What More Can Be Done To Automate Performance Management Using RMF Monitor III and SMF Records

Meral Temel
Garanti Technology

11 August 2011 9527
Who is GT?

- A wholly-owned subsidiary of Garanti Bank, the second largest private bank in Turkey owned by Doğuş Group and BBVA.
- One of the largest private internal IT service providers in Turkey
- Most up-to-date IT infrastructure
- Tightly integrated and fully in-house developed, custom-fit IT solutions
- Uninterrupted transaction capability and infrastructure security
- Well-reputed as a company of “firsts”
- Visionary and continuous investment in technology since 90’s

Fast decision making and strong communication from top to down
- Centralized management reporting systems, enable management to take timely actions
- Advanced CRM applications
- Paperless banking
Our Customers
Who is GT?

Number of Transactions / Day (mio.)

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63</td>
<td>91</td>
<td>142</td>
<td>160</td>
<td>175</td>
</tr>
</tbody>
</table>

Average daily txs. : 205 million  
Peak daily txs. : 281 million  
Average response time: 0.045 sec.

Average Login / Day (‘000)

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td></td>
<td>470</td>
<td>720</td>
<td>754</td>
<td>817</td>
<td>849</td>
</tr>
</tbody>
</table>

Internet Average logins /day : 849,000  
Internet Logins/day on peak days :1,209,000  
Internet Average response time : 22 msec.
GT Is A Member Of …

- SHARE
- CMG
- GDPS Design Council
- zBLC
GT Mainframe Configuration
GT Parallel Sysplex Configuration - Hardware

**IBM zEnterprise Z96**
- 2817 M32:717
- 15076 MIPS:1816 MSU
- 2 x ICF
- 2 x zILP
- 192 GB memory
- 2 x Crypto Express cards
- 3 x OSA Express GbE cards
- 5 x OSA Express 10GbE
- 32 x FICON Express adapters
- 1560 MSU CAP

**Production Disk Subsystems**
- 4 x DS8700, 12.8 TB per box
- 4 x DS8800 Turbo, 12.8 TB per box
- 2 x DS8330 Turbo, 6.4 TB per box
- GDP5PPRC, GDP9XRC, HyperP AV zHPF
- 128GB (4), 256GB (6) cache per box
- 24 (8) and 32 (4) FICON adapters per box

**Archive and TEST Disk Subsystems**
- 3 x DS8300, 6.4 TB per box
- 1 x DS8700, 8.5 TB
- GDP5PPRC, GDP9XRC, PAV
- 256GB(1), 128GB(2), 64GB(1)
- cache per box
- 24 FICON adapters per box

**GRID**
- TS3500 Tape Library
  - 10 x TS1130 drive
  - 700GB and 1TB uncompressed media
  - 2550 cartridge slots
  - 7 frames

- TS3500 Tape Library
  - 10 x TS1130 drive
  - 700GB and 1TB uncompressed media
  - 2550 cartridge slots
  - 7 frames

**240 TB**

**8 FICON paths To Each Box**

**2 x SAN768B Ficon Directors**
- 192 port per box

**16 FICON Channels**

**IBM zEnterprise Z96**
- 2817 M32:717
- 15076 MIPS:1816 MSU
- 2 x ICF
- 1 x zILP
- 192 GB memory
- 2 x Crypto Express cards
- 3 x OSA Express GbE cards
- 3 x OSA Express 10GbE cards
- 32 x FICON Express adapters
- 1600 MSU CAP

**Archive and TES Disk Subsystems**
- 3 x DS8300, 6.4 TB per box
- 1 x DS8700, 8.5 TB
- GDP5PPRC, GDP9XRC, HyperP AV zHPF
- 128GB (1), 256GB (2), 64GB (1)
- cache per box
- 24 FICON adapters per box

**TS740 Virtual Tape(2)**
- 6 TB native capacity
- 256 virtual drive

**4 x PPRC links**

**4 x PPRC links**

**4 x PPRC links**

**4 x PPRC links**

**4 x PPRC links**

**GRID**
GT LPAR Configuration

PCF2GAR2

PRDA

PRDC

PRDE

PRDF

PCF1GAR1

PRDB

PRDD

PRDG

PRDW

PRDK

ICF

ICF

ICF

ICF
GT- CICS Configuration –TORs & AORs

Average daily trx : 205 million
Peak daily trx : 281,817,000 million

130 CICS Regions

- TORs
- WEB Banking
- TORs
- POS Banking
- TOR
- ATM Banking
- Listener
- Switch
- TORs
- Branch Banking

SLA
Availability : % 99.999
Response : 0.045 sec.
PART I

Performance Management /Capacity Planning
&
Different View Of Enablers
Create Processes To Prevent The Occurrence Of Performance Problem

If Exists Solve As Soon As Possible

Improve!

