

WLM

Performing a Cursory WLM Review



z/OS Performance
Education, Software, and
Managed Service Providers



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WLM High Level Analysis - 1

Performance Workshops Available

During these workshops you will be analyzing your own data!

- ❑ [WLM Performance and Re-evaluating of Goals](#)
 - ❑ Instructor: Peter Enrico
 - ❑ June 23 – 27, 2014 - Detroit, Michigan, USA
 - ❑ September 15 – 19, 2014 - Kansas City, Missouri, USA
- ❑ [Parallel Sysplex and z/OS Performance Tuning \(Web / Internet Based!\)](#)
 - ❑ Instructor: Peter Enrico
 - ❑ July 29 – 31, 2014 (Web)
 - ❑ August 19 – 21, 2014 (Web)
- ❑ [Essential z/OS Performance Tuning Workshop](#)
 - ❑ Instructors: Peter Enrico and Tom Beretvas
- ❑ [z/OS Capacity Planning and Performance Analysis](#)
 - Instructor: Ray Wicks



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Cookbook Approach to a WLM Analysis

□ High level steps for revisiting your WLM setup and service definition

- Step 1: Learn the basic concepts of WLM (and the oddities)
- Step 2: Inventory Your Managed Resources
- Step 3: Inventory System Workloads
- Step 4: Understand Current WLM Definition
- Step 5: Clean Up Your Service Definition
- Step 6: Learn How to Interpret WLM Measurements
- Step 7: Verify Properness of WLM Controls
- Step 8: Determine Effectiveness of Controls
- Step 9: Examine Workload Mixtures
- Step 10: Re-evaluate Assigned Goals and Importance
- Step 11: Explore Exploiting New Functions
- Step 12: Start to Tackle Those Difficult Issues



Presentation Overview

□ Please note that this is a multiple day presentation / discussion

□ Covered in this presentation

- Simplifying your WLM service definition by removing usage of NEWWORK service class.
- *Some* considerations for evaluating importance levels
- *Some* considerations for evaluating performance indexes
- *Some* considerations for evaluating response time goals

If extra time at end of session:

- *Some* considerations for evaluating multiple period service class durations

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Understanding Current WLM Service Definition

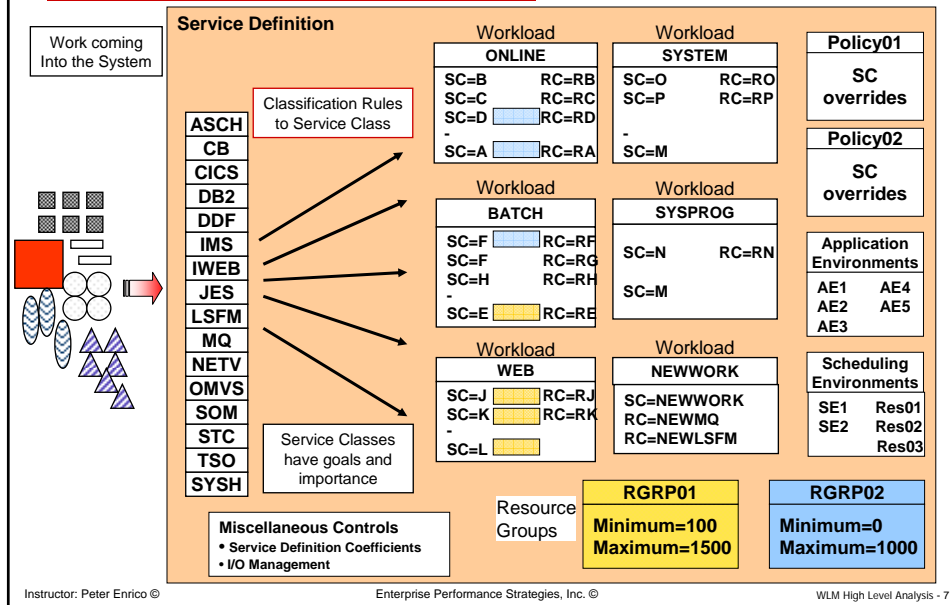
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Overview of WLM Service Definition



Clean up exercise : Remove unused subsystem types to simplify service definition

Workload Manager Service Definition

SYSPX1SD SYSPLEX1 Scripted: 2014-01-31.

Table of Contents

- [Service Definition PLEX1SD](#)
- [Overview](#)
- [Service Coefficients](#)
- [Service Definition Options](#)
- [Workload and Service Class Descriptions](#)
- [Report Classes](#)
- [Classification Rules](#)
- [ASCH: ASCH \(APPC\) Processing](#)
- [CB: Component Broker Processing](#)
- [CICS: CICS Transaction Processing](#)
- [DB2: DB2 Sysplex Query Processing](#)
- [DDF: Distributed DB2 Processing](#)
- [EWLM: Enterprise WLM Processing](#)
- [IMS: IMS Transaction Processing](#)
- [IWEB: HTTP Server Processing](#)
- [JES: Batch Processing](#)
- [LSFM: LAN Server Processing](#)
- [MQ: MQSeries Workflow Processing](#)
- [NETV: Netview Processing](#)
- [OMVS: UNIX Systems Service Processing](#)
- [SOM: SOM Processing](#)
- [STC: Started Task Processing](#)
- [SYSH: Non-z/OS Processing](#)

Chances are very high you are not running following WLM subsystems :

- DB2 (remote parallel SQL)
- EWLM
- LSFM
- MQ (MQSeries Workflow)
- SOM
- SYSH

Most also do not run:

- ASCH
- IWEB
- NETV

Yet they have rules and report classes defined for these subsystems.

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Old NEWWORK Service Class Methodology

- ❑ Old methodology of using 'NEWWORK' as the default service class for 'unused' subsystems is outdated in the year 2014
 - Many monitors have been updated to report where all work is classified.
- ❑ Old thinking: Even if some work is not running on your system; still should ensure it is identified and classified
- ❑ Old solution: Create a NEWWORK service class
 - Assign a discretionary goal (certainly not a multiple period service class)
 - Assign a default service class for every new/unused subsystem type
 - ❑ Go into WLM application, classification rules, and make sure the list shown there matches what the IBM manuals say are available
 - If not, add the new subsystem type
 - ❑ For any subsystem type with new service class defined, assign NEWWORK service class
 - Assign unique default report class for that subsystem
 - ❑ Now new work can be identified and managed easier
 - ❑ Example: LSFM subsystem type
 - Default service class: NEWWORK
 - Default report class: NEWLSFM

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Example of NEWWORK Classification

- ❑ Installation then use NEWWORK to classify work they will most likely never see

LSFM: LAN Server Processing

Level	Qualifier Type	Qualifier Name	Starting Position	LSFM Service Class	LSFM Report Class
		Default		NEWWORK	R_LSFM

Level	Qualifier Type	Qualifier Name	Description	Stor. Crit.	Mgmt. Goals
-------	----------------	----------------	-------------	-------------	-------------

MQ: MQSeries Workflow Processing

Level	Qualifier Type	Qualifier Name	Starting Position	MQ Service Class	MQ Report Class
		Default		NEWWORK	R_MQ

Level	Qualifier Type	Qualifier Name	Description	Stor. Crit.	Mgmt. Goals
-------	----------------	----------------	-------------	-------------	-------------

NETV: Netview Processing

Level	Qualifier Type	Qualifier Name	Starting Position	NETV Service Class	NETV Report Class
		Default		NEWWORK	R_NETV

Level	Qualifier Type	Qualifier Name	Description	Stor. Crit.	Mgmt. Goals
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New and Old way

❑ Old way

- Use NEWWORK to allow all possible unused subsystem type work to be classified
 - ❑ This way the work gets still gets management.
- Some installations even have NEWWORK set to multiple period service class with something other than discretionary goal
- Logic
 - ❑ If work goes to NEWWORK, then known WLM subsystem type, so go to associated report class to figure out what the work is.
 - ❑ If anything in SYSOTHER than not a defined subsystem type

❑ New Way

- Just let any new work for a subsystem not defined to go to SYSOTHER
 - ❑ Avoids NEWWORK service class and associated report classes
- Just check if anything in SYSOTHER (discretionary goal)
 - ❑ If yes, just check all your monitors what that work is to correct.

