SAP Performance Assessment

SAP R/3 Performance Optimization –

Findings & Recommendations

by OZSoft Consulting Corp.

January-1st, 2010

V1.0

Objectives

- Conduct top-down assessment of the R/3 Production system performance

- Identify Short-term "Get the house in order" action items to improve performance

- Establish Medium-term plan to improve performance management process

Content

- **Top-down Assessment**
  - Reviewed performance reports from SAP CCMS, Application analysis, and long-term trending reports
- **Short term Optimization Project Goals**
  - Initial findings presented and prioritized top recommendations in the following areas:
    - SAP memory management,
    - Workload redistribution
    - App server consolidation/rebalancing,
- **Next Step Recommendations**
  - System resources
  - Performance management processes & tools (IT-Conductor and/or SAP Management Pack for SCOM)

Overall Performance by IT-Conductor
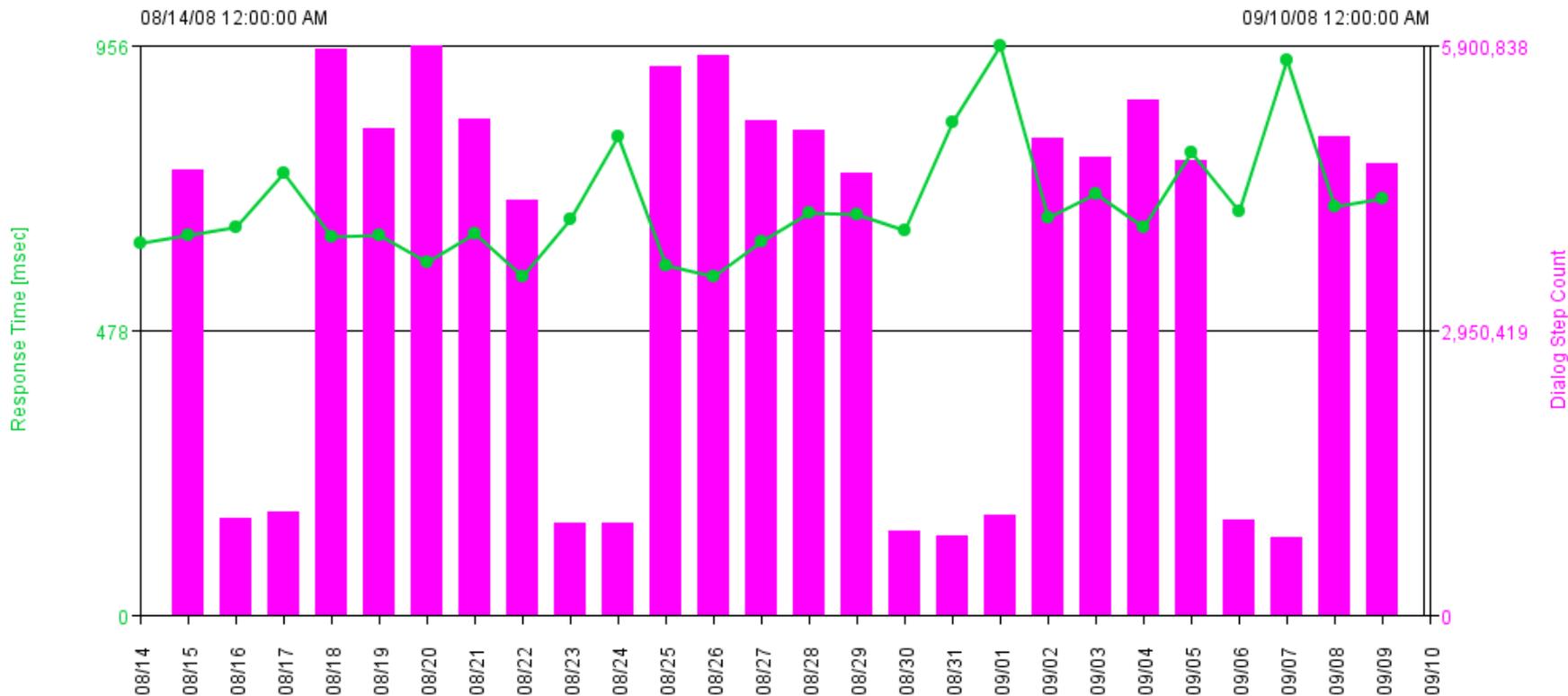
- Dialog Response Times within Baseline threshold

