

zIIP and zAAP Eligible Time Analysis with Workload License Charges Impact

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Goals and Objectives

- Overview zIIP and zAAP Engines
 - Why Do We Have Specialty Engines?
- Overview zIIP and zAAP Eligible Time
 - PROJECTCPU
- Analysis of Eligible Time
- Demand for Engines
- Impact On The 4 Hour Rolling Average
- Impact on Monthly Software Charges
- LPAR Group Capping

ETVALUE: Value of Additional Specialty Engines

LCS: 04.02, LCS Extractor: 04.02, MXG: 25.02, Prepared: 12:20 Sunday, 09SEP2007

Currency is 'USD'

PricingPlex: 00011 2063-AG1
Machines: 2094#1111, 2094#1122

LCS Unique Machine ID	Product ID	Product Name	Charge Per MSU	Current SCRT Billable MSUs (b)	Current SCRT Product Date/Time	Estimated S4HRA After Adding More zXXPs (c)	Date/Time With More zIIPs & zAAPs	Reduced MSUs With More zXXPs (b-c)	Estimated Value of More zXXPs
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	5625-DB2	DB2 V8	47.00	383	31MAR2007:09	371	31MAR2007:09	12	\$576
	5675-DB2	DB2 V7 (SVC)	0.00	337	09MAR2007:06	334	09MAR2007:06	3	\$0
	5655-M15	CICS TS	54.00	383	31MAR2007:09	371	31MAR2007:09	12	\$662
	5655-L82	MQSERIES	25.00	400	31MAR2007:09	388	31MAR2007:09	12	\$306
2094#1111			226.00						\$2,852

zIIP and zAAP Specialty Engines

- **zAAP Engines**

- Run JAVA Workloads Under z/OS: WebSphere, CICS, IMS, DB2
- Everything newer than z990
- Lower Cost and Lower Maintenance Than General Purpose Engines

- **zIIP Engines**

- DB2 V8 and V9 Can Redirect Some CPU Time to zIIPs
 - DRDA over TCP/IP, DB2 Complex Parallel Queries, and DB2 Utility Functions Related to Index Maintenance

- **Both**

- Capacity is *NOT* Included in the Announced MSU Value
- CPU Time is *NOT* Included in the LPAR's 4 hr Rolling Averages
 - No Software Charges for zXXP Capacity
 - zXXP CPU Time is Used by PlexCALC
- You Can Plan the Savings Without Having the Engines Installed

zIIP and zAAP Specialty Engines (Future)

- zIIP Engines

- Being Enabled for Additional Functions by IBM and ISVs

Why Are There Specialty Engines?

- zAAP and zIIP Move Work Off Your “General-Purpose” Engines
- “Work” is CPU Usage
 - Java Requires 5x to 10x the Capacity of the Same Application Logic Written in COBOL/CICS/DB2
 - Generally WebSphere is 50% Java and 50% non-Java
- zAAP/zIIP CPU Usage is Not Included in the 4-Hour Rolling Average
 - There Is Some Additional Overhead to Determine Which Work is zAAP/zIIP Eligible and to Handle Dispatching
 - CPU Resources Moved Out of the Maximum Simultaneous 4-Hour Rolling Average May Reduce Your Software Charges
 - Your Maximum Simultaneous 4-Hour Rolling Average May Move to Another Hour of the Month

Why Are There Specialty Engines?

- When Does CPU Time Moving to a Specialty Engine Matter?
 - From a “Pricing” Point of View Only During the Hour (or the typical hours) of Your Peak Simultaneous 4HRA of Each Machine

IF (Your Billable MSUs are Driven by Overnight Batch Workload)

and

(Specialty Engines Would “Help” Daytime Online Workload)

THEN

There May Not be a Reduction In Monthly Charges!

Why Are There Specialty Engines?

- **Out of Capacity**

- Traditionally, You Would Upgrade the Machine With General Purpose Engines (GPs)
 - New Capacity That Will Be Included in the Announced MSU Value
 - Adding GPs May Involve Upgrade Fees for “Capacity Based Licenses” (IBM and ISVs)
 - New Capacity May Lead to Higher Simultaneous 4HRAs, Leading to Higher Monthly Charges for Variable WLC Products (IBM and ISVs)

Why Are There Specialty Engines?

- If You Have Eligible Work That Could Move to zXXP
 - Same Installed GP MSU Capacity
 - Eligible Work Moved to zXXP Releases Some General Purpose Capacity
 - (which could be consumed by your latent demand!)
 - Improved Performance: Higher Trans Rates, Faster Response

zXXP is NOT a Performance Solution

- zXXPs are Software Pricing Solutions
- There is Additional Overhead in z/OS to Dispatch the Work onto the Specialty Engine
- Certainly There Are Exceptions
 - Adding zXXPs Without Removing GPs Will Provide More Computing Resources Than GPs Provided Alone
 - More Engines Could Lead to
 - Improved Performance
 - Reduced Cost

How Do I Analyze zXXPs?

- IBM Will Do This For You
- Do It Yourself
 - SAS, MXG, CA-NeuMICS
 - Other SMF and RMF Analysis Tools
- Acquire a Tool To Help with WLC and zXXP Analysis 😊

Objectives of zXXP Analysis

- **Technical View**

- Can My Workloads Use zIIPs or zAAPs?
 - Which LPARs?
- How Many Specialty Engines Are Needed?
 - A Machine May Not Have More zIIPs or zAAPs Than General Purpose Engines
 - LPARs Do Not Have This Rule
 - A LPAR May Have 1 GP, 2 zAAPs and 2 zIIPs

- **Management View**

- What Does It Cost?
- How Much Will My Software Charges Be Reduced?