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Ensure Only Active Subsystem Types Are Defined

❑ Recommendation: Make sure only active subsystem types are defined

- It makes for a simpler service definition
- Work that exists for a subsystem type not used goes to SYSOTHER
 - ❑ So monitor SYSOTHER to make sure it is always void of activity
 - ❑ If not, then figure out the new type of work and add the necessary subsystem type and classification
 - ❑ All monitors and SDSF and other products will tell you what is in SYSOTHER

```
Subsystem-Type  View  Notes  Options  Help
-----
Subsystem Type Selection List for Rules      Row 1 to 11 of 11
Command ==>

Action Codes: 1=Create, 2=Copy, 3=Modify, 4=Browse, 5=Print, 6=Delete,
              /=Menu Bar

Action  Type      Description                      -----Class-----
-----
   —    CICS      CICS Transactions                  CICSTX
   —    DDF       All data_server requests          DDF
   —    JES       JES2 Batch                        BATCH
   —    OMVS      Unix Services                     OMVS
   —    STC       started Tasks                     STCLO
   —    TSO       Single service class              TSO
***** Bottom of data *****
```

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Quick Review of Importance Levels

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WLM Service Class Period Importance

- When there is not sufficient capacity to meet goals, WLM uses importance to prioritize work
 - Helps WLM to prioritize goal work relative to other goal work
 - WLM attempts to meet higher importance goals before trying to meet lower importance goals
- Importance is considered when work is not meeting their assigned goals
 - Higher importance work tends to receive resources to help it meet its goals
 - Lower importance work tends to have resources taken away before higher importance work
- All work assigned a velocity or response time goal is also assigned a relative importance level
 - 1 - highest
 - 2 - high
 - 3 - medium
 - 4 - low
 - 5 - lowest
 - SYSTEM & SYSSTC are more important than importance 1
 - Discretionary goals are less important than importance 5

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Importance Levels cont...

- There are 4 *primary* ways that WLM uses importance settings
 - Selecting a service class period to help
 - WLM attempts to meet higher importance goals before trying to meet lower importance goals
 - Selecting a service class period to take resources from
 - Determining if an action being considered has net value
 - WLM will not take from higher importance work to help lower importance work if the higher importance work is projected to miss its goals
 - There needs to be a net positive effect of all changes
 - Considered when CPU and storage critical controls are used
 - WLM considers importance when making tradeoffs to protect critical workloads
- Relative importance does not translate to relative CPU or I/O dispatch priorities
 - A higher importance goal could have a lower CPU dispatch priority than a lower importance goal
 - CPU Critical control does influence this
 - Lower importance work will never have same or high DP as work identified as CPU critical

Verifying Properness of WLM Controls

Importance Levels



Evaluating Importance Levels

- Some key objectives of this evaluation include the following:
 - Determine which importance levels are being used
 - Helpful to WLM if all 5 importance levels are used
 - Determine the amount of system resources being used by each of the importance levels
 - Example: CPU and Storage
 - Determine if there are opportunities for WLM to steal from lower importance service class periods to give to higher importance service class periods
 - Remember WLM can only steal from another period using the same resource
 - Determine if too much work at any importance level could cause WLM to make 'less than desirable' trade-offs at the same importance level.
- Determine if there is a feeder effect in your workloads
 - Generally speaking, certain types of work depend on other types of to run effectively
 - Example: IRLM -> DB2 -> CICS
 - Make sure you consider this when setting importance

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Evaluating Importance Levels cont...

- Some key objectives of this evaluation include the following:
 - Determine if the resource consumption is dominated by importance levels 1 and 2, and little work running in the lower importance levels
 - This might show few periods to steal from to help high importance work
 - Are importance levels correctly being used to prioritize work to WLM?
 - Or do they specify business importance to satisfy management and the users?

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Importance Level Questions

- ❑ For each system, evaluate the number of active periods at each importance level
- ❑ For each system, evaluate the relative amount to CPU used at each importance level
- ❑ For importance level 1 work, if on any system there are more than 3 to 4 active periods or the collection of importance 1 work is using a sizable amount of CPU (relative to other work on that system), is there anything that can be separated out and moved to a lower importance level?
 - A question to ask is 'If WLM had to make a choice between two importance level 1 items of work, which one would you want WLM to give service to before the giving service to the other?'
- ❑ Ask the same questions for importance level 2
- ❑ Ask the same questions for importance level 3
- ❑ What work would you want WLM to take from first? Is this work correctly identified as lower importance work?

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Importance Level 1 Classes

- ❑ Examine WLM service definition for the way the importance levels are used

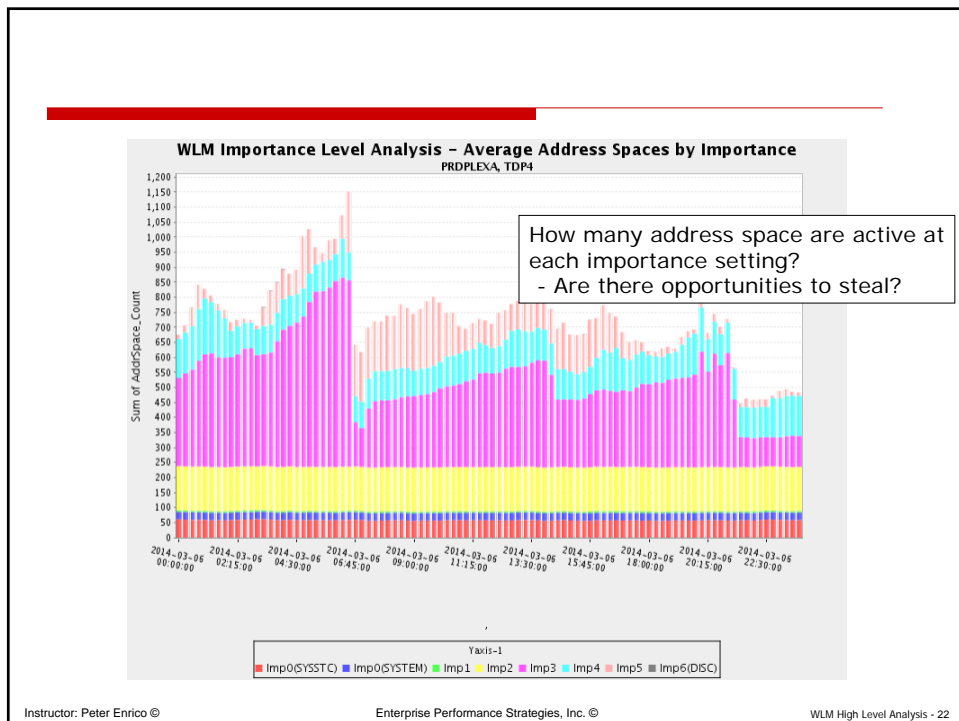
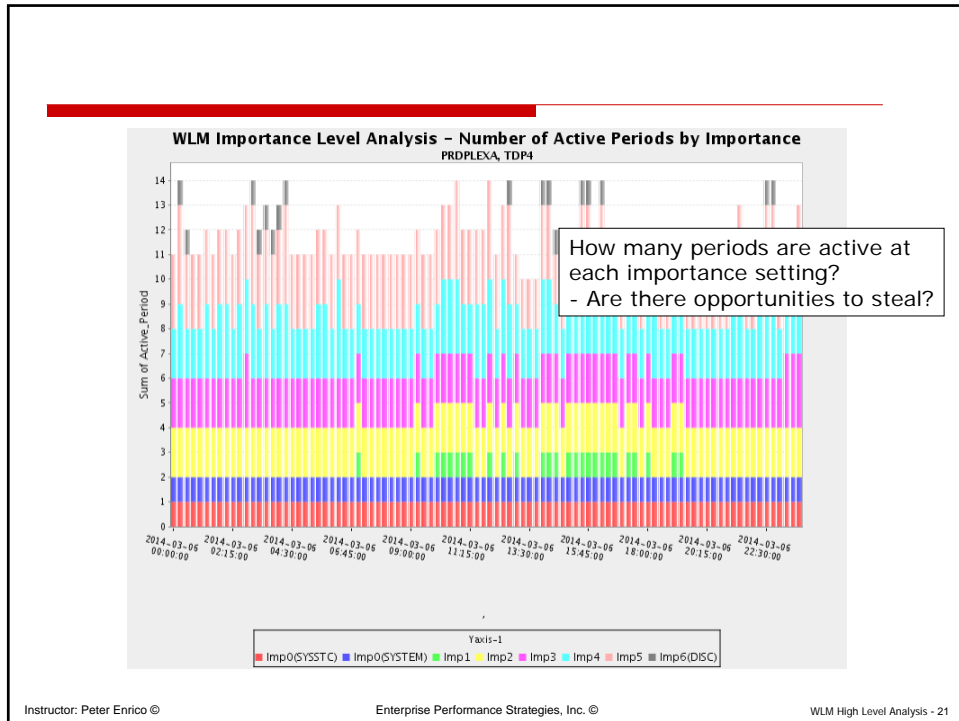
Service Class	Workload	Per	Duration	Imp	Goal
BATCH05	BATCH	1		1	Velocity 60
CICS	ONLINES	1		1	Velocity 60
CICSQA	ONLINES	1		1	Velocity 25
DDFBOBJ	DB2	1	6000	1	Avg 00:00:11.000
DDFBOBJ	DB2	2	2500000	1	Avg 00:03:00.000
DDFDBS	DB2	1	2500	1	80% 00:00:00.300
DDFDBS	DB2	2		1	Velocity 35
DDFDEF	DB2	1	2500	1	80% 00:00:00.400
DDFWTF	DB2	1	2500	1	80% 00:00:00.180
DDFWTF	DB2	2		1	Velocity 55
DDFWTFQ	DB2	1	2500	1	80% 00:00:00.500
DDFWTFWF	DB2	1	2500	1	80% 00:00:00.200
DDFWTFWF	DB2	2		1	Velocity 55
DDFLDPRA	DB2	1	2500	1	80% 00:00:00.300
DDFLDPRA	DB2	2		1	Velocity 35
DDFLNG	DB2	1	4000	1	80% 00:00:01.000
DDFLNG	DB2	2		1	Velocity 60
DDFSRV	DB2	1	2500	1	80% 00:00:00.300
DDFSRV	DB2	2		1	Velocity 35
DDFTDEVQ	DB2	1	4000	1	80% 00:00:00.500
OMVS	OMVS	1		1	Velocity 70
STCCNTL	STC	1		1	Velocity 50
STCHI	STC	1		1	Velocity 30
STCH3	STC	1		1	Velocity 10
STCH6	STC	1		1	Velocity 50
STCSERV	STC	1		1	Velocity 45
STPDEF	ONLINES	1	10000	1	Avg 00:00:00.500
TSO	TSO	1	2000	1	80% 00:00:00.200
TSOPRIV	TSO	1	500	1	80% 00:00:00.100
TSOPRIV	TSO	2		1	Velocity 60
WSTHI	ONLINES	1		1	90% 00:00:02.000
WSTMD	ONLINES	1		1	Velocity 40

