容量规划

阿里巴巴 & 51Testing

第二十四期软件测试沙龙
（巡回沙龙杭州站）

Capacity Planning for mySAP ERP

Planning Ahead for the Future

This presentation provides you with guidelines how to forecast the system resources necessary for running mySAP ERP.

Capacity planning can mean applying different methods:

- **SAP's online sizing tool Quick Sizer**
- **Analyzing current and productive data profiles**
- **Applying initial and advanced sizing guidelines for simple applications but also complex scenarios**
- **Making use of SAP Notes on hardware requirements for new releases**

Agenda

Preliminaries

Capacity Planning Process

Capacity Planning

- with Quick Sizer
- using productive data (delta sizing)
- for upgrade sizing
- for special system landscapes
- for miscellaneous phenomena

Summary

Capacity Planning: Assumptions & Prerequisites

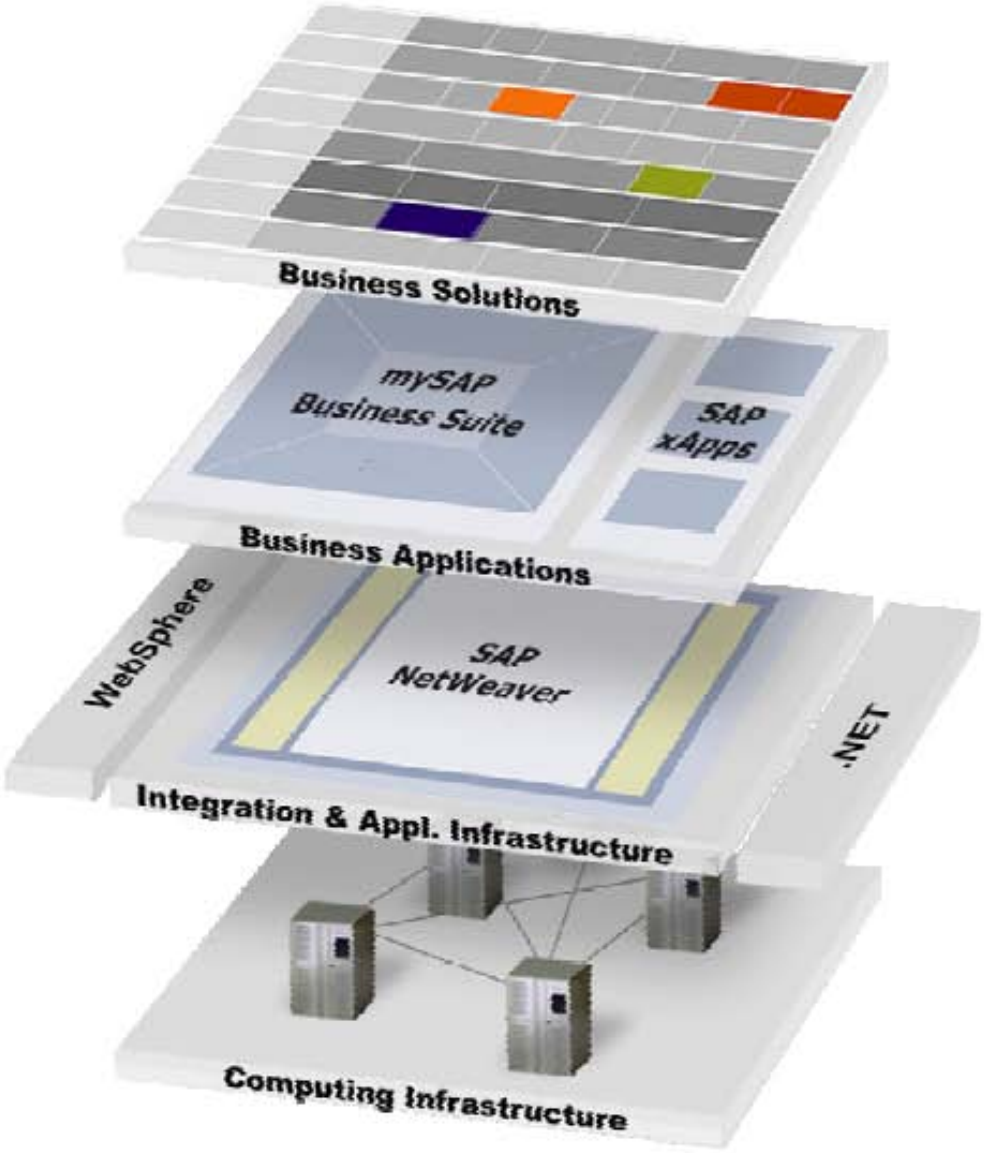
Assumptions

- The system is properly tuned for optimal performance
- The focus is laid on net consumption of business processes on hardware
  - Disk
  - Memory
  - CPU
  - Network load between application server and frontend
- Capacity planning motivation is the same - minimize the impact to end user productivity and its associated costs

A compromise

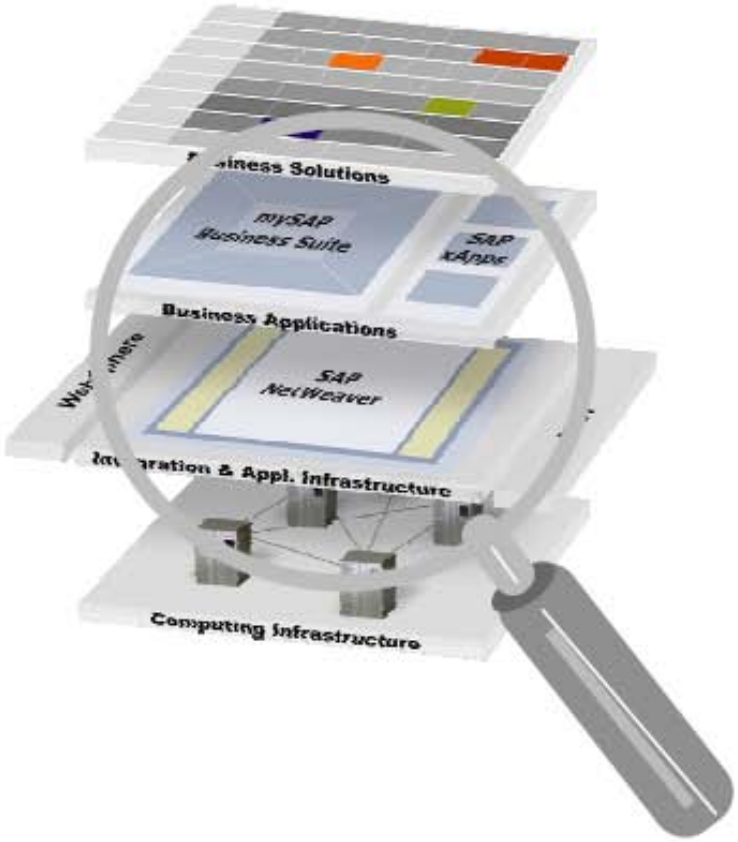
- Find the right balance between end user response times and hardware costs

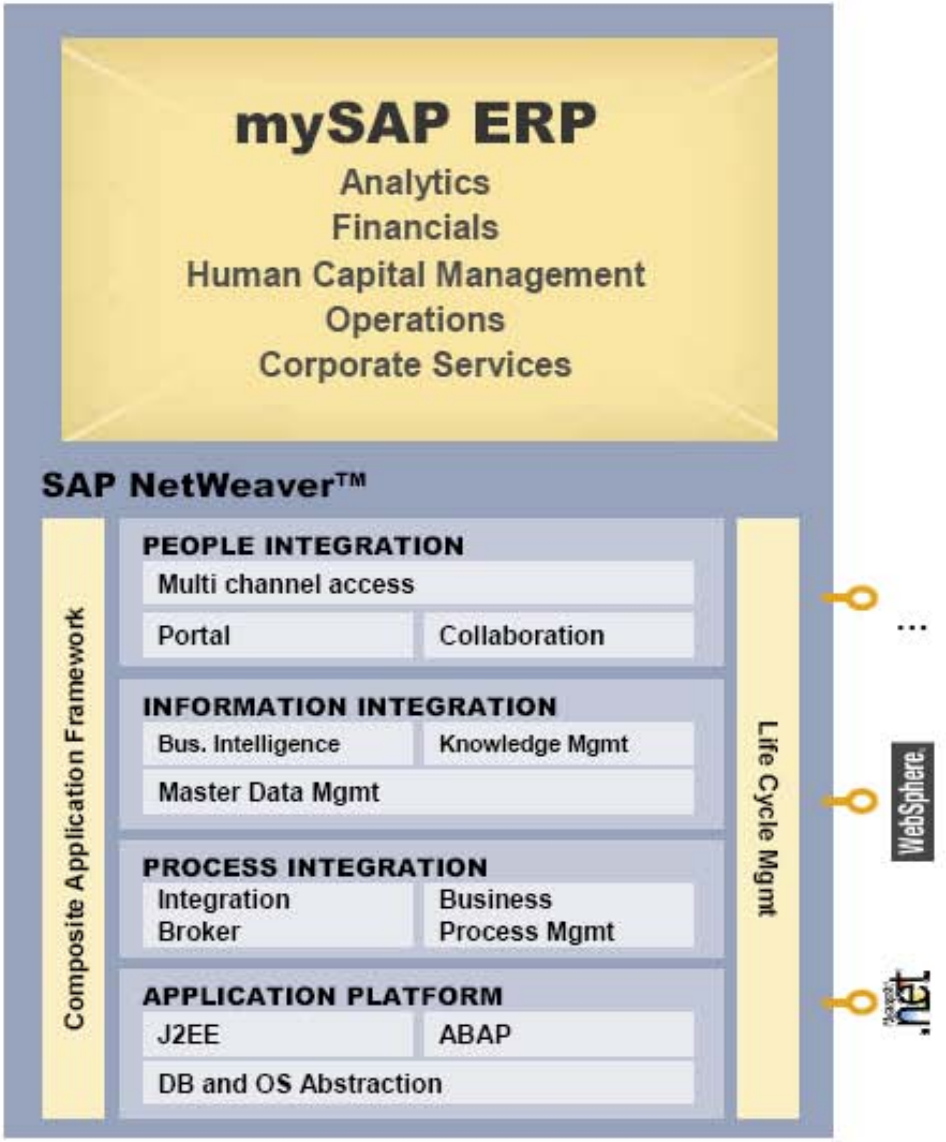
Enterprise Services Architecture
= Application Adoption of SAP NetWeaver



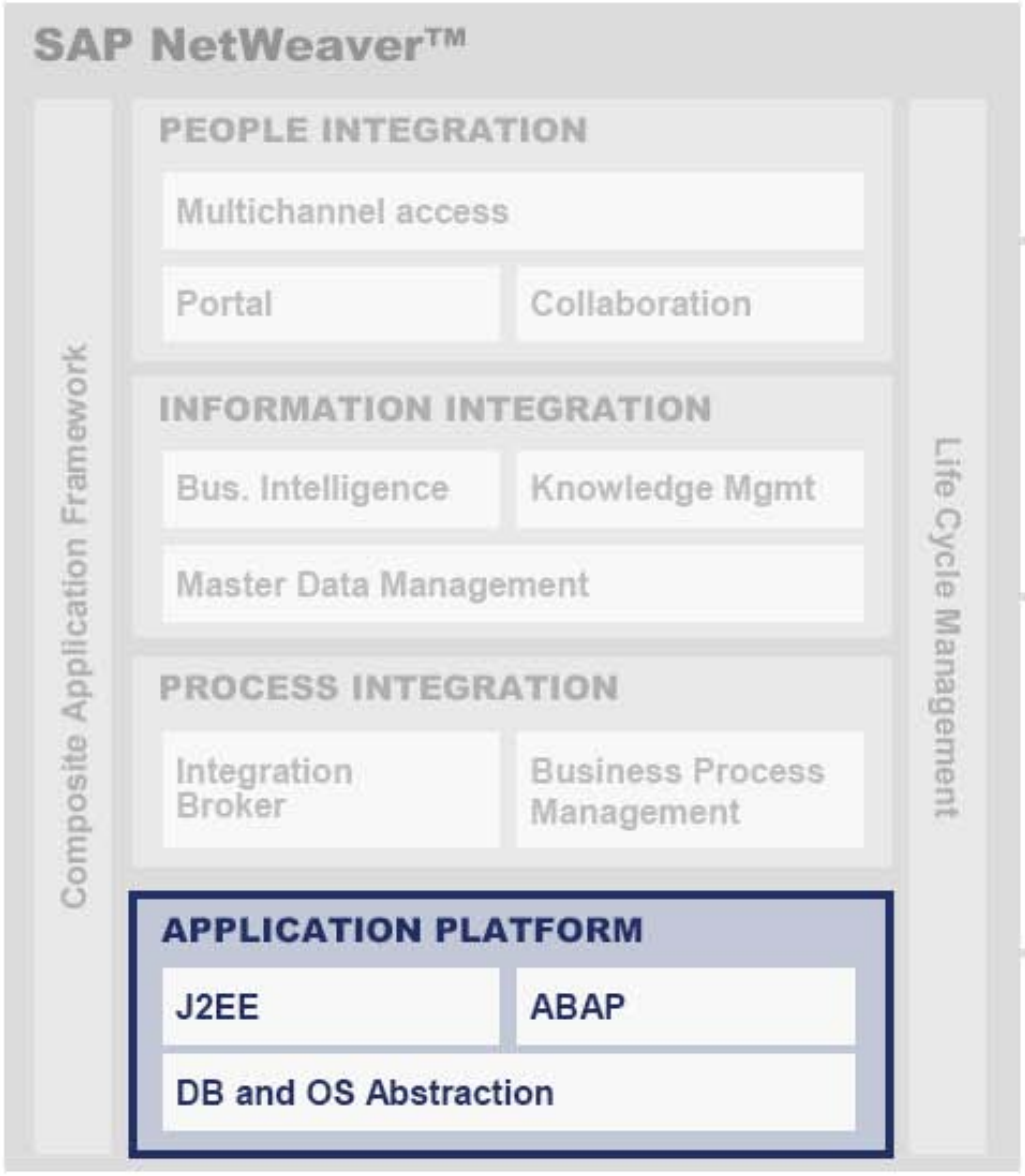
- Basic building block of adaptive enterprise
- Open technology standards
- Component oriented
- 'Web' Services based
- Flexible

Powered by SAP NetWeaver





SAP NetWeaver Application Platform



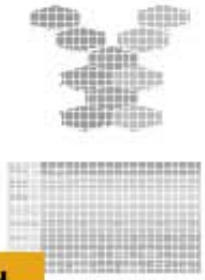
What it comes down to:

Business processes of different solutions finally all meet on the persistence layer causing standard operations such as INSERT, UPDATE, DELETE.