Eligible Time, Key to Analysis

- RMF 72 and SMF 30 Record “Eligible” zXXP Time
- This is Time That Work Executed On a GP That Could Have Executed on a zXXP, “If” a zXXP Was Available
- Once You Have a zXXP Engine Installed - z/OS Records Eligible Time
- Even Without zXXPs Installed You Can Have z/OS Record Eligible Time with PROJECTCPU in IEAOPTxx

zXXP Measurement Actual and Eligible

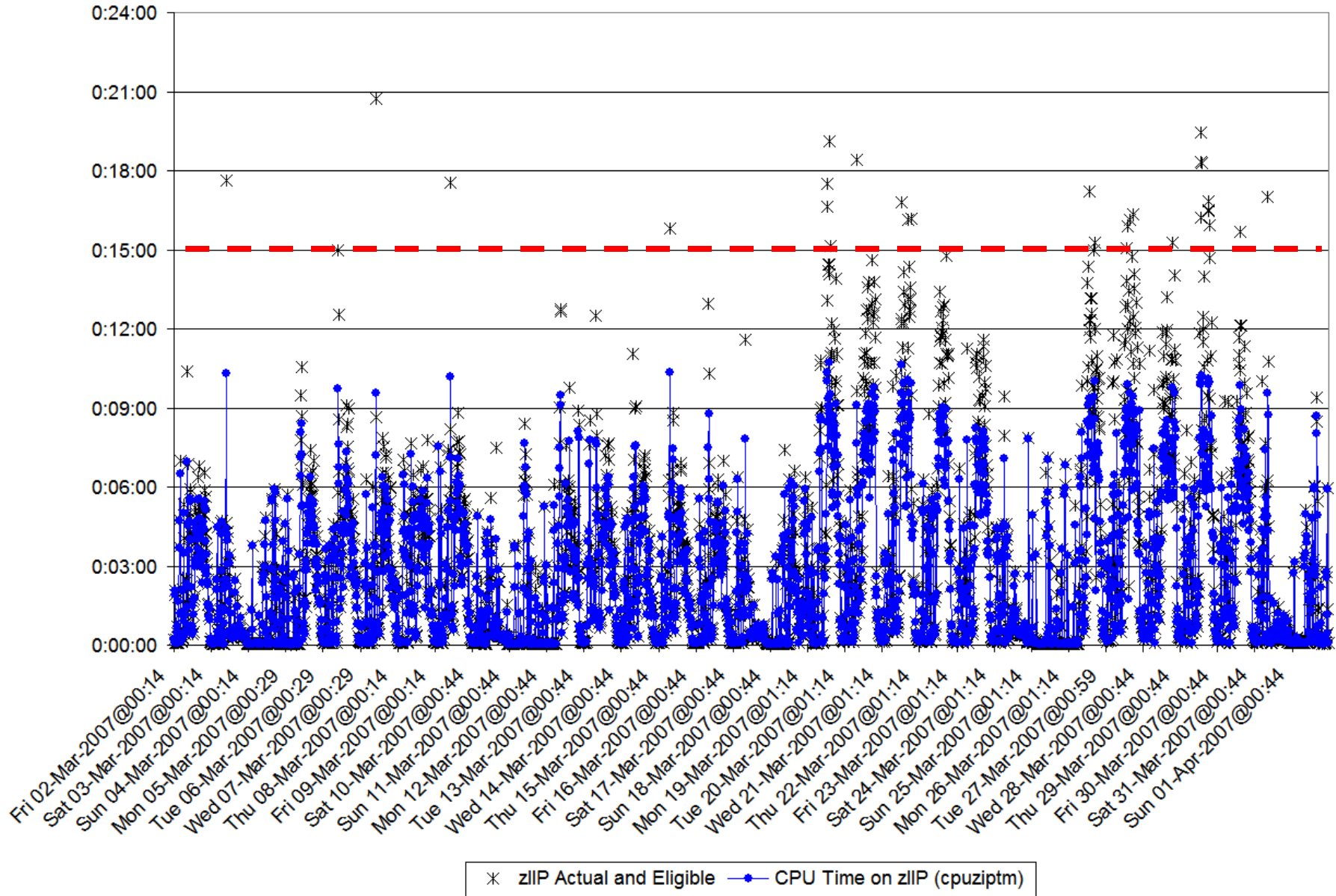
- SMF30 has zIIP Information For Job Steps
- RMF70 has zXXP Executing, Available Time, Percent Busy and Number of Engines Installed
- RMF72 has Time Using the zXXPs and Time Eligible for zXXPs
- DB2 has Executing and Eligible Time
 - (APAR PK18454)

PROJECTCPU

- IEAOPTxx Parameters

- PROJECTCPU: Projects zAAP / zIIP Consumption When The zXXP Engines Are Not Actually Installed in the Machine
- ZIIPAWMT: Specify zIIP Alternate Wait Management Threshold
- ZAAPAWMT: Specify zAAP Alternate Wait Management Threshold
- Available in z/OS 1.8 and beyond

