Cheryl Watson's GoalTender™

How to Manage WLM

Cheryl Watson

Session 2539; SHARE 104 in Anaheim

March 2, 2005

Watson & Walker, Inc.

home of **Cheryl Watson's TUNING Letter, BoxScore & GoalTender**

Session Abstract

This vendor session describes our new WLM software monitoring product called ***Cheryl Watson's GoalTender™***. The product is designed to let you analyze your WLM environment as we would do it manually. The session should still be valuable to any goal mode installation, even those sites not interested in purchasing software, because we describe the process of analysis.

We'll look at several common problems and describe our solutions.

GoalTender and WLM Techniques

- WLM Status
- GoalTender Introduction
- Tracker Overview
  - Tracker Reports
- GoalTender Overview
  - Summary Report
  - Interval Report
  - CPU Report
  - Servers Report
  - Missed Goals Report
  - Service Definition Report

WLM Status

- History and help are on WLM home page at:
  www.ibm.com/zseries/zos/wlm
- Most sites are now running in goal mode
- But that leads to several questions:
  - How do you monitor WLM?
  - How often do you monitor WLM?
  - What are the key indicators?
  - How often do you need to modify policies?
  - What has caused missed goals?

GoalTender Introduction

- Cheryl Watson's GoalTender™ is a new product to help you manage WLM goal mode
- Implements our own WLM analysis method
- It's a combination started task and batch job
  - **Tracker** – Started task that runs continually on each system and collects data to record on a common file
  - **GoalTender** – batch job that analyzes the data and produces a series of reports and recommendations
- Written in assembler, so only requirement is goal mode and OS/390 or later
- GA date was March 3, 2004

GoalTender Introduction

- Tracker collects:
  - WLM policies and service definitions
  - Operator changes to service classes
  - SMF type 70, 72 data
- GoalTender runs daily or as needed to identify:
  - Missed goals
  - Operator activities
  - Summary of usage by service class
  - Detailed service class analysis
  - Recommendations and explanations

GoalTender Introduction

- Unique – keeps a history of service definitions, including data not kept on SMF (classification rules, application environments, resource scheduling, descriptions)
- Uses industry ***best practices*** to evaluate your system
- Reduces your time in analyzing performance problems
- Helps train new personnel
- Provides comprehensive advice on how to improve your policy
- Produces easy-to-read reports and service policy

Problem

- **Lack of history**
  - What happens when you are analyzing a problem period from last week, but the policy has changed?
  - What was defined in the policy?
  - Who knows what changed?
  - SMF only contains a portion of the information
- **Solution**
  - **Keep a history of policies**
  - **Tracker keeps a database of policies and changes to those policies**

Tracker – This STC allows you to …

- Keep historical database of COMPLETE service definitions & policies, including classification rules, descriptions, application environments, etc.
- Identify when service definitions are installed
- Identify when service policies are activated
- Identify when operators get "creative"
  - Operators should have some service classes for their own use, but using things like the CICS service class for TSO users could keep you from meeting your goals
- Identify missing SMF data
- Identify periods when Tracker is down

Tracker Log – Part 1

```
17Feb2004 15:14          Cheryl Watson's Tracker Utility                Page    1
 V1R0                           Database Log Report

   Date       Time     System  Typ  Msg  Activity
---------- -------- -------- --- ----- --------
17Dec2003 08:48:59 SYS0     WLM T003I SD STANDARD(Standard Definition) Installed by IBMUSER.
          08:49:17 SYS0     WLM T002I Policy STANDARD(Standard Policy) Activated by IBMUSER.
                                      SD STANDARD(Standard Definition) Installed at 17Dec2003 08:48:59.
          09:04:43 SYS0     TRK T001I Tracker Started.
          09:05:47 SYS0     OPR T029I Job WANDWDOG(JOB00055) SC Changed from PRDBATHI to HOTBATCH by WANDW.
          09:07:32 SYS0     OPR T030I Job WANDWDG2(JOB00059) Quiesced from SC PRDBATMD by WANDW.
          09:08:01 SYS0     OPR T031I Job WANDWDG2(JOB00059) Resumed in SC PRDBATMD by WANDW.
          09:09:05 SYS0     OPR T029I Job WANDWDOG(JOB00062) SC Changed from PRDBATHI to HOTBATCH by WANDW.
          09:54:05 SYS0     SMF T023I SMF Data Collected from 17Dec2003:09:00:00 to 17Dec2003:09:59:59.
          09:54:05 SYS1     SMF T023I SMF Data Collected from 17Dec2003:09:00:00 to 17Dec2003:09:59:59.
          09:54:05 SYS2     SMF T023I SMF Data Collected from 17Dec2003:08:30:00 to 17Dec2003:08:59:59.
          09:55:19 SYS0     OPR T029I Job WANDWDOG(JOB00087) SC Changed from PRDBATHI to HOTBATCH by WANDW.
          09:55:45 SYS0     OPR T030I Job WANDWDG2(JOB00059) Quiesced from SC PRDBATMD by WANDW.
          09:56:06 SYS0     OPR T031I Job WANDWDG2(JOB00059) Resumed in SC PRDBATMD by WANDW.
          15:33:33 SYS0     SMF T023I SMF Data Collected from 17Dec2003:10:00:00 to 17Dec2003:15:44:59.
          18:58:01 SYS0     SMF T023I SMF Data Collected from 17Dec2003:15:45:00 to 17Dec2003:18:44:59.
          18:58:01 SYS0     TRK T033I Tracker Stopped.
18Dec2003 09:01:29 SYS0     TRK T001I Tracker Started.
          10:10:27 SYS0     SMF T023I SMF Data Collected from 18Dec2003:10:00:00 to 18Dec2003:10:15:00.
          15:36:13 SYS0     OPR T029I Job WANDW(TSU00048) SC Changed from TSOPRD to HOTBATCH by *BYPASS*.
          18:25:37 SYS0     SMF T023I SMF Data Collected from 18Dec2003:10:15:00 to 18Dec2003:18:15:00.
          18:25:37 SYS0     TRK T033I Tracker Stopped.
19Dec2003 08:36:02 SYS0     TRK T001I Tracker Started.
          08:37:36 SYS0     OPR T029I Job WANDW(TSU00049) SC Changed from TSOPRD to HOTBATCH by *BYPASS*.
          09:00:03 SYS0     TRK T033I Tracker Stopped.
```