Overall Performance by IT-Conductor

Response Time Trends

Avg. Resp. Times (ms) by Task Types

Legend: TOTAL, DIALOG, RFC, UPDATE, UPDATE2, ALE, SPOOL, BCKGRD
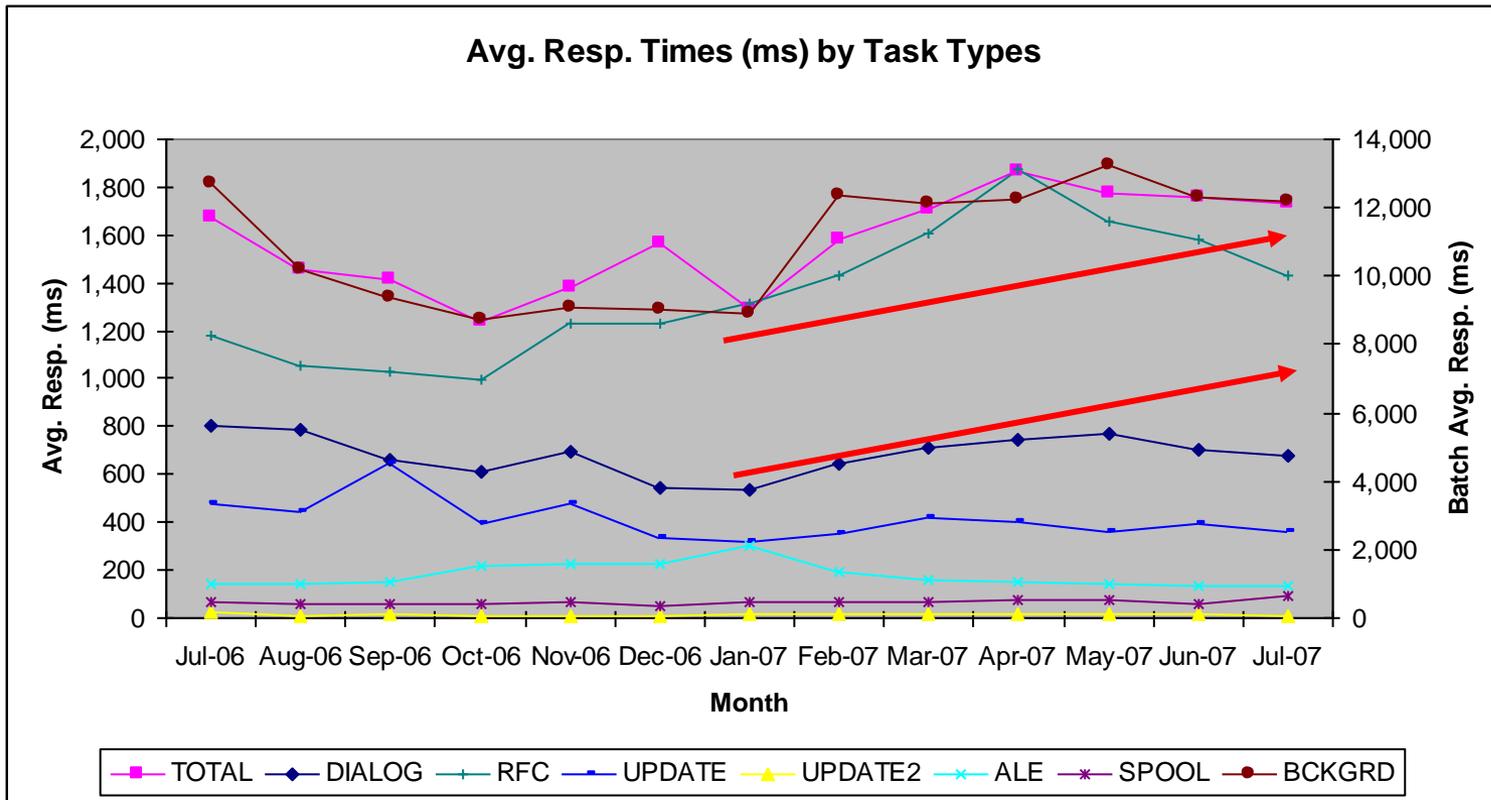
- Since Dec-06:
  - 20-25% increase in average response times for Total, Batch, Dialog and RFC
- Response time impacts are correlating to increasing Batch and RFC/ALE Workload
- **Recommendation**:
  - Isolate Batch to separate application servers
  - Isolate RFC/ALE to separate application servers