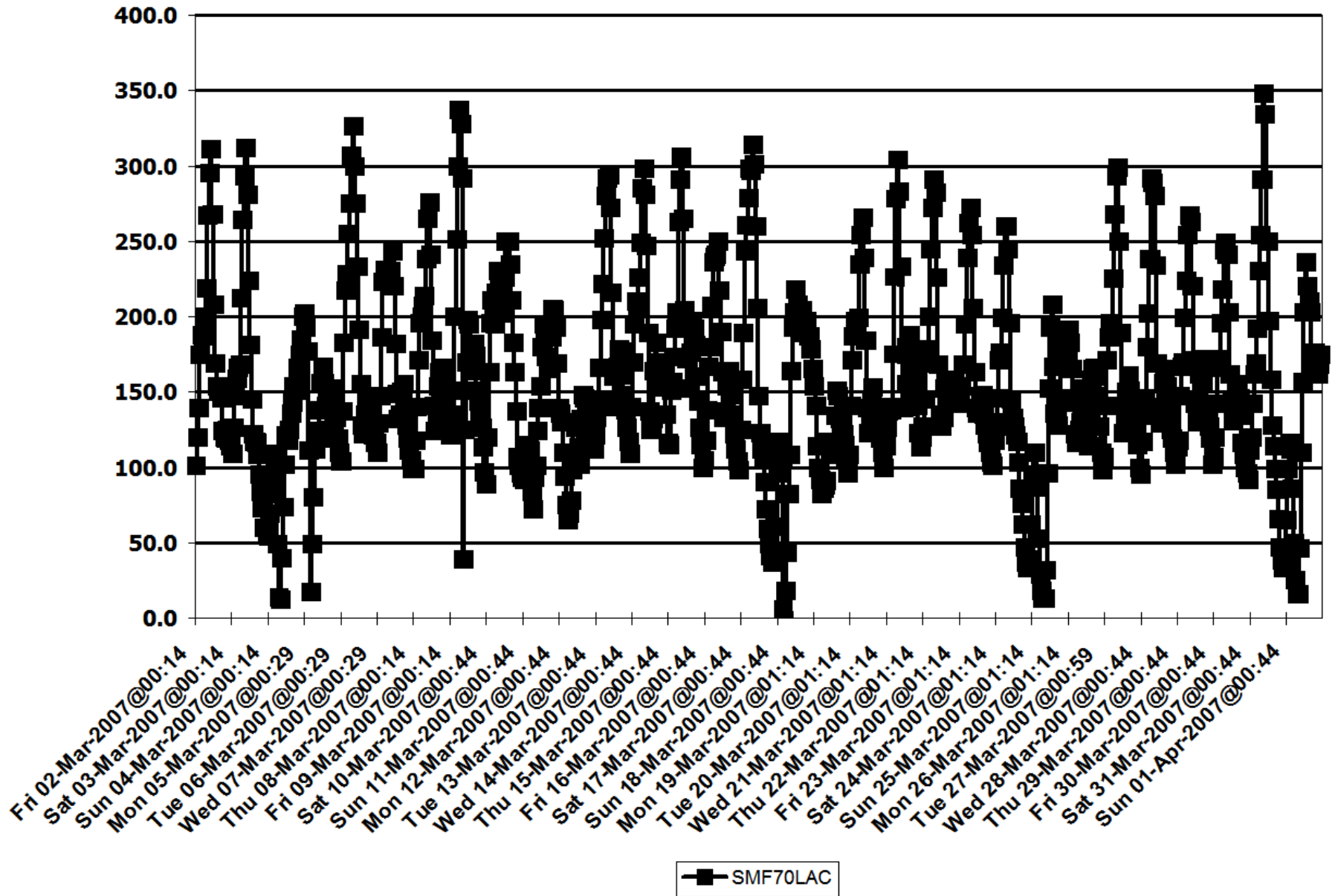
zIIP Demand



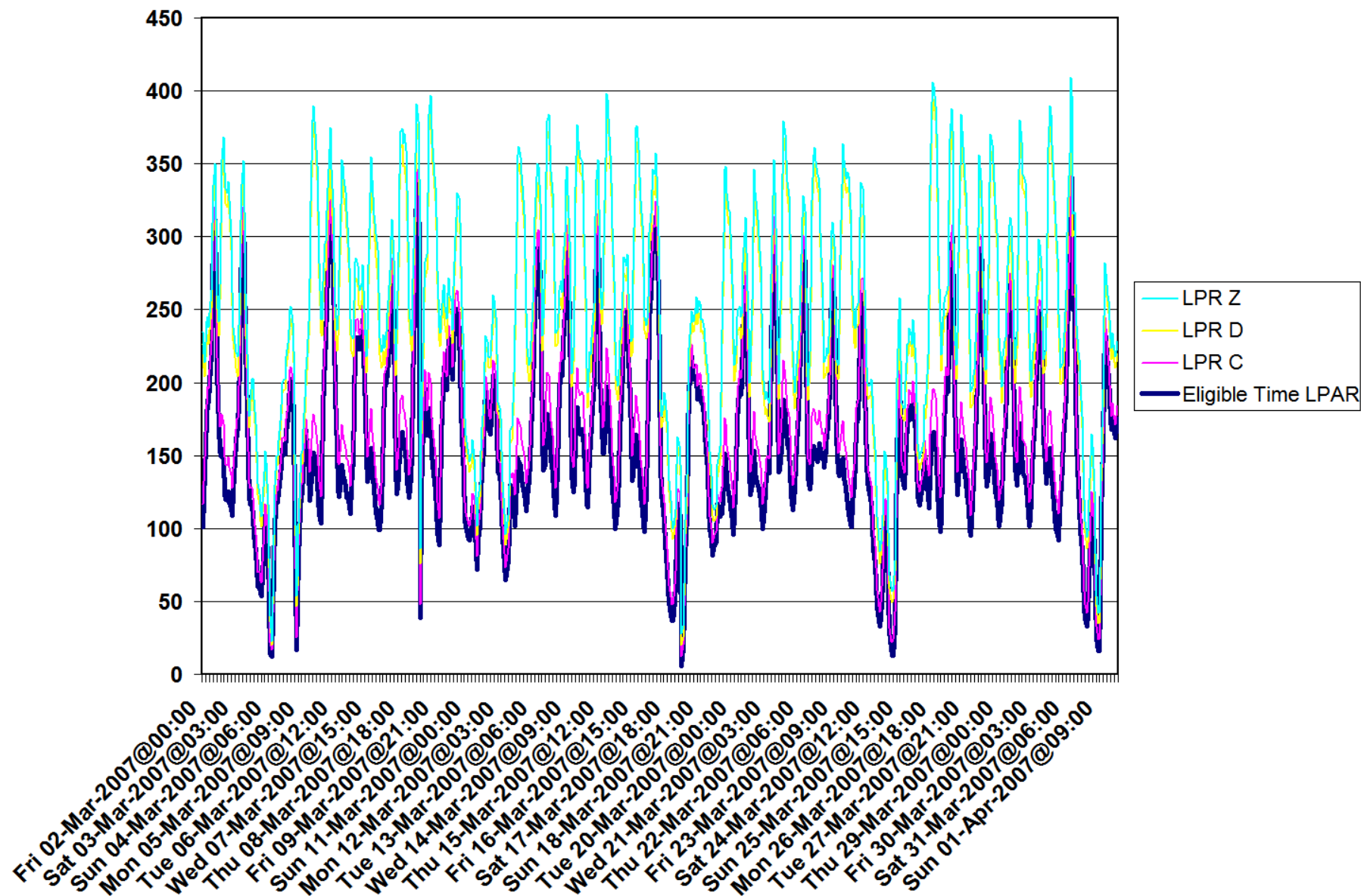
zIIP Demand

- Notice There Are Many '*'s Below 15 Minutes
 - In This Example 1 zIIP is Installed
 - If the zIIP is Busy Work May Wait,
 - Or With z/OS Alternate Wait Management May Execute on a GP
 - Only zIIP Work That Runs on a GP is Marked as "Eligible"