Sizing and Hardware Landscaping

PRIOR

Mapping business requirements to SAP solutions

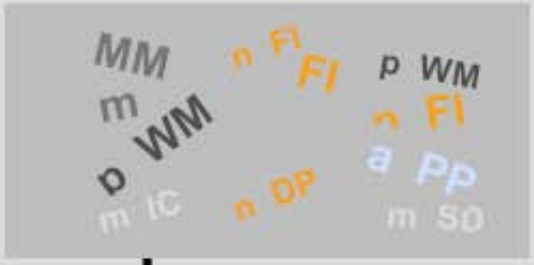


Business background

Key Processes and objects

Customers, partners, SAP in personal consulting

Translating business requirements into high-level technical requirements



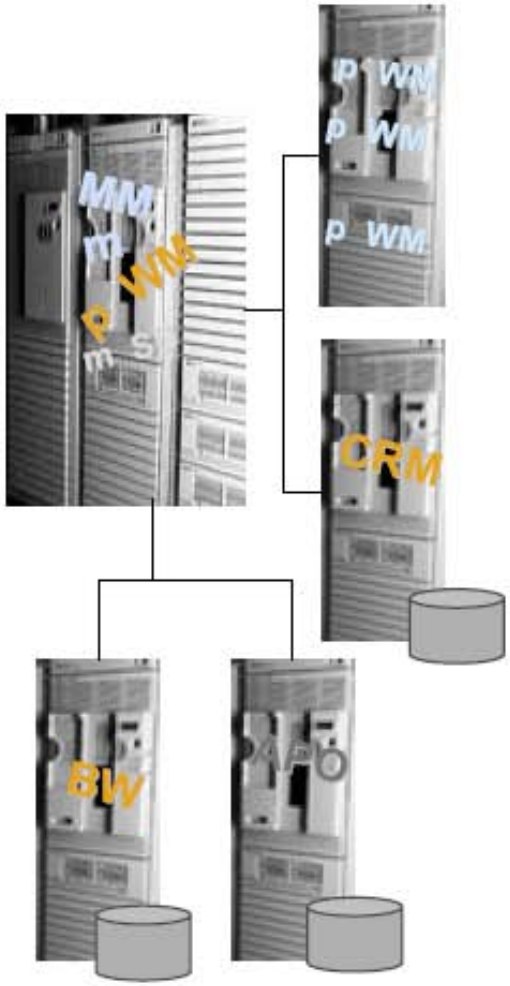
Sizing Tool & Algorithms

xxxx SAPS
yyyy Memory

Hardware independent server size

POSTERIOR

Implementing actual servers and infrastructure



Hardware vendors

Factors that Influence Sizing

SAP and Partner

- Software Version
- DB Version
- OS Version
- Hardware

Performance / Sizing

Throughput
Response Times

Customer

- Number of users
- Amount of Reporting / Batch
  - Reporting
  - Dialog / Batch
- Load profile
- Customizing

Scalability – Predict System Behavior

Small Test System,
One User

Forecast

Scalability

Thousands of Users

Terabytes of data

High throughput

Large objects

7*24h operation

Connected users worldwide

High Concurrency

Many Servers

Sizing Relevant Technical Requirements

Net Disk space

- Possible dependencies on OS and RDBMS are neglected

Memory

- Possible dependencies on OS and RDBMS are neglected

Network load between application and frontend

- Possible dependencies on OS, network protocol and network infrastructure are neglected

CPU (number and speed of necessary CPUs)

- Dependencies on processor speed and hardware architecture cannot be neglected, therefore there is an independent measurement unit, called SAPS

Introducing SAPS: Hardware Independent CPU Description

S AP

A pplication Benchmark

P erformance

S tandard

SD Benchmark

2,000 fully processed

order line items / hour*

100 SAPS

* ≙ 6,000 dialog steps and 2,000 postings *or* 2,400 SAP transactions

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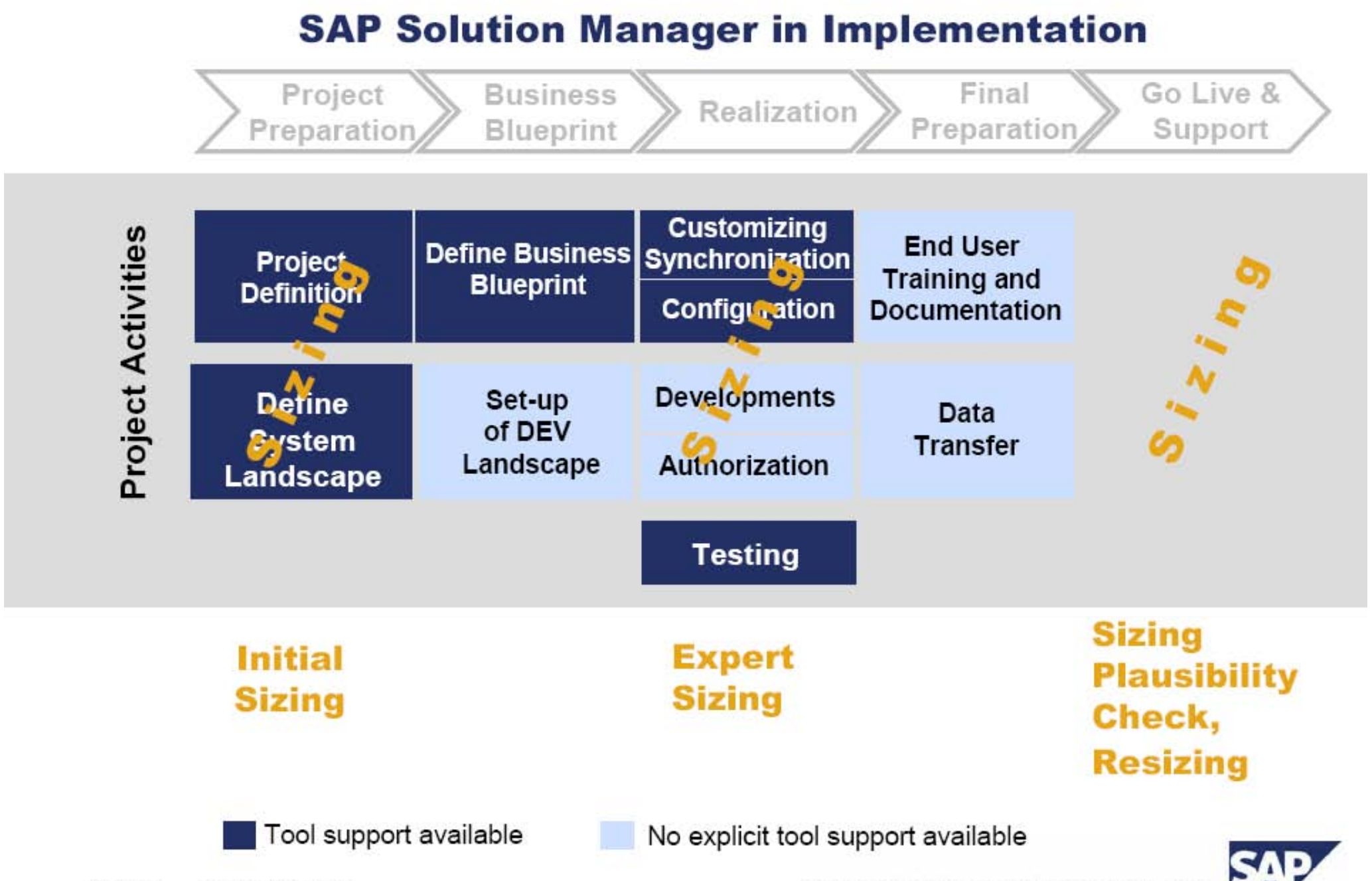
Summary

A Customer Can Perform More Than One Sizing



Available Sizing Methods and Tools

T-Shirt Sizing

- Simple algorithms with many assumptions

Formulas

- Simple or more complex

Offline Questionnaires

- For structured questions

Quick Sizer

- Based on users and throughput

Customer Performance Tests

For our sizing, we assume the following:

- There are no configurable products
- Group conditions are included

2.1 Sizing the IPC for the E-Selling B2B Scenario

In this case, we assume that customers enter the article numbers directly and only do one pricing step for the shopping basket.

Category	Up until # line items per hour	SAPS
Small	20,000	300
Medium	40,000	600
Large	80,000	1200
Extra Large	320,000	4800

The following formula is intended to give you a basic idea of what network load may be expected. Note, however, that we strongly recommend that you conduct measurements on the most important transactions yourselves.

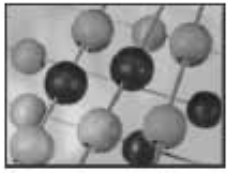
$C = X * N * D * 0.25$

The parameters are as follows:

- C: Bandwidth in kbps that is needed for the SAP GUI
- X: Amount of data per dialog step in kB
- N: Number of active users (independent of the number of sessions)
- D: Average number of dialog steps per minute per user*
- Numerical factor: ~0.25 = 8 (kb/kB) * 1.25 (protocol overhead) * 1/60 (mins) * safety factor 1.5* (response time, peak load, different technologies)

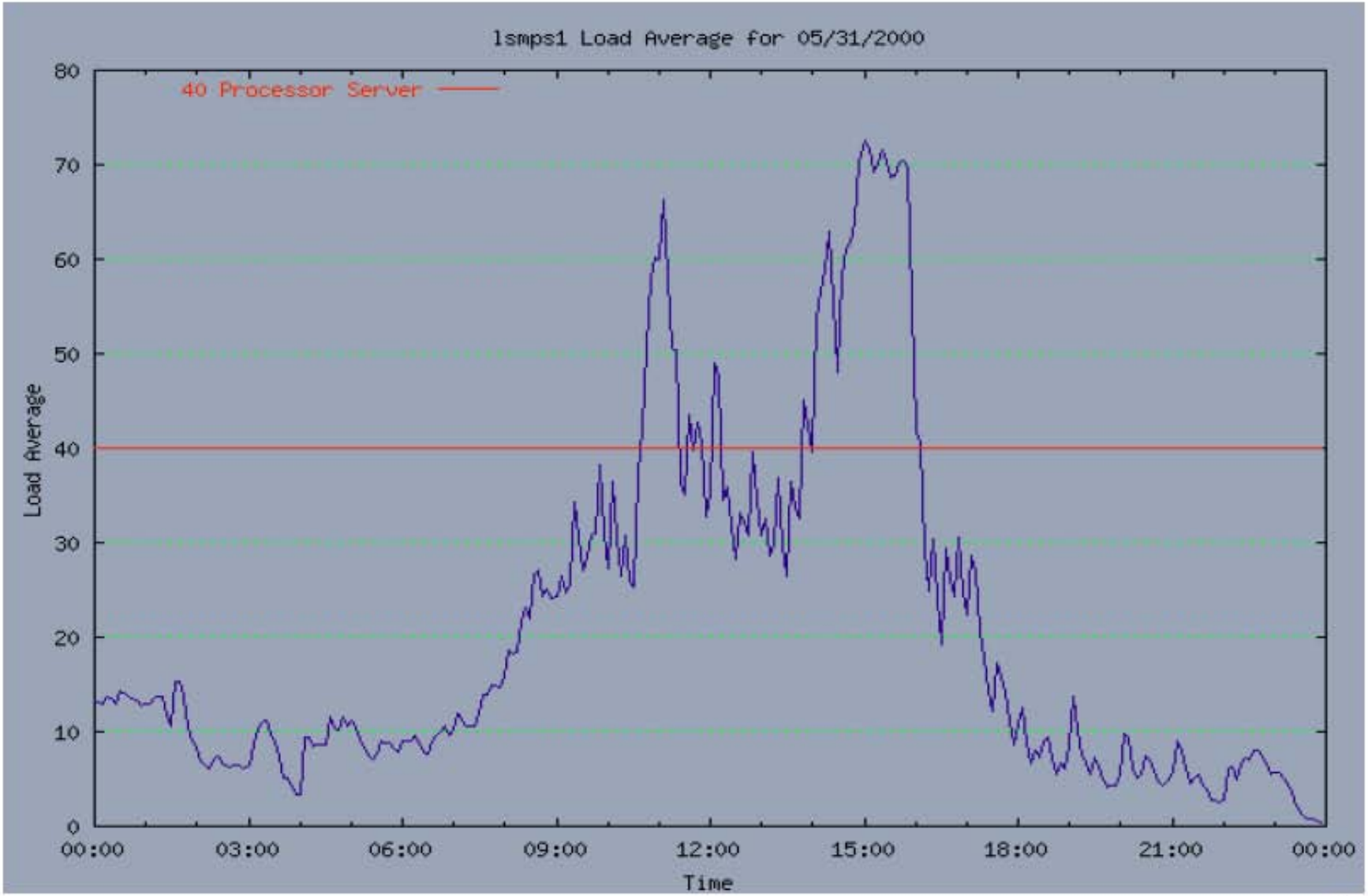
Sizing Questionnaire for the Commission System

Case Processing	Details	Comments
Basic Data		
Number of cases (case versions) each year	10000000	
Average number of participants	1.5	
Average number of due dates	12.0	
Average number of remunerations	2.0	
Average number of objects		
Average number of remuneration detail rows		
Average residence time in months	7	
Peak Period		
Number of cases (case versions) per case during peak period	50000	The maximum case number is 300,000 per day, for which maximum 6 hours are available
Time period indicator	1	Only on working days



Peak Hours and Throughput

Load distribution from an actual customer site



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Factors that Influence Sizing

Scope of this method

SAP and Partner

- ✓ Software Version
- ✗ DB Version
- ✗ OS Version
- ✗ Hardware

Performance / Sizing

Throughput
Response Times

Customer

- Number of users ✓
- Amount of Reporting / Batch: Reporting, Dialog / Batch ✓
- Load profile ✓
- Customizing ✗