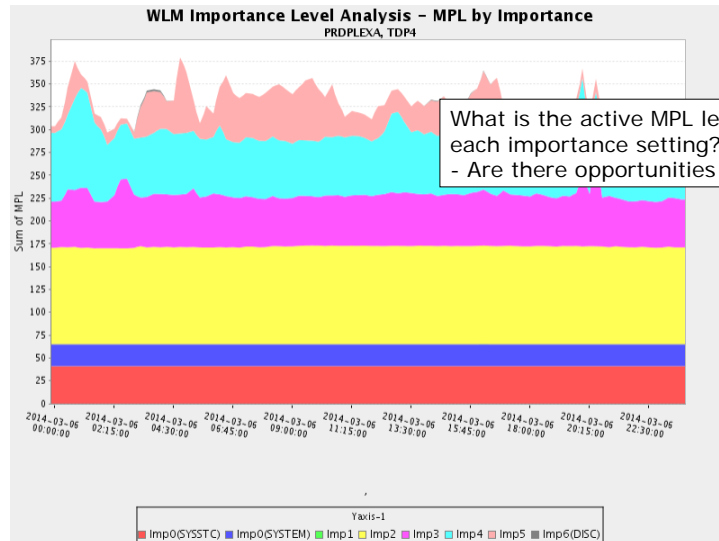
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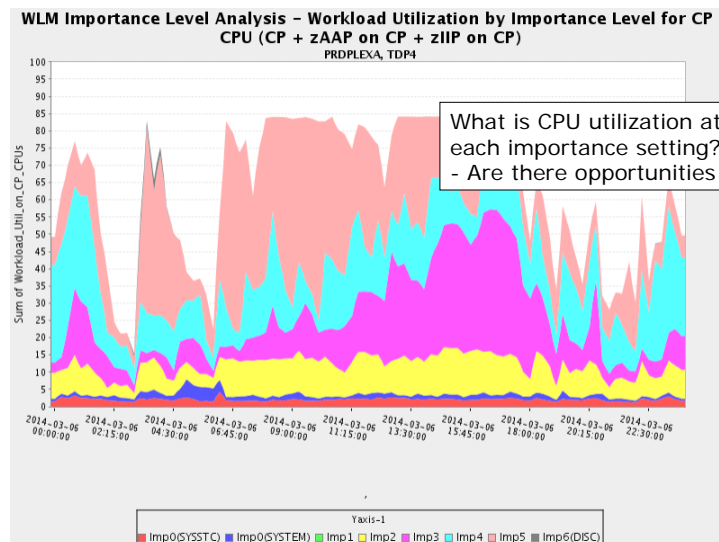


What is the active MPL level at each importance setting?
- Are there opportunities to steal?

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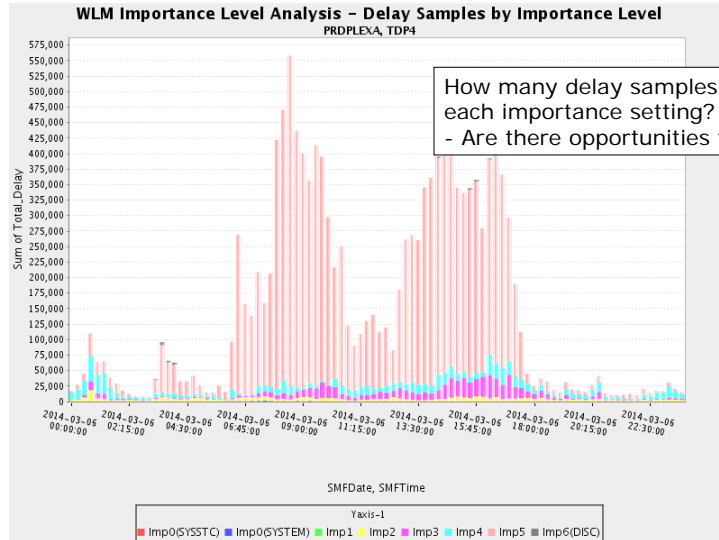


What is CPU utilization at each importance setting?
- Are there opportunities to steal?

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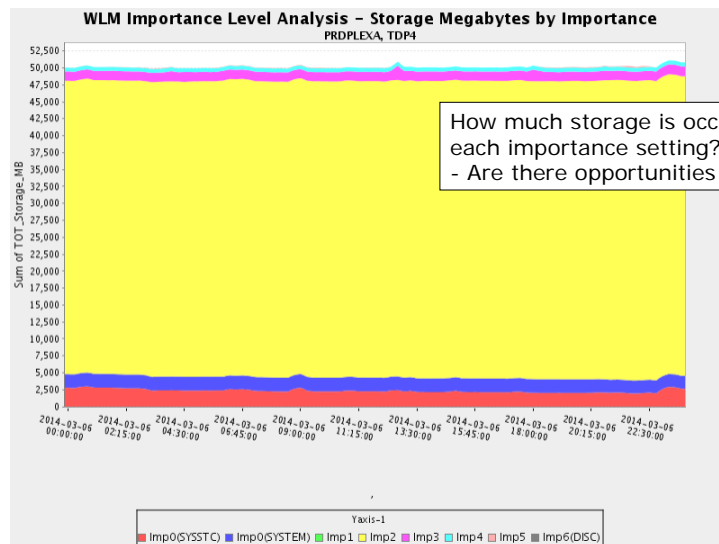


How many delay samples at each importance setting?
- Are there opportunities to donate?

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How much storage is occupied at each importance setting?
- Are there opportunities to steal?

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Quick Review of Performance Indexes

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Performance Index (AKA PI)

- During Policy Adjustment summarization WLM calculates the PI for every service class period
 - PI is an indicator of how well a service class period is achieving its goal
 - Allows for comparison of unlike goals for unlike work
- $PI < 1$ indicates that a goal is being exceeded
 - example: $PI = .5$ means that work is achieving twice goal
- $PI = 1$ indicates that a goal is exactly being met
- $PI > 1$ indicates that a goal is being missed
 - example: $PI = 3$ means goal is being missed by 3 times

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Performance Index (PI) Formulas

- Average Response Time goal periods

$$\text{Average RT Goal PI} = \frac{\text{Actual Average Response Time}}{\text{Average Response Time Goal}}$$
- Velocity goal periods

$$\text{Velocity Goal PI} = \frac{\text{Velocity Goal \%}}{\text{Actual Velocity Achieved}}$$
- Percentile Response Time goal periods

$$\text{Percentile RT Goal PI} = \frac{\text{Actual RT at Percentile}}{\text{Response Time Goal at Percentile}}$$
- Discretionary goal periods
 - Always have PI of .81

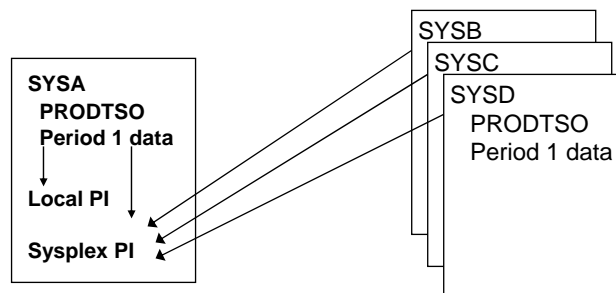
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Local PI vs Sysplex PI

- Each local system calculates two Performance Indexes for each goal period
 - Local PI
 - Indicates how well goal period is doing on local z/OS image
 - Based on goal period data just from local z/OS image
 - Sysplex PI
 - Indicates how well goal period is doing globally throughout the sysplex
 - Based on period data from all z/OS images in goal mode in sysplex



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Verifying Properness of WLM Controls

Performance Indexes

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Evaluating Goals (in General) via PIs

- Some key objectives of this evaluation include the following:
 - Are any goals too easy?
 - Are any goals too difficult?