 - If It Waits and Eventually Runs on a zIIP, Then It Is CPU time On A zIIP, (not zIIP Eligible Time)
- A Few '*'s Above 15 Minutes
 - Two zIIPs Are Needed for This Workload
- Technically, If a zIIP Was Added To This LPAR
 - It Would Be Used
 - But, What Is the Value?

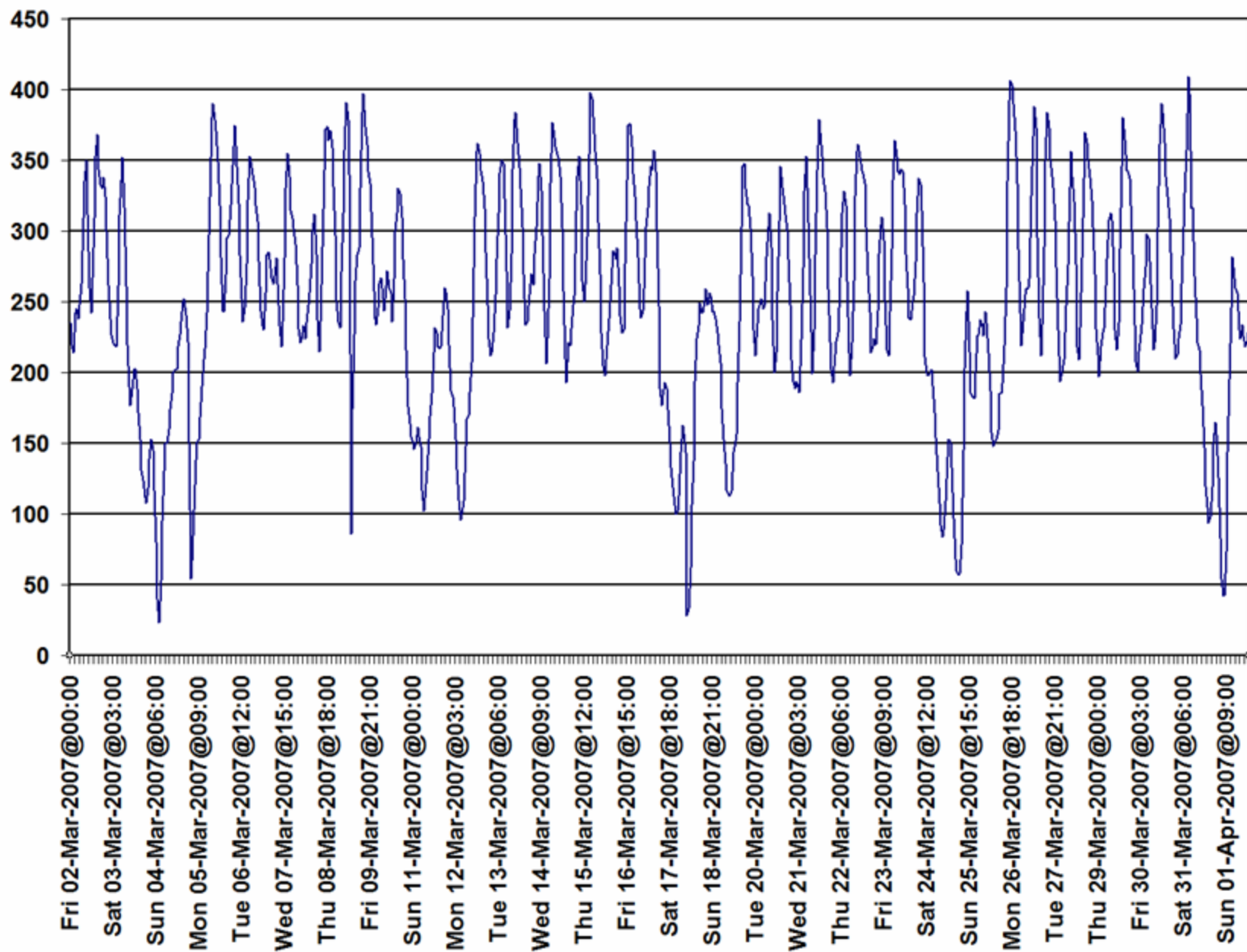
LPAR's 4 HR Rolling Average (Starting Point)