HW Sizing: Task of the Competence Center

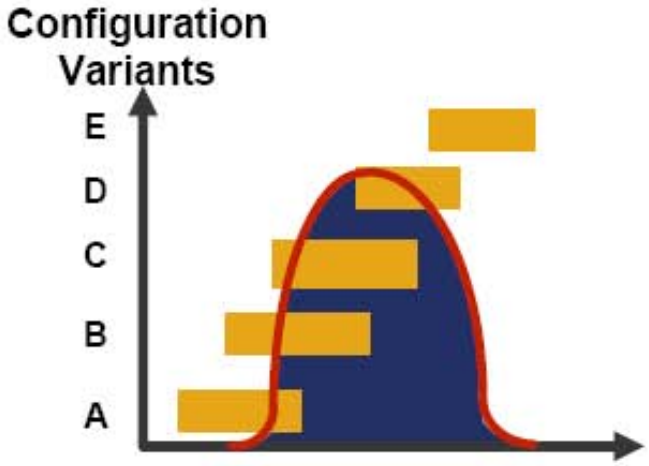
Expectations

- Response Times
- Throughput

Load Profile

- n • FI
- m • SD
- o • MM
- p • WM
- a • PP

Load equivalent to

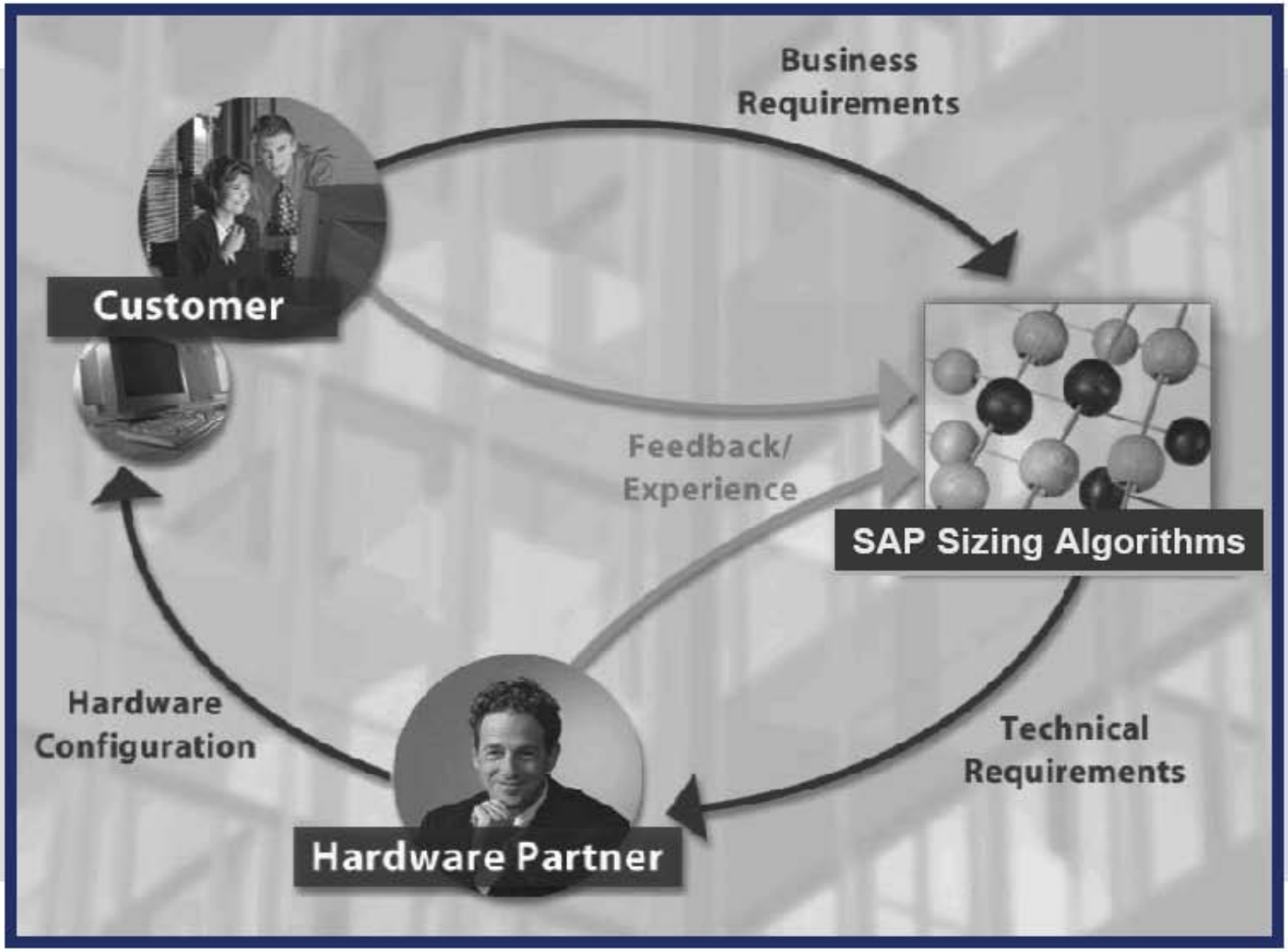


SAPS

equivalent to xxxx SAPS

Hardware
Configuration
for the customer

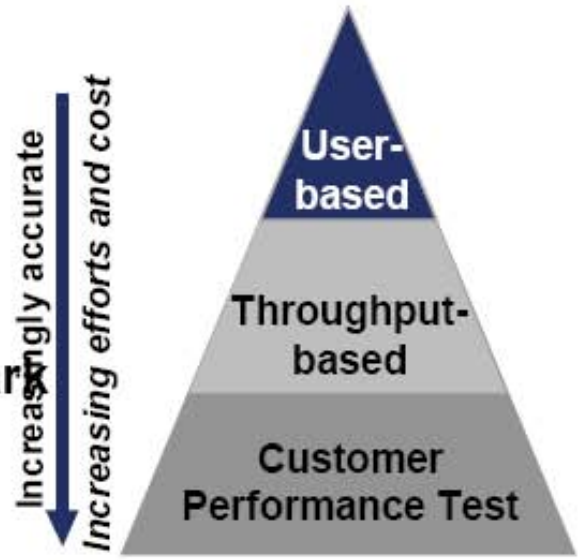
The Sizing Process



The Sizing Approach - Three Steps

1 Step 1 – User-Based Sizing

- Check of basic feasibility
- Useful for initial budget planning
- Limit set to 800 SD (Sales & Distribution) benchmark users

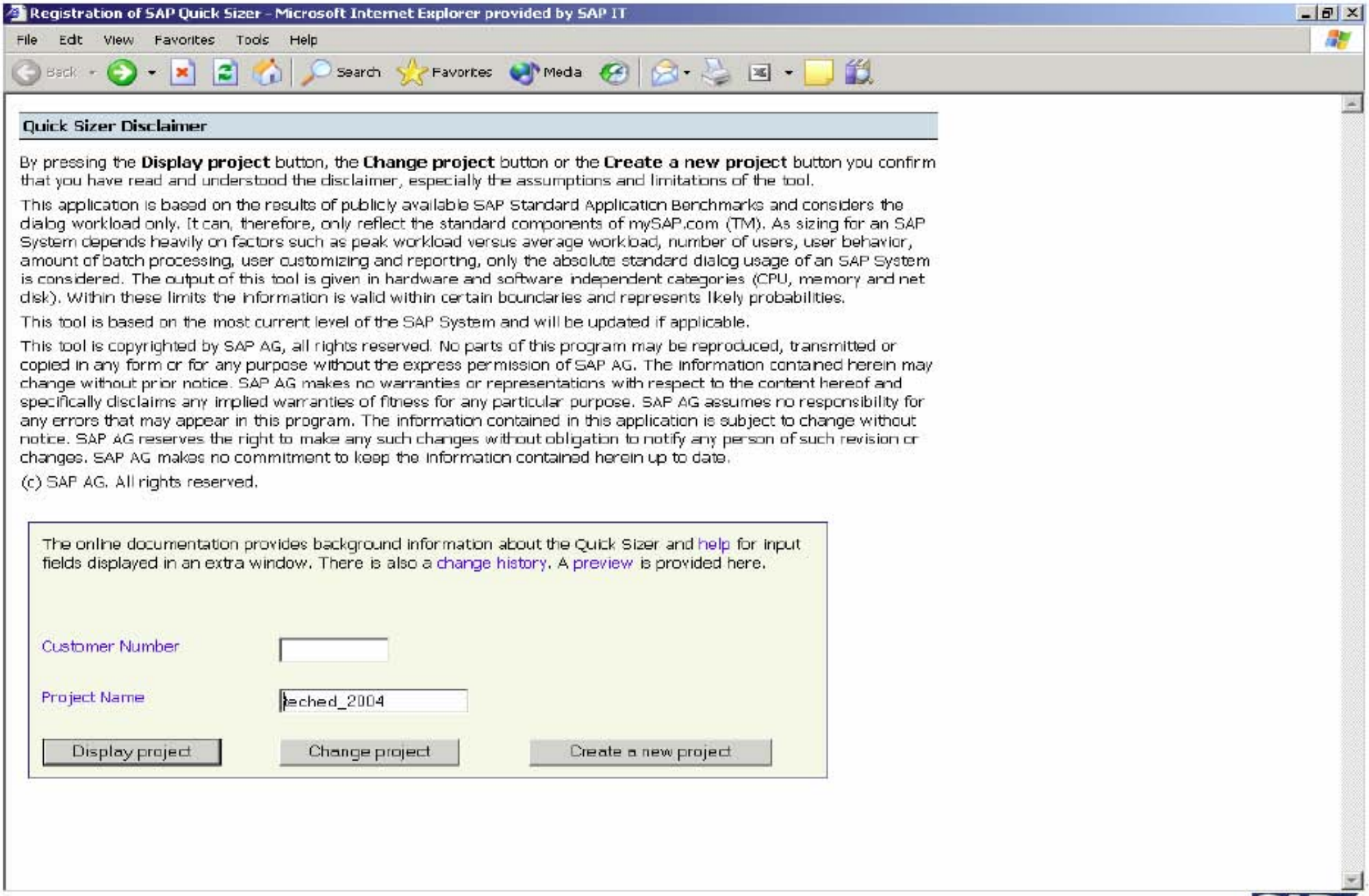


2 Step 2 – Quantity Structure-Based / User-Based Sizing

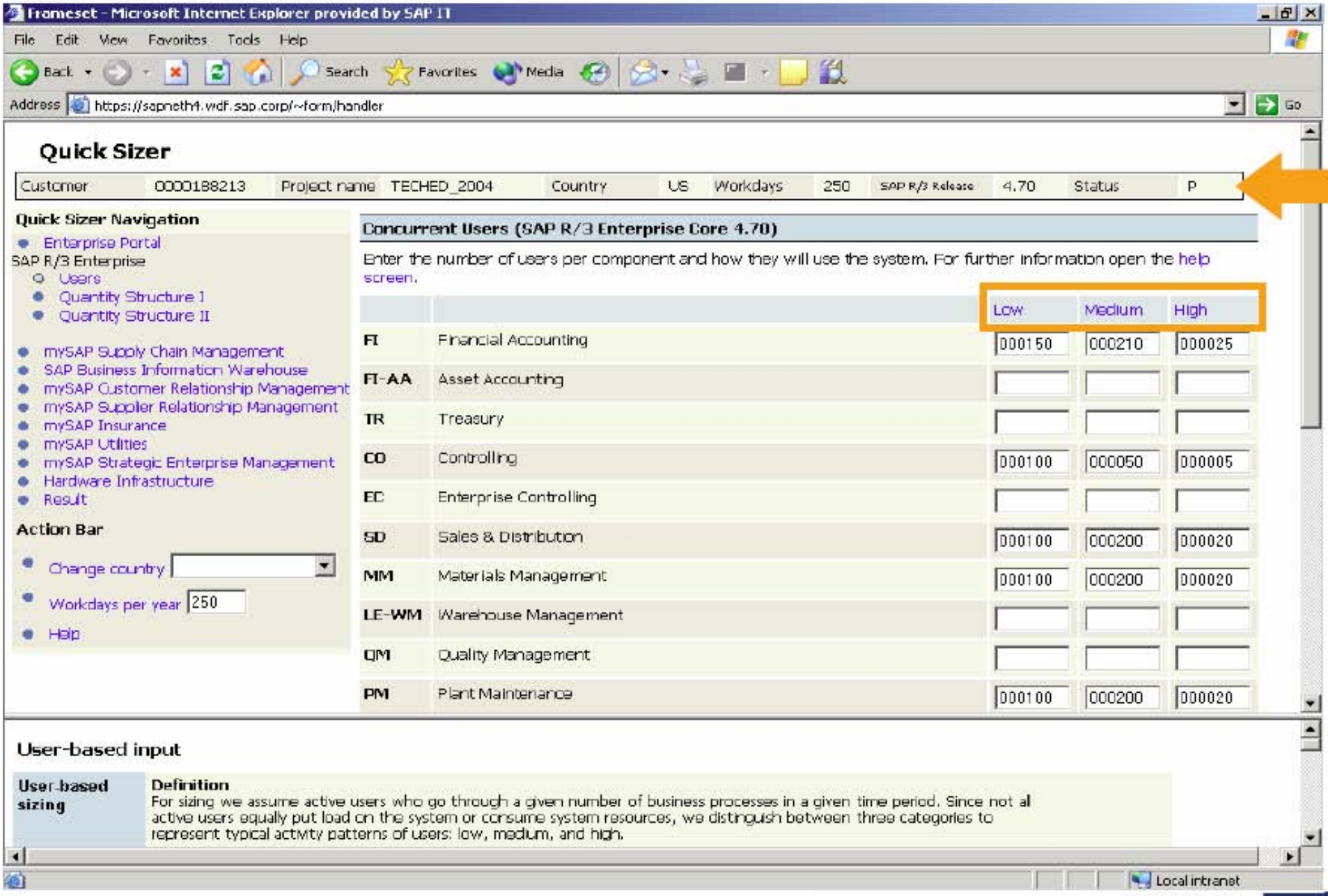
- More detailed input
- Necessary for batch oriented load
- For more than 800 SD benchmark users

