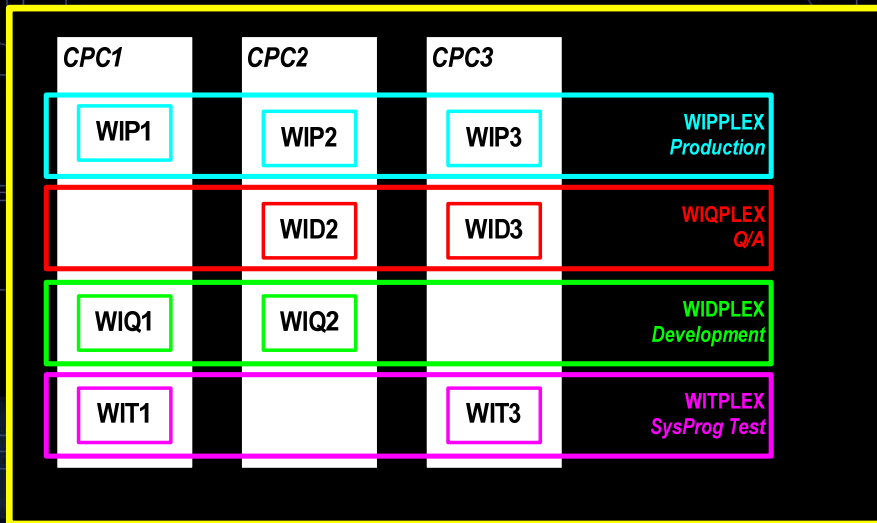
Action codes:  A=After      C=Copy      M=Move      I=Insert rule
                B=Before    D=Delete row R=Repeat  IS=Insert Sub-rule
                More ==>>

Action  Type  -----Qualifier-----  Start  -----Class-----
_____ 1 PF          20          _____  SERVICE  Report
_____ 1 PFG         PFG_CRIT   _____  STC_LO   RC_SUNKN
_____ 1 PF          22          _____  STC_MD   RC_PPROD
                STC_MD   RC_PPROD
                STC_HI   RC_PCRI T
    
```

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Sysplex Name



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Sysplex Name Qualification



//PROC1 JOB (00123456ABCDEF00,ROOM2004),'PGMRNAME'

```

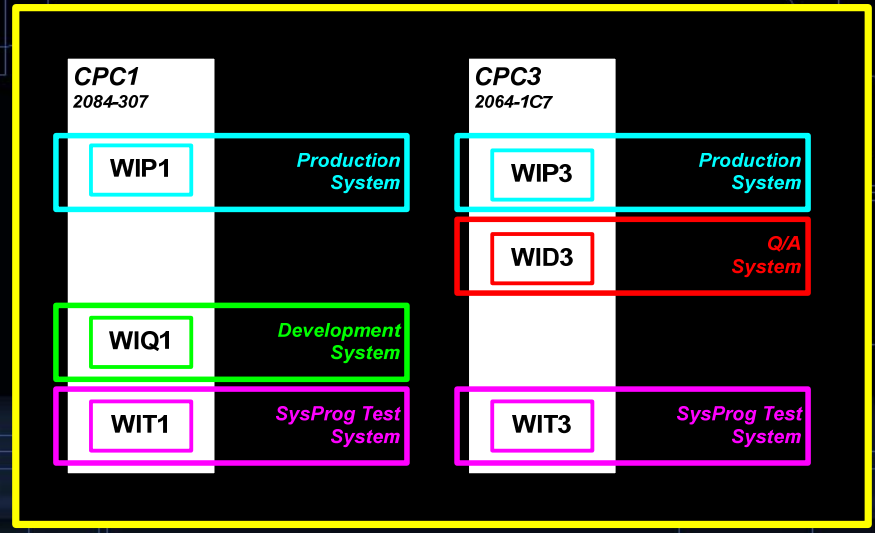
Subsystem-Type Xref Notes Options Help
-----
Modify Rules for the Subsystem Type      Row 1 to 5 of 5
Command ==> _____ SCROLL ==> CSR

Subsystem Type . : STC      Fold qual ifier names?  Y (Y or N)
Description . . . Started Tasks

