



***IBM SAP Technical Brief***

**IBM's INSIGHT For SAP R/3**

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## General

### ***Edition Notice (February 2000)***

This is the first edition of this document. A listing of available IBM SAP Technical Briefing documents can be obtained either by:

**TOOLS SENDTO MAZVM01 IIVTOOLS SAPCC LIST \* \***

or from the IBM/SAP Web Page on IBM's Intranet for INSIGHT at:

<http://www.ibm.com/erp/sap/insight>

### ***Scope***

This document is written for Customers and IBM personnel involved in the installation, configuration and use of INSIGHT for SAP R/3 (henceforth referred to as INSIGHT) that are interested in more detail then is provided by the standard "Question & Answer" document or the available README's. The purpose of this document is to provide an experienced SAP BASIS specialist with a additional information about the various elements involved with INSIGHT.

### ***Acknowledgments***

The authors want to graciously acknowledge the work of Jim Dilley, who took the time to review, critique, and contribute to the contents of this document. Also to John Oustalet, Ralf Schmidt-Dannert, and Azam Saeed, whom have all contributed greatly to this paper.

### ***Feedback***

Please send feedback to: [lnagel@us.ibm.com](mailto:lnagel@us.ibm.com)

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### ***References***

All references are attached at in appendices at the end of this document.

## **Introduction**

INSIGHT is a tool provided free to the marketplace. It can collect data from virtually all SAP R/3 supported configurations. It is designed to run on a PC (no transports into SAP R/3 required) using lightweight SAP provided RFCs to collect data from the target SAP R/3 system. In the design of the collection tool was the requirement for ease of use and minimal impact on the target SAP R/3 system. For this reason, IBM then analyzes this collected data for the customer. These results are provided back to the INSIGHT user in the form of a report written in MSWord. This report provides data, to the user, that is otherwise unattainable from other sources.

INSIGHT was conceived in an attempt to answer a series of questions that has been plaguing vendors and customers of SAP for years. These questions are:

- What are the real ratios in capacity intensity between the various SAP R/3 modules?
- How well does this capacity intensity correlate with the benchmarks being utilized to create the sizing estimates used by the various hardware vendors and by SAP?
- How much variability exists in capacity consumption from one production environment to the next?
- What is the source of variability to these production SAP R/3 environments?
- What do the response times look like for the various modules when compared to CPU utilization and capacity intensity?

The hope is that after collecting data from many production systems, statistical analysis could be used to answer these questions. To this end, the INSIGHT process was conceived and written.

This document is segmented into several key elements that follow the actual process. Each element or section contains chapters that contain detailed information pertinent to the use and troubleshooting for the element being discussed in that chapter. The major sections are INSIGHT, processing of the data collected, and analysis of the resulting reports.

The INSIGHT section contains chapters on installation, usage, and internal processes. The installation chapter will discuss how to acquire, install and resolve problems that may arrive. Usage will talk about how the tool should be used, some sizing information on PC requirements for running the tool plus the identification and resolution of any issues that may arise during the execution of the INSIGHT collection tool. The final chapter, in this section, will discuss some of the decision criteria used to identify the various workloads and why they can be significantly different from those commonly observed through the various functions of CCMS (Computer Center Management System) provided in SAP R/3.

Processing will only be of interest to those IBMers assigned the responsibility of processing the submitted data and creating the report back to the user of the INSIGHT tool. It will contain chapters on installation of the analysis tools, use of the analysis tools and validation of the results (including problem resolution when the analysis process fails). It should be noted at this time, that the analysis tools will not

be distributed. The reason for this is simple, the distribution of the analysis tool could compromise the intellectual assets involved in the INSIGHT process.

The last section will provide additional understanding for the results of the analysis process. It will have a chapter on each of the graphics provided back to the user of the INSIGHT collection tool. Each of these chapters will discuss the important elements of each graph. Mainly, how to use the graph and how to interpret it in context of other charts provided.

## **INSIGHT Collection Tool**

### ***Overview of the Collection Tool***

The INSIGHT collection tool runs on Windows platforms. Specifically Win95/98 and NT4.0. The PC should be LAN connected to a network that can access the SAP R/3 system that is to be monitored. This connectivity can be checked if a SAPGUI is installed on the machine. Note: a SAPGUI on the machine running INSIGHT is not required.

The user of INSIGHT must be authorized to run RFCs (remote function calls – discussed in detail later in this section) and have a valid USERID with password on the target SAP R/3 system. Other than these requirements, no other security requirements exist.

The installation and removal of the INSIGHT collection tool does not require any interaction or involvement with the SAP R/3 system. The tool was designed to be easy to install and remove from the PC. One of the design objectives was to eliminate any requirement for any transports or other modifications to the SAP R/3 system, not even the addition of a USERID.

The only potential change to the system is a result of some customers disallowing RFCs on their production SAP R/3 systems.. In this case, authentication will need to be changed for the user of this tool in order for them to use INSIGHT, or a new USERID added. This activity will not be required for the installation or uninstal of the INSIGHT collection tool.

It is generally required that the PC being used be connected and powered up continuously for the entire collection period of several days. This period should be four days. For most installations, the PC does not need to be dedicated as the INSIGHT process can be iconized and just left running while the user can do regular work on the machine. The exception to this statement is for very large SAP R/3 installation that will require most of the resources of a larger PC (discussed in more detail later). This requirement comes from the need for the PC to keep up with the workload being presented through the RFCs.

This section contains several chapters. These chapters cover:

- Usage requirements
- Installation
- Preparation for use
- Using V2.4
- Using V2.5
- How transactions are identified
- Troubleshooting



## ***PC Requirements for Using the INSIGHT Collection Tool***

The largest change to PC requirements between V2.4 and V2.5, was the amount of disk space required. In V2.5, the data reduction does not occur until the collection process is stopped. The reason for this change was the inability of slower PC's to keep up with the workload, when monitoring very large active user communities. For this reason, the PC requirements will be broken into two parts. The first part is the general requirements for both versions. The second part of this chapter will discuss the disk requirements for each of the two currently support versions of the INSIGHT collector.