3 Step 3 – Considering Special Processes and Factors

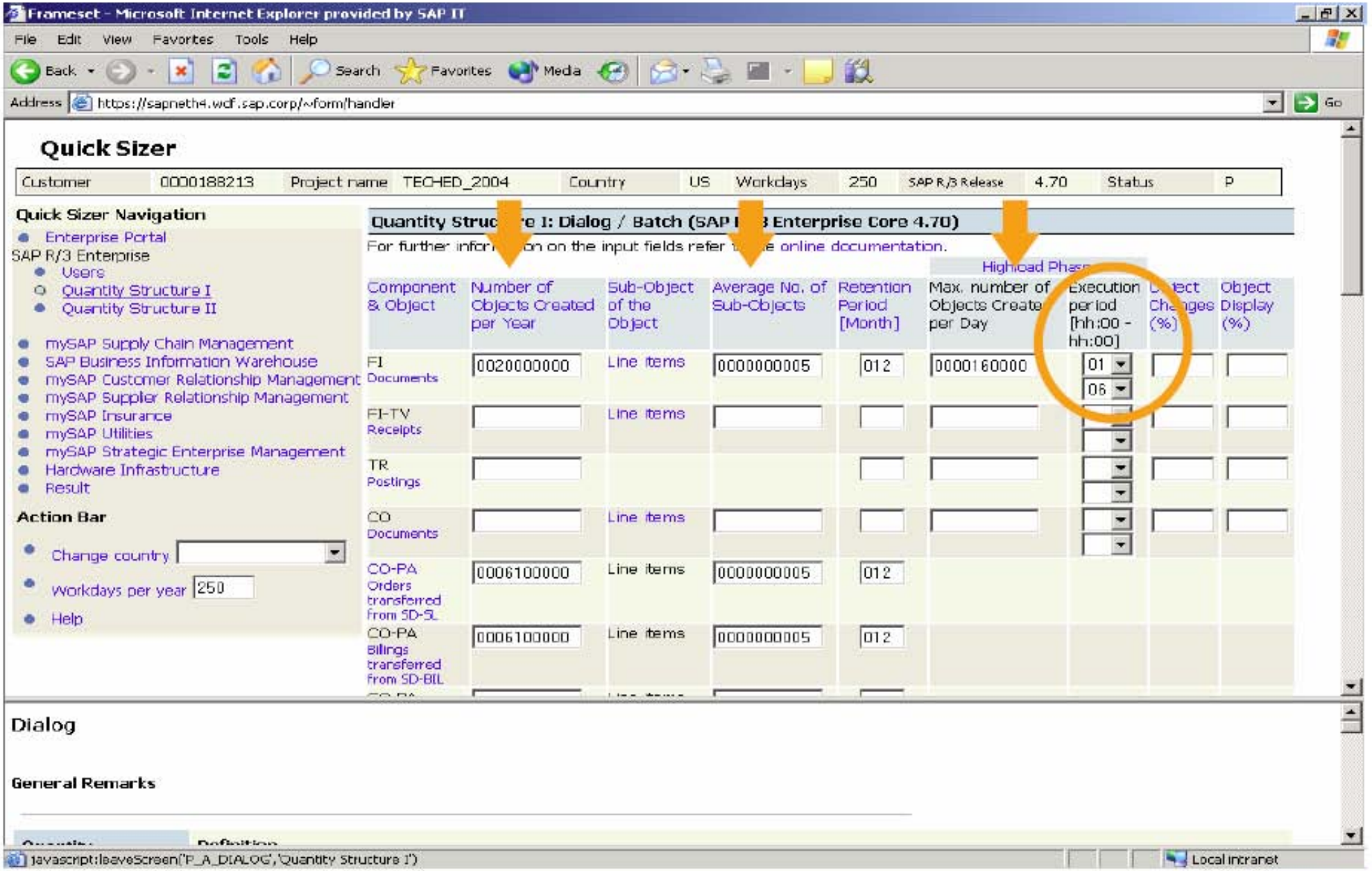
Quick Sizer – Entry Screen
http://service.sap.com/quicksizing



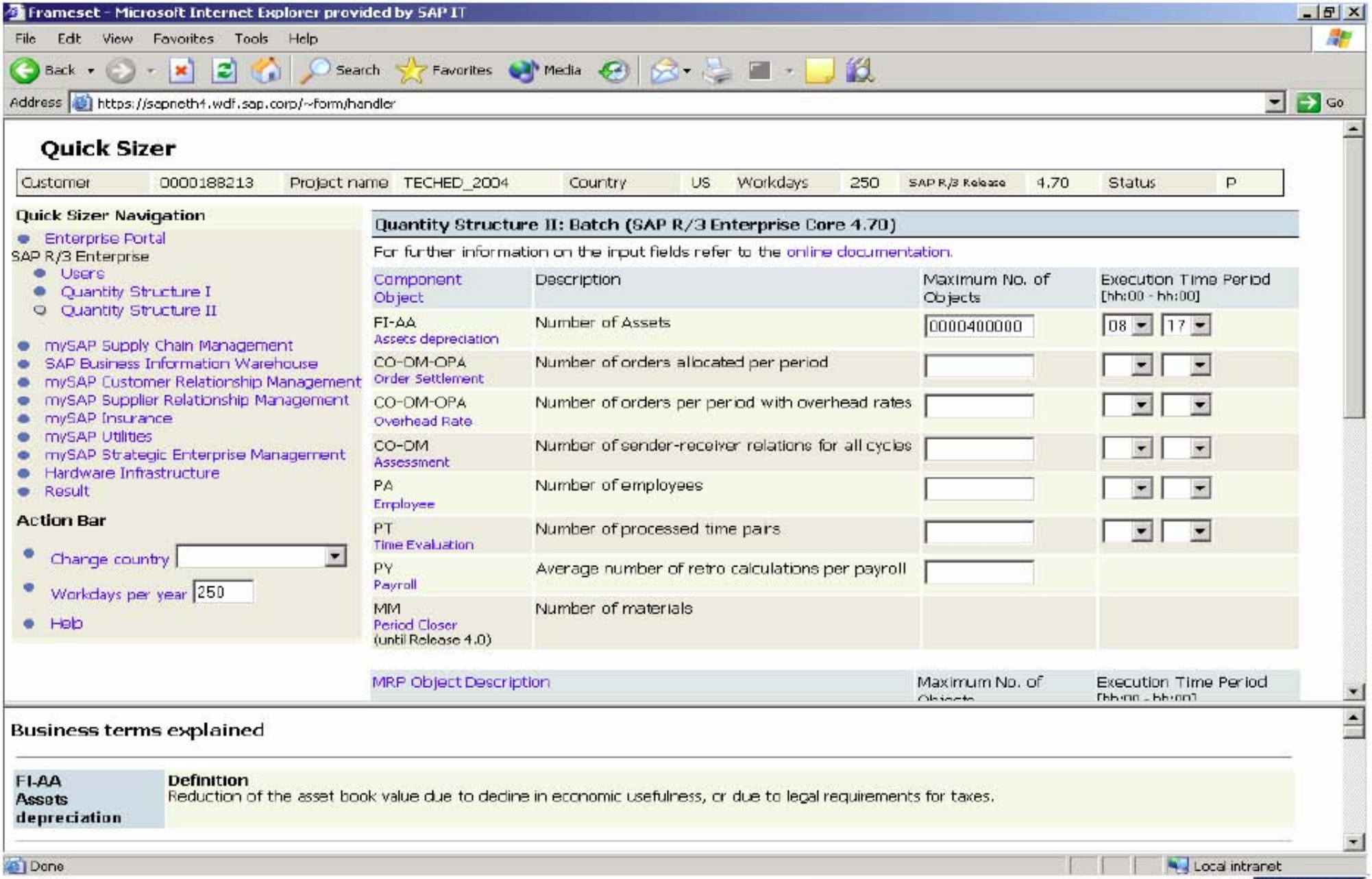
User-based Input (-> Memory)



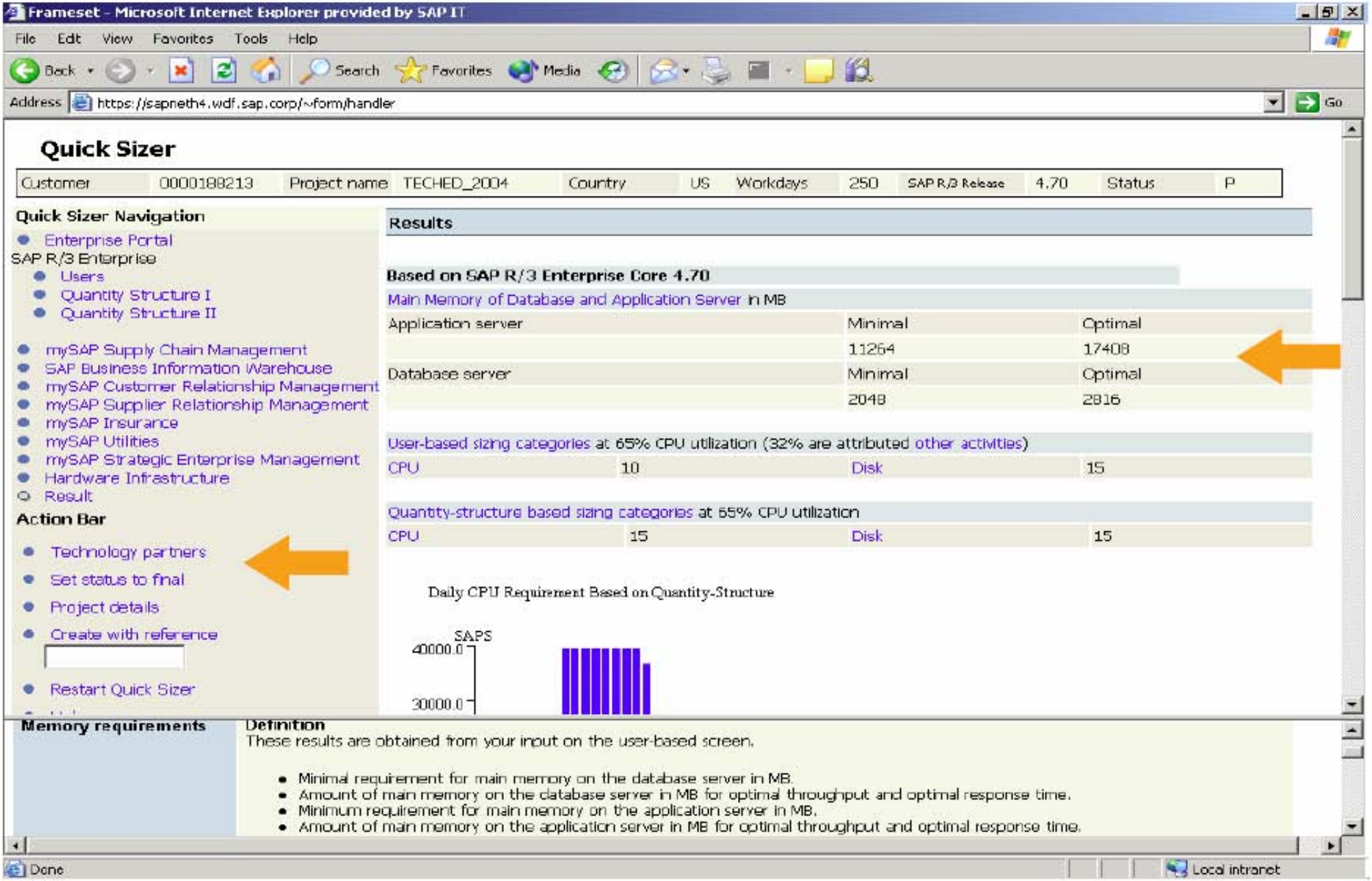
Quantity Structure Dialog I



Quantity Structure Batch



Memory & Disk Requirements



Detailed Results

Overview Page of SAP Quick Sizer - Microsoft Internet Explorer provided by SAP IT

File Edit View Favorites Tools Help

Back Search Favorites Media Links

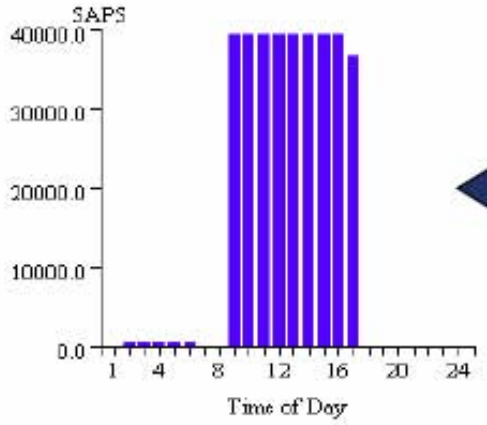
Results (SAP R/3 Enterprise Core 4.70)

User based sizing categories at 65% CPU Utilization		
Main Memory of Database and Application Server in MB		
Application server	Minimal	Optimal
	11264	17408
Database server	Minimal	Optimal
	2048	2816

Disk and CPU sizing categories at 65% CPU utilization (32% are attributed other activities)			
CPU	10	Disk	15
SAPS (4.70)	0000008745	Disk size in MB	0000557157
SD Benchmark users (from user-based sizing)	0000001749		

Quantity-structure based sizing categories at 65% CPU Utilization			
CPU	15	Disk	15
SAPS (4.70)	0000039533	Disk size in MB	0001141832

Daily CPU Requirement Based on Quantity-Structure



May not reflect your actual load profile

Detailed Results

Result Distribution Tables

Time Intervall	Application Server (number of SAPS)	Database Server (number of SAPS)
00:00-01:00	0	0
01:00-02:00	0000000739	0000000074
02:00-03:00	0000000739	0000000074
03:00-04:00	0000000739	0000000074
04:00-05:00	0000000739	0000000074
05:00-06:00	0000000739	0000000074
06:00-07:00	0	0
07:00-08:00	0	0
08:00-09:00	0000035771	0000003762
09:00-10:00	0000035771	0000003762
10:00-11:00	0000035771	0000003762
11:00-12:00	0000035771	0000003762

The 25 Largest Contributors - Disk

Application	Disk Size in MB
PM	0000176423
PP-SFC	0000176423
FI	0000172636
LE-SHP	0000126770
SD	0000118149
SD-SLS	0000118149
SD-BIL	0000097126
CO-PA	0000076625
MM-IM	0000052109
	0000016500
LE-WM	0000010709
MM-PUR	0000000217