Workload Trends
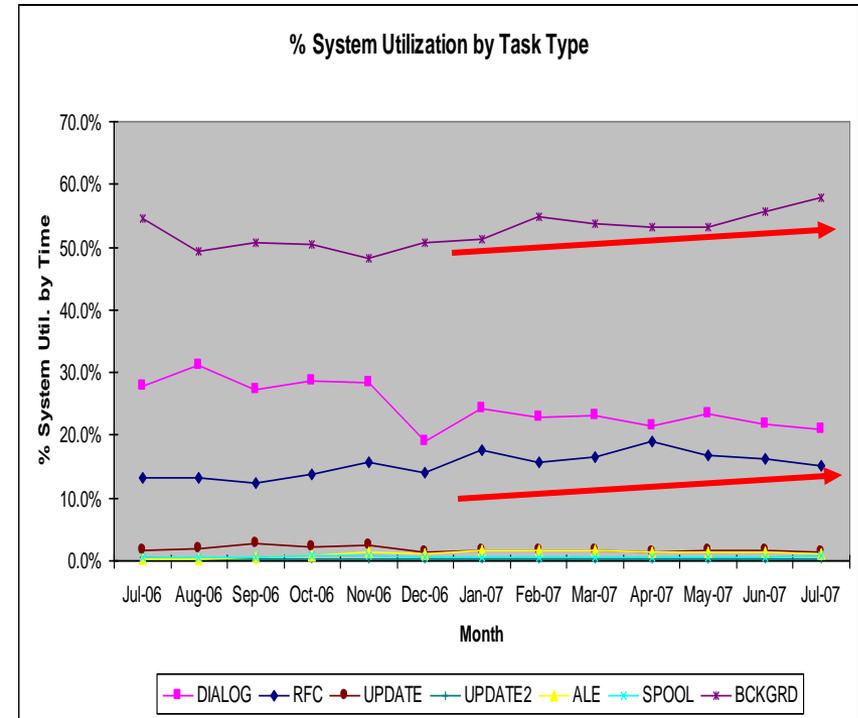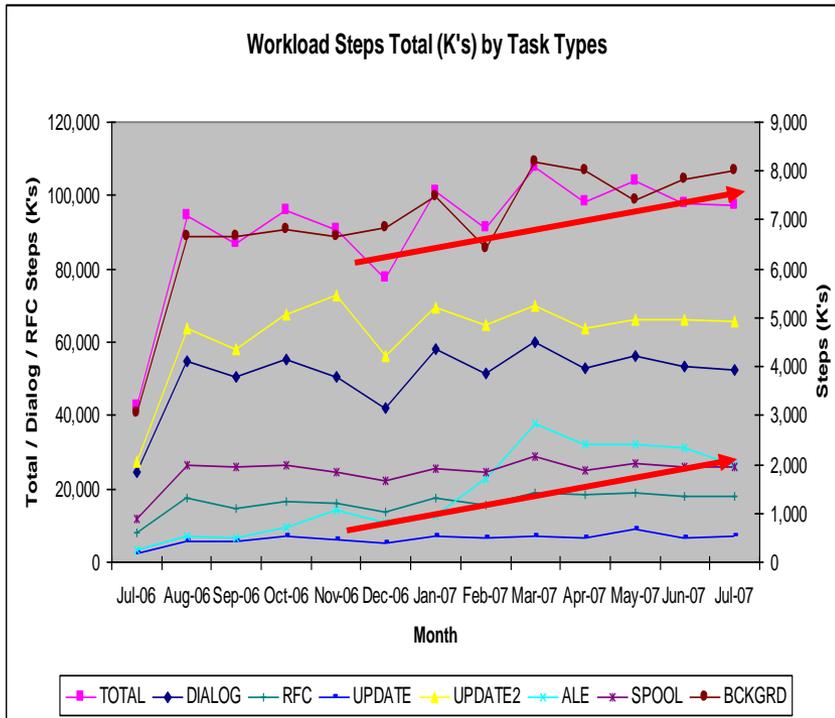
- **Batch** is more than 55% of Total system utilization and trending higher
- **RFC** and **ALE** is more than 15% of Total system utilization and trending higher
- **Dialog** is about 20% of Total system utilization and is stable
- Response time impacts are correlating to increasing Batch and RFC/ALE Workload