A “dedicated” PC:

- PC must be running Windows 95, 98, or NT 4.0.
- At least a 90MHz Pentium, 32MB RAM (when using V2.4, to monitor large SAP R/3 installations, much larger PC requirements exist)
- A dedicated virtual memory allocation of 256MB.
- PC must be on LAN with direct TCP/IP access to all production servers (except a dedicated database server).
- The TCP/IP address of all server short host names (as seen in SM51) must be resolved by either “hosts” file entries, or DNS with a consistent, fully qualified domain. In an SP environment, short host names may require an alias to resolve switch host names from the PC over a token-ring or Ethernet network.
- The PC and all server clocks must be synchronized to the minute.
- The PC must be powered on during the entire data collection process
- Disable power management (suspend) during the collection process.

The free PC disk requirement for V2.4 is 40MB of free space on the disk into which INSIGHT was installed. This requirement changes drastically if the default collection options are changed. Worst case, expect a 25% uplift in free disk requirements from those calculated for V2.5 below.

The free disk requirements for V2.5 must be calculated from the workload being monitored. To determine this requirement, multiply the total expected number of dialog steps the INSIGHT collector will process by 0.00025. As an example, if the plan is to run for four days at one million dialog steps per day, the resulting calculation would be: 4 days \* 1,000,000 Ds \* 0.00025. This results in a requirement of 1,000MB, or 1GB of free disk space on the PC being used for monitoring.

## ***Installation of the INSIGHT Collection Tool***

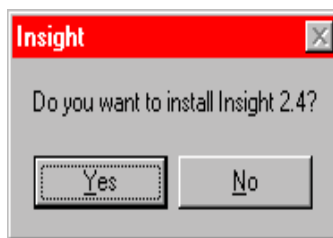
On the designated PC, copy “setupinsight.exe” to a temporary directory.

INSIGHT uses an industry standard “Install Shield” process. This provides several benefits. Most Windows users are already familiar with the process and screens presented during this type of installation. Additionally, it allows for a clean removal of the tool when the collection is completed.

The installation process can be started with either:

“run <disk>\<directory to which it was downloaded>\setupinsight.exe

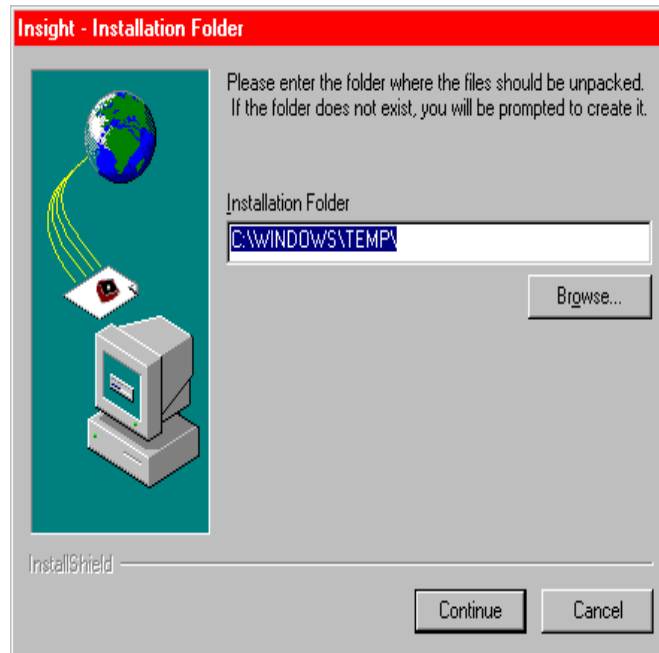
or by double clicking on the icon for “setupinsight” in the temporary directory in which it was stored. When this is done, the following screen will come up:



The version 2.5 of ***INSIGHT*** has just been released, the above is obviously a sample from V2.4. There are minor changes in the look of the screens, but the basic flow is the same with one exception. In V2.5, a readme is posted at the end of the install process in "Notepad". In either case, it is important to read the README. Both the INSIGHT V2.4 and the INSIGHT V2.5 READMEs are attached in Appendices at the end of this document. The current README is provided in several forms (.doc, .pdf, and .txt) and can be found in the target directory into which INSIGHT was installed (not downloaded). There is additional documentation about INSIGHT on the WEB page listed in the next paragraph.

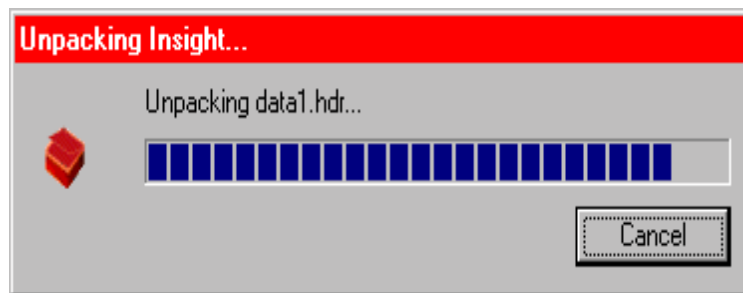
The version being installed will depend on when your download of the tool took place from <http://www.ibm.com/erp/sap/insight>. It is important that V2.4 or higher is installed and used. There will be periodic updates to the INSIGHT collection tool during the year that will add additional data elements to the collection process. This will enable additional reports to be generated out of the analysis process.