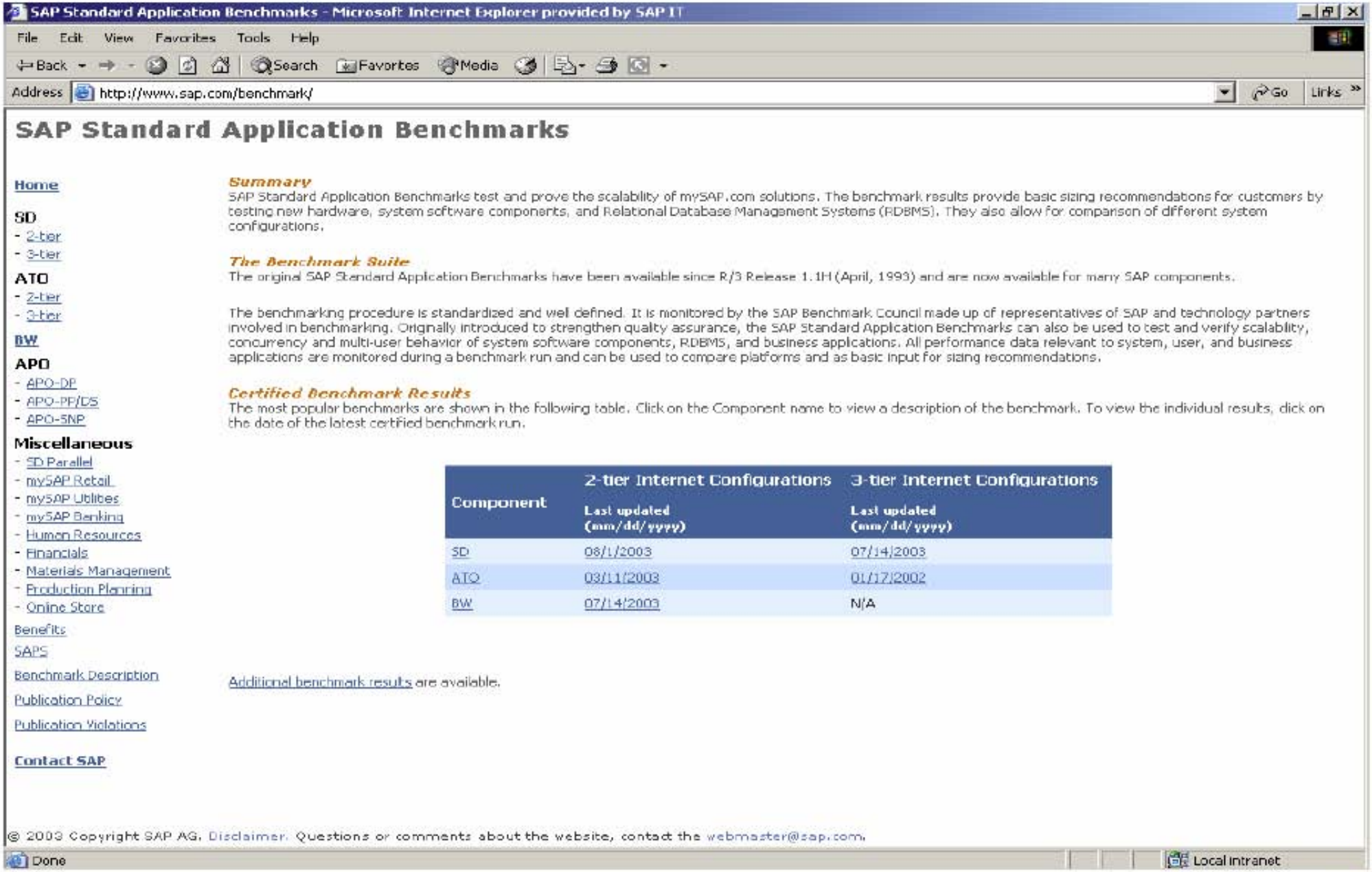
The 30 Largest Tables

Table	Size in MB
RESB	0000095672
VBAP	0000081024
KOCLU	0000072139
LIPS	0000066986
MSEG	0000046196
BSAK	0000042234
BSAD	0000039968
RFBLG	0000038147
CE1	0000035579
VBRP	0000035334
JCDS	0000032958
VBEP	0000030470

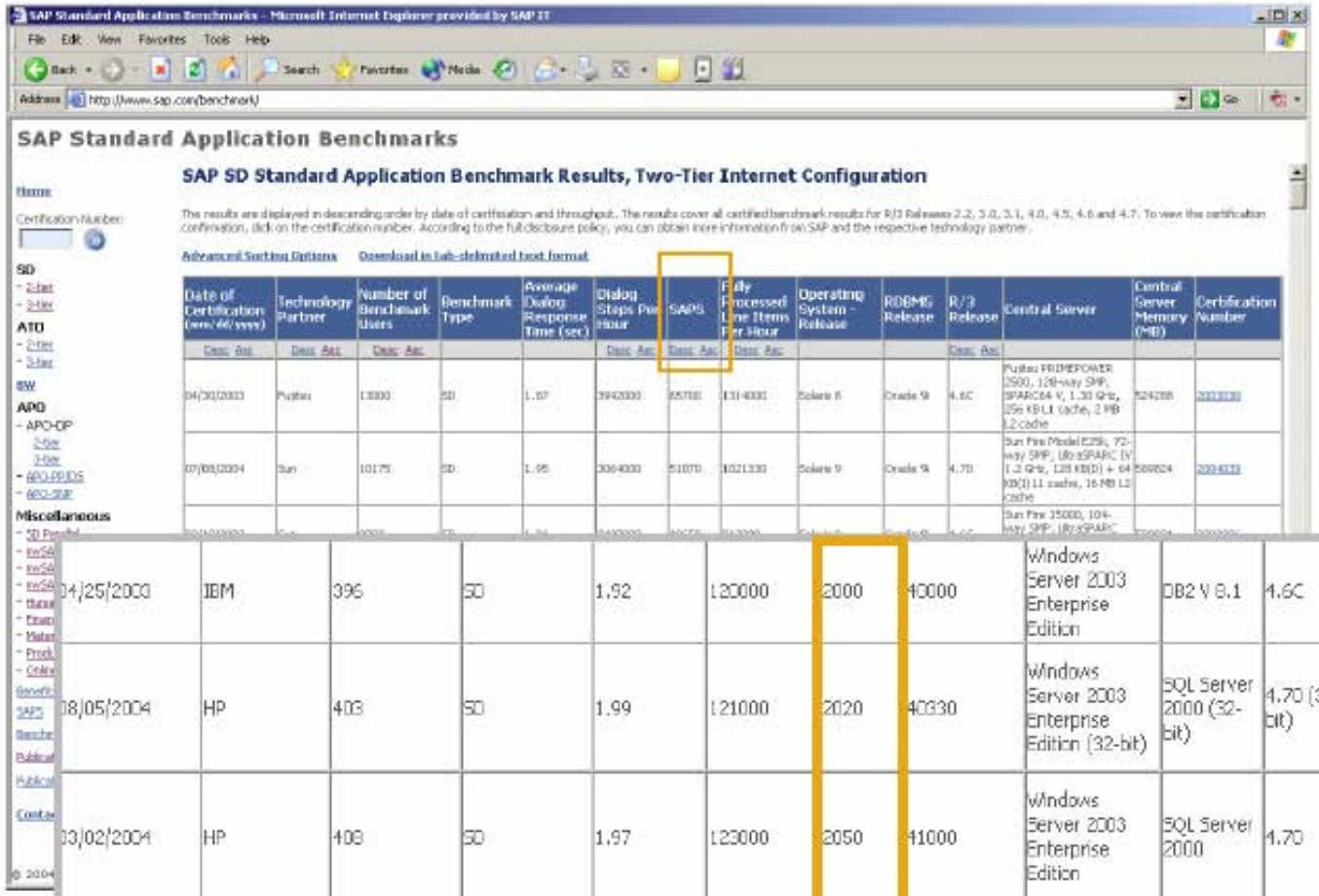
The 30 Largest Indices

Table	Index	Size in MB
JEST	0	0000023918
JCDS	0	0000017700
JEST	I	0000013914
M_REVN	0	0000011750
VAPMA	0	0000008010
CE1	2	0000007167
CE1	0	0000007167
CE1	1	0000007167
JSTO	0	0000005720
VBUP	0	0000005330
RESB	M	0000004654

www.sap.com/benchmark



Example: Search for Benchmarks with 2,000 SAPS



04/25/2003	IBM	396	SD	1.92	120000	2000	40000	Windows Server 2003 Enterprise Edition	DB2 V 8.1	4.6C	IBM eServer xSeries 440 Model 8687-4RY, 4-way SMP, Intel Xeon DP, 2.4 GHz, 512 KB L2 cache	8192	2003028
08/05/2004	HP	403	SD	1.99	121000	2020	40330	Windows Server 2003 Enterprise Edition (32-bit)	SQL Server 2000 (32-bit)	4.70 (32-bit)	HP ProLiant DL360 G4, 2-way SMP, Intel XEON 3.4 GHz, 12 KB Instruction + 16 KB Data L1 cache, 1 MB L2 cache	8192	2004053
03/02/2004	HP	408	SD	1.97	123000	2050	41000	Windows Server 2003 Enterprise Edition	SQL Server 2000	4.70	HP ProLiant Model BL20p G2, 2-way SMP, Intel Xeon DP 3.2 GHz, 20 KB L1 cache, 512 KB L2 cache, 2 MB L3 cache	8192	2004012
03/31/2000	Compaq	400	SD	1.57	124000	2070	41330	Tru64 Unix 4.0F	Oracle 8.0.4	4.0B	AlphaServer ES40, 4-way SMP, EV6.7 (21264A) 667 MHz, 8 MB L2 cache	8192	2000010
05/10/2004	Sun	410	SD	1.84	125000	2080	41670	SuSE Linux Enterprise Server 8 (64-bit)	Oracle 9i	4.70 (32-bit)	Sun Fire Model V20z, 2-way SMP, AMD Opteron 248 series processor 2.2 GHz, 128 KB L1 cache, 1 MB L2 cache	16384	2004025

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- **using productive data (delta sizing)**
- for upgrade sizing
- for special system landscapes
- for miscellaneous phenomena

Summary

When Does Delta Sizing Apply

Examples

- The software needs to be physically moved to a different platform
- Multiple Components in One Database (MCOD)
- Merging different SAP systems
- Increasing
  - The number of users
  - Throughput

Capacity Planning with Productive Data

So you are live and wish to use your productive data for a delta sizing

- **Disk Analysis** — **DB02**
  - (*DB Performance Tables & Indexes*)
- **CPU Analysis** — **ST03N, STAD**
  - (*Workload Analysis, Statistical Records*)
- **User Analysis** — **ST07, STAD**
  - (*Application Monitor, Statistical Records*)
- **Memory Analysis** — **SM04, STAD**
  - (*User List, Statistical Records*)
- **Frontend Network Load** — **STAD, ST03N**
  - (Statistical Records, Workload Analysis)

Factors that Influence Sizing

Scope of this method

SAP and Partner

- ✗ Software Version
- ✗ DB Version
- ✗ OS Version
- ✓ Hardware

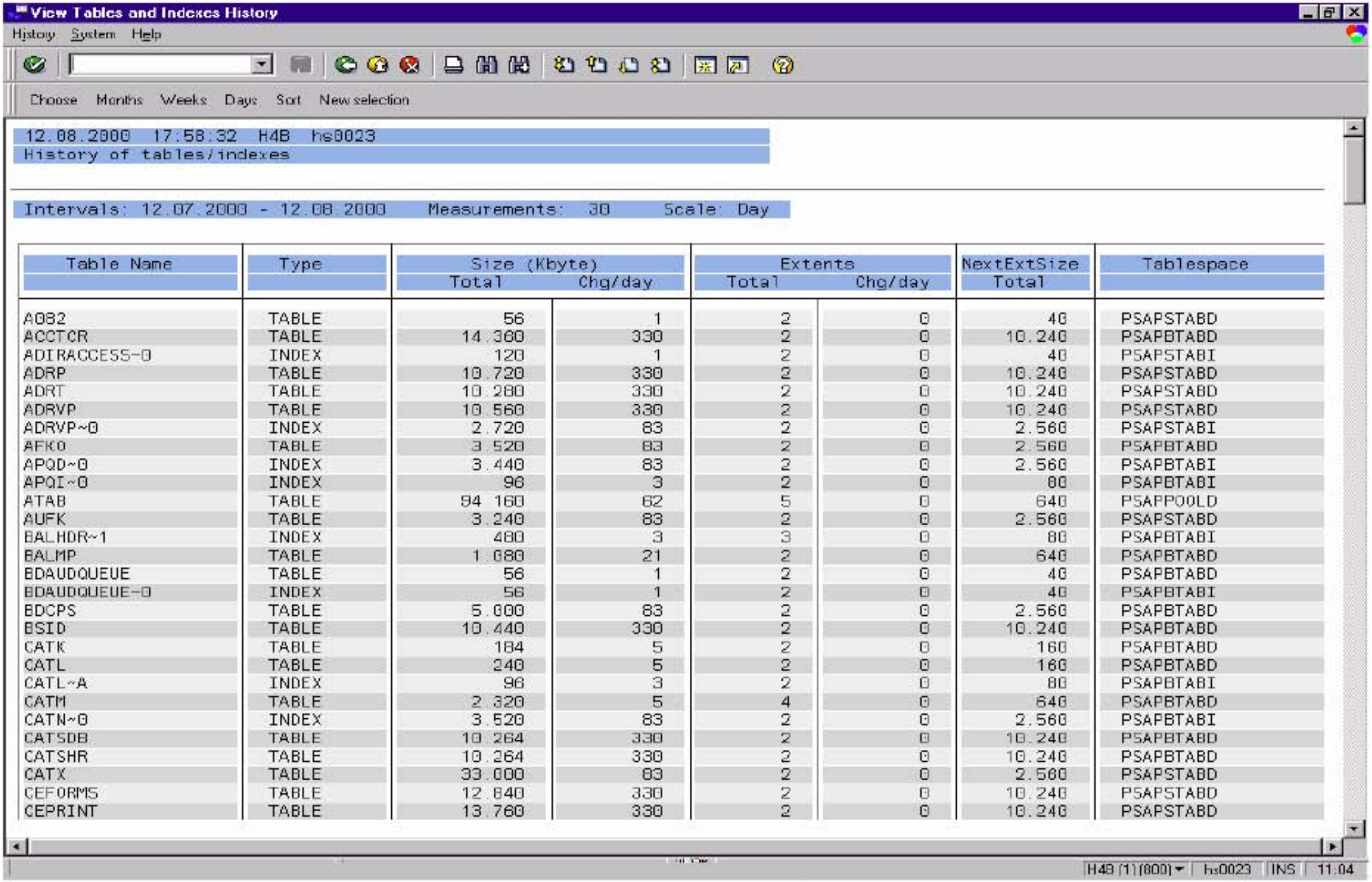
Performance / Sizing

Throughput
Response Times

Customer

- Number of users ✓
- Amount of Reporting / Batch: Reporting, Dialog / Batch ✓
- Load profile ✓
- Customizing ✗

Capacity Planning: Disk Growth Analysis (DB02)