DB Request Trends

Avg. DB Req. Times (ms) by Task Types

Avg. DB Req. per Work Step by Task Types

Legend: TOTAL — DIALOG — RFC — UPDATE — UPDATE2 — ALE — SPOOL — BCKGRD
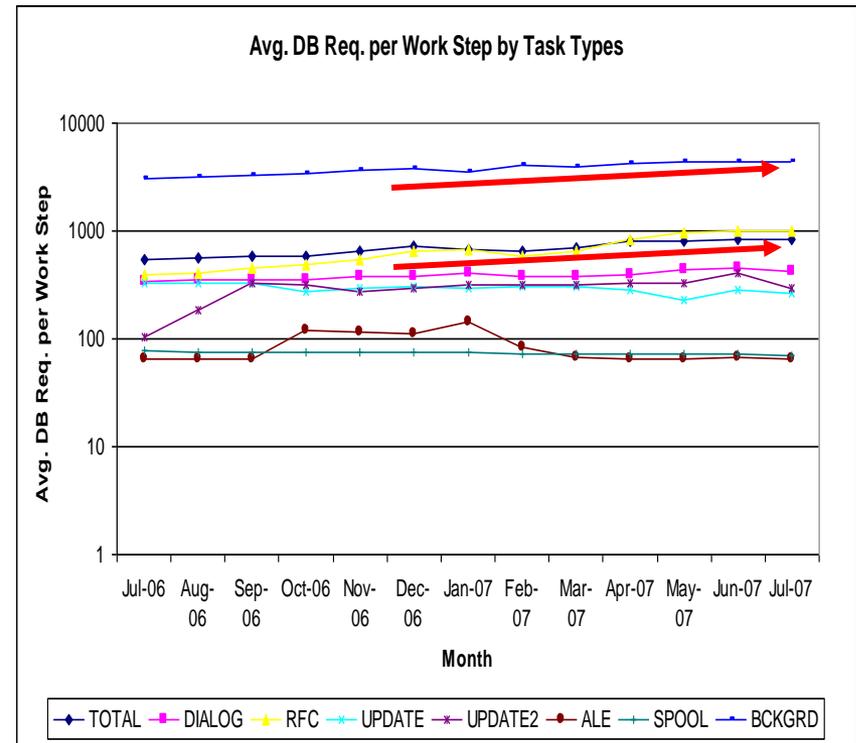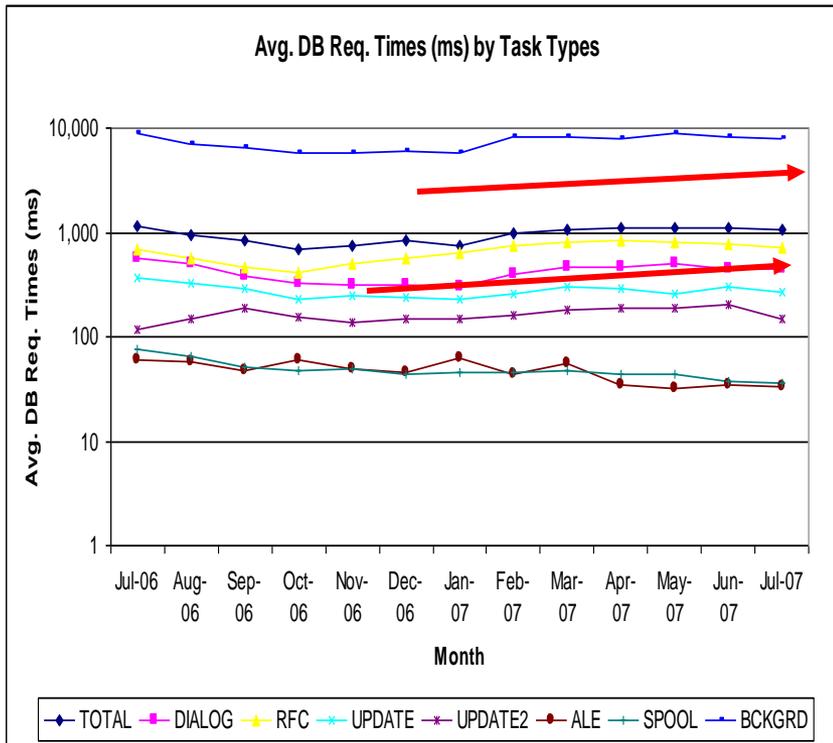
- Since Feb-2007:
  - The average DB request times and associated requests per work step has been trending higher about 15-20% for Batch, Dialog and RFC
- Response time impacts are correlating to increasing DB Workload
- **Recommendation**:
  - Remove all Batch Input (BDC's) and RFC from the Central Instance server to free resources to service DB requests
  - Increase IO-subsystem's performance, and/or analyze tables/indices with high req. times