After clicking on the “Yes” button, the next typical Windows install screen will appear. It is prompting for the location of the temporary directory that is available for un-packing the setup program. This will typically be c:\windows\temp on a Win95/98 system or c:\temp on WinNT. The prompt window that will be displayed is at the top of the next page:



It is generally sufficient to accept the temporary location for these temporary work files. If an aborted install of a software package has occurred, a message box may pop up indicating that a file already exists in the temporary sub-directory. Since these are just temporary files, go ahead and reply “Yes” to replace it.

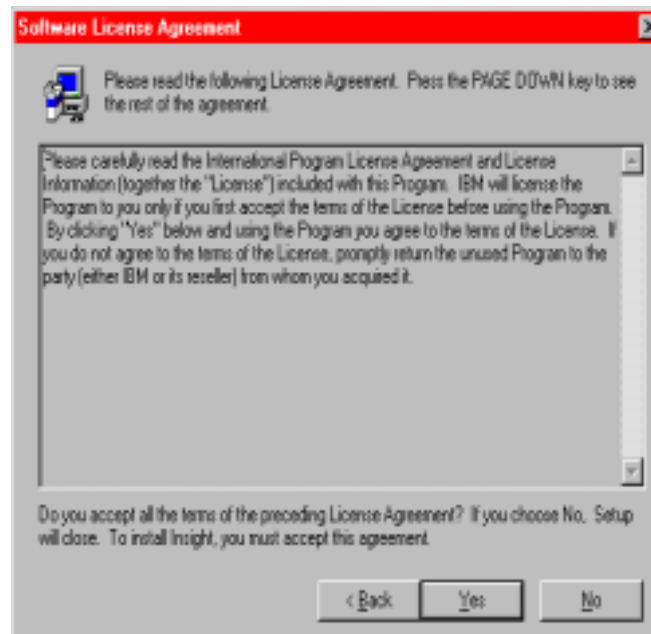
While the decompression takes place, several thermometer boxes will be displayed indicating the progress of setup process. This is not the install process, just the process of set up for the install process. This progress window will look as follows:



When the final progress indicator completes, the standard setup screen will be displayed. It is as follows:



To continue the install, click next and another dialog box will be presented. This dialog box is the typical license message box commonly seen when installing software. It should appear as follows:

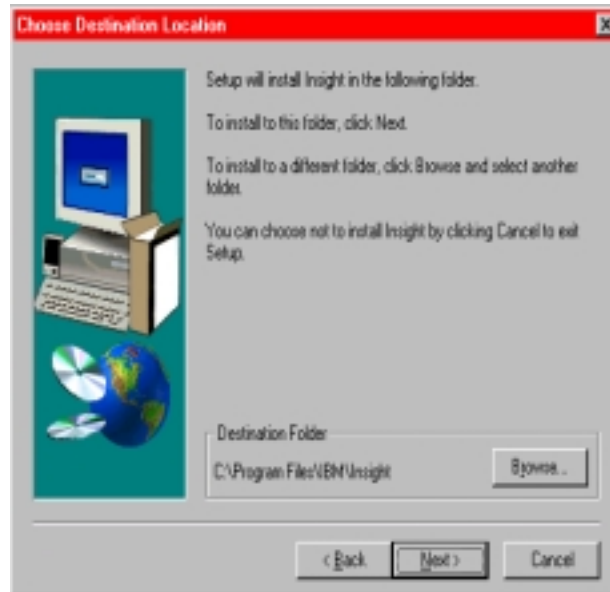


To continue, read the agreement and click “Yes”.

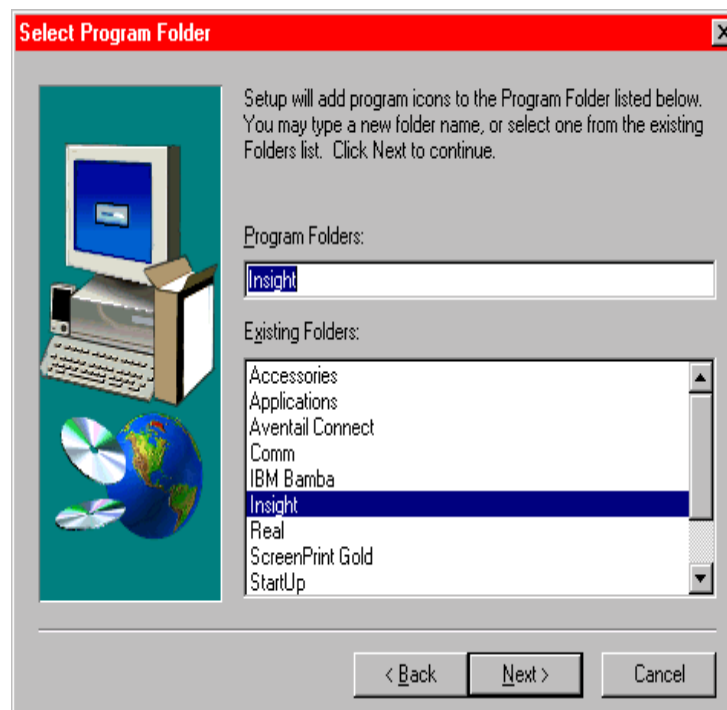
The next screen will ask into which directory the **INSIGHT** tool should be installed. Again, standard Windows install “stuff”. This will default into “C:\Program Files” directory. This can be changed without causing any problems in the install process, as long as enough free disk space exists on the target

disk. For further information, see the chapter on the “PC Requirements For Using The INSIGHT Collection Tool” that precedes this section. It contains sizing information for disk free space.