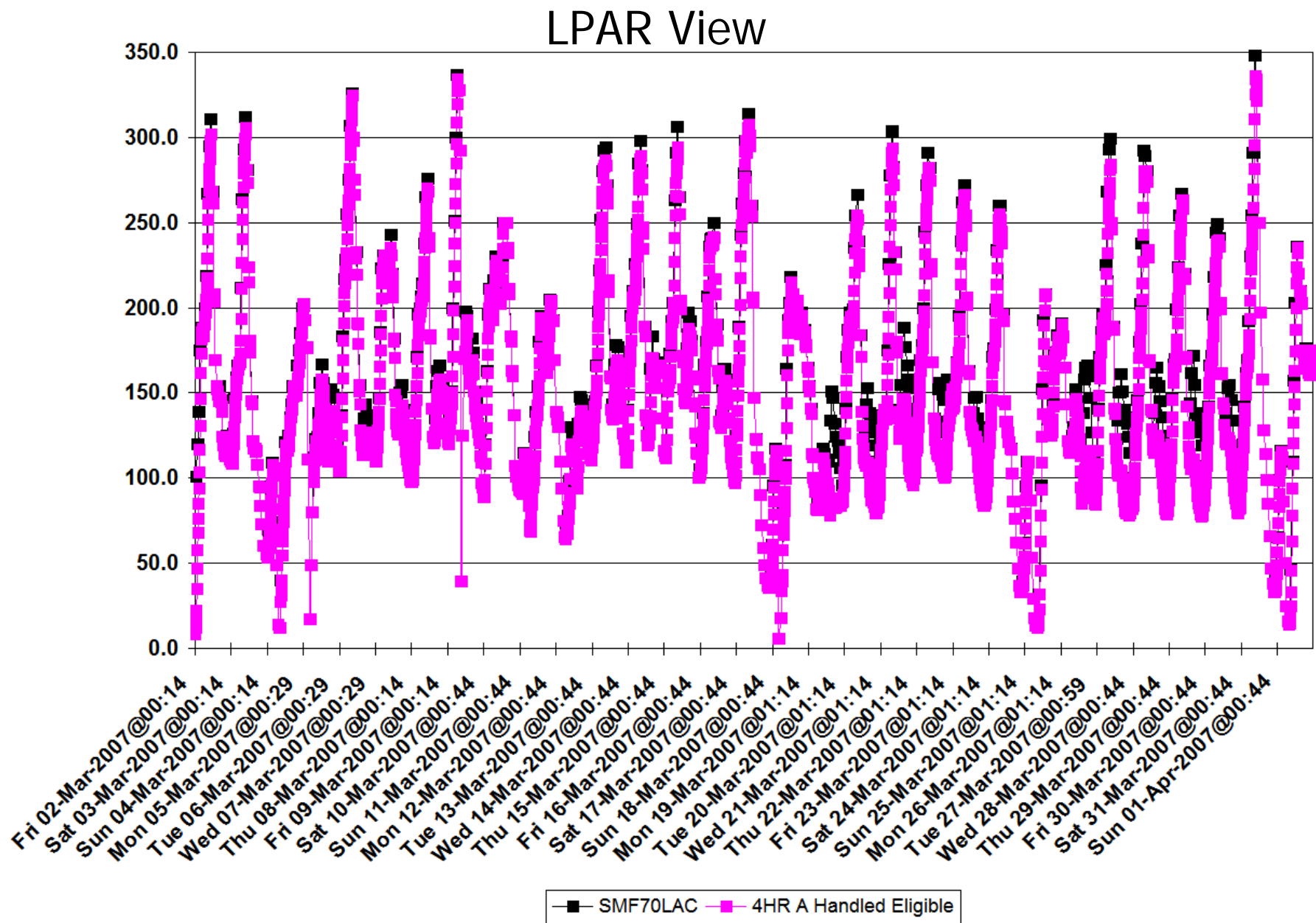
z/OS's Simultaneous 4hr Rolling Average



z/OS's Simultaneous 4hr Rolling Average

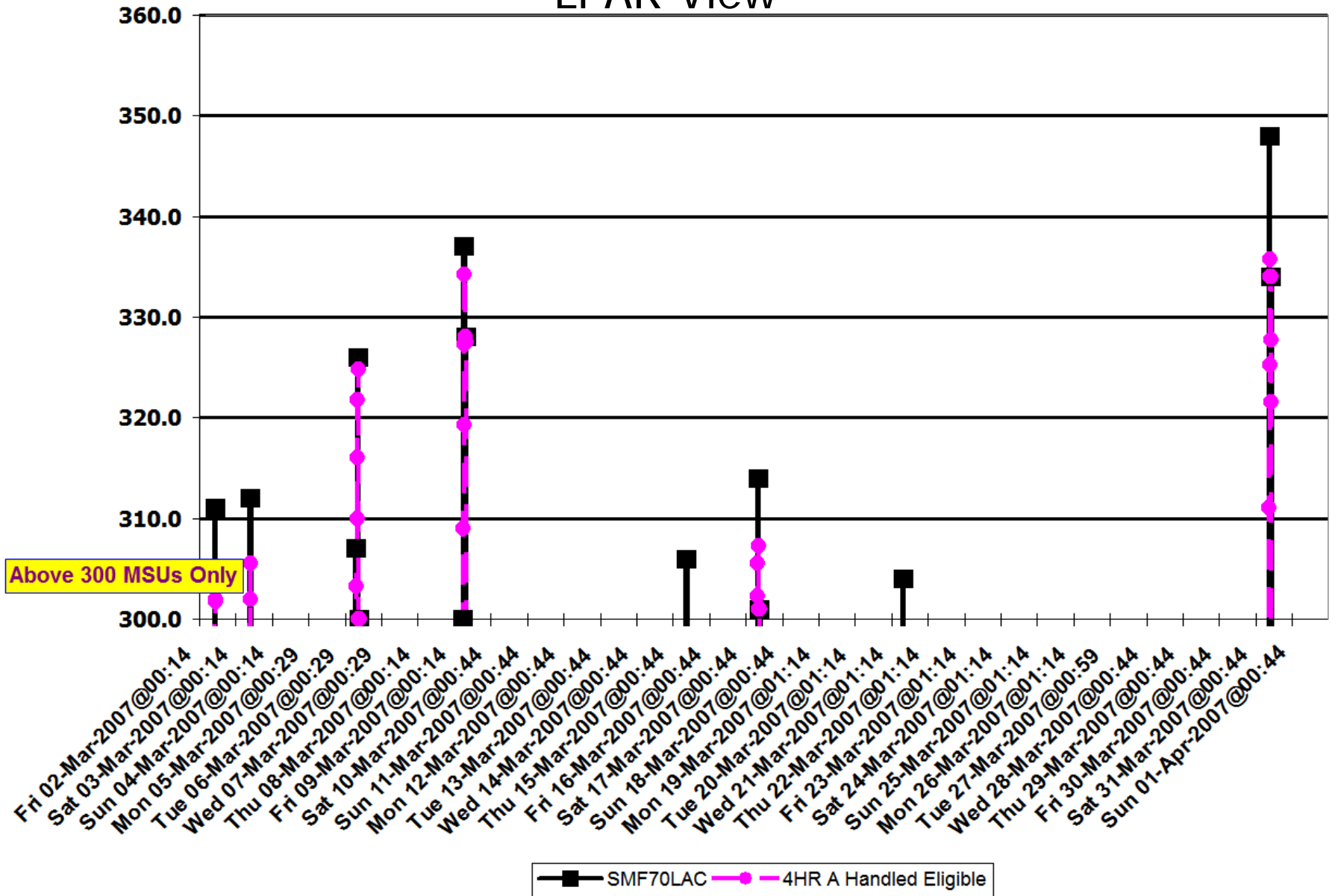


Add One zIIP to Handle All Eligible Time