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Performance Index Questions

- ❑ What are the achieved performance indexes for importance 1 periods?
- ❑ What are the achieved performance indexes for importance 2 periods?
- ❑ What are the achieved performance indexes for importance 3 periods?
- ❑ What are the achieved performance indexes for importance 4 periods?
- ❑ What are the achieved performance indexes for importance 5 periods?

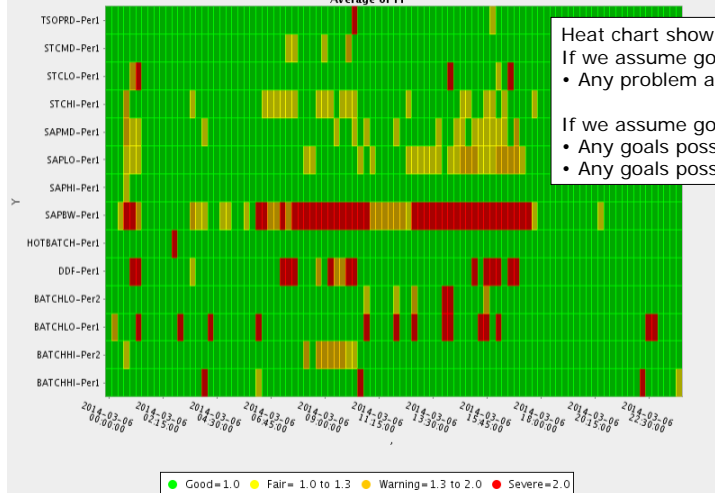
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WLM PI Analysis – PI Heat Chart for Service Class Periods

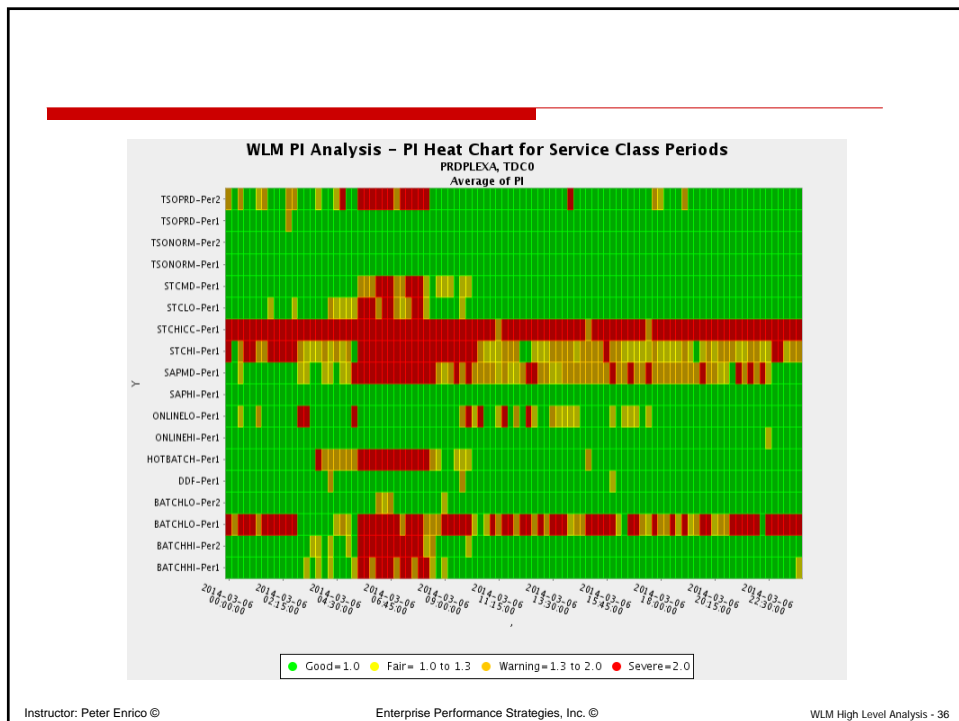
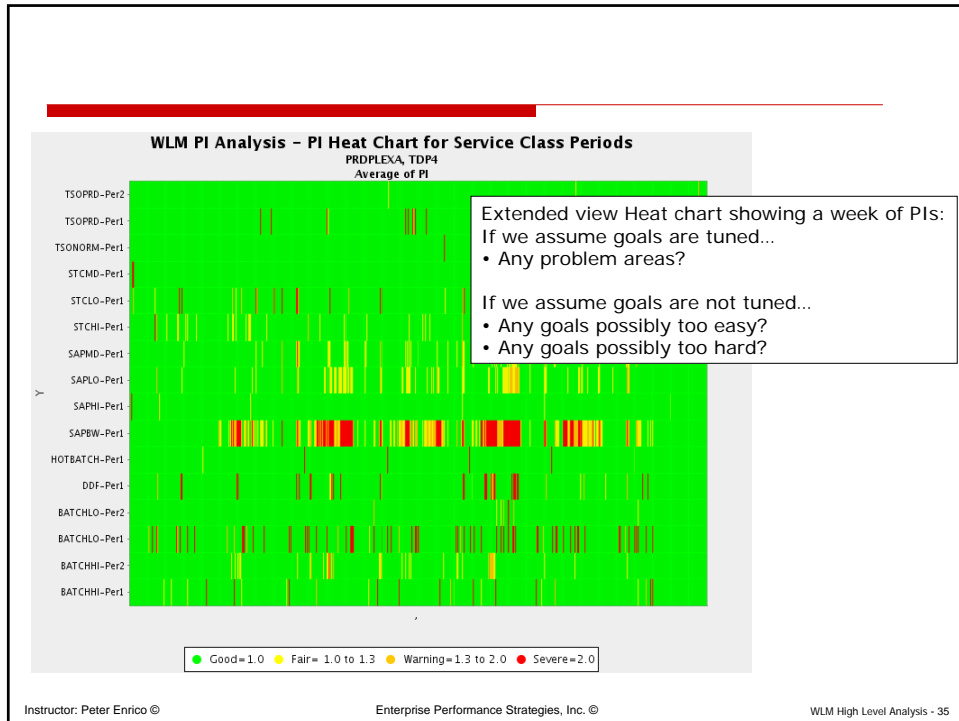
PRDPLEXA, TDP4
Average of PI

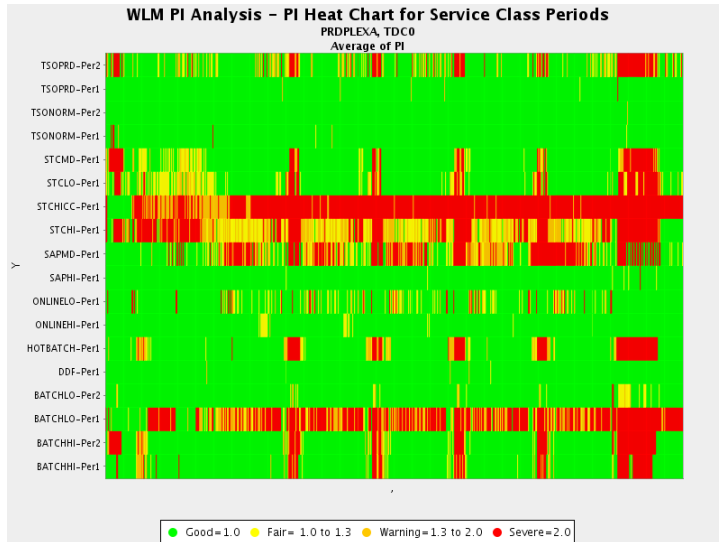


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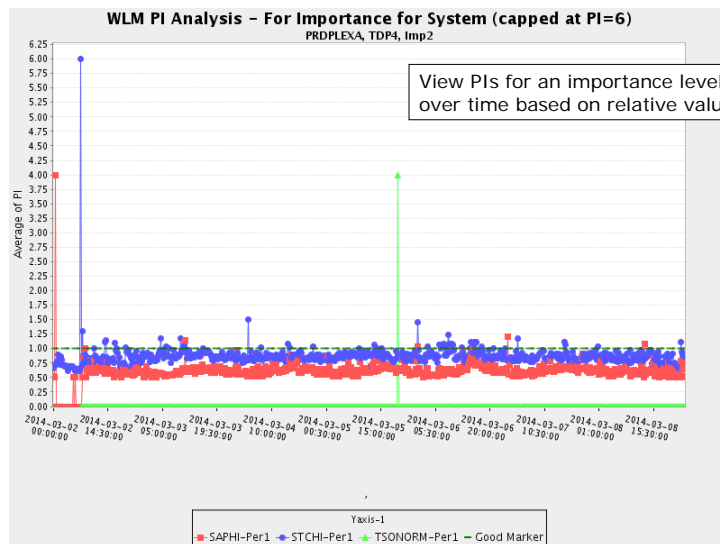