Automate!

Make Correct Capacity Planning

Create Innovative Solutions

Create Performance Management Methodology Suitable For Your Company
Performance Management & Capacity Planning ....

“Performance is about the amount of time that an individual transaction or piece of work takes to be completed“

“Capacity is about the amount of work that can be completed over a period of time”

CMG- MeasureIT Article By Michael Ley – November 2008

Performance is the time it takes me to drive from London back to the family home in Wales ~ a distance of about 200 miles.

Capacity is the number of cars per hour the M4 motorway* can handle.

By extension, utilisation is the number of cars per hour travelling on the M4, divided by the maximum number of cars per hour that the M4 can handle.**

And high utilisation on the M4 certainly may lead to delays because of queuing, which in turn leads to elongated travelling time i.e. reduced performance.
Components Used In Performance/Capacity Planning Management In GT

### Performance Monitoring /TroubleShooting
- RMF
- IBM Tivoli Omegamon For z/OS,CICS,DB2,MQ
- CPEXPERT, MXG
- Online Monitor Services (GT-PM Group)
- Reporting Services (GT-PM Group)
  - [Based OnRMF-SMF & Other SMF Records]
  - ALERTS & Automation Code
- Netmaster, CA Detector,STROBE, Subsystem analyzer
- CICS Performance analyzer
- z/OS HealthChecker, Tivoli  SA Alerts

### Capacity Planning
- zPCR
- Latent Demand Estimation (CMG)
- ResponseTime Estimation (CMG)
- Inhouse Developed Data Collection
- GT-PM Group Reporting Services
  - Trend Reports
  - Input : All Platforms Perf Data
  - Mainframe SMF Records
- For Pricing Analyzing LCS Tool
When we do performance troubleshooting, we work just like agents in CSI series

• desires much deeper knowledge
• knows where to look for the correct clue
• is aware of using latest methods is the way to success
• expected to know best way to use latest technologies
• expected to see the clues as soon as possible
• expected to know well how to combine collected data
WHAT IS NEED?

- Collecting Correct Data
- Relating Data
- Daily Reports
- For Problematic So Short Period Of Times – Data In Seconds Period
- Mechanism To Decrease The Time To Process The Data So That We Will Have Time For Analize – Find Out What Is Wrong
- Alerts To Do The Checking That We Are Already Doing Manually
- Mechanism To Do Checking Report Automaticly
PART II

GT In-House Developed Online Performance Monitor Services Architecture & RMF Distributed Data Server API
GT- In-House Developed Online Performance Monitor Services Architecture & RMF Monitor III DDS


Published Interface available to cics;db2;mvs syprgs To create reports they want
How Do We Know Which HTTP Request To Use In .net Program?

How Do We Know Which HTTP Request To Use In .net Program?

Inside the program, HTTP Request


is used to get the data below
How Can We See Which Metrics Are Available In RMF Data Portal?

1/3.

RMF Monitor III Data Portal for z/OS

Explore
Overview
My View
Home

Welcome, you are connected to: ,PPLEX,SYSPLEX

Click On Metrics

2/3.

Children of: ,PPLEX,SYSPLEX

Click On Metrics
How Can We See Which Metrics Are Available In RMF Data Portal?