View Tables and Indexes History

History System Help

Choose Months Weeks Days Sort New selection

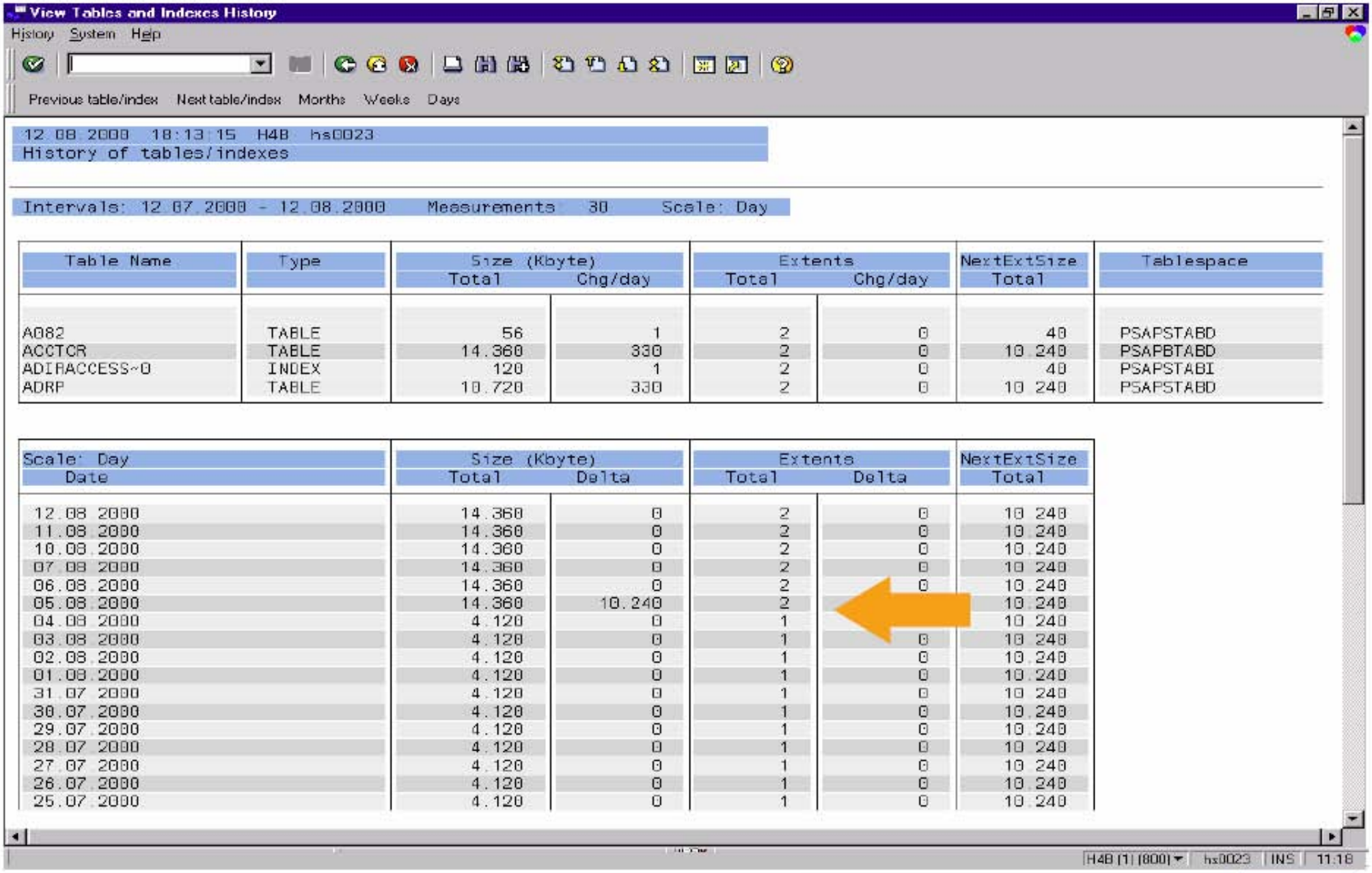
12.08.2000 17:58:32 H4B hs0023
History of tables/indexes

Intervals: 12.07.2000 - 12.08.2000 Measurements: 30 Scale: Day

Table Name	Type	Size (Kbyte)		Extents		NextExtSize	Tablespace
		Total	Chg/day	Total	Chg/day	Total	
A082	TABLE	56	1	2	0	40	PSAPSTABD
ACCTCR	TABLE	14.360	330	2	0	10.240	PSAPBTABD
ADIRACCESS~0	INDEX	120	1	2	0	40	PSAPSTABI
ADRP	TABLE	10.720	330	2	0	10.240	PSAPSTABD
ADRT	TABLE	10.280	330	2	0	10.240	PSAPSTABD
ADRVP	TABLE	10.560	330	2	0	10.240	PSAPSTABD
ADRVP~0	INDEX	2.720	83	2	0	2.560	PSAPSTABI
AFKO	TABLE	3.520	83	2	0	2.560	PSAPBTABD
APQD~0	INDEX	3.440	83	2	0	2.560	PSAPBTABI
APQI~0	INDEX	96	3	2	0	80	PSAPBTABI
ATAB	TABLE	94 160	62	5	0	640	PSAPPOOLD
AUFK	TABLE	3.240	83	2	0	2.560	PSAPSTABD
BALHDR~1	INDEX	480	3	3	0	80	PSAPBTABI
BALMP	TABLE	1.680	21	2	0	640	PSAPBTABD
BDAUDQUEUE	TABLE	56	1	2	0	40	PSAPBTABD
BDAUDQUEUE~0	INDEX	56	1	2	0	40	PSAPBTABI
BDCPS	TABLE	5.000	83	2	0	2.560	PSAPBTABD
BSID	TABLE	10.440	330	2	0	10.240	PSAPBTABD
CATK	TABLE	184	5	2	0	160	PSAPBTABD
CATL	TABLE	240	5	2	0	160	PSAPBTABD
CATL~A	INDEX	96	3	2	0	80	PSAPBTABI
CATM	TABLE	2.320	5	4	0	640	PSAPBTABD
CATN~0	INDEX	3.520	83	2	0	2.560	PSAPBTABI
CATSDB	TABLE	10.264	330	2	0	10.240	PSAPBTABD
CATSHR	TABLE	10.264	330	2	0	10.240	PSAPBTABD
CATX	TABLE	33.000	83	2	0	2.560	PSAPSTABD
CEFORMS	TABLE	12.840	330	2	0	10.240	PSAPSTABD
CEPRINT	TABLE	13.760	330	2	0	10.240	PSAPSTABD

H4B (1) (800) hs0023 INS 11:04

Capacity Planning: Disk Growth Analysis



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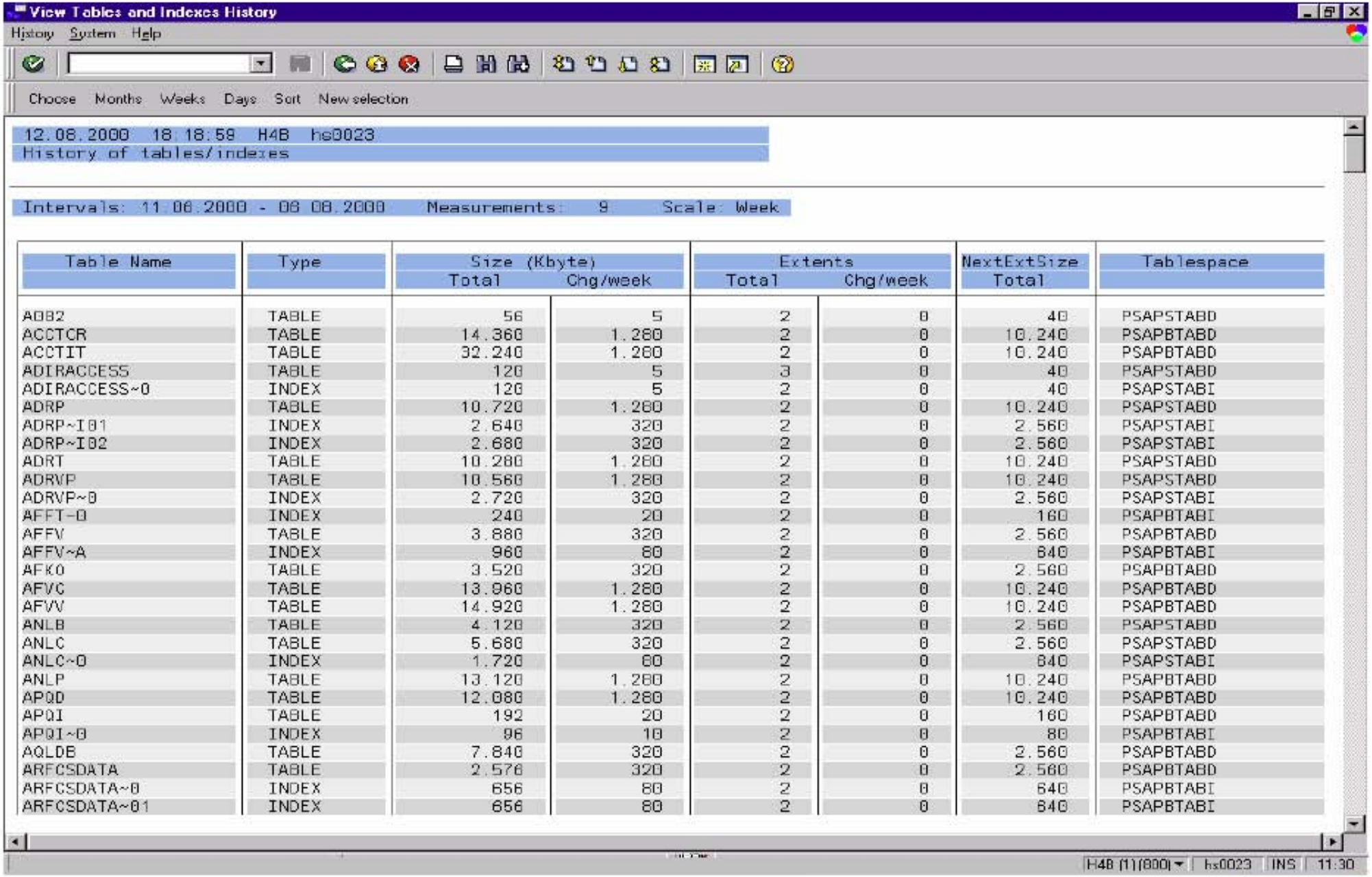
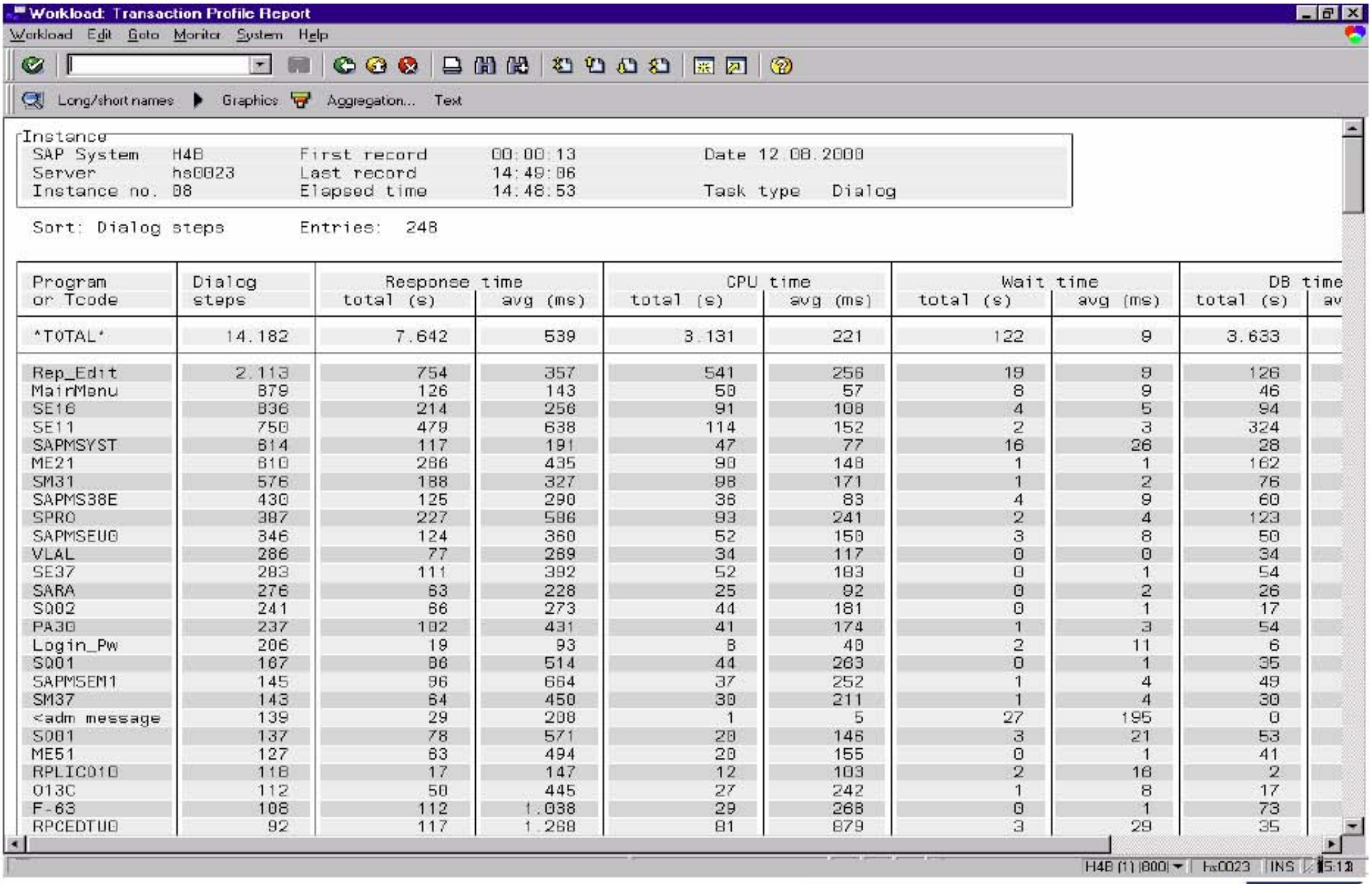