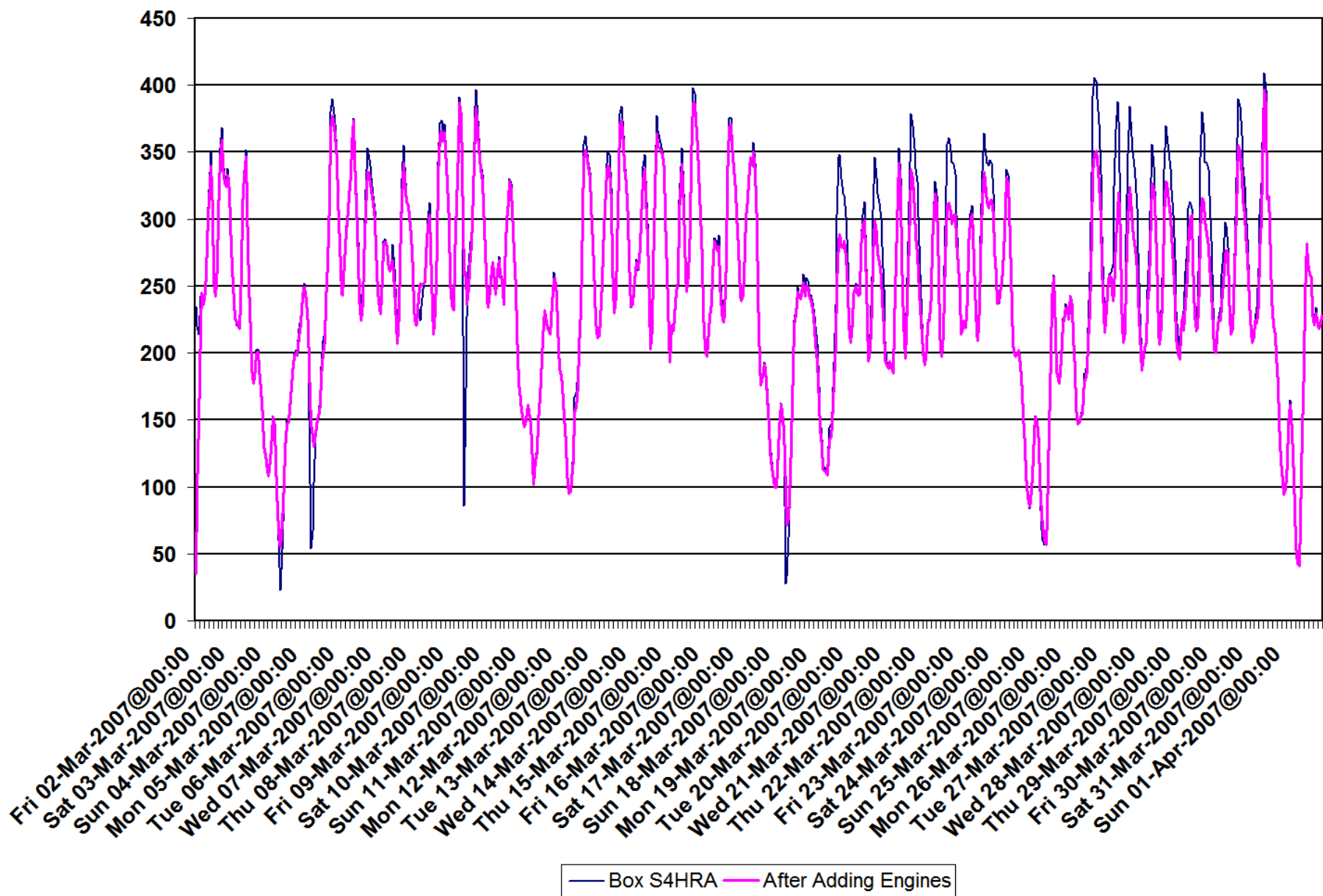


4 HR Rolling Average Impact

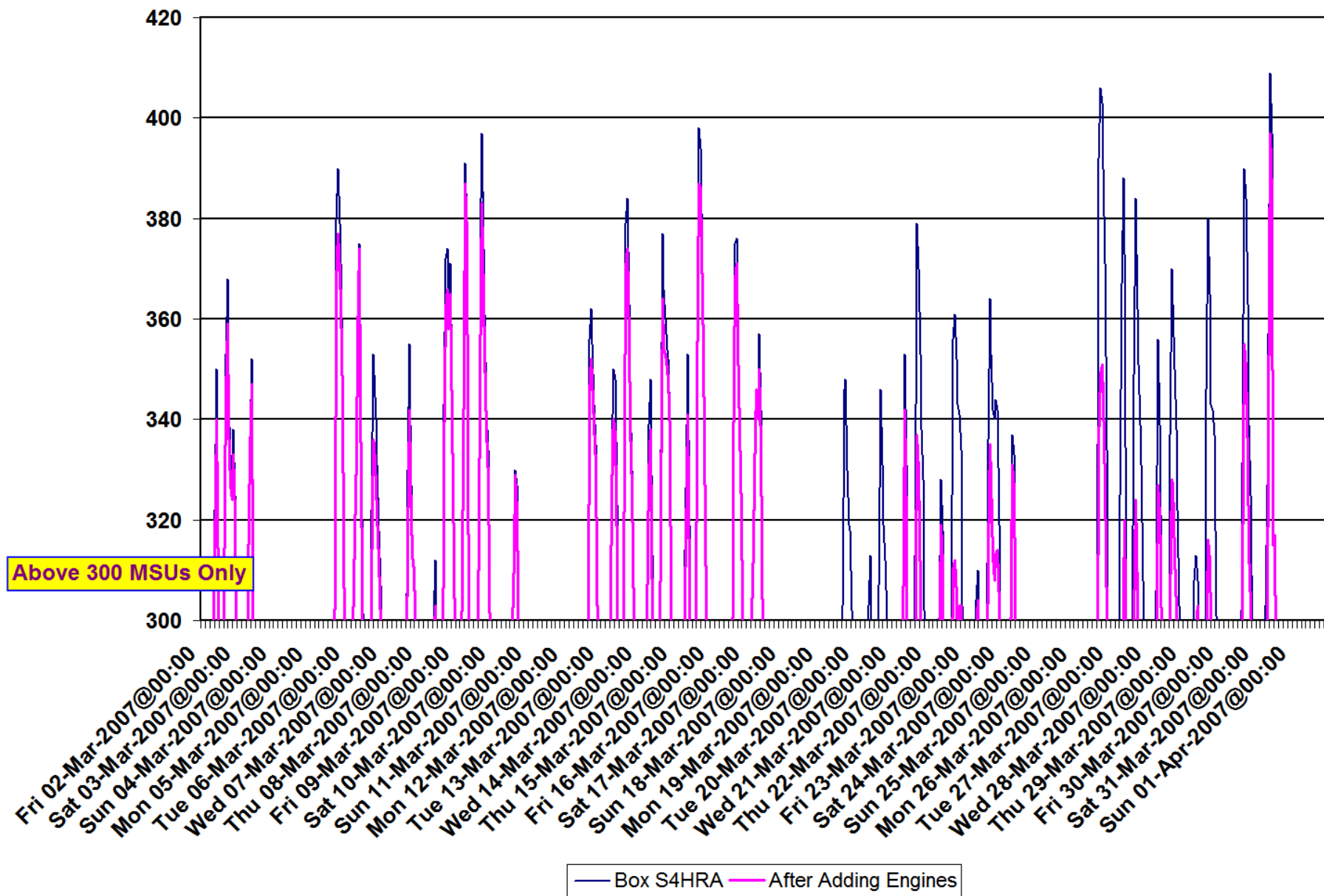
LPAR View



z/OS's Simultaneous 4hr Rolling Average



z/OS's Simultaneous 4hr Rolling Average



Financial Value

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	5655-M15	CICS TS	54.00	383	31MAR2007:09	371	31MAR2007:09	12	\$662
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2094#1111			226.00						\$2,852