Tracker Log – Part 2

```
Tracker Database: WANDW.PLEX3.DATABASE

Report and Filtering Options:
     Log(ALL)                                                              00278404

SMF Contents:  System:SYS0   Earliest:17Dec2003:09:00  Latest:18Dec2003:18:15  SMF-70: ...72 SMF-72: ..3,456
               System:SYS1   Earliest:17Dec2003:09:00  Latest:17Dec2003:09:59  SMF-70: ....4 SMF-72: ....192
               System:SYS2   Earliest:17Dec2003:08:30  Latest:17Dec2003:08:59  SMF-70: ....2 SMF-72: .....59

Record Counts: Policy  .....1  SD      .....1  Tracker ....14
               New SC  .....5  Quiesce .....2  Resume  .....2
               Compat  .....0  Goal    .....0
```


Tracker Log – Selective

- Selection parameter example:
  SYSTEM(SYS0)
  DATE(17Dec2003-19Dec2003)
  LOG(WLM,OPR)

```
17Feb2004 15:14         Cheryl Watson's Tracker Utility                Page   1
 V1R0                         Database Log Report

   Date      Time    System  Typ  Msg  Activity
 --------- -------- -------- --- ----- --------
 17Dec2003 08:48:59 SYS0     WLM T003I SD STANDARD(Standard Definition) Installed by IBMUSER.
           08:49:17 SYS0     WLM T002I Policy STANDARD(Standard Policy) Activated by IBMUSER.
                                       SD STANDARD(Standard Definition) Installed at 17Dec2003 08:48:59.
           09:05:47 SYS0     OPR T029I Job WANDWDOG(JOB00055) SC Changed from PRDBATHI to HOTBATCH by WANDW.
           09:07:32 SYS0     OPR T030I Job WANDWDG2(JOB00059) Quiesced from SC PRDBATMD by WANDW.
           09:08:01 SYS0     OPR T031I Job WANDWDG2(JOB00059) Resumed in SC PRDBATMD by WANDW.
           09:09:05 SYS0     OPR T029I Job WANDWDOG(JOB00062) SC Changed from PRDBATHI to HOTBATCH by WANDW.
           09:55:19 SYS0     OPR T029I Job WANDWDOG(JOB00087) SC Changed from PRDBATHI to HOTBATCH by WANDW.
           09:55:45 SYS0     OPR T030I Job WANDWDG2(JOB00059) Quiesced from SC PRDBATMD by WANDW.
           09:56:06 SYS0     OPR T031I Job WANDWDG2(JOB00059) Resumed in SC PRDBATMD by WANDW.
 18Dec2003 15:36:13 SYS0     OPR T029I Job WANDW(TSU00048) SC Changed from TSOPRD to HOTBATCH by *BYPASS*.
           08:49:17 SYS0     WLM T002I Policy NIGHT(Night Policy) Activated by IBMUSER.
                                       SD STANDARD(Standard Definition) Installed at 17Dec2003 08:48:59.
 19Dec2003 08:37:36 SYS0     OPR T029I Job WANDW(TSU00049) SC Changed from TSOPRD to HOTBATCH by *BYPASS*.
```

Problem

- **Too much data**
  - Reams of reports to review
  - Which are peak activity periods?
  - Which are worst periods for missing goals?
  - Did anything change during or right before those periods?
- **Solution**
  - **Automatically pick peak periods and worst periods**

GoalTender Summary Report

- Produced each time GoalTender is run
- GoalTender usually runs once a day, so summary shows you the results of one day
- Key elements:
  - Top three peak intervals based on service units
  - Top three worst intervals based on a unique weighted score
  - SMF data that is present on Tracker database
  - Number of recommendations and missed goals during the period

GoalTender Summary Report

```
Policy: STANDARD              Activation Date: 17Dec2003:08:49:17
   Description: Standard Policy
   Service Definition: STANDARD  Install Date: 17Dec2003:08:48:59
      Description: Standard Definition
   Analysis period for this policy: 17Dec2003:09:00:00 - 17Dec2003:10:45:00

Peak Intervals:  Interval Start      Raw SUs (K)  Policy Name  Install Date
                 17Dec2003:09:45:00         2144  STANDARD     17Dec2003:08:49:17
                 17Dec2003:09:30:00         2076  STANDARD     17Dec2003:08:49:17
                 17Dec2003:09:15:00         1972  STANDARD     17Dec2003:08:49:17

Worst intervals: Interval Start      Score/#Miss  Policy Name  Install Date
                 17Dec2003:09:45:00     24     12  STANDARD     17Dec2003:08:49:17
                 17Dec2003:09:00:00     19     11  STANDARD     17Dec2003:08:49:17
                 17Dec2003:09:30:00     18     10  STANDARD     17Dec2003:08:49:17

Tracker Database: WANDW.PLEX3.DATABASE  Sysplex Name: ADCDPL

SMF Contents:
   System: SYS0     Earliest: 17Dec2003:09:00:00  Latest: 17Dec2003:10:45:00
                    OS Level: z/OS 01.04          Cycle: 1.000 seconds
                    SMF-70: .....8                SMF-72: ...384

   System: SYS1     Earliest: 17Dec2003:09:00:00  Latest: 17Dec2003:09:45:00
                    OS Level: z/OS 01.04          Cycle: 1.000 seconds
                    SMF-70: .....4                SMF-72: ...192

Number of SMF records processed: 588

Number of times when PIs were missed: 55, Percent of Total: 88%

Number of warnings based on SMF data: 75

Number of service definition advice recommendations given: 6
```