Wait Time Trends

Avg. Wait Times (ms) by Task Types
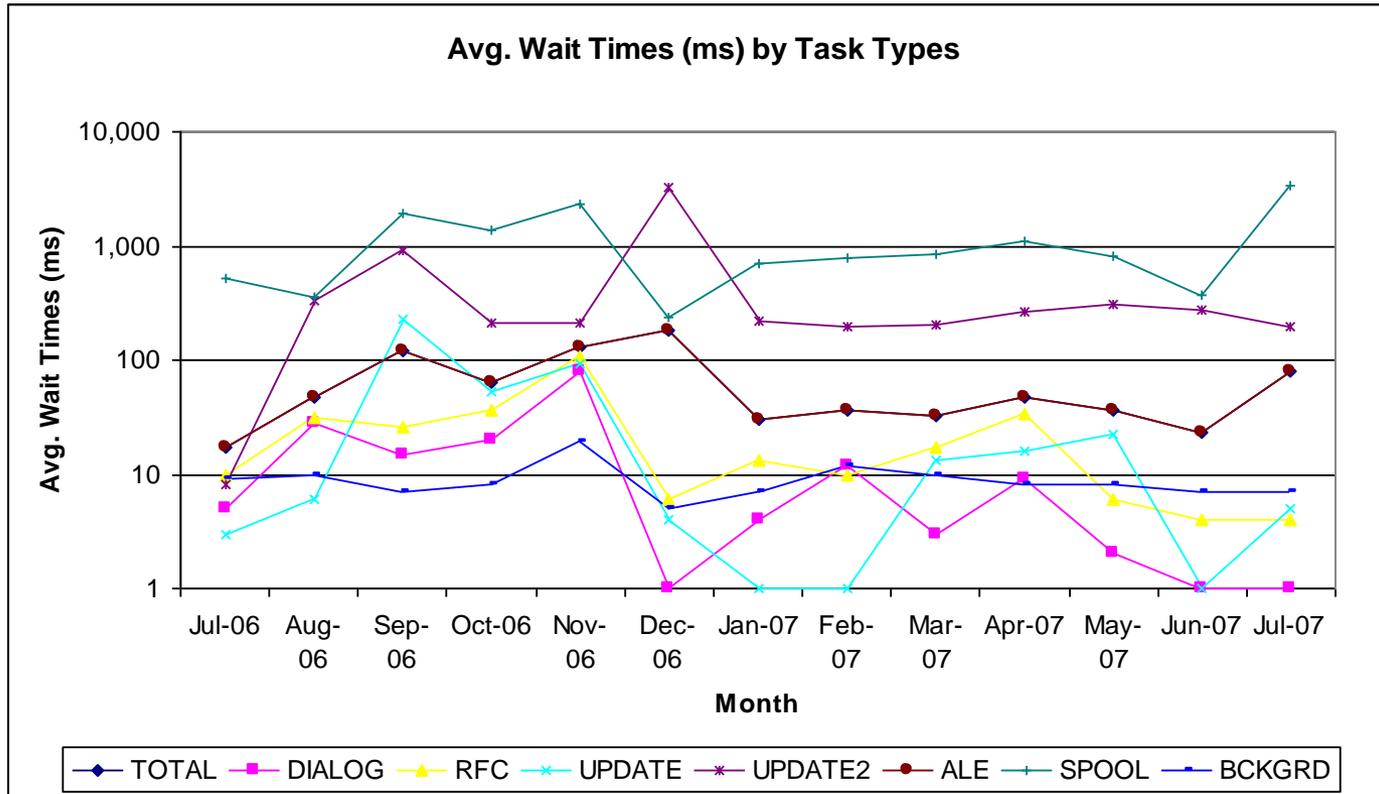
- Wait times are relatively high for RFC, ALE, SPOOL, UPDATE and UPDATE2 in comparison with DIALOG and BATCH