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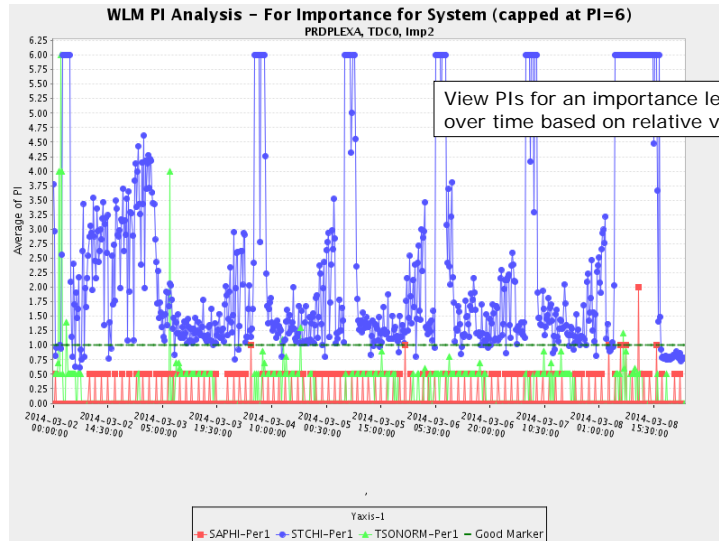
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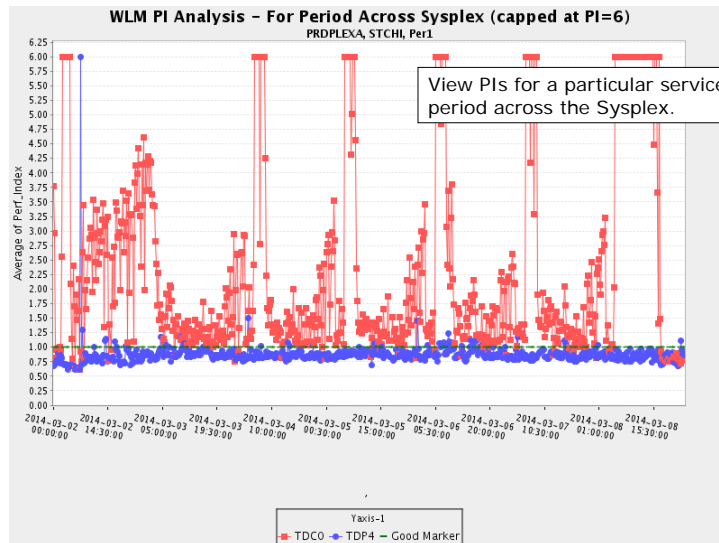
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Quick Review of Response Time Goals

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Understanding WLM's Response Time Distributions

- WLM maintains a response time distribution for periods assigned a response time goal
 - Distribution compose of 14 buckets
 - Each bucket represents a count of transactions that completed within a certain percentage of the assigned goal value
 - Examples:
 - Bucket 4 represents count of all transactions completing between 70% and 80% of the goal value
 - Bucket 6 represents count of all transactions completing between 90% and exactly the goal value
 - Bucket 12 represents count of all transactions that complete between 1.5 and twice the goal value
 - Bucket 13 represents count of all transactions that complete between twice and 4 times goal value

Bucket	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Width	<=50%	60%	70%	80%	90%	100%	110%	120%	130%	140%	150%	200%	400%	>400%
Transaction Count	0	85	240	365	260	100	50	20	25	20	25	0	0	0

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Understanding WLM's Response Time Distributions

Items to note:

- Response time distribution only exists for periods with response time goals
- The value of each bucket is dependent on the goal
 - The below example is a distribution for a 2 second response time goal
- Buckets 1 and 14 are unique in that they can contain *outlier* transactions
 - We never know the precise time range that the transactions completed
 - Example: Bucket 14 could contain transactions that completed in 5x, 10x, or 100x the goal value
- Response time distribution data is reported by the performance monitors

Bucket	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Width	<=50%	60%	70%	80%	90%	100%	110%	120%	130%	140%	150%	200%	400%	>400%
Value	<=1sec	1.2sec	1.4sec	1.6sec	1.8sec	2sec	2.2sec	2.4sec	2.6sec	2.8sec	3sec	4sec	8sec	>8sec
Trans Count	0	85	240	365	260	100	50	20	25	20	25	0	0	0

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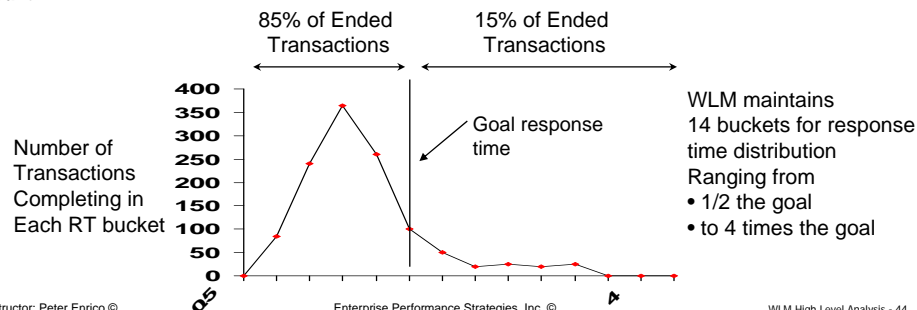
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Percentile Response Time Goals

Percentile of ended transactions that need to complete within a particular response time desired

- Reduces the influence of outlier transactions
 - Example: 85% of transactions (or better) to complete within a given response time
 - Measure response time of all completed transactions and drop highest 15%

Bucket	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Width	<=50%	60%	70%	80%	90%	100%	110%	120%	130%	140%	150%	200%	400%	>400%
Trans Count	0	85	240	365	260	100	50	20	25	20	25	0	0	0



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Verifying Properness of WLM Controls

Response Time Goals

Evaluating Response Time Goal Periods

- Some key objectives of this evaluation include the following:
 - Making sure all response time goals are percentile response time goals
 - Percentile goals are less sensitive to outlier transactions
 - Ensure the work assigned a response time goal is response time oriented
 - Response time goals are best for work running 20 seconds or less
 - Verify that during times that matter, there is enough work in a response time goal period to warrant a response time goal
 - If too few transactions or consume too little resource then may need to consolidate this response time goal period with another



Evaluating Response Time Goal Periods cont...

- Some key objectives of this evaluation include the following:
 - Evaluate the response time goal value
 - Where do the PIs hover? Between 0.5 and 1.2 is usually OK
 - Evaluate the percentile assigned to the response time goal
 - Remember that percentile represents transactions to meet goal
 - Determine the regular pattern of the response time distribution.
 - Determine if the goal is too easy or too hard.
- Evaluate both percentile and response time
 - Peter Enrico preference : Avoid percentiles of 96% or higher
 - Better to lower the response time value

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Response Time Goal Classes

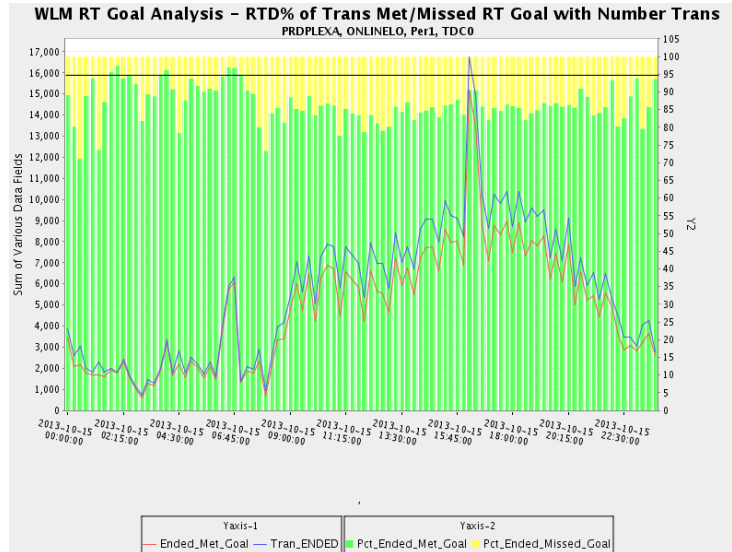
- Verify that all response time goals are percentile response time goals
- If Average response time goals are found
 - Is there a reason for them being defined as average RT goals?
 - If converted to percentile RT goal, use RT distribution to figure percentile