Action codes:  A=After      C=Copy      M=Move      I=Insert rule
                B=Before     D=Delete row R=Repeat   IS=Insert Sub-rule
                                                More ==>

Action  -----Qual ifier-----          -----Cl ass-----
Type   Name      Start          Servi ce      Report
-----
DEFAULTS: STC_ LO      RC_STCUK
          STC_HI       RC_SYSH
          STC_MD       RC_SYSM
          STC_LO       RC_SYSL
    
```

System Name (SID)



SysID Qualification



//PROC1 JOB (00123456ABCDEF00,ROOM2004),'PGMRNAME'

```

Subsystem-Type Xref Notes Options Help
-----
Modify Rules for the Subsystem Type          Row 1 to 5 of 5
Command ==> _____ SCROLL ==> CSR

Subsystem Type . : STC          Fold qual ifier names?  Y (Y or N)
Description . . . Started Tasks

Action codes:  A=After      C=Copy      M=Move      I=Insert rule
                B=Before    D=Delete row R=Repeat   IS=Insert Sub-rule
                                                More ==>

Action  -----Qual ifier-----          -----Cl ass-----
Type   Name      Start          Servi ce      Report
-----
DEFAULTS: STC_ LO          RC_SUNKN
          STC_HI          RC_SYSH
          STC_MD          RC_SYSM
          STC_LO          RC_SYSL
  
```

Other Work that looks like STCs



- **UNIX System Services (OMVS) can have WLM Definitions for:**
 - General User Processes
 - USS Work (OMVSKERN Startup Processes)
 - USS WORK that runs Forked or Spawned Processes
 - Long-running Daemons

Suggested USS Classifications



- **SYSTEM Service Class: OMVS**
- **SYSSTC Service Class: OMVSKERN, BPXAS, BPXOINIT**
- **SYSSTC Service Class: Daemon-type Processes- CRON, INETD, RLOGIN, SYSLOGD, Automation, Monitors**
- **STC_HI Service Class: Long-running Processes- IMWEB***
- **STC_MD Service Class: Long-running Processes- FTPD***

OMVS Qualification



```

Subsystem-Type Xref Notes Options Help
-----
Modify Rules for the Subsystem Type Row 1 to 7 of 7
Command ==> _____ SCROLL ==> CSR

Subsystem Type . : OMVS Fold qualifier names? Y (Y or N)
Description . . . UNIX System Services

Action codes: A=After C=Copy M=Move I=Insert rule
               B=Before D=Delete row R=Repeat IS=Insert Sub-rule
               More ==>

Action  -----Qualifier-----  -----Class-----
Type      Name      Start  Service Report
-----  -
1 UI      OMVSKERN  _____  STC_LO RC_STCUK
1 UI      IMWEB*    _____  SYSSTC RC_SYSH
1 UI      FTP*      _____  STC_HI  RC_SYSH
1 UI      CRON      _____  STC_MD  RC_SYSM
1 UI      INET*     _____  SYSSTC  RC_SYSH
1 UI      RLOGIN*   _____  SYSSTC  RC_SYSH
1 UI      SYSLOG*   _____  SYSSTC  RC_SYSH
    
```

SYSSTC Service Class



- Use this Service Class for “Trusted” Work that should not otherwise be managed
- Many types of Work belongs here
- Many types of Work does not belong here
- Short-running “spikey” work, that needs quick access to the Processor, is appropriate
- This Service Class should NOT contain the majority of Started Tasks

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Conclusion



- Preparing to Classify STC Workloads has many Options
- With some careful consideration, 1 Service Policy may be used across many Systems and Sysplexes
- Keep It as simple as possible, without Over-simplification
- Re-visit Goals over Time to keep Performance at Advertised Levels

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References



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- **Planning for Workload Manager**
- **JES2 Initialization and Tuning Reference**
- **JES3 Initialization and Tuning Reference**
- **Scheduler and Automation Installation and Customization Guides**
- **Share Presentations: What's New in RMF?
What's New in WLM?**
- **Peter Enrico's "Advanced z/OS Workload Manager and Re-evaluation of Goals" Class**

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