Problem

- **How do you start analyzing WLM data?**
- **Solution**
  - **Find peak and/or worst interval**
  - **Analyze the sysplex like WLM manages it!**
  - **First analyze WLM by sysplex**
    - **This is WLM's view of the workload**
    - **A PI of 1.0 at the sysplex level doesn't necessarily mean that all systems are meeting the goal**
  - **Then analyze WLM for each system**
    - **This is what's really going on**

GoalTender Interval Report

- Provides a snapshot in time
- Can select peak interval, worst interval or specific intervals
  - Worst interval is based on a unique score given to each interval based on missed goals
- One-page view of sysplex
  - By service class name, PI or volume of activity
  - PCT is volume based on service units
  - Distribution of workload across systems
  - Distribution of total resources across systems

GoalTender Interval Report

- We identify:
  - Missed goals during the interval
  - Missed system goals, even when the sysplex goal is not missed
  - Too much work running above a service class that is missing its goal
  - No/too little /too much work living in discretionary or system categories
  - Distribution of resources as you planned?

GoalTender Interval Report – Page 1

```
17Feb2004 15:14            Cheryl Watson's GoalTender                  Page  15
 V1R0                Interval Report - Analysis by Worst Interval
                        Sample Reports for SHARE Presentation

 Service Definition: STANDARD  Install Date: 17Dec2003:08:48:59  Description: Standard
    Definition
 Policy: STANDARD  Install Date: 17Dec2003:08:49:17  Description: Standard Policy

 Worst Interval: 17Dec2003:09:45:00
     SUs Used=2144K, Duration=14:59, Defined Periods=23, Sort=IMP
     Missed Goals=12, Missed Score=24

 ------------------------------------------------------------------------------
     Service Per Imp   Sysplex     SYS0        SYS1
      Class            ---------   ---------   ---------   ---------   ---------
                        PI   Pct    PI   Pct    PI   Pct    PI   Pct    PI   Pct

     SYSSTC    1  (0)   0.0   3.4   0.0   1.7   0.0   1.6
     SYSTEM    1  (0)   0.0   6.0   0.0   3.1   0.0   2.8
     HOTBATCH  1   3    1.2   2.8   1.2   2.8   0.0   0.0
     PRDBATHI  1   4   17.5  57.9  23.8  28.4   8.6  29.4
     PRDBATMD  1   4    5.5  24.8  11.8   5.4   3.1  19.3
     TSOPRD    1   4    2.0   1.0  ****   0.9   0.5   0.1
     TSOPRD    2   5    7.2   3.2   7.2   3.2   0.0   0.0
     STCLO     1  (6)   0.0   0.5   0.0   0.2   0.0   0.3

     *TOTALS*           100.0        46.1        53.8
```


Problem

- **High importance work uses a lot of CPU**
  - It then exceeds its goal and uses cycles that could be used by discretionary or lower importance work (e.g. CICS response time is .3 seconds instead of goal of 1 second). This occurs mainly on uni- or dyadic machines.
  - Two results:
    - Discretionary work doesn't get the excess cycles and languishes a long time
    - Users get used to rapid response and complain when response time drops to the goal you all agreed upon
- **Solution**
  - **Identify whenever PI goes below some limit (e.g. .5)**

GoalTender Interval Report – Page 2


```
17Feb2004 15:14           Cheryl Watson's GoalTender                  Page  16
 V1R0              Interval Report - Analysis by Worst Interval
                      Sample Reports for SHARE Presentation
 ------------------------------------------------------------------------------
 Messages and advice for Worst Interval: 17Dec2003:09:45:00

       G200E - HOTBATCH, Period=1, Imp=3, missed its goal sysplex wide,
               PI=1.2, PCT=2.8%, Goal=50% Vel, Actual=41% Vel,
               Delay=CPU
       G200E - PRDBATHI, Period=1, Imp=4, missed its goal sysplex wide,
               PI=17.5, PCT=57.9%, Goal=15 sc Avg, Actual=263 sc Avg,
               Delay=Idle
       G200E - PRDBATMD, Period=1, Imp=4, missed its goal sysplex wide,
               PI=5.5, PCT=24.8%, Goal=80% Vel, Actual=15% Vel,
               Delay=Swapping
       G200E - TSOPRD, Period=1, Imp=4, missed its goal sysplex wide,
               PI=2.0, PCT=1.0%, Goal=80% in 200 ms, Actual=78% in 200 ms,
               Delay=Idle
       G200E - TSOPRD, Period=2, Imp=5, missed its goal sysplex wide,
               PI=7.2, PCT=3.2%, Goal=80% Vel, Actual=11% Vel,
               Delay=CPU
       G202E - HOTBATCH, Period=1, Imp=3, missed its system (SYS0) goal,
               PI=1.2, PCT=2.8%, Goal=50% Vel, Actual=41% Vel,
               Delay=CPU
       G202E - PRDBATHI, Period=1, Imp=4, missed its system (SYS0) goal,
               PI=23.8, PCT=28.4%, Goal=15 sc Avg, Actual=357 sc Avg,
               Delay=Idle
```