Here is the sample of the screen requesting the target directory for the install:

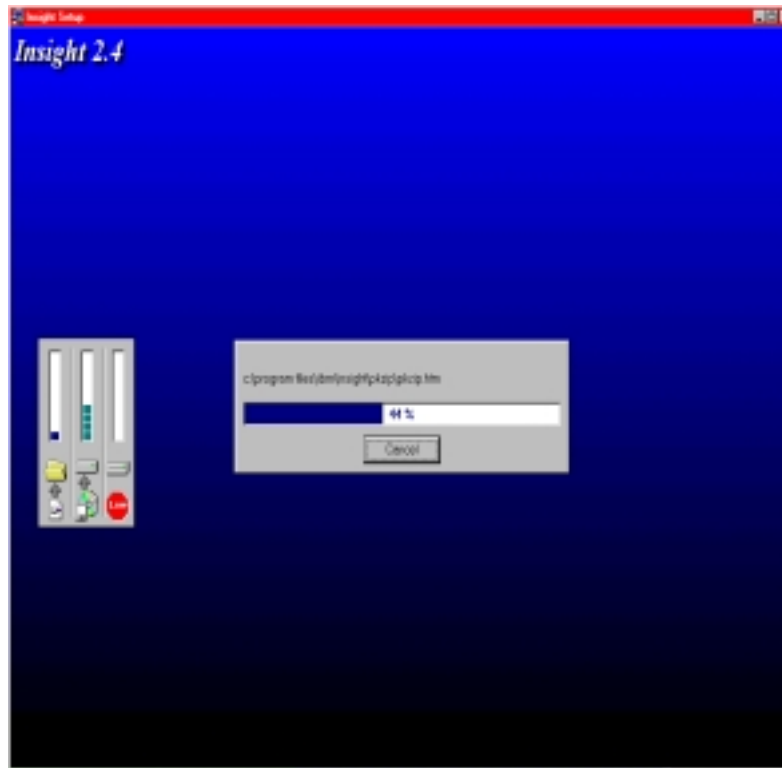


Once the target directory has been entered (or if current is satisfactory), click “Next”. This will take the install process to the step required for defining the program group into which the icons for execution and use should be created.



As can be seen, the default is Insight and is adequate for short duration installs. Selecting “Next” will start the actual install process.

While the install runs, the screen should be familiar to those used for installing most Windows based software and should look similar to the following (obviously, this is a V2.4 install, the bars and colors are different for V2.5, but still display the installation proces):



When this process is completed for an INSIGHT V2.4 install, the installer will be prompted with regards to re-starting the PC. On an INSIGHT V2.5 install, the “Notepad” will be invoked with the current README loaded.

Upon the conclusion of the install, the user will be prompted to re-boot the PC prior to executing INSIGHT. This is also required of many software packages. Care should be taken when responding to this dialog box in order to cause an inadvertant re-start of the PC.

Once the PC is re-booted, INSIGHT can be run (see the next chapter for using INSIGHT).

Once the data is collected and analyzed, the “Uninstall” process can be executed. This may be located in the target INSIGHT program group (depending on release level), or can be accomplished by: “Start→Settings→Control Program” double click on “Add/Remove Programs” and selecting *INSIGHT* from the list of programs. This will enable the “Add/Remove” button that should then be selected.

## ***Preparation for Running the INSIGHT Collection Tool***

There is a set of information required for starting the INSIGHT collector. Additionally, there is some information needed during the stopping of the collector. Acquiring each of the following pieces of required information will be discussed in greater detail during the remainder of this chapter:

- Userid authorized to execute RFCs
- The hostname of the message server
- Hostnames for all servers, there hardware type and configuration.
- Connectivity to each server supporting the target SAP R/3 system  
If DNS required, what is domain name?
- The SAPOSCOL collector is running on each application server and on the database
- SAP Router string, if required
- Hardware configuration of servers

### **Authorized Userid**

If, for security reasons, the user of INSIGHT is not authorized to execute RFCs, the easiest solution is to have a Userid added type “CPIC” with the following authorizations:

- S\_ADMI\_FCD(S\_ADMI\_ALL)
- S\_C\_FUNCT(S\_C\_FUNCT\_AL)
- S\_CPIC(S\_CPIC\_ALL)
- S\_DATASET(S\_DATASET\_AL)
- S\_RFC(S\_RFC\_ALL)

Be sure to find out to which client this new Userid was added, assuming a new Userid was required.

### **Hostname of the message server**

To determine the correct hostname of the message server, follow the following steps:

1. Logon to SAP and execute transaction "SM51".
2. While on the "SM51" screen, note the third column labeled “Type”, and identify the host that is running “enqueue”, this will be the name of the server that has the message server. This short hostname of the server running the message server will be needed during startup.

### **Machine Information (required prior to ending execution)**

At the conclusion of the data collection process, the following information will be required for each server:

- Vendor that supplied the server
- Model of the server as designated by the vendor
- Number of processors on this server
- The chip speed of the CPUs in the server
- Amount of memory in the server

## Server Connectivity

In order for the INSIGHT collector to run, it is necessary for it to have connectivity to each server supporting the target SAP R/3 system that is to be monitored. To do this, perform the following steps:

1. Logon to SAP and execute transaction "SM51".
2. The middle column, labeled "Host", lists all of the application server names that may need to be in the PC's "hosts" file. Write these names down.
3. Try pinging the message server with the short hostname (example: "ping appsvr01").
  - If that works, DNS is probably not required.
  - If a messages similar to "No Response" or "Packets: 5 sent, 0 received" or "Unknown hostname" is displayed in response to the ping, DNS may be required.
  - If ping was unsuccessful try pinging with a fully qualified name (example: "ping appsvr01.yourcompany.com"). If this runs successfully, DNS is required and the domain name will need to be entered when starting the INSIGHT collector (in this example the domain name is "yourcompany.com"). If this fails, see the chapter on "Troubleshooting the INSIGHT Collector" later in this paper.
4. Repeat step number 3 for each host found in "SM51".