Service Class	Workload	Per	Duration	Imp	Goal
ASCHDEF	STC	1	500	2	80% 00:00:01.000
DDFBOBJ	DB2	1	6000	1	Avg 00:00:11.000
DDFBOBJ	DB2	2	2500000	1	Avg 00:03:00.000
DDFDBS	DB2	1	2500	1	80% 00:00:00.300
DDFDEF	DB2	1	2500	1	80% 00:00:00.400
DDFWTF	DB2	1	2500	1	80% 00:00:00.180
DDFWTFQ	DB2	1	2500	1	80% 00:00:00.500
DDFWTFWF	DB2	1	2500	1	80% 00:00:00.200
DDFLDPRA	DB2	1	2500	1	80% 00:00:00.300
DDFLNG	DB2	1	4000	1	80% 00:00:01.000
DDFSRV	DB2	1	2500	1	80% 00:00:00.300
DDFTDEVQ	DB2	1	4000	1	80% 00:00:00.500
STPDEF	ONLINES	1	10000	1	Avg 00:00:00.500
STPDEF	ONLINES	2		2	Avg 00:00:50.000
TSO	TSO	1	2000	1	80% 00:00:00.200
TSOPRIV	TSO	1	500	1	80% 00:00:00.100
WSTHI	ONLINES	1		1	90% 00:00:02.000

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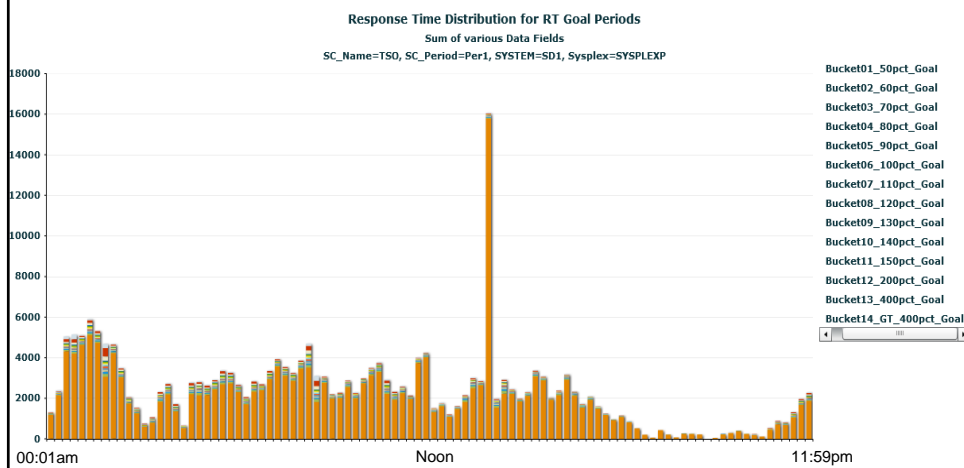
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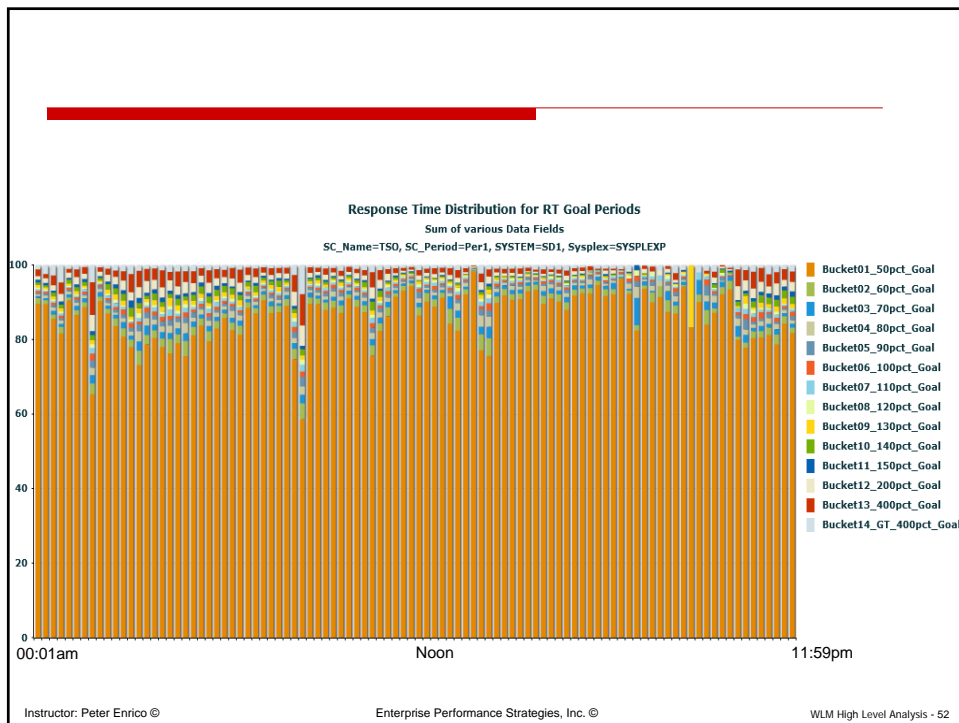
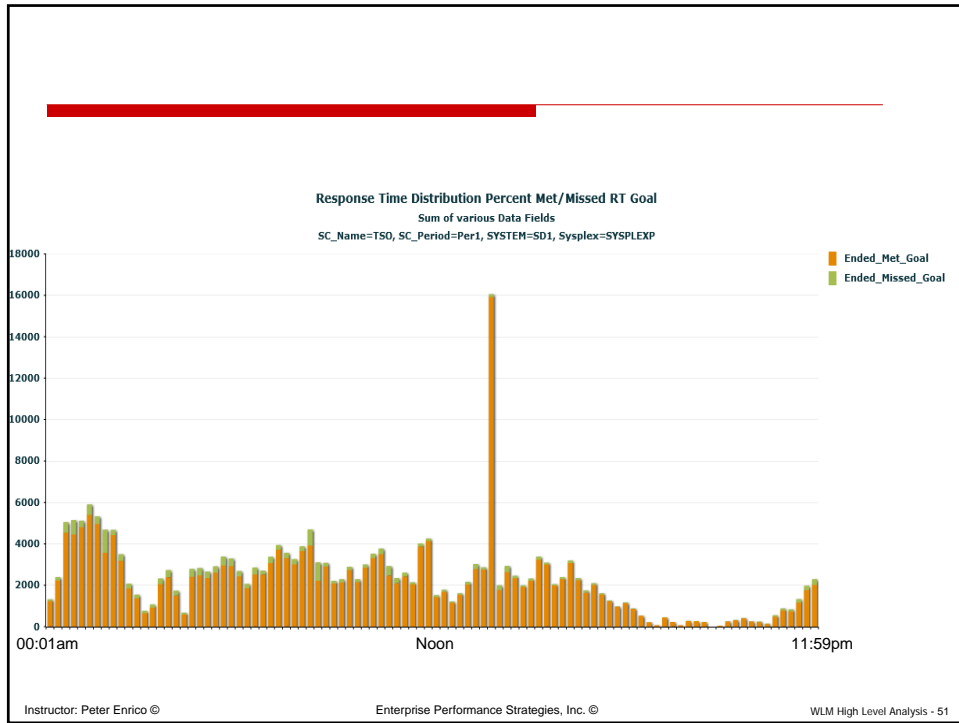


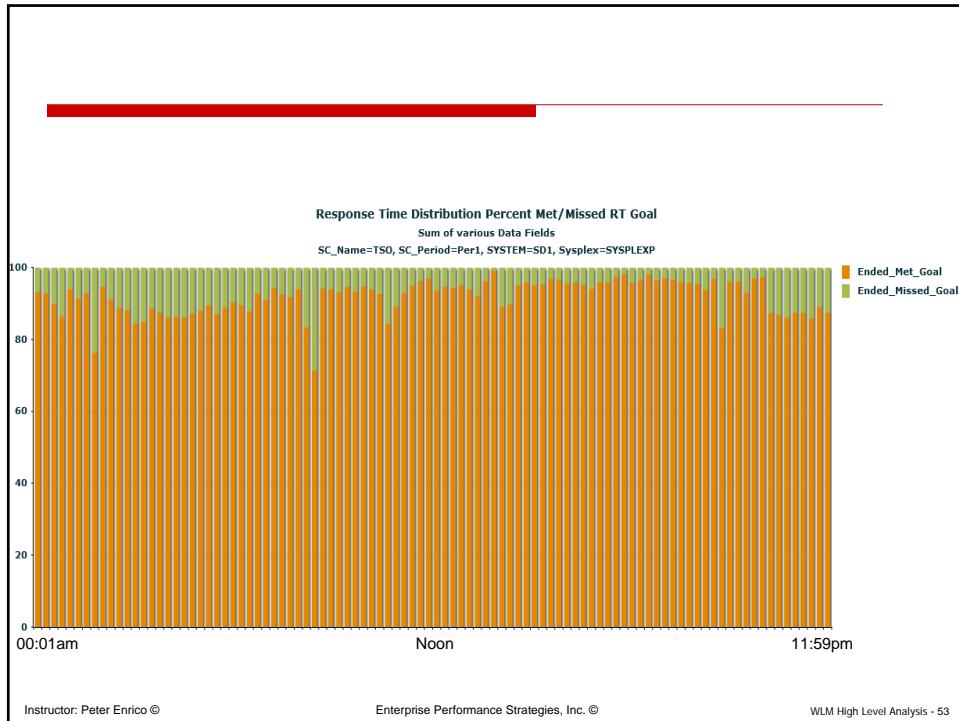
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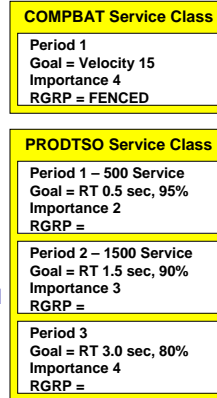