GoalTender Interval Report – Page 3


```
17Feb2004 15:14           Cheryl Watson's GoalTender                  Page  16
 V1R0              Interval Report - Analysis by Worst Interval
                      Sample Reports for SHARE Presentation
 ------------------------------------------------------------------------------
 Messages and advice for Worst Interval: 17Dec2003:09:45:00

       G202E - PRDBATMD, Period=1, Imp=4, missed its system (SYS0) goal,
               PI=11.8, PCT=5.4%, Goal=80% Vel, Actual=7% Vel,
               Delay=Swapping
. . .
       G207W - Job WANDWDOG(JOB00087) service class changed from PRDBATHI
               to HOTBATCH on system SYS0 by operator/user WANDW at 09:55:19.
       G208W - Job WANDWDG2(JOB00059) was quiesced in service class PRDBATMD
               on system SYS0 by operator/user WANDW at 09:55:45.
       G209W - Job WANDWDG2(JOB00059) was resumed in service class PRDBATMD
               on system SYS0 by operator/user WANDW at 09:56:06.
       G214W - PRDBATHI, Period=1, Imp=4, averaged less than one ended
               transaction every two minutes, which may have caused the
               system (SYS1) goal to be missed.
       G203I - TSOPRD, Period=1, Imp=4, exceeded its system (SYS1) goal,
               PI=0.5, PCT=0.1
```

Interval Report – Messages

G201I - *servclass*, Period=*per*, Imp=*import*, exceeded its goal sysplex wide, PI=*pivalue*, PCT=*percent*

Condition - A service class period had a PI less than .5 at a sysplex level during the peak intervals (as defined by your PEAK parameter). The .5 default can be changed with the OVERRIDE parameter.

Description - This message only occurs for multi-system sysplexes and indicates that a service class period has greatly exceeded its sysplex-wide goal during a peak interval. It's important for you to set your a value for the PEAK interval because you will typically exceed your goals during non-peak times. There are two major problems with exceeding your goals during your peak intervals:

The users will come to expect this level of service at all times, and your agreed upon service will have no meaning. Once users have experienced a certain level of service, it's impossible to reduce that level without complaints. This becomes the new level of service.

When you exceed your goals for one service class, it's possible that work at lower importance levels may miss their goals. Because of this, you should not set higher goals than you need for any level of importance.

Recommendation - Review any of these messages for to see if you've set your velocity goals too low or response goals too high for peak period. If so, you should either increase the velocity or decrease the response time. Please review message G200E (Recommendation) because it gives a list of times (e.g. there are too few transactions to determine an adequate goal) when goals are not reasonable.

GoalTender Interval Report

- Shows you:
  - Major reasons for missed goals
  - Whether there are enough transactions to meet a goal
  - Whether some service classes are exceeding goals while lower importance ones are missing theirs
  - Whether operators moved things into or out of service classes and caused missed goals

Problem

- **Too few transactions**
  - Recommendation is that you have at least ten ended transactions in a twenty minute period before using an average or percentile response goal - else use velocity goal or discretionary goal
- **Solution**
  - **Identify whether this happens when a goal is missed**

Problem

- **Who is using the CPU?**

- **Solution - Analysis by Importance**
  - **by System**
  - **by SYSSTC**
  - **by discretionary**
  - **by work running at higher importance**
  - **by each system in each importance**

GoalTender Interval Report – CPU


```
17Feb2004 15:14           Cheryl Watson's GoalTender                  Page  18
 V1R0              Interval Report - Analysis by Worst Interval
                      Sample Reports for SHARE Presentation

 ------------------------------------------------------------------------------

 Worst Interval: 17Dec2003:09:45:00

 CPU Usage by Importance Level:

     Importance      Sysplex   SYS0        SYS1

     System            9.4%    4.9%         4.5%
       1               0.0%    0.0%         0.0%
       2               0.0%    0.0%         0.0%
       3               2.8%    2.8%         0.0%
       4              83.8%   34.8%        49.0%
       5               3.2%    3.2%         0.0%
     Discretionary     0.5%    0.2%         0.3%
```


Problem

- **Server Configuration**
  - Servers and served not assigned correctly
  - Causes goals to appear to be missed or met, when the actual situation is reversed
- **Solution**
  - **Understand all of the server connections and volumes**

GoalTender Interval Report - Servers

View of Servers

Sorted by System/Server Class:

System	Server	Served	Count
SYSA	SERVERS	TRANHI	121,931
SYSA	SERVERS	TRANLO	186,674
SYSA	STCMD	TRANHI	44
SYSA	STCMD	TRANLO	102
Total			308,751

Sorted by System/Served Class:

System	Served	Server	Count
SYSA	TRANHI	SERVERS	121,931
SYSA	TRANHI	STCMD	44
SYSA	TRANLO	SERVERS	186,674
SYSA	TRANLO	STCMD	102
Total			308,751

Problem

- **What happened during the rest of the day?**
- **Solution**
  - **Use exception reporting**
  - **With GoalTender, we pick the exceptions, but user can modify them**
  - **Review this daily**