RMF Monitor III Data Portal for z/OS

<table>
<thead>
<tr>
<th>Metric Description</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical processors shared (IFL) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Logical processors shared (IP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors dedicated (AAP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors dedicated (CP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors dedicated (IIP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors online (AAP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors online (CP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors online (IIP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with high share (AAP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with high share (CP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with high share (IIP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with low share (AAP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with low share (CP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with medium share (AAP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with medium share (CP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Processors with medium share (IIP) by partition</td>
<td>BD3430</td>
</tr>
<tr>
<td>Actual MSU (CP) by partition</td>
<td>BD2F50</td>
</tr>
<tr>
<td>LPAR weight (AAP) by partition</td>
<td>BD3F40</td>
</tr>
<tr>
<td>LPAR weight (CP) by partition</td>
<td>BD3F70</td>
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<td>LPAR weight (IIP) by partition</td>
<td>BD3F40</td>
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<tr>
<td>LPAR weight (ICF) by partition</td>
<td>BD3F40</td>
</tr>
<tr>
<td>LPAR weight (ICF/LAAP) by partition</td>
<td>BD3F40</td>
</tr>
<tr>
<td>LPAR weight (IPL) by partition</td>
<td>BD3F40</td>
</tr>
<tr>
<td>LPAR weight (IPL) by partition</td>
<td>BD3F40</td>
</tr>
</tbody>
</table>
GT - Online Performance Monitor Services – Main Panel
GT- Online Performance Monitor Panels -1

PR/SM LPAR Weight Enforcement Algorithms Used To Calculate
As IRD changes actual Weights, these values will be changed too.

LPAR’s Actual CEC Utilization %
Page Refresh in 1 min period
PART III

GT In-House Developed Online Performance Monitor Services
MORE PERFORMANCE ALERTS
Where/When And How Alerts Are Created?

When Data is read from mainframe & written to SQL tables:
“Threshold Definitions Are Checked HERE!”

ANY FIELD IN RMF Mon III Can Be a Trigger For An Alert
(RMF WTO Mechanism Can Do Same At Some Level)
Checking CPU Usage Of System AS

From: Performans Yönetimi - Online Monitoring Uygulaması [PerfMonAlerts@garanti.com.tr]
To: Meral Temel (Garanti Teknoloji)
Cc: Meral Temel (Garanti Teknoloji)
Subject: Address Space CPU kullanımı artışı!! *MASTER* (PRDB), (Max Değer:19), Gerçekleşen: 40.9

Address Space CPU kullanımı son 1 ay max değerini aştı. *MASTER* (PRDB), (Max Değer:19), Gerçekleşen: 40.9

06.08.2011 07:32:11

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz
CPU Delay değeri belirlenen değeri geçti.
(PRDB-RGARCPRT), (Max Değer: %90), Gerçeklesen: 100%

01.08.2011 10:16:48

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz

Bu mail adresi bilgilendirme amaçlıdır, lütfen reply yapmayıniz...
CPU Delay değeri belirlenen değeri geçti.
(PRDB-RGARCPRT),(Max Değer: %90), Gerçekleşen: 100%

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz

Bu mail adresi bilgilendirme amaçlıdır, lütfen reply yapmayınız...
Checking CPU Usage Of DB2 AS

From: Performans Yönetimi - Online Monitoring Uygulaması [PerfMonAlerts@garanti.com.tr]
To: Meral Temel (Garanti Teknoloji)
Cc: Meral Temel (Garanti Teknoloji)
Subject: Address Space CPU kullanımı artışı!! PDA2IRLM (PRDA), (Max Değer: 3.5), Gerçekleşen: 7

Address Space CPU kullanımı son 1 ay max değerini aştı.
PDA2IRLM (PRDA), (Max Değer: 3.5), Gerçekleşen: 7

31.07.2011 04:29:07

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz

Bu mail adresi bilgilendirme amacılıdır, lütfen reply yapmayınız...
Checking CF Utilization %

From: Performans Yönetimi - Online Monitoring Uygulaması [PerfMonAlerts@garanti.com.tr]
To: Meral Temel (Garanti Teknoloji)
Cc: Emre Aliakar (Garanti Teknoloji)
Subject: CF Utilizasyonu Belirlenen Degeri (PCF1GAR1), (Max Değer: %25), Gerçekleşen: % 46.6

CF Utilizasyonu Belirlenen degerini gecti
(PCM1GAR1), (Max Değer: %25), Gerçekleşen: % 46.6

19.07.2011 22:02:40

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz

Bu mail adresi bilgilendirme amacılıdır, lütfen reply yapmayınız...
Checking CPU Delay% Of Service Classes