Quick Review of Periods and Durations

WLM Service Classes

- Within a WLM Workload, work with similar performance characteristics is grouped into *Service Classes*
- Service Classes are created for a group of work with similar
 - Work types
 - Performance goals
 - Resource requirements
 - Business importance to installation
- Service class consists of
 - Service class name
 - Service class description
 - Period(s), Performance goal and importance
 - Period durations
 - Resource group name
- Service class can only be associated with one workload
- Can define up to 100 service classes



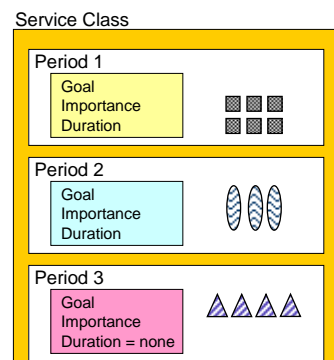
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Service Class Periods

- Periods allowed an installation to further control work
 - Allowed to group work by dividing the life span of the transactions
 - Like work in periods are group to *service classes*
 - Example: short TSO and long TSO
- Performance periods allowed an installation to vary performance characteristics of transactions as their execution characteristics changed
 - WLM could manage transactions differently at each stage of aging
- Measure of aging is period duration
 - Transactions of short duration may need to experience consistent response times
 - As these transaction run and are no longer 'short', period control allowed these transactions to run differently



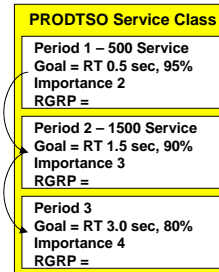
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WLM Service Class Durations

- Because some work may have variable resource requirements, service classes can be defined with multiple periods
 - Periods are a way of defining different goals for work depending on the amount of resources the work consumes
- Typically periods are used to
 - Give shorter transactions more aggressive goals
 - Give longer transactions less aggressive goals
- Each period consists of
 - Goal and importance
 - Duration (except for last period)
- Durations
 - The amount of resources, in service, that work consumes
 - As work consumes service and consumption exceeds duration, work is transitioned to the next period and managed to goal of next period
 - Way of aging transactions



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Example of a Multi-Period Service Class Definition

- The following is an example of a three period service class for TSO
 - The last period of a service class is the one without a duration
 - Thus, if the first period of a service class had no duration, then it would be a single period service class

```

Service-Class  Xref  Notes  Options  Help
-----
                                Modify a Service Class                                Row 1 to 4 of 4

Command ==> _____

Service Class Name . . . . . : TSO
Description . . . . . : All TSO Activity
Workload Name . . . . . : TSO (name or ?)
Base Resource Group . . . . . : (name or ?)
Cpu Critical . . . . . : NO (YES or NO)

Specify BASE GOAL information. Action Codes: I=Insert new period,
E=Edit period, D=Delete period.

---Period--- -----Goal-----
Action # Duration Imp. Description
---
1 2000 2 90% complete within 00:00:00.500
2 3000 3 90% complete within 00:00:02.000
3 4 50% complete within 00:00:10.000
***** Bottom of data *****
  
```

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Verifying Properness of WLM Controls

Period and Durations

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Review Your Multiple Period Service Classes

- Some key objectives of this evaluation include the following:
 - Determine if certain periods of a service class can be eliminated, or if any can be consolidated with other periods
 - Does the period have enough activity to warrant its existence?
 - What is the justification?
 - Verify the usage of the last period of the service class
 - Many last periods are penalty periods in which transactions are never expected to run there. If transactions do run there then there is a problem. Is the last period of the class this type of period?
 - Determine the effectiveness of the duration
 - When a transaction transitions to a different period is it really a different type of transaction that warrants to be managed towards a different goal?
 - Determine if there is enough work in a service class period to allow for effective WLM management of the work in that period
 - A period may have activity, but is there enough activity for it to be effectively managed by WLM?

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Questions to Ask of Multiple Period Service Classes

- Evaluate the activity of each period relative to all the other periods in the service class.
 - Are there any periods that never show activity of resource consumption?
- Are there any multiple period service classes mistakenly being used to run long running work?
 - Note if any work is stuck in the last period of a service class.
 - Look to see if MPL or ENC are regularly non-zero but ended transactions is zero
- Are there any transactions oriented periods that usually have no ended transactions?
 - Look at the number of ended transactions for each period and determine if certain periods just have no activity
- Evaluate the CPU consumed by each period in the service class.
 - Are there any periods with very low activity?
 - If so, can this period be merged with another?

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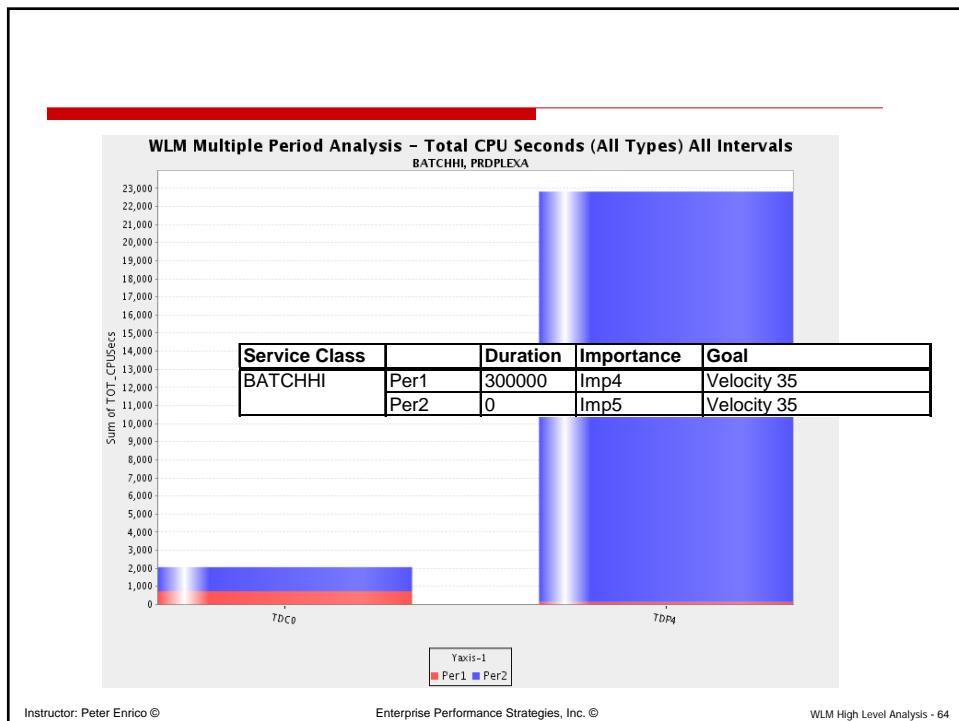
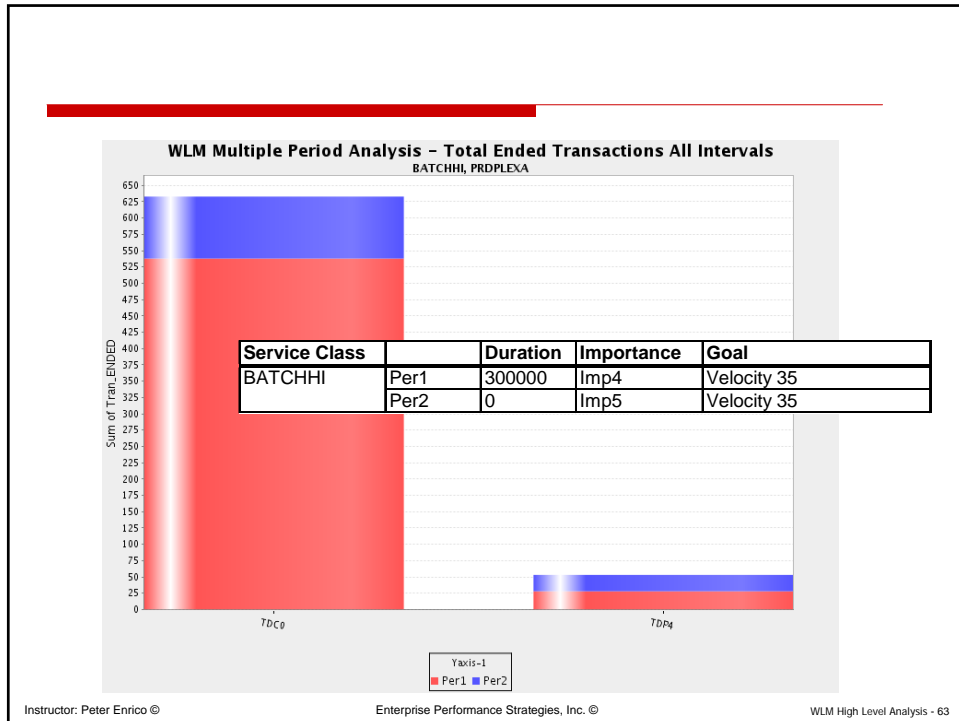
Questions to Ask of Multiple Period Service Classes