Missed Goals Report – By Time

```
17Feb2004 15:14            Cheryl Watson's GoalTender                  Page    1
 V1R0                  Missed Goals Report - Analysis by Time
                       Sample Reports for SHARE Presentation

 Service Definition: STANDARD  Install Date: 17Dec2003:08:48:59  Description: Standard
    Definition
 Policy: STANDARD  Install Date: 17Dec2003:08:49:17  Description: Standard Policy

 Date: 17Dec2003

    10:45:00 (SUs Used=1228K, Duration=15:00, Missed=3, Score=5)
       G202E - PRDBATHI, Period=1, Imp=4, missed its system (SYS0) goal,
               PI=7.4, PCT=56.1%, Goal=15 sc Avg, Actual=112 sc Avg,
               Delay=Idle
       G202E - PRDBATMD, Period=1, Imp=4, missed its system (SYS0) goal,
               PI=3.3, PCT=28.9%, Goal=80% Vel, Actual=24% Vel,
               Delay=CPU
       G202E - TSOPRD, Period=2, Imp=5, missed its system (SYS0) goal,
               PI=18.7, PCT=3.3%, Goal=80% Vel, Actual=4% Vel,
               Delay=CPU
       G214W - PRDBATHI, Period=1, Imp=4, averaged less than one ended
               transaction every two minutes, which may have caused the
               system (SYS0) goal to be missed.

    10:30:00 (SUs Used=1210K, Duration=14:59, Missed=3, Score=5)
       G202E - PRDBATHI, Period=1, Imp=4, missed its system (SYS0) goal,
               PI=8.0, PCT=54.1%, Goal=15 sc Avg, Actual=119 sc Avg,
               Delay=Idle
```


Missed Goals Report – By Importance

```
17Feb2004 15:14            Cheryl Watson's GoalTender                  Page    6
 V1R0                  Missed Goals Report - Analysis by Importance
                          Sample Reports for SHARE Presentation

 Service Definition: STANDARD  Install Date: 17Dec2003:08:48:59  Description:
    Standard Definition
 Policy: STANDARD  Install Date: 17Dec2003:08:49:17  Description: Standard
    Policy

 G200E - Imp=3 Missed Goals Sysplex Wide
    HOTBATCH 17Dec2003:09:45:00 Period=1, PI=1.2, PCT=2.8%,
             Goal=50% Vel, Actual=41% Vel, Delay=CPU
    Number missed in this group: 1 (1.8% of total)

 G200E - Imp=4 Missed Goals Sysplex Wide
    TSOPRD   17Dec2003:09:30:00 Period=1, PI=****, PCT=1.0%,
             Goal=80% in 200 ms, Actual=56% in 200 ms, Delay=Idle
    TSOPRD   17Dec2003:09:15:00 Period=1, PI=****, PCT=1.0%,
             Goal=80% in 200 ms, Actual=62% in 200 ms, Delay=Idle
    PRDBATHI 17Dec2003:09:45:00 Period=1, PI=17.5, PCT=57.9%,
             Goal=15 sc Avg, Actual=263 sc Avg, Delay=Idle
    PRDBATHI 17Dec2003:09:30:00 Period=1, PI=8.9, PCT=62.6%,
             Goal=15 sc Avg, Actual=133 sc Avg, Delay=Idle
```

Problem

- **Service Definition Management**
  - Sysprogs don't know about any service definition but the active definition
  - Service Definition report is too bulky
- **Solution**
  - **Keep complete service definitions on database and be able to print them as needed**
  - **Have slimmer print format**

Problem

- **Education**
  - New people in systems programming
  - Not everyone gets to go to SHARE and classes
  - Current staff may not know what to look for
  - Training budget has been cut
- **Solution**
  - **Let us do the analysis and provide the recommendations**

Service Definition Report

- Concise listing of entire service definition
- Recommendations made using 'best practices', including the reasons for the recommendations
- Service classes sorted by both importance and name
- Additional sections not shown here – application environments, scheduling environments, scheduling resources
- Can be produced for historical policies (yesterday, last month)

Service Definition Report – 1

```
17Feb2004 15:14           Cheryl Watson's GoalTender                Page  20
 V1R0                 Service Definition Report with Advice
                      Sample Reports for SHARE Presentation

 Service Definition: STANDARD Install Date: 17Dec2003:08:48:59
     Description: Standard Definition

     6 workloads
     21 service classes
     23 periods; 18 service class periods with response or velocity goals
     1 resource groups
     1 service policies
     13 classification groups
     17 subsystem types
     27 report classes
     0 application environments
     0 scheduling environments
     0 scheduling resources

     CPU = 1.0
     IOC = 0.1
     MSO = 0.0
     SRB = 1.0
     I/O Management is YES
     Dynamic Alias Management is NO

 Notepad:

    This Quickstart policy was created by Cheryl Watson of              00000100
    Watson & Walker.  This updated version was created in               00000200
    April of 2003.  A description of this policy can be                 00000201
    found at <http://www.watsonwalker.com>.                             00000210
```

Service Definition Report - 2

```
Service Policies:

    Base:     STANDARD - Standard Policy
********************************************************************************
Workloads:

    Workload  Service Classes
        Workload Description

    NEWWORK   NEWWORK, NEWWORKV
        New Workloads
    ONLINE    ONLPRD, TRANHI, TRANLO, ONLTST, SERVERS
        Online Workloads
    PRDBAT    HOTBATCH, PRDBATHI, PRDBATMD, PRDBATLO
        Production Batch
    STC       STCLO, STCMD, KILLIT
        Started Tasks
    SYSTEM    SYSTEM, SYSSTC, SYSOTHER
        (WLM Internal)
    TSO       TSOPRD
        TSO Users
    TSTBAT    TSTBATHI, TSTBATLO, TSTBATMD
        Test Batch
********************************************************************************
Resource Groups:

    Group     Limits               Resource Description

    KILLIT    Min=None, Max=1      Logical Swapout for Non-Swap
        Used by service classes: KILLIT
```