## Verify that SAPOSCOL is running on each server and the database

In order to acquire CPU utilization information, it is required that the SAPOSCOL process is running correctly on each server. This normally is the case in production environments, but should still be checked.

1. Logon to SAP and execute transaction "SM51".
2. Highlight an application server and select "OS collector".
3. Check that non-zero statistics are being returned.
4. Repeat steps 2 and 3 above until all servers have been verified.
5. For a dedicated database server, execute transaction OS07. Select the appropriate SAPOSCOL destination (and write it down for later use). Verify that some non-zero statistics are returned.
6. If step 3 or step 5, above, show zero values, contact BASIS support for assistance.

## SAP Router String, if required

Most company Intranets do not require this field. If a "SAP Router String" is required, it was required when setting the SAPGUI logon on a workstation. The requirement for the use of this field and its value can be determined through either the "SAP Session Manager" or "SAPLogon". In either case, select the desired SAP R/3 system from the displayed list. For the "SAP Session Manager", select edit. For "SAPLogon", select properties. Check if the "SAP Router String" is blank. If not blank, write down this string, as it will need to be entered when starting the INSIGHT collector.



## Use of the INSIGHT V2.4 Collection Tool

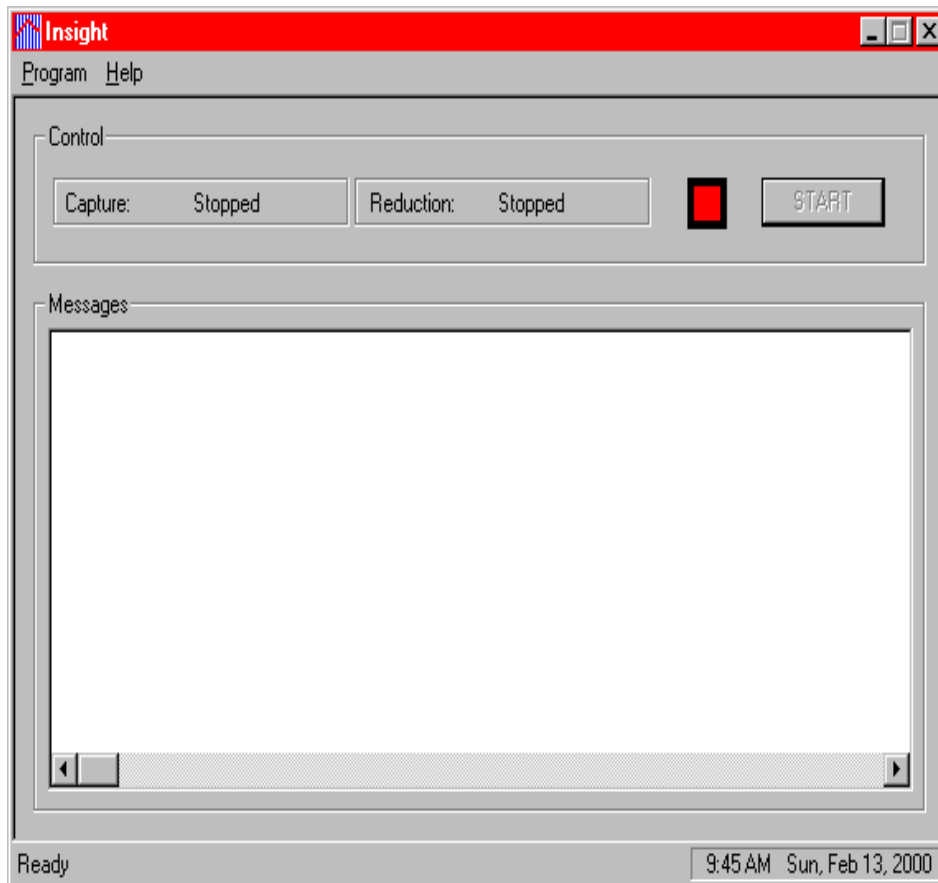
Numerous enhancements were made to the Version 2.5 collection tool. Several of these were to enhance error detection and configuration automation. Therefore, the use of that version is recommended. However, Version 2.4 is still supported and is the topic of this chapter.

From the Windows Start menu, select Programs→Insight→Insight 2.4 or go to the target installation directory and double click on the INSIGHT icon.

Once this has been done, a message box will appear with the shown “splash screen” graphic. This “splash” screen will disappear briefly after being displayed.

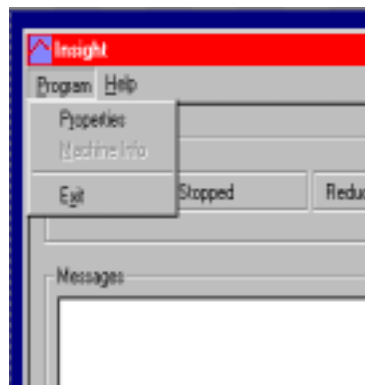


After the the “splash screen” disappears, the message box will look like this:

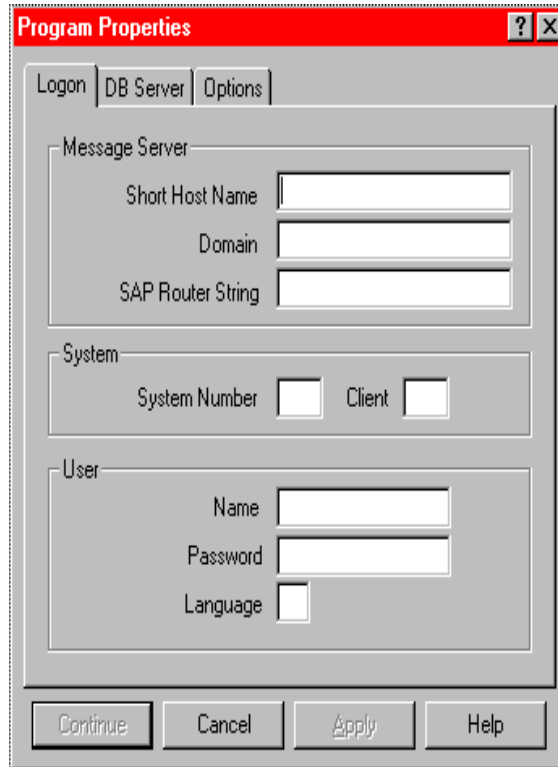


Notice that there is a red “light” to the left of the grayed out START button (meaning that INSIGHT is not running). Also, it is apparent that Capture is “Stopped” and Reduction is Stopped”. Basically, this all means that the collector is not running and has not yet been configured.