From: Performans Yönetimi - Online Monitoring Uygulaması [PerfMonAlerts@garanti.com.tr]
To: Meral Temel (Garanti Teknoloji); Adem Arslan (Garanti Teknoloji)
Cc: Emre Aliakar (Garanti Teknoloji)
Subject: CPU Delay değeri belirlenen değeri geçti. (PRDB-SCICMED),(Max Değer: %90), Gerçekleşen: 100%

CPU Delay değeri belirlenen değeri geçti.
(PRDB-SCICMED),(Max Değer: %90), Gerçekleşen: 100%

01.08.2011 11:37:58

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz

Bu mail adresi bilgilendirme amacıyla, lütfen reply yapmayınız...
Checking DFW ByPass Value

From: Performans Yönetimi - Online Monitoring Uygulaması [PerfMonAlerts@garanti.com.tr]
To: Meral Temel (Garanti Teknoloji)
Cc: Meral Temel (Garanti Teknoloji)
Subject: Disklerde NVS cache i bypass etmek zorunda kalan I/O lar olustu. (P2lx62-4c0e) 80 adet I/O request NVSi bypass etmek zorunda kaldı.

Disklerde NVS cache i bypass etmek zorunda kalan I/O lar olustu. (P2lx62-4c0e) 80 adet I/O request NVSi bypass etmek zorunda kaldı.

14.07.2011 07:02:40

http://SLM adresinde 'On-Line Monitoring' menüsünden takip edebilirsiniz

Bu mail adresi bilgilendirme amaçlıdır, lütfen reply yapmayınız...
SMF113 Related Alerts - CPI

Online Period Intervals That is > That LPAR’s Characteristic CPI Value

Online Period Average CPI (Cycle Per Instruction) Values

Z196 Upgrade
### SMF113 Related Alerts - CPI Thresholds

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>z10CPI</th>
<th>z196CPI</th>
<th>%Decrease</th>
<th>SYSTEM</th>
<th>z10CPI</th>
<th>z196CPI</th>
<th>%Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRDA</td>
<td>11.2</td>
<td>5.3</td>
<td>52.3</td>
<td>PRDA</td>
<td>18.1</td>
<td>7.4</td>
<td>59.4</td>
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<td>PRDB</td>
<td>6.5</td>
<td>4.7</td>
<td>28.6</td>
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<td>8.5</td>
<td>5.7</td>
<td>32.6</td>
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<td>PRDC</td>
<td>9.7</td>
<td>5.7</td>
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<td>14.3</td>
<td>8.2</td>
<td>42.3</td>
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<td>PRDD</td>
<td>7.2</td>
<td>5.1</td>
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<td>PRDD</td>
<td>10.7</td>
<td>7.7</td>
<td>28.0</td>
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<tr>
<td>PRDE</td>
<td>10.4</td>
<td>5.0</td>
<td>51.4</td>
<td>PRDE</td>
<td>9.1</td>
<td>6.2</td>
<td>31.3</td>
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<td>PRDF</td>
<td>6.1</td>
<td>4.6</td>
<td>25.0</td>
<td>PRDF</td>
<td>10.0</td>
<td>5.0</td>
<td>50.0</td>
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<tr>
<td>PRDG</td>
<td>6.4</td>
<td>5.0</td>
<td>21.9</td>
<td>PRDG</td>
<td>8.2</td>
<td>5.4</td>
<td>34.8</td>
</tr>
<tr>
<td>PRDW</td>
<td>6.2</td>
<td>4.4</td>
<td>28.7</td>
<td>PRDW</td>
<td>7.2</td>
<td>4.6</td>
<td>35.8</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>8.0</strong></td>
<td><strong>5.0</strong></td>
<td><strong>37.5</strong></td>
<td><strong>Average</strong></td>
<td><strong>10.8</strong></td>
<td><strong>6.3</strong></td>
<td><strong>41.6</strong></td>
</tr>
</tbody>
</table>
Other Alerts

CF Requests > Normal Workload Values – Online /Batch Alert

Channel Utilization > 30% & Above Normal Workload Values Alert

Average Structure Async Request % > Normal Workload Values Alert

Average Structure Delay Request % > 10% Alert
Checking Last 1 Week DFW ByPass Value