Service Definition Report - 3

Service Classes (in Name Sequence):

```
    Service  Per Imp   Dur  Goal               CPU  Workload  Svc Class Description
    Class                                      Crit

    HOTBATCH  1   3         Velocity=50              PRDBAT    Hot Batch
    KILLIT    1  (6)        Discretionary            STC       Logical swapout for non-swap
        In KILLIT Resource Group, Min=None, Max=1
    NEWWORK   1   3    500  80% within 500 ms        NEWWORK   New Work on System
*1            2   4         Velocity=20              NEWWORK   New Work on System
*1  NEWWORKV  1   3         Velocity=20              NEWWORK   New Work on System (Velocity)
    ONLPRD    1   1         Velocity=50              ONLINE    Online Production Regions
*1  ONLTST    1   5         Velocity=10              ONLINE    Online Test Regions
*2  PRDBATHI  1   4         Avg 15 sec               PRDBAT    Production Batch High
    PRDBATLO  1  (6)        Discretionary            PRDBAT    Production Batch Low
*3  PRDBATMD  1   4         Velocity=80              PRDBAT    Production Batch Medium
*4  SERVERS   1   1         Velocity=70              ONLINE    Server Address Spaces
    STCLO     1  (6)        Discretionary            STC       STC Low
    STCMD     1   3         Velocity=40              STC       STC Medium
    SYSOTHER  1  (6)        Discretionary            SYSTEM    (WLM Internal)
    SYSSTC    1  (0)        Second highest DP        SYSTEM    (WLM Internal)
    SYSTEM    1  (0)        Highest DP               SYSTEM    (WLM Internal)
    TRANHI    1   1         80% within 500 ms        ONLINE    Online Transactions High
*5  TRANLO    1   3         50% within 10 min        ONLINE    Online Transactions Low
    TSOPRD    1   4    500  80% within 200 ms        TSO       TSO Production
              2   5         Velocity=80              TSO       TSO Production
    TSTBATHI  1   3         90% within 10 min        TSTBAT    Test Batch High
    TSTBATLO  1  (6)        Discretionary            TSTBAT    Test Batch Low
    TSTBATMD  1   4         80% within 30 min        TSTBAT    Test Batch Medium
```

Service Definition Report - 4

Service Classes (in Importance Sequence):

Service Class	Per	Imp	Dur	Goal	CPU Crit	Workload	Svc Class Description
SYSTEM	1	(0)		Highest DP		SYSTEM	(WLM Internal)
SYSSTC	1	(0)		Second highest DP		SYSTEM	(WLM Internal)
ONLPRD	1	1		Velocity=50		ONLINE	Online Production Regions
SERVERS	1	1		Velocity=70		ONLINE	Server Address Spaces
TRANHI	1	1		80% within 500 ms		ONLINE	Online Transactions High
HOTBATCH	1	3		Velocity=50		PRDBAT	Hot Batch
NEWWORK	1	3	500	80% within 500 ms		NEWWORK	New Work on System
NEWWORKV	1	3		Velocity=20		NEWWORK	New Work on System (Velocity)
STCMD	1	3		Velocity=40		STC	STC Medium
TRANLO	1	3		50% within 10 min		ONLINE	Online Transactions Low
TSTBATHI	1	3		90% within 10 min		TSTBAT	Test Batch High
NEWWORK	2	4		Velocity=20		NEWWORK	New Work on System
PRDBATHI	1	4		Avg 15 sec		PRDBAT	Production Batch High
PRDBATMD	1	4		Velocity=80		PRDBAT	Production Batch Medium
TSOPRD	1	4	500	80% within 200 ms		TSO	TSO Production
TSTBATMD	1	4		80% within 30 min		TSTBAT	Test Batch Medium
ONLTST	1	5		Velocity=10		ONLINE	Online Test Regions
TSOPRD	2	5		Velocity=80		TSO	TSO Production
KILLIT	1	(6)		Discretionary		STC	Logical swapout for non-swap
In KILLIT Resource Group, Min=None, Max=1							
PRDBATLO	1	(6)		Discretionary		PRDBAT	Production Batch Low
STCLO	1	(6)		Discretionary		STC	STC Low
SYSOTHER	1	(6)		Discretionary		SYSTEM	(WLM Internal)
TSTBATLO	1	(6)		Discretionary		TSTBAT	Test Batch Low

Service Definition Report - 5

Classification Groups:

Group Name	Type	Description	Contents and Description
MONITORS	TNG	Monitor Products	
		RMF*	RMF
		OMON*	Omegamon
		NETV*	NetView
		TMON*	TMON Products
		CMF*	CMF
		CA*	CA Monitors
		SDSF	SDSF
ONLPRD	TNG	Online Production Regions	
		DSN*	DB2 Production Regions
		ADABAS*	ADABAS
		IDMS*	IDMS
		ORA*	(If not using OSDI subsystem)
		*DIST	(If not using DDF subsystem)
		MQ*	(If not using MQ subsystem)
ONLTST	TNG	Online Test Regions	
		CICST*	CICS Testing
		IMST*	IMS Testing
		DB2T*	DB2 Testing

Service Definition Report - 6

```
PRDBATHI     TCG    Production Batch High
                        A        (Replace these with the job
                        B        classes assigned to your high
                        C        priority production jobs)
PRDBATLO     TCG    Production Batch Low
                        G        (Replace these with the job
                        H        classes assigned to your low
                        I        priority production jobs)
PRDBATMD     TCG    Production Batch Medium
                        D        (Replace these with the job
                        E        classes assigned to your medium
                        F        priority production jobs)
SERVERS      TNG    Server Address Spaces
                        CICS4*   CICS
                        CICSTS*  CICS
                        IMS5*    IMS
                        IMS6*    IMS
                        IMS7*    IMS
                        *DIST    (If using DDF subsystem)
                        ORA*     (If using OSDI subsystem)
                        MQ*      (If using MQ subsystem)
```