It is now time to configure the INSIGHT collector. This is done by selecting “Program” from the menu bar, as shown below:



Selecting “Properties” from this pull down menu will invoke the following screen:



There are several tabs across the top of the dialog box that will each be discussed in turn. First is a description, of what is required in completing each of these fields in the currently displayed box:

- In the first field, labeled “Name”, enter the message server hostname. This should be the short hostname (example: appsrv01). IP address cannot be used in this field (example: 123.123.123.123 is invalid). Additionally, a domain suffix also cannot be used in this field (appsrv01.yourcompany.com is invalid).
- The second field, labeled, “Domain”, is used if your company is using DNS (domain name services) for resolving hostnames, enter your company’s domain (ex: yourcompany.com) if required. For a discussion about this requirement for entry into this field, see the “Preparation For Using The Insight Collection Tool” Chapter earlier in this paper.
- The last field in the first section, labeled “Router String”, is generally not required. This is dependent how SAP is being accessed through the network topology to the target SAP R/3 system. Again, if this is required here, it is also required when setting up the SAPGUI for the PC being used for the collection. As noted above, this information may be determined by using the “SAP Session Manager” or “SAPLogon”.
- Enter the message server’s system number (ex: 00). As already noted this is required when setting up a SAPGui and can be determined in fashions already discussed.
- Enter the “client number” where the Userid exists or was created.

- Enter the Userid name, password, and language (ex: SAPCPIC, ADMIN, EN).
- Press the “Apply” button.

Next, if the database is standalone, select the “DB Server” tab. Standalone means that there is no SAP presence on the database server (no SAP instance). If that tab is selected, the following dialog box will be displayed:



Notice that the SAPOSCOL Destination box is grayed out. If a dedicated database is in use, check the “Dedicated Database Server” box and this destination box will become enabled. For more information about entering data into this box, see the “Preparation for Using The Insight Collection Tool” chapter earlier in this paper. If any changes are made to this box, press the “Apply” button prior to proceeding.

Upon completion of this dialog box, it is time to select the last tab. On selecting the “Options” tab, the following dialog box will appear:



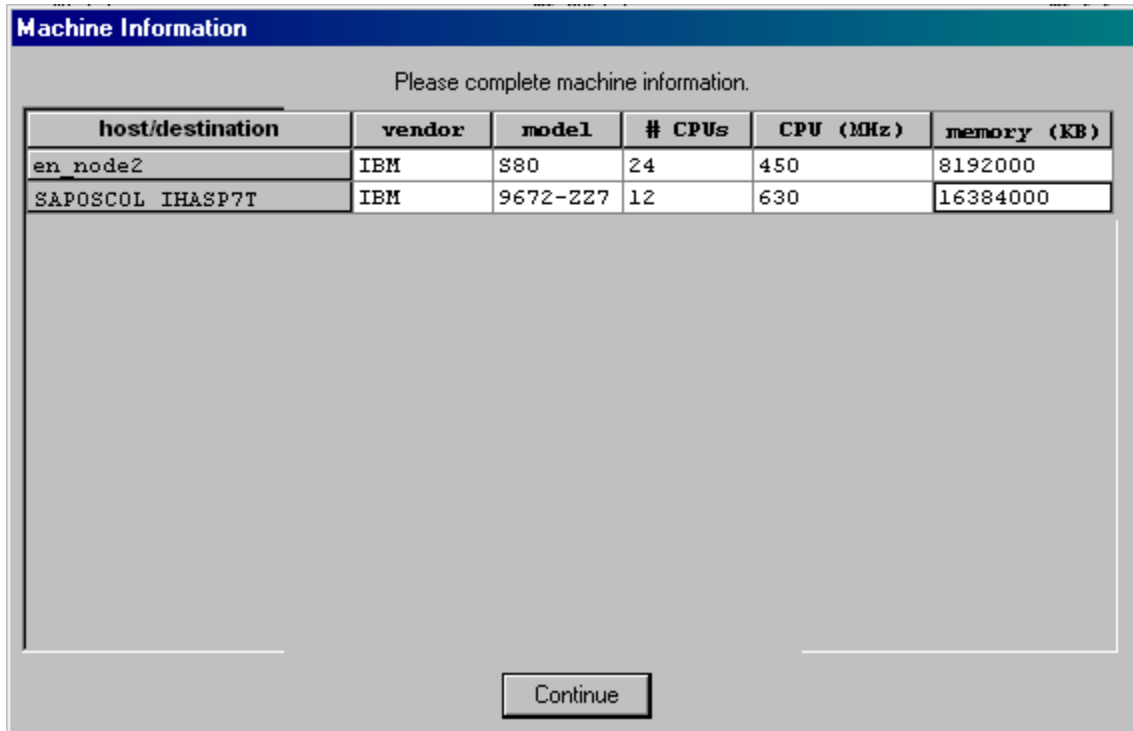
There are many options on this screen that affect the recording of data to flat files for later evaluation. Unless specifically instructed by IBM, it is recommended that these options be left alone (in other words, use the defaults). Selecting everything can generate disk storage requirements measured in the gigabyte range. Un-selecting items will make data analysis impossible. These options are no longer available in V2.5 because of the high occurrence of changes on this screen causing problems.