Table Name	Type	Size (Kbyte)		Extents		NextExtSize	Tablespace
		Total	Chg/week	Total	Chg/week	Total	
A082	TABLE	56	5	2	0	40	PSAPSTABD
ACCTCR	TABLE	14.360	1.280	2	0	10.240	PSAPBTABD
ACCTIT	TABLE	32.240	1.280	2	0	10.240	PSAPBTABD
ADIRACCESS	TABLE	120	5	3	0	40	PSAPSTABD
ADIRACCESS~0	INDEX	120	5	2	0	40	PSAPSTABI
ADRP	TABLE	10.720	1.280	2	0	10.240	PSAPSTABD
ADRP~I01	INDEX	2.640	320	2	0	2.560	PSAPSTABI
ADRP~I02	INDEX	2.680	320	2	0	2.560	PSAPSTABI
ADRT	TABLE	10.280	1.280	2	0	10.240	PSAPSTABD
ADRVP	TABLE	10.560	1.280	2	0	10.240	PSAPSTABD
ADRVP~0	INDEX	2.720	320	2	0	2.560	PSAPSTABI
AFFT~0	INDEX	240	20	2	0	160	PSAPBTABI
AFFV	TABLE	3.880	320	2	0	2.560	PSAPBTABD
AFFV~A	INDEX	960	80	2	0	640	PSAPBTABI
AFKO	TABLE	3.520	320	2	0	2.560	PSAPBTABD
AFVC	TABLE	13.960	1.280	2	0	10.240	PSAPBTABD
AFVV	TABLE	14.920	1.280	2	0	10.240	PSAPBTABD
ANLB	TABLE	4.120	320	2	0	2.560	PSAPSTABD
ANLC	TABLE	5.680	320	2	0	2.560	PSAPSTABD
ANLC~0	INDEX	1.720	80	2	0	640	PSAPSTABI
ANLP	TABLE	13.120	1.280	2	0	10.240	PSAPBTABD
APQD	TABLE	12.080	1.280	2	0	10.240	PSAPBTABD
APQI	TABLE	192	20	2	0	160	PSAPBTABD
APQI~0	INDEX	96	10	2	0	80	PSAPBTABI
AQLDB	TABLE	7.840	320	2	0	2.560	PSAPBTABD
ARFCSDATA	TABLE	2.576	320	2	0	2.560	PSAPBTABD
ARFCSDATA~0	INDEX	656	80	2	0	640	PSAPBTABI
ARFCSDATA~01	INDEX	656	80	2	0	640	PSAPBTABI

Capacity Planning: CPU Growth Analysis (STAD)



Workload: Transaction Profile Report

Workload Edit Goto Monitor System Help

Long/short names ▶ Graphics Aggregation... Text

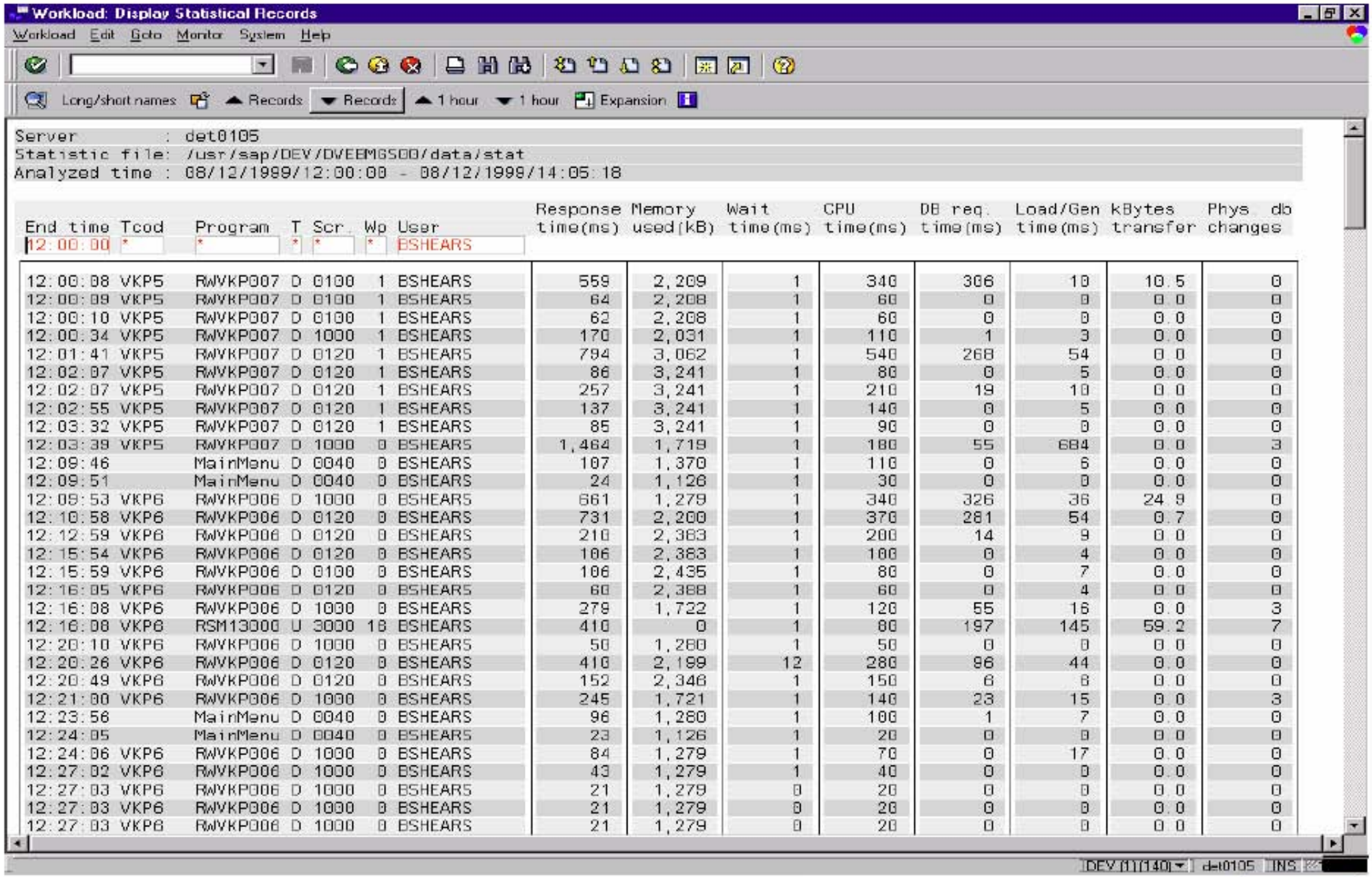
Instance
SAP System H4B First record 00:00:13 Date 12.08.2000
Server hs0023 Last record 14:49:06
Instance no. 08 Elapsed time 14:48:53 Task type Dialog

Sort: Dialog steps Entries: 248

Program or Tcode	Dialog steps	Response time total (s)	Response time avg (ms)	CPU time total (s)	CPU time avg (ms)	Wait time total (s)	Wait time avg (ms)	DB time total (s)	DB time av
TOTAL	14.182	7.642	539	3.131	221	122	9	3.633	
Rep_Edit	2.113	754	357	541	256	19	9	126	
MainMenu	879	126	143	50	57	8	9	46	
SE16	836	214	256	91	108	4	5	94	
SE11	750	479	638	114	152	2	3	324	
SAPMSYST	814	117	191	47	77	16	26	28	
ME21	810	286	435	90	148	1	1	162	
SM31	576	188	327	98	171	1	2	76	
SAPMS38E	430	125	290	36	83	4	9	60	
SPRO	387	227	586	93	241	2	4	123	
SAPMSEU0	346	124	360	52	150	3	8	50	
VLAL	286	77	269	34	117	0	0	34	
SE37	283	111	392	52	183	0	1	54	
SARA	276	63	228	25	92	0	2	26	
SQ02	241	66	273	44	181	0	1	17	
PA30	237	102	431	41	174	1	3	54	
Login_Pw	206	19	93	8	40	2	11	6	
SQ01	167	86	514	44	263	0	1	35	
SAPMSEM1	145	96	664	37	252	1	4	49	
SM37	143	64	450	30	211	1	4	30	
<adm message	139	29	208	1	5	27	195	0	
SQ01	137	78	571	20	146	3	21	53	
ME51	127	83	494	20	155	0	1	41	
RPLIC010	118	17	147	12	103	2	16	2	
O13C	112	50	445	27	242	1	8	17	
F-63	108	112	1.038	29	268	0	1	73	
RPCEDTU0	92	117	1.268	81	879	3	29	35	

H4B (1) 800 hs0023 INS 5:11

Capacity Planning: CPU Growth Analysis



Workload: Display Statistical Records

Workload Edit Goto Monitor System Help

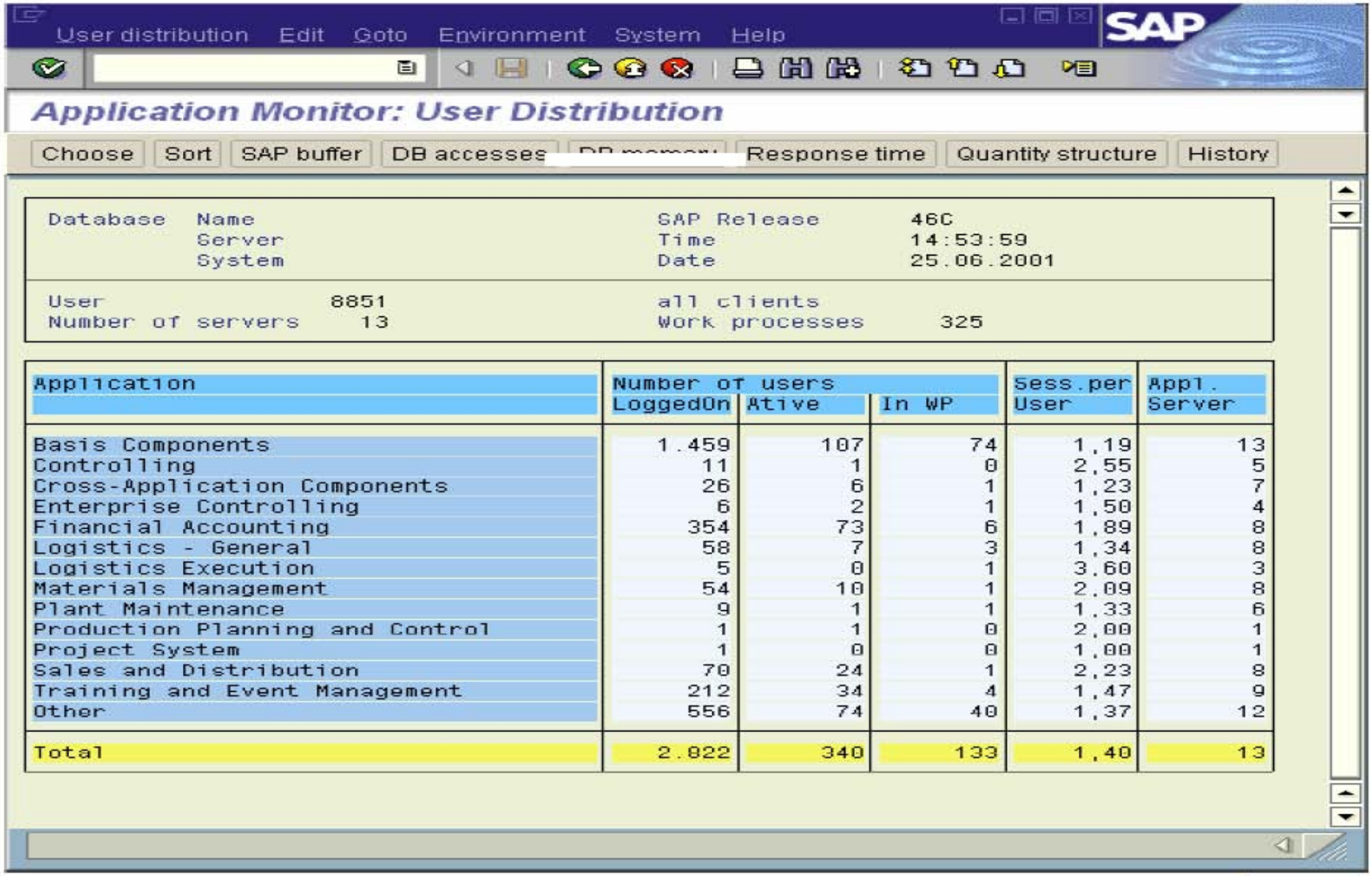
Long/short names | Records | Records | 1 hour | 1 hour | Expansion

```
Server          : det0105
Statistic file: /usr/sap/DEV/DVEBMGS00/data/stat
Analyzed time : 08/12/1999/12:00:00 - 08/12/1999/14:05:18
```

End time	Tcod	Program	T	Scr.	Wp	User	Response time(ms)	Memory used(kB)	Wait time(ms)	CPU time(ms)	DB req. time(ms)	Load/Gen time(ms)	kBytes transfer	Phys db changes
12:00:00	*	*	*	*	*	BSHEARS								
12:00:08	VKP5	RWVKP007	D	0100	1	BSHEARS	559	2,209	1	340	306	10	10.5	0
12:00:09	VKP5	RWVKP007	D	0100	1	BSHEARS	64	2,208	1	60	0	0	0.0	0
12:00:10	VKP5	RWVKP007	D	0100	1	BSHEARS	62	2,208	1	60	0	0	0.0	0
12:00:34	VKP5	RWVKP007	D	1000	1	BSHEARS	170	2,031	1	110	1	3	0.0	0
12:01:41	VKP5	RWVKP007	D	0120	1	BSHEARS	794	3,062	1	540	268	54	0.0	0
12:02:07	VKP5	RWVKP007	D	0120	1	BSHEARS	86	3,241	1	80	0	5	0.0	0
12:02:07	VKP5	RWVKP007	D	0120	1	BSHEARS	257	3,241	1	210	19	10	0.0	0
12:02:55	VKP5	RWVKP007	D	0120	1	BSHEARS	137	3,241	1	140	0	5	0.0	0
12:03:32	VKP5	RWVKP007	D	0120	1	BSHEARS	85	3,241	1	90	0	0	0.0	0
12:03:39	VKP5	RWVKP007	D	1000	0	BSHEARS	1,464	1,719	1	180	55	684	0.0	3
12:09:46		MainMenu	D	0040	0	BSHEARS	107	1,370	1	110	0	6	0.0	0
12:09:51		MainMenu	D	0040	0	BSHEARS	24	1,126	1	30	0	0	0.0	0
12:09:53	VKP6	RWVKP006	D	1000	0	BSHEARS	661	1,279	1	340	326	36	24.9	0
12:10:58	VKP6	RWVKP006	D	0120	0	BSHEARS	731	2,200	1	370	281	54	0.7	0
12:12:59	VKP6	RWVKP006	D	0120	0	BSHEARS	210	2,383	1	200	14	9	0.0	0
12:15:54	VKP6	RWVKP006	D	0120	0	BSHEARS	106	2,383	1	100	0	4	0.0	0
12:15:59	VKP6	RWVKP006	D	0100	0	BSHEARS	106	2,435	1	80	0	7	0.0	0
12:16:05	VKP6	RWVKP006	D	0120	0	BSHEARS	60	2,388	1	60	0	4	0.0	0
12:16:08	VKP6	RWVKP006	D	1000	0	BSHEARS	279	1,722	1	120	55	16	0.0	3
12:16:08	VKP6	RSM13000	U	3000	18	BSHEARS	410	0	1	80	197	145	59.2	7
12:20:10	VKP6	RWVKP006	D	1000	0	BSHEARS	50	1,280	1	50	0	0	0.0	0
12:20:26	VKP6	RWVKP006	D	0120	0	BSHEARS	410	2,199	12	280	96	44	0.0	0
12:20:49	VKP6	RWVKP006	D	0120	0	BSHEARS	152	2,346	1	150	6	8	0.0	0
12:21:00	VKP6	RWVKP006	D	1000	0	BSHEARS	245	1,721	1	140	23	15	0.0	3
12:23:56		MainMenu	D	0040	0	BSHEARS	96	1,280	1	100	1	7	0.0	0
12:24:05		MainMenu	D	0040	0	BSHEARS	23	1,126	1	20	0	0	0.0	0
12:24:06	VKP6	RWVKP006	D	1000	0	BSHEARS	84	1,279	1	70	0	17	0.0	0
12:27:02	VKP6	RWVKP006	D	1000	0	BSHEARS	43	1,279	1	40	0	0	0.0	0
12:27:03	VKP6	RWVKP006	D	1000	0	BSHEARS	21	1,279	0	20	0	0	0.0	0
12:27:03	VKP6	RWVKP006	D	1000	0	BSHEARS	21	1,279	0	20	0	0	0.0	0
12:27:03	VKP6	RWVKP006	D	1000	0	BSHEARS	21	1,279	0	20	0	0	0.0	0