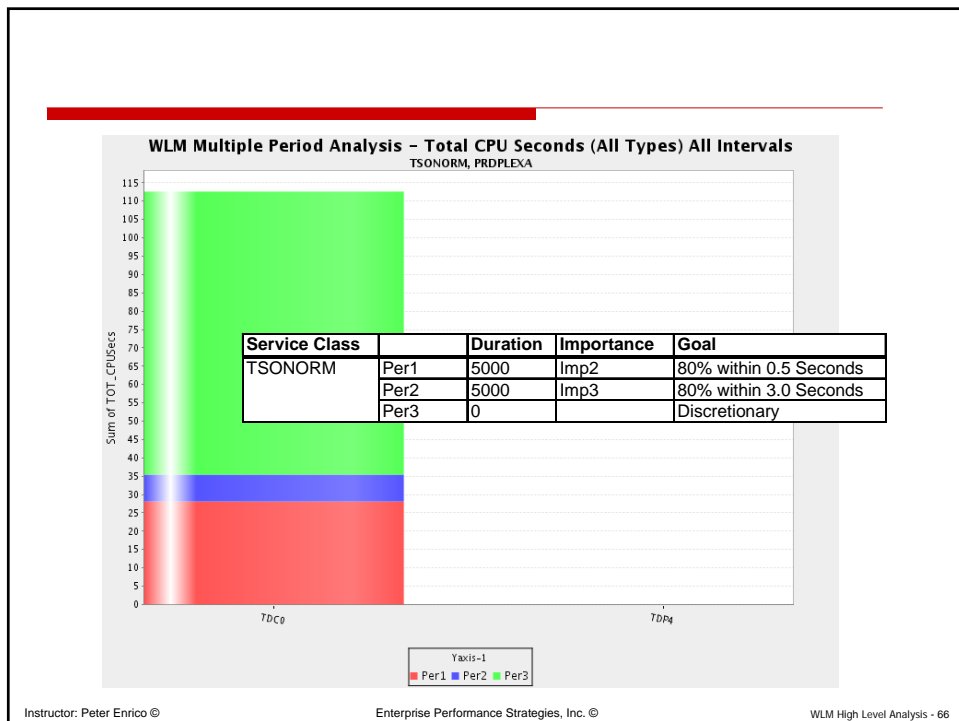
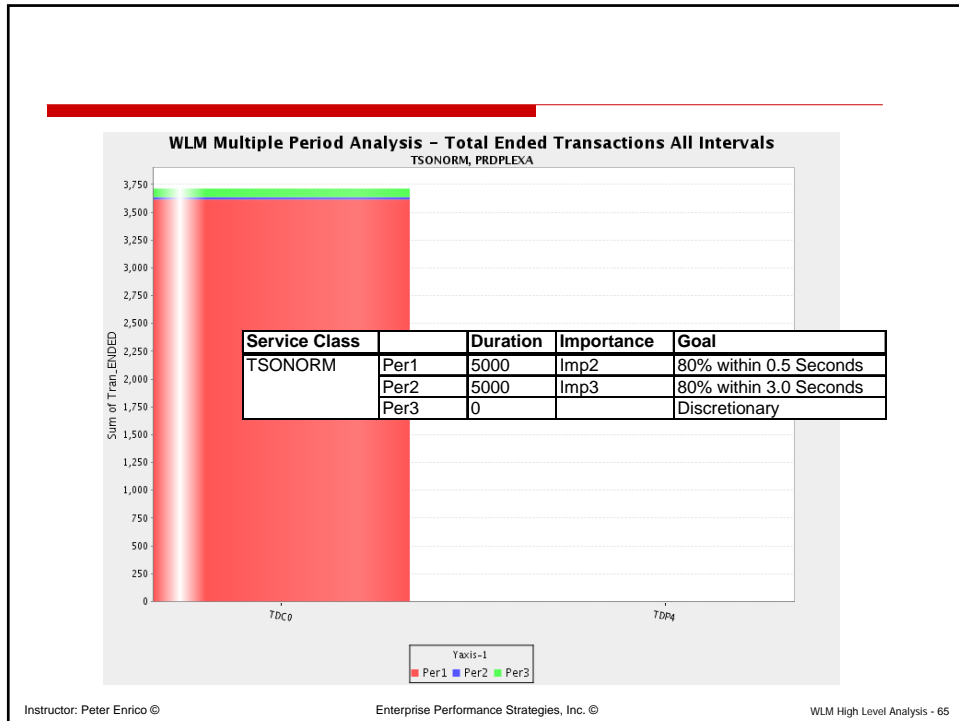
- Evaluate the importance levels of each of the periods belonging to a multiple period service class.
 - Are any two periods in the same service class assigned the same importance level?
- If the last period of a service class appears to be setup as a penalty period, is there ever any activity in this period?
- Given the duration of a period and the SU/Sec constant for the LPARs, are any of the durations in conflict with the response time objectives of the periods?
 - Example, assuming all service consumed by work in a period is CPU, is the CPU time represented by the duration greater than the response time objective of the period?
- Are there any periods that consume so few resources and have so few ended transactions they probably do not warrant a separate period?
 - Can any of the low activity periods be consolidated with other periods?

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Cookbook Approach to a WLM Analysis

- High level steps for revisiting your WLM setup and service definition
 - Step 1: Learn the basic concepts of WLM (and the oddities)
 - Step 2: Inventory Your Managed Resources
 - Step 3: Inventory System Workloads
 - Step 4: Understand Current WLM Definition
 - Step 5: Clean Up Your Service Definition
 - Step 6: Learn How to Interpret WLM Measurements
 - Step 7: Verify Properness of WLM Controls
 - Step 8: Determine Effectiveness of Controls
 - Step 9: Examine Workload Mixtures
 - Step 10: Re-evaluate Assigned Goals and Importance
 - Step 11: Explore Exploiting New Functions
 - Step 12: Start to Tackle Those Difficult Issues

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Performance Workshops Available

During these workshops you will be analyzing your own data!

- WLM Performance and Re-evaluating of Goals
 - Instructor: Peter Enrico
 - June 23 – 27, 2014 - Detroit, Michigan, USA
 - September 15 – 19, 2014 - Kansas City, Missouri, USA
- Parallel Sysplex and z/OS Performance Tuning
(Web / Internet Based!)
 - Instructor: Peter Enrico
 - July 29 – 31, 2014 (Web)
 - August 19 – 21, 2014 (Web)
- Essential z/OS Performance Tuning Workshop
 - Instructors: Peter Enrico and Tom Beretvas
- z/OS Capacity Planning and Performance Analysis
 - Instructor: Ray Wicks



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WLM Reports Processing/Discussion Offer !!!

- **Special Reports Offer!**
 - See your WLM SMF 72.3 records in chart and table format
 - Please contact me, Peter Enrico for instructions for sending raw SMF data
 - Send an email to peter.enrico@epstrategies.com
 - Deliverable: Dozens of coupling facility based reports (charts and tables)
 - WLM SMF30 Address Space Analysis
 - WLM - Period Setup Analysis
 - WLM - Importance Level Analysis
 - WLM - PI Analysis
 - WLM - Velocity Goal Analysis
 - WLM - Response Time Goal Analysis
 - WLM - Discretionary Goal Analysis
 - WLM - Enclave Analysis
 - WLM - Multiple Period Analysis
 - WLM - CPU Analysis
 - WLM - Storage Analysis
 - WLM - DASD IO Analysis
 - One-on-one phone call to explain your coupling facility measurements



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