Return to the “Logon” tab and select “Continue”, at this time, the initial dialog box will be presented. Selecting “Start” will then validate the setup of the INSIGHT collection tool and start data capture. While the tool is running, the indicator light will be green, the “Capture” indicator will show “Running” and once an hour, the “Reduction” indicator will show “Running”. There will also be status messages posted in the window.

At this time, this dialog box can be iconized until it is time to stop the tool.

After four days of data collection, stop INSIGHT by pressing the "Stop" button

Finally, a dialogue box will be displayed requesting the machine information be entered into a spreadsheet like grid. Press the “Continue” button once completed. This information is important and filling it out correctly will expedite the return of the analysis report.



The dialog box titled "Machine Information" contains the instruction "Please complete machine information." Below this is a table with the following data:

host/destination	vendor	model	# CPUs	CPU (MHz)	memory (KB)
en_node2	IBM	S80	24	450	8192000
SAPOSCOL IHASP7T	IBM	9672-227	12	630	16384000

At the bottom of the dialog box is a "Continue" button.

INSIGHT can now safely be quit by going to the menu bar and selecting “Properties→Exit”.

Please take time to complete the survey questionnaire (SURVEY.DOC) found in the INSIGHT installation directory.

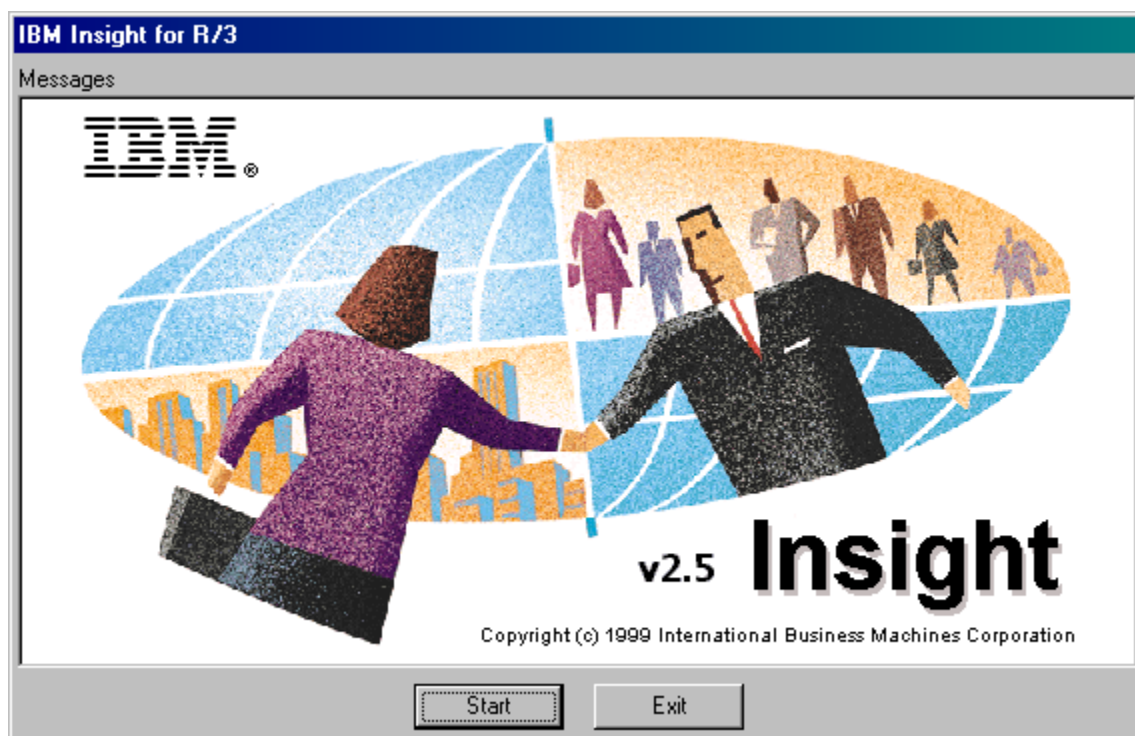
Execute the batch file "zip2file.bat" (zip2file.cmd for NT) in the INSIGHT installation directory or from the same "Programs" list used to start INSIGHT. This will execute PKZip in order to compress the captured data files for shipment to IBM. The resulting Zip file is SAP\_DATA.ZIP and will be placed in the INSIGHT installation directory. Please e-mail this Zip file to [ibmerp@us.ibm.com](mailto:ibmerp@us.ibm.com) for analysis.

## ***Use of the INSIGHT V2.5 Collection Tool***

Numerous enhancements were made to the Version 2.5 collection tool. Several of these were to enhance error detection and configuration automation. Therefore, the use of this version, while similar to Version 2.4, requires its own chapter and is recommended.

From the Windows Start menu, select Programs→Insight→Insight 2.5 or go to the target installation directory and double click on the INSIGHT icon.

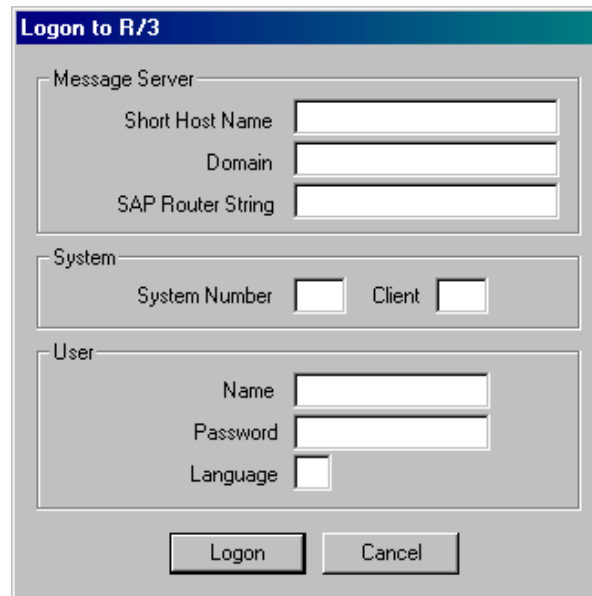
Once this has been done, a message box will appear with the shown “splash screen” graphic imbedded. This “splash” screen will disappear briefly after being displayed.