- The Workload Could Use 1 More zIIP Engine
 - Sep2006 Approx. Cost \$100-120K per engine. Mar2007 around \$75-80K. Recently I've Heard Quotes In The \$45-50K Range
- For This PricingPlex: z/OS, DB2 V8, CICS, MQ Reduced The Simultaneous 4hr Rolling Average by 12 MSUs
- Estimated Savings For This Analyzed Month: \$2,852

Financial Value 2nd Machine

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2094#1122	5694-A01	Z/OS V1	109.00	444	26MAR2007:18	438	02MAR2007:17	6	\$627
	5625-DB2	DB2 V8	47.00	410	26MAR2007:18	405	02MAR2007:17	5	\$247
	5675-DB2	DB2 V7 (SVC)	0.00	252	10MAR2007:07	252	10MAR2007:07	0	\$0
	5655-M15	CICS TS	54.00	410	26MAR2007:18	405	02MAR2007:17	5	\$284
	5655-L82	MQSERIES	25.00	426	26MAR2007:18	421	02MAR2007:17	5	\$119
2094#1122			235.00						\$1,276

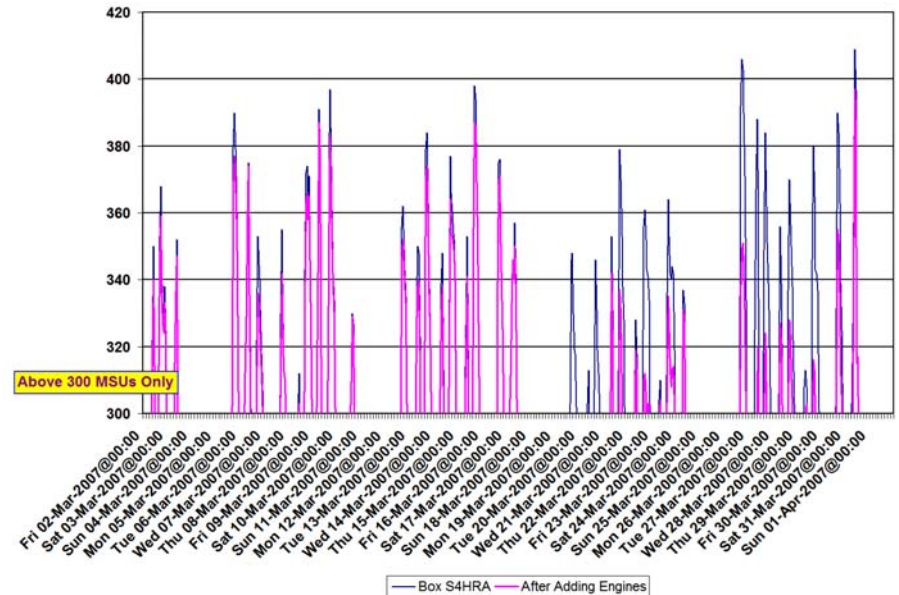
- This Workload Could Use 1 More zIIP Engine
- For This Pricing Plex:
 - z/OS by 6 MSUs
 - DB2, CICS, & MQ Reduced the Simultaneous 4hr Rolling Average by 5 MSUs
- Estimated Savings For This Analyzed Month: \$1,276
- Note: Adding the zIIP Moved the Machine's Peak Simultaneous 4HRA From 26MAR at 6PM to 2MAR at 5PM

Summary Eligible Time

- Eligible Time Can Be Analyzed to Determine If Adding zXXP Engines Are Applicable to Your Workloads
- These Engines Move CPU Time From the General Purpose Engines to the Specialty Engines
- Perhaps zXXP Engines Defer the Point Where A General Purpose Engine Capacity Increase Would Be Necessary
- LPAR Analysis is Not Adequate
 - You Need to Analyze the Whole Machine and the Simultaneous 4 Hour Rolling Averages
- May or May Not Reduce Your Simultaneous 4 Hour Rolling Averages

Summary

LCS Provides Analysis of Eligible Time and Recalculates Your Estimated Invoice To Demonstrate the Financial Value for Your Environment



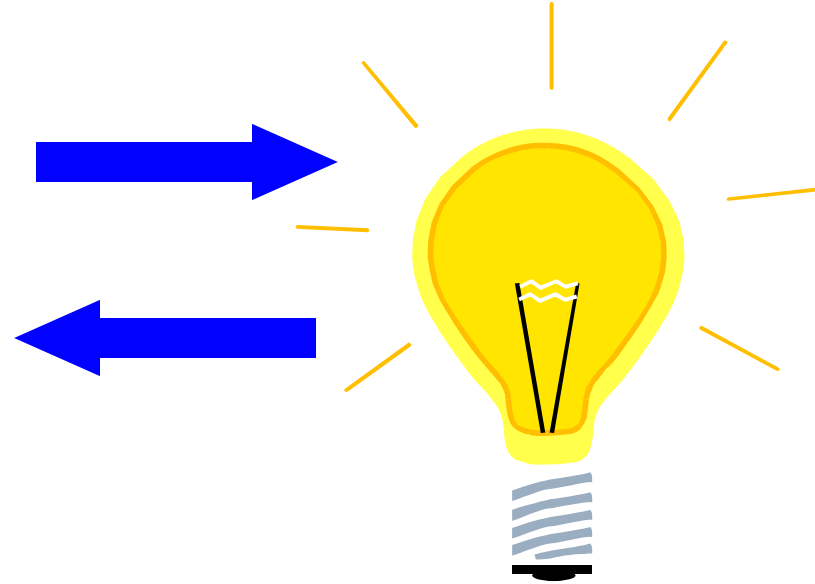
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Management, Lawyers, and Contracting Agents

**All Examples Are From
LPAR Capacity and Software Usage
Analysis (LCS) Software!**