- **Recommendation**:
  – Isolate RFC & ALE workloads to separate application servers
  – Increase UPDATE and UPDATE2 processes on each application server

Memory Management

System: p10-a1_P10_11
Date & time of snapshot: 08/07/2007 16:34:34   Tune summary   Startup: / /   : :

Buffer	Hitratio [%]	Allocated [kB]	Free space [kB]	[%]	Dir. size Entries	Free directory Entries	[%]	Swaps	Database accesses
Nametab (NTAB)									
Table definition	96.46	25,742	13,514	68.16	108,000	73,606	68.15	0	30,491,100
Field description	100.00	122,438	15,782	13.84	108,000	75,142	69.58	0	43,670
Short NTAB	100.00	5,875	938	37.52	27,000	20,506	75.95	0	6,619
Initial records	100.00	12,015	1,788	20.69	27,000	1,493	5.53	0	25,788
Program	99.96	1,500,000	6,490	0.46	375,000	337,648	90.04	52,341	747,537
CUA	99.99	30,000	5,052	19.25	15,000	8,362	55.75	0	6,819
Screen	99.99	142,560	110,611	77.97	12,000	10,454	87.12	0	7,551
Calendar	100.00	488	366	76.73	200	78	39.00	0	610
OTR	100.00	4,096	3,592	100.00	2,000	2,000	100.00	0	0
Tables									
Generic key	99.98	301,641	16,842	6.46	180,000	22,806	12.67	231	4,004,271
Single record	99.79	124,800	72,198	57.94	500	301	60.20	682	1,806,383
Export/import	80.64	256,000	113,168	48.99	100,000	2	0.00	1,017,010	0
Exp./Imp. SHM	96.91	4,096	3,568	99.33	2,000	1,999	99.95	0	0

SAP memory	Current use [%]	Max. use [kB]	In memory [kB]	On disk [kB]	SAP cursor cache	Hitratio [%]
Roll area	2.80	56,075	192,456	480,000	1,520,000	IDs	95.28
Paging area	2.34	146,929	4,193,720	1,200,000	5,091,456	Statements	98.00
Extended Memory	30.86	5,177,344	14413,824	16777,216		
Heap Memory		104,537	9,532,769			

System: p10-a1_P10_11
Date & time of snapshot: 08/07/2007 16:34:34   SAP memory: Startup:

Dialog tasks

Step	Memory Type	Amount [kB]
1	Roll	0
2	Extended	80,000
3	Roll	8,000
4	Heap	2,929,688

Non-dialog tasks

Step	Memory Type	Amount [kB]
1	Roll	0
2	Extended	80,000
3	Roll	8,000
4	Heap	3,906,250

Tune These

- **Recommendation**:
  - Increase Program Buffer (PXA) to 3GB to reduce program swap and load times
  - Increase Generic Key Table buffer and directory entries. Double the current value
  - Increase Single record buffer and directory entries. Double the current value
  - Increase the Export/import buffer and directory entries. Double the current value
  - Increase the ztta/roll_extension for both dialog and non-dialog tasks to allow >1GB processing without going to PRIV mode (Heap – private memory), which should allow faster and more efficient dispatching and context switching.