DEV (1) (140) | det0105 | INS

User Analysis (ST07)

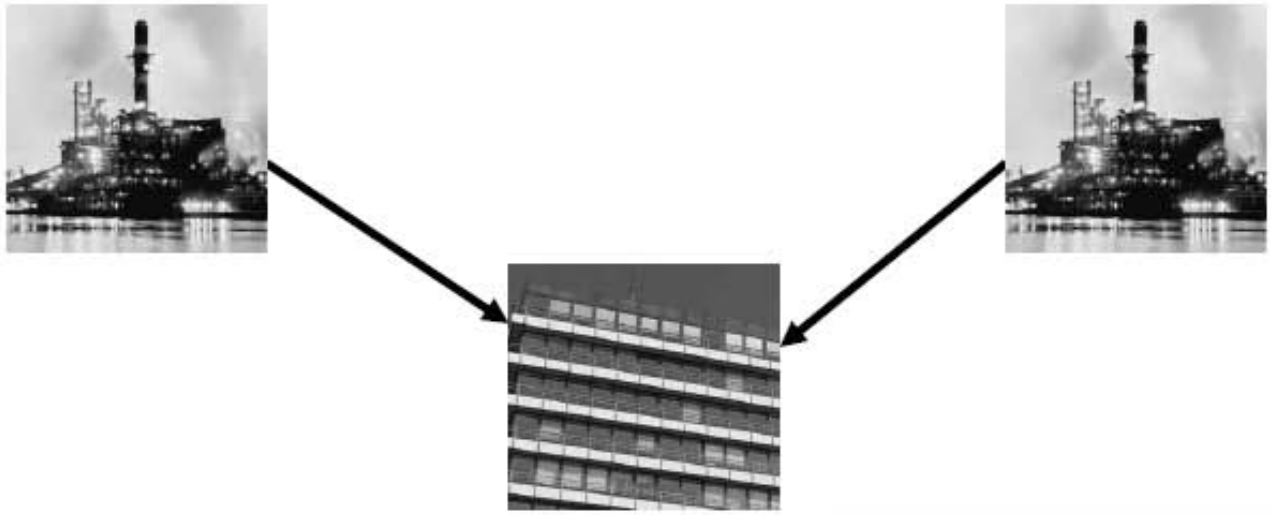


Procedure for Enhancing System Requirements by Using Productive System Information

Because the solutions are scalable you can

- simply add the resource requirements
  - For Multiple Components in One Database (MCOD)
  - When merging different systems
- Scale your system with the new number of users or the expected additional throughput numbers

Don't use the Quick Sizer, because your productive data reflects your business more accurately



Agenda

Preliminaries

Capacity Planning Process

Capacity Planning

- with Quick Sizer
- using productive data (delta sizing)
- **for upgrade sizing**
- for special system landscapes
- for miscellaneous phenomena

Summary

Factors that Influence Sizing

Scope of this method

SAP and Partner

- ✓ Software Version
- ✗ DB Version
- ✗ OS Version
- ✗ Hardware

Performance / Sizing

Throughput
Response Times

Customer

- Number of users ✗
- Amount of Reporting / Batch: Reporting / Dialog / Batch ✗
- Load profile ✗
- Customizing ✗

Upgrade Sizing - Guidelines and Rules

Analyze the current system resource consumption for

- Disk space
- CPU consumption
- Memory consumption

Reflections on Upgrade Sizing

Resource consumption (CPU, memory) strongly depends on the business process

Ideally

- Calculate "weighted average" with throughput numbers from the productive system

Compromise

- Use an average for all components and distinguish between database and application server
- See OSS notes 89305, 113795, 323263, 517085
- Analysis is still in process for Enterprise Core Component 5.0, OSS note 752532 will be released when the analysis is complete

Potential issues

- Database server is used as application server
- Additional database users
- SAP upgrade implies database and/or OS upgrade
- Indirect effects due to buffer sizes, longer transactions
- Different behavior of query optimizer
- Changes of the hardware and software configuration
- Some processes dominate resource consumption

Upgrade Sizing Example: The Database Server 4.6 to R/3 Enterprise

Precondition

- Database software is not upgraded

Memory sizing

- Number of database calls remains the same (OSS 517085)
- Additional database users because of additional work processes or application servers?

Scale the memory used by

- Additional database users
- Growth of user contexts

Upgrade Sizing Example: The Database Server 4.6 to R/3 Enterprise

CPU sizing

- Number of database calls remains the same (OSS 517085)
- Additional database users because of additional work processes or application servers ?

Scale the CPU

- Used by additional database users

Upgrade Sizing Example: The Application Server 4.6 to R/3 Enterprise

Memory sizing

- Memory requirements grow by 5% on average (OSS 517085)
- Care should be taken for the central instance environment or with very special application servers

New_application_server_memory = application_server_memory * 1.05

CPU sizing

- CPU requirements grow by 5% on average (OSS 517085)
- Care should be taken for the central instance environment or with very special application servers

Scale the CPU used by an application instance

New_application_server_CPU = application_server_CPU * 1.05

Upgrade Sizing

Resource requirements of the database server may depend on the database platform and the used database release, too

- Additional impact on the CPU consumption of the application server and the database server was observed when moving from a 32-Bit to a 64-Bit operating system

Business data, disk, is heavily dependant on the database and the used business solution, estimates are: 0% - 10% more disk space

Resource consumption can also depend on the applied Service Package

The sizing observation are valid for non-unicode systems

- For more information on Unicode, see http://service.sap.com/unicode -> Unicode Media Library -> Unicode Hardware Requirements

Just a little Exercise

Say, the upgrade note reads:

- CPU consumption DB: + 5 %
- CPU consumption application: + 50 %

Currently, both the DB and the application server run at 30 % CPU consumption each

What is the CPU consumption after the upgrade?

New_CPU_Consumption_application_server = 30 % application_server_CPU * 1.50

New_CPU_Consumption_DB = 30 % DB_CPU * 1.05

Upgrade Sizing – Conclusions

CPU upgrade of application servers can be done via

- Additional application servers
- Additional CPUs
- Faster CPUs
- No upgrade necessary

Each of these have a different impact on the database server

Please consider OS-dependent factors in addition

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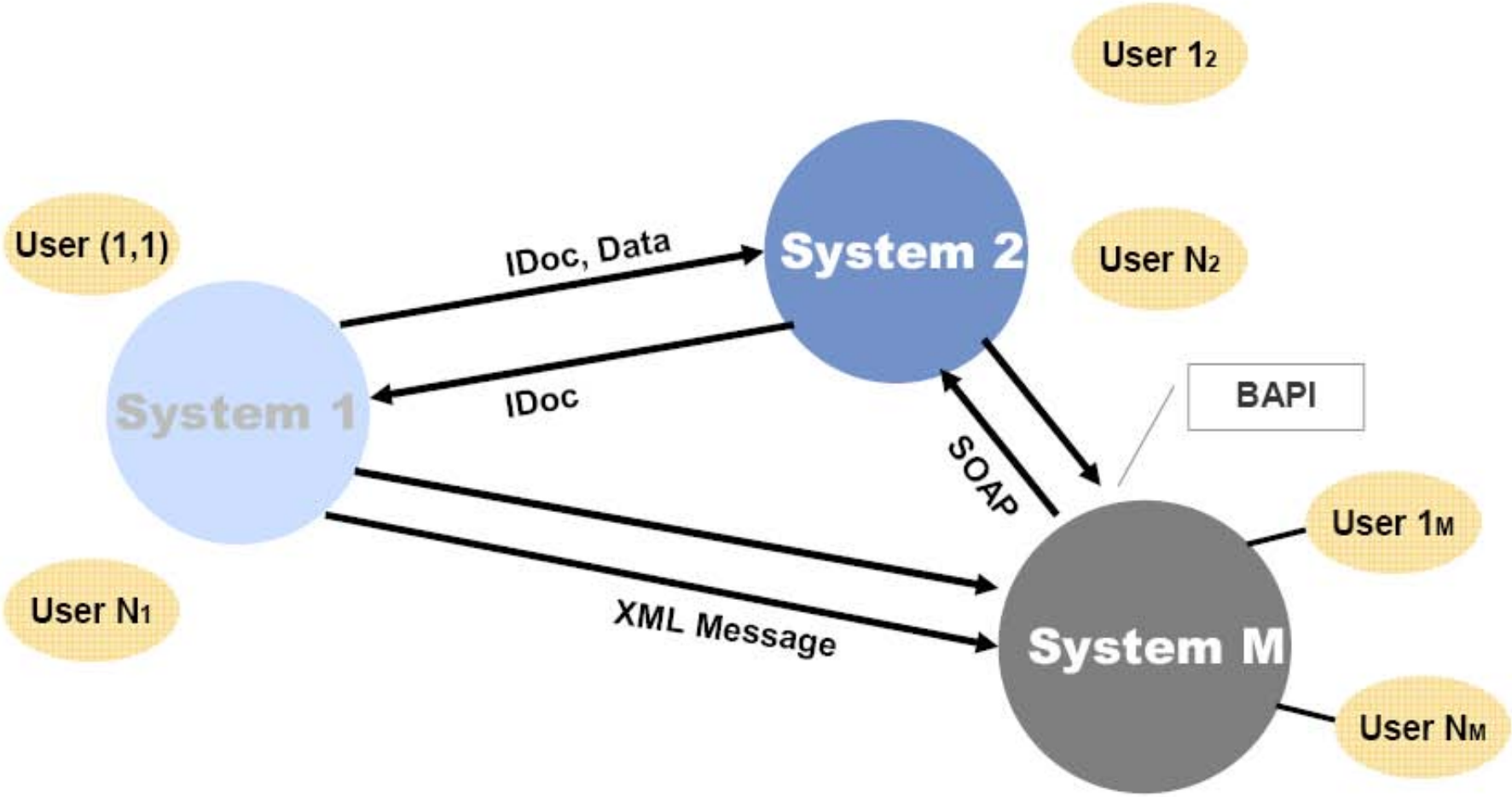
- Amount of Reporting / Batch: Reporting, Dialog / Batch ✓
- Load profile ✓
- Customizing ✓

The Parent Guideline

Map new procedures to existing ones in the Quick Sizer



Size user and quantity structure individually for each system

- Determine amount / size and type of IDocs/messages transferred between systems
- Use throughput sizing for documents created by IDocs/messages in the receiving systems

Sizing XI

- XI sizing depends on the number of messages per time slot
- Protocols with which the messages are sent
- Asychronous or synchronous processes
- For the sizing procedure see the document "Sizing Exchange infrastructure" at http://service.sap.com/sizing -> Media Library -> Literature

Map to GUI transactions

10% overhead for communication

- Error handling
- Monitoring
- Transactional behavior

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- **for miscellaneous tasks, special topics**

Summary

Initial Data Load

Problem

- Master data is normally not an issue
- No information in Quick Sizer on master data

Rule of thumb for initial forecast

- Precondition: ratio of DB:App = 1:5
- 1s for each object on one CPU, if critical refer to sizing of special business processes

Note

- For critical objects such as material master there are dedicated SAP notes how to improve throughput for initial load
- In some cases it makes sense to allocate additional hardware (application servers) for initial load

Batch Processing

Specific batch jobs in batch section of Quick Sizer

- Make only sense in batch mode

Check batch screen

If respective online process is contained in Quick Sizer
➔ Use that one

Data Extractors

- Comparable to reporting
- In general contained in reporting, or may be added as "object display" load
- Benefits in OLTP system because of reduced reporting load

Specific Customizing / Data Constellations

Conduct analysis in

- Test system
- Validation system
- Prototype

Analyze

- Number of database calls
- CPU time on application server
- Memory consumption on application server

Compare results with benchmark load and scale with the factors obtained by measurements

There is no rule of thumb, but the "rule of three"

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Summary

Summary

- Proven software scalability is the prerequisite for sizing
- There are many different sizing approaches. Find the most suitable one
- Sizing is not reserved for just the initial phase of a project. It needs to be revisited.
- Balance user response times with hardware expenditures.

Further Information

Public Web:

http://www.sap.com/benchmark

SAP Customer Services Network:

http://service.sap.com/benchmark
http://service.sap.com/performance
http://service.sap.com/sizing
http://service.sap.com/quicksizing

Related Workshops/Lectures at SAP TechEd

SDN301 Performance Tuning Massive SAP BW Systems – Tips & Tricks
NW204 Performance Analysis and Tuning of SAP NetWeaver
CI202 Performance and Scalability of SAP Business Solutions

SAP Developer Network

Look for SAP TechEd ' presentations and videos on the SAP Developer Network.

http://www.sdn.sap.com/

Questions?

Q&A

Feedback

Thank You !

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