Service Definition Report - 7

```
STCHI        TNG    High Priority STCs
                        ASCH     ASCH
                        APPC     APPC/MVS
                        AOPS*    Automated Operations Products
                        DLF      DLF
                        IRLM     IRLM
                        JES*     JES2 / JES3
                        LLA      LLA
                        MIM      MIM
                        NPM      NPM
                        OMVS     OMVS Kernel
                        PCAUTH   PCAUTH Address Space
                        RACF     (Or ACF2 or Top Secret)
                        SMS      DFSMS
                        SYSBMAS  SYSBMAS
                        TRACE    System Trace
                        TSO      TCAS
                        VLF      VLF
                        VTAM     VTAM
                        NFS*     NFS
                        CB*      WebSphere
                        JES2AUX  JES2AUX
                        ANTMAIN  ANTMAIN
                        ANTAS000 ANTAS000
```

Service Definition Report – 8

```
STCMD       TNG   Medium Priority STCs
                      SCHED*   Your Scheduler Program
                      SPOOL*   Your Spooler Programs
                      PRINT*   Your Spooler Programs
                      OPS_JOBS Your Important Operations Work
                      OMVSD*   OMVS Daemons
TRANCIC     TNG   Important CICS Transactions
                      IMPCICA  (Replace these with the
                      IMPCICB  names of your important
                      IMPCICC  CICS transactions)
TRANIMS     TCG   Important IMS Transactions
                      ITRANA   (Replace these with the
                      ITRANB   transaction names of your
                      ITRANC   important IMS transactions)
TSTBATHI    TCG   Test Batch High
                      R        (Replace these with the job
                      S        classes assigned to your high
                      T        priority test jobs)
TSTBATMD    TCG   Test Batch Medium
                      U        (Replace these with the job
                      V        classes assigned to your medium
                      W        priority test jobs)
```


Service Definition Report – 9a

Subsystem Classification Rules:

Subsys	Level/Rule	Start	Service Class	Report Class	Reg/ Tran	Stor Crit	Subsystem Description Rule Description
ASCH	Default		NEWWORK	RASCH			APPC/MVS Users
CB	Default		NEWWORK	RCB			WebSphere Transactions
CICS	Default		TRANLO	RCICS			CICS Workload
	1 SI CICSP*		TRANHI	RCICS	TRAN		CICS Region Name
	1 TNG TRANCIC		TRANHI	RCICS	TRAN		CICS Transaction Name
DB2	Default		NEWWORK	RDB2SQ			DB2 Sysplex Queries
DDF	Default		NEWWORK	RDDF			DB2 Distributed Transactions
IMS	Default		TRANLO	RIMS			IMS Workload
	1 SI IMSP*		TRANHI	RIMS	TRAN		IMS Subsystem Name
	1 TCG TRANIMS		TRANHI	RIMS	TRAN		IMS Transaction Classes
IWEB	Default		NEWWORK	RIWEB			Web Server Transactions
JES	Default		TSTBATLO	RTBATLO			Batch Jobs
	1 TCG PRDBATHI		PRDBATHI	RPBATHI	TRAN		High Prod Job Classes
	1 TCG PRDBATMD		PRDBATMD	RPBATMD	TRAN		Medium Prod Job Classes
	1 TCG PRDBATLO		PRDBATLO	RPBATLO	TRAN		Low Production Job Classes
	1 TCG TSTBATHI		TSTBATHI	RTBATHI	TRAN		High Test Job Classes
	1 TCG TSTBATMD		TSTBATMD	RTBATMD	TRAN		Medium Test Job Classes

Service Definition Report – 9b

Subsystem Classification Rules:

Subsys	Level/Rule	Start	Service Class	Report Class	Reg/ Tran	Stor Crit	Subsystem Description Rule Description
LSFM	Default		NEWWORKV	RLSFM			Lan Server for MVS
MQ	Default		NEWWORKV	RMQ			MQSeries
NETV	Default		NEWWORKV	RNETV			NetView
OMVS	Default		NEWWORK	ROMVS			OpenEdition MVS/UNIX
OSDI	Default		NEWWORK	ROSDI			Oracle
SAP	Default		NEWWORK	RSAP			SAP R/3
SOM	Default		NEWWORKV	RSOM			System Object Model
STC	Default		STCLO	RSTC			Started Tasks
	1 TN	GRS	SYSTEM	RGRS	TRAN		GRS Address Space
	1 TN	CATALOG	SYSTEM	RCATALOG	TRAN		Catalog Address Space
	1 SPM	SYSSTC	SYSSTC	RSTC	TRAN		System Tasks
	1 SPM	SYSTEM	SYSTEM	RSTC	TRAN		System Tasks
	1 TNG	STCHI	SYSSTC	RSTC			High Priority STCs
	1 TNG	STCMD	STCMD	RSTC			Medium Priority STCs
	1 TNG	SERVERS	SERVERS	RONLINE	TRAN		Server Address Spaces
	1 TNG	MONITORS	SYSSTC	RMONITOR			Monitor Products
	1 TNG	ONLPRD	ONLPRD	RONLINE			Online Production Regions
	1 TNG	ONLTST	ONLTST	RONLINE			Online Test Regions
TSO	Default		TSOPRD	RTSO			TSO Users

Service Definition Report – 10

Cross Reference:

	Service Class	Subsys	Report Class	Report Class Description
	NEWWORK	ASCH	RASCH	APPC/MVS Users
		CB	RCB	WebSphere Transactions
		DB2	RDB2SQ	DB2 Sysplex Queries
		DDF	RDDF	DB2 Distributed Transactions
		IWEB	RIWEB	Web Server Transactions
		OMVS	ROMVS	OpenEdition MVS/UNIX
		OSDI	ROSDI	Oracle
		SAP	RSAP	SAP R/3
	NEWWORKV	LSFM	RLSFM	Lan Server for MVS
		MQ	RMQ	MQSeries
		NETV	RNETV	NetView
		SOM	RSOM	System Object Model
*6	ONLPRD	STC	RONLINE	Online Systems
*6	ONLTST	STC	RONLINE	Online Systems
	PRDBATHI	JES	RPBATHI	Batch Production High
	PRDBATLO	JES	RPBATLO	Batch Production Low
	PRDBATMD	JES	RPBATMD	Batch Production Medium
*6	SERVERS	STC	RONLINE	Online Systems
*6	STCLO	STC	RSTC	Started Tasks
*6	STCMD	STC	RSTC	Started Tasks
	SYSSTC	STC	RMONITOR	Monitor Products
*6		STC	RSTC	Started Tasks
	SYSTEM	STC	RCATALOG	Catalog Address Space
		STC	RGRS	GRS Address Space
*6		STC	RSTC	Started Tasks
*6	TRANHI	CICS	RCICS	CICS Transactions
*6		IMS	RIMS	IMS Transactions
*6	TRANLO	CICS	RCICS	CICS Transactions
*6		IMS	RIMS	IMS Transactions
	TSOPRD	TSO	RTSO	TSO Users
	TSTBATHI	JES	RTBATHI	Batch Test High
	TSTBATLO	JES	RTBATLO	Batch Test Low
	TSTBATMD	JES	RTBATMD	Batch Test Medium

Service Definition Report – 11

```
Service Definition Advice:

    (None)

Service Class Advice (Base):

    *1  G113I - If work in this period exceeds its goal, discretionary
                work could run above it.
    *2  G106W - Percentile response time goals are much more effective
                than average response time goals.
    *3  G111I - The specified batch velocity goal seems to be unreasonably
                large.
    *4  G136I - The specified STC velocity goal seems to be unreasonably
                high.
    *5  G108I - The response time goal specified for IMS work seems
                to be unreasonably large.

Service Class Advice (Override):

    (None)

Subsystem Classification Rules Advice:

    (None)

Report Class Advice:

    *6  G116E - Multiple service classes are assigned to the same report
                class, which may limit your ability to analyze goals.

Summary of Advice Recommendations:

    4 Informational Messages Issued
    1 Warning Messages Issued
    1 Critical Messages Issued
```


Service Definition Report - Advice

G106W - Percentile response time goals are much more effective than average response time goals.

Condition - An average response time goal was specified for a service class period.

Description - When you specify an average response time, WLM will attempt to assign resources in order to achieve the average response or turnaround time you've defined. The problem with an average response time is that a single long transaction or job can ruin the average. As an example, a test batch job that should get 10-minute turnaround could result in a turnaround of many hours if it was submitted to a class without an initiator. Having 20 jobs with 5-minute turnaround and one job with a 6-hour turnaround results in an average response time of 22 minutes, when over 95% of the jobs took less than 5 minutes.

When using average response time goals, it's quite possible for a few long transactions to skew the results. WLM may then go to extra work trying to compensate for the long work and actually give preferred service to other work in the same service class period while lower importance work misses its goals. Because of this, percentile response times provide more consistent management.

There is one major exception. You can allow CICSPlexSM to manage CICS transactions. CICSPlexSM can run in either goal mode or compat mode (its own terms, unrelated to WLM goal mode and compat mode). When in goal mode, CICSPlexSM requires that WLM goals for CICS service class periods use only average, not percentile, response time goals.

Also remember that in order to use any type of response goals, you need to have at least ten completions within twenty minutes; otherwise you're better off using a velocity goal,

Recommendation - We recommend that you replace the average response time goals with percentile response time goals. A percentile response time goal is specified as the percentage of transactions completing within a specified response time, such as 80% of first period TSO completing within .5 seconds. The percentile goals can be used for the same type of service classes that use average response times, but are easier to consistently meet because a few long transactions can't skew the results. If you have currently specified a goal with an average response time of 10 minutes, you can simply change the goal to 80% within 10 minutes. This is probably quite close to what you are currently experiencing. After running with this goal for an hour or so, you can review the PIs and response times to determine if a different setting would be closer to what users had been experiencing. (You will still be able to see the average response times in any online monitors.)

Tending to WLM

- Creating a service definition is not a one-time task
- As work changes, hardware changes, software changes (and even user habits change), WLM must be modified
- The good news – WLM produces lots of information to help you manage it
- The bad news – WLM produces lots of information to help you manage it
- Exception reporting is your only choice
- But what do you look for besides missed goals?

How GoalTender Works

- Product to accomplish all that automatically
- Designed to be run daily, but can be run as soon as problems occur (at end of RMF interval)
- Exception reporting where exceptions are determined by us, but modifiable by you
- Easy to read, summarized reports
- Provides historical database of service policies, including classification rules, application environments and scheduling resources
- Training guide for new WLM sysprogs
- Our best and most comprehensive advice

GoalTender Futures

- Detail analysis
  - Complete analysis with daily and weekly trends of a single service class, including recommendations
  - Specific analysis of CICS and IMS
  - Complete reporting of all RMF/CMF type 72 data, including summaries
- Download for spreadsheet graphs and user analysis
- More report formats on request
- More exceptions
- Additions to recommendations in User Guide

Questions?

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