Memory Management (Cont'd)

Instance	TOTAL			First record	08/02/2007	00:00:00
Period	08/02/2007			Last record	08/02/2007	23:59:59
Task type	All			Time period	0 Day(s)	23:59:59

Transactions | User

Task type

Memory Usage: Transactions, # Number, Memory Usage (kB)

Report or Transaction name	Name of Background Job	Ø Private Memory(KB)	Max.Private Mem.(KB)	WP Sta...
S_BCE_68001400		52,966	454,174	8,602
Y_D50_32000072		76,669	88,964	7,645
SM37		42,193	248,388	3,039
Y_D50_32000039		139,739	474,272	2,327
SE16		49,052	284,556	1,744
IH08		11,363	34,586	1,483
SM30		2,922	578,040	972
Y_D50_32000089		17,459	476,078	778
VA02		501	96,378	440
Y_D50_32000092		13,956	495,620	438
VK13		37,777	164,489	396
RFC		44	365,689	368
MMBE		958	102,862	364
RKAEP000		100,769	222,697	310
SBWP		2,518	96,378	310
Y_D50_32000075		5,524	440,855	271
ZCONF		5,019	102,862	262

- Too many process restarts due to PRIV mode processing in private Heap memory
- **Recommendation**:
  - Increase the ztta/roll_extension for both dialog and non-dialog tasks to allow 1GB processing without going to PRIV mode (Heap – private memory), which should allow faster and more efficient dispatching and context switching.

Real-time Performance Baseline by IT-Conductor

IT-Conductor®1.1   Session: Nguyen, Linh   12/11/2008 01:16 AM   Eastern Standard Time   Log Out

Home   **Actions**   **Administration**   **Configuration**   **Management**   **My Objects**   **Charts**

P10 Performance Baseline

Weeks ▼   ◀◀ ◀ 12/14/08 12:00:00 AM   Set ▶ ▶▶

P10 Performance Baseline

Component		11/02	11/09	11/16	11/23	11/30	Latest 12/07
ALL	Wait Time, msec	0	0	0	0	0	0
	Dialog Step Count	30,616,916	30,362,720	31,047,320	21,865,816	30,869,238	18,242,636
	Total Memory, KB	5,577,446,407	5,692,211,381	5,909,978,314	3,781,959,483	5,660,402,606	3,592,359,595
	DB Time, msec	319	271	304	325	366	351
	Response Time, milliseconds	561	511	575	630	657	664
	CPU Time, msec	108	107	120	128	120	117
	GUI Network Time, msec	0	0	0	0	0	0
Business Apps	Average Response Time, ms		1,299	1,314	1,773	1,373	832
BW Jobs	Average Response Time, ms	589,617	515,551	534,624	490,506	760,019	442,656
Finance	Average Response Time, ms	5,777	6,171	5,992	6,681	4,646	628
Human Resources							351
Manufacturing							453
TOP TCODE CPU							9,298
TOP TCODE Memo							45,512,995
Troubleshooting TC							144

IT-Conductor®1.1   Session: Nguyen, Linh   12/11/2008 01:20 AM   Eastern Standard Time   Log Out

Home   **Actions**   **Administration**   **Configuration**   **Management**   **My Objects**   **Charts**