Dasd Fast Write Bypass
30-07-2011 - 06-08-2011

<table>
<thead>
<tr>
<th>stationname</th>
<th>time</th>
<th>even/odd</th>
<th>Value</th>
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<tbody>
<tr>
<td>4100</td>
<td>30-07-2011 09:00</td>
<td>Even</td>
<td>4194</td>
</tr>
<tr>
<td>4100</td>
<td>01-08-2011 13:15</td>
<td>Even</td>
<td>1399</td>
</tr>
<tr>
<td>4100</td>
<td>05-08-2011 19:00</td>
<td>Even</td>
<td>3710</td>
</tr>
</tbody>
</table>
Sample SMF Records – CF Report

AVERAGE CF REQUEST RATE / WORKLOAD

20-06-2011

System 924,570,947 — 11.86%
MQSeries 275,730,417 — 3.54%
DB2 Lock & SCA 3,022,086,969 — 38.85%
DB2 Group BufferPool 3,424,756,173 — 44.00%
CICS 131,556,846 — 1.69%
PR/SM LPAR Weight Enforcement Algorithms Used To Calculate

As IRD changes actual Weights, these values will be changed too.
CPU Captured/Uncaptured - RMF Mon III Data

SQL Server Reporting Services
Home > SLM > MAINFRAME > MVS > CPUDOT >
CPU_Captured_Uncaptured

New Subscription

Date  8/10/2011  

09:00

t2  18:00

LPAR  PRDA

PRDA

0.00 %  10.00 %


0.00 %  2.00 %  4.00 %  6.00 %  8.00 %  10.00 %

UnCaptured Ratio
Channel Utilization – One LPAR Peak Day

01/08/2011 14:10 - 01/08/2011 15:10
Calculating Actual Throughput

### New Subscription

<table>
<thead>
<tr>
<th>Date1</th>
<th>Date2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time1</th>
<th>Time2</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>18</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Date3</th>
<th>Date4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/31/2011</td>
<td>2/1/2011</td>
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</table>

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### Actual Throughput - Relative ITR Difference

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<tr>
<th>System</th>
<th>Before Avg Oran (03.01.2011-03.01.2011)</th>
<th>After Avg Oran (31.01.2011-01.02.2011)</th>
<th>After/Before Relative ITR Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRDA</td>
<td>261</td>
<td>267</td>
<td>1.02</td>
</tr>
<tr>
<td>PRDB</td>
<td>204</td>
<td>250</td>
<td>1.23</td>
</tr>
<tr>
<td>PRDC</td>
<td>225</td>
<td>303</td>
<td>1.35</td>
</tr>
<tr>
<td>PRDD</td>
<td>233</td>
<td>291</td>
<td>1.25</td>
</tr>
<tr>
<td>PRDE</td>
<td>273</td>
<td>292</td>
<td>1.07</td>
</tr>
<tr>
<td>PRDF</td>
<td>271</td>
<td>439</td>
<td>1.62</td>
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<tr>
<td>PRDG</td>
<td>253</td>
<td>356</td>
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<tr>
<td>PRDW</td>
<td>370</td>
<td>549</td>
<td>1.48</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine ID</th>
<th>Before Avg Oran (03.01.2011-03.01.2011)</th>
<th>After Avg Oran (31.01.2011-01.02.2011)</th>
<th>After/Before Relative ITR Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAR1</td>
<td>265</td>
<td>362</td>
<td>1.36</td>
</tr>
<tr>
<td>GAR2</td>
<td>257</td>
<td>325</td>
<td>1.26</td>
</tr>
</tbody>
</table>
SQL Server & Queries

```
SELECT AVG(tappl) as Atappl, [Date], [Jobname]
FROM [OnlineMonitor].[dbo].[CPUUsage__Hist]
WHERE
jobname ilike '%IRLM' AND
(( [Date] >= CONVERT(DATETIME, '2010-11-30 00:00:00', 102) ) AND
([Date] <= CONVERT(DATETIME, '2011-01-10 00:00:00', 102) ) OR
([Date] >= CONVERT(DATETIME, '2011-1-30 00:00:00', 102) ) AND
([Date] <= CONVERT(DATETIME, '2011-4-10 00:00:00', 102) ) AND
(DATEPART(week,Date) IN (2, 3, 4, 5, 6) ) AND
```
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www.share.org      www.acm.org

http://www-03.ibm.com/servers/eserver/zseries/zos/rmf/
www.watsonwalker.com http://www.sherkow.com/
http://www-03.ibm.com/systems/z/advantages/management/srm/
Thank You!