P10 Performance Baseline

Weeks ▼   ◀◀ ◀ 12/14/08 12:00:00 AM   Set ▶ ▶▶

P10 Performance Baseline

Component		11/02	11/09	11/16	11/23	11/30	Latest 12/07
SBIE0001*	Average KBytes Requested, KB	54,269	128,771	72,645		143,557	52,634
	Average DB Time, msec	50,042	136,941	107,678		534,992	190,033
	Average Reponse Time, msec	73,343	225,559	165,018		955,040	307,282
	Average CPU Time, msec	5,386	18,388	13,617		69,419	25,351
	Total Dialog Steps	16,665	7,843	5,703		957	1,806
	Average Wait Time, msec	14	25	35		76	38
Z*BW*	Average KBytes Requested, KB	45,941,961	44,567,840			47,647,959	19,852,483
	Average DB Time, msec	600,953	551,375			537,624	611,553
	Average Reponse Time, msec	757,648	681,807			725,342	774,784
	Average CPU Time, msec	51,932	53,270			71,988	56,885
	Total Dialog Steps	571	583			893	209
	Average Wait Time, msec	0	0			0	0

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Real-time Performance Baseline by IT-Conductor
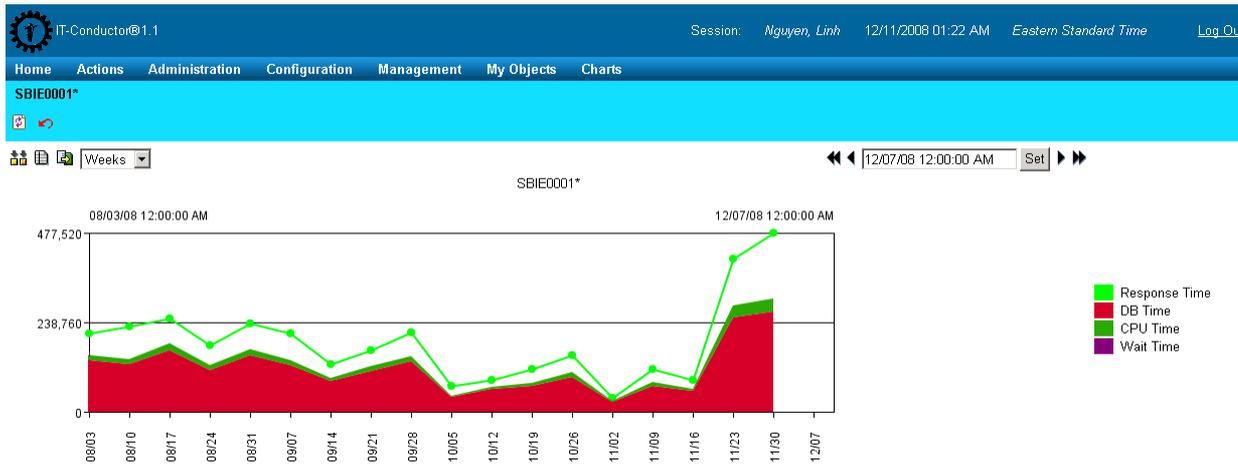
- Thresholds on critical business transactions or groups of transactions provide real-time reports and alerts, as well as troubleshooting via drill-down and timeframe comparisons

Recommendations Summary

- Short-term goals:
  - Re-align application servers into 3 types:
    - Dialog (3 servers)
    - RFC/ALE (2 servers)
    - Batch (4 servers)
  - Remove RFC/ALE workload from the Central Instance
  - Tune application server memory management
    - Reduce buffer swaps
    - Increase roll_extension to reduce PRIV modes
- Intermediate goals:
  - Monitor SAP network response times
  - Monitor DB accesses & IO-subsystem to identify opportunities for reducing sequential service times
  - Implement Application group transactional performance monitoring
  - Load test frequently for existing and new workloads
  - Custom Z* Application Tuning

Processes to Achieve the Grand Performance Plan

Process Services	Assess	Plan	Deploy	Maintain		
Performance Assessment	✔	**Rapid assessment & recommendations to "Get the House in Order"**				
TestFactory^{TM} **Consulting**	**Load Testing in "Promote to Production" Path**					
24x7Consult ^{SM} **Performance Taskforce**	✔	**24x7 Remote consulting to continually manage Performance**				
IT-Conductor^{TM} **Service Level Management**	**World class IT Process Automation to facilitate SAP Performance Level Reporting for Tuning support**					