After the the “splash screen” disappears, the message box will look like this:



Pressing the start button will cause the following dialog box to appear. This is the start of the logon process to SAP R/3. The input fields should be mostly familiar to a SAP user. This input screen looks like:



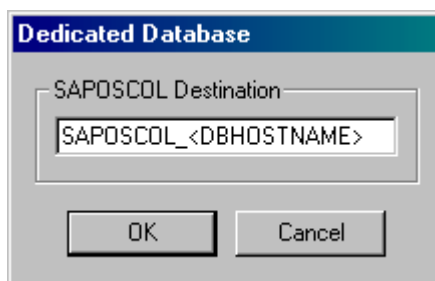
Here is a description, by field, of what is required in completing each element of this box:

- In the first field, labeled “Name”, enter the message server hostname. This should be the short hostname (example: appsrv01). IP address cannot be used in this field (example: 123.123.123.123 is invalid). Additionally, a domain suffix also cannot be used in this field (appsrv01.yourcompany.com is invalid).



- The second field labeled, “Domain”, is used if your company is using DNS (domain name services) for resolving hostnames. If required, enter your company’s domain (ex: yourcompany.com). For a discussion about the requirement an entry in this field, see the “Preparation For Running The Insight Collection Tool” Chapter earlier in this paper.
- The last field in the first section, labeled “Router String”, is generally not required. This is dependent how SAP is being accessed through the network topology to the target SAP R/3 system. Again, if this is required here, it is also required when setting up the SAPGUI for the PC being used for the collection. As noted above, this information may be determined by using the “SAP Session Manager” or “SAPLogon”.
- Enter the message server’s system number (ex: 00). As already noted, this is required when setting up a SAPGui and can be determined in fashions already discussed.
- Enter the “client number” for the Userid being used.
- Enter the user name, password, and language (ex: SAPCPIC, ADMIN, EN).
- Press the “Logon” button.

At this time, connection testing and logon will occur. Depending on the configuration of the SAP R/3 system, the following screen may or may not appear:



This dialog box displays when the database is dedicated. This means that no R/3 instance is running on the host where the database is located. For more information about entering data into this box, see the “Preparation for Running The Insight Collection Tool” chapter earlier in this paper.

The program is now running and will capture performance statistics every minute. Status messages will scroll in the INSIGHT “Messages” window. At this time, the message window can be iconized without causing problems.

After four days of data collection, stop INSIGHT by pressing the "Stop" button. Do not cancel INSIGHT through any mechanisms available through Windows as this will probably result in corrupted or incomplete data for the analysis phase.

Once “Stop” has been requested, post-processing will reduce the captured SAP R/3 data records for shipping to IBM for analysis. This may take some time.

Finally, a dialog box will be displayed requesting that the machine information be entered into a spreadsheet like grid. Press the “Continue” button once completed. This information is important and filling out correctly will expedite the return of the analysis report.

**Machine Information**

Please complete machine information.

host/destination	vendor	model	# CPUs	CPU (MHz)	memory (KB)
en_node2	IBM	S80	24	450	8192000
SAP0SC0L IHASP7T	IBM	9672-Z27	12	630	16384000

Continue

INSIGHT can now safely be quit by pressing the “Exit” button.

Please take time to complete the survey questionnaire (SURVEY.DOC) found in the INSIGHT installation directory.

Execute the batch file "zip2file.bat" (zip2file.cmd for NT) in the INSIGHT installation directory or from the same “Programs” list used to start INSIGHT. This will execute PKZip in order to compress the captured data files for shipment to IBM. The resulting Zip file is SAP\_DATA.ZIP and will be placed in the INSIGHT installation directory. Please e-mail this Zip file to [ibmerp@us.ibm.com](mailto:ibmerp@us.ibm.com) for analysis.

## ***Analysis Processes inside the INSIGHT Collection Tool***

The INSIGHT collection tool performs some analysis of the data that it collects from SAP R/3. This is to achieve several purposes. They are:

- Data reduction is essential if the data is to fit on a PC hard disk and be small enough to e-mail the resulting data back to IBM for analysis.
- Source data record quality is also handled by the INSIGHT collection tool. This prevents the posting of invalid data to the output data files.
- Dialog step identification and characterization can only be performed in the context of users activity. Performing this function permits the data reduction mentioned.

Data reduction is simple, most of the data is characterized and summarized into 1 minute or 5 minute buckets. This reduces the required disk space dramatically, but limits some types of analysis of the data. This summation also requires that data problems be handled prior to summation.

Data quality is always important. Checks are made to verify the following:

- Total CPU consumed is not greater than 100%
- Response time is less than the elapsed time of the dialog step
- Reported fields are positive
- Reported fields are reasonable.

Finally, a decision tree for characterization is used to identify types of workloads and modules that are being used. Here are the decisions that are used:

1. If the dialog step was run in a background process, it is batch.
2. If the dialog step was invoked by the SAP Reporting Tree, Report Writer, or generates more than 5K bytes back to the WAN, and was executed in a DISP+WORK process (foreground), it is a report.
3. If the transaction code is for a Cross Application module, assign it to the invoking SAP module.
4. If no SAP R/3 module can be identified, assign it to the module previously used by this user.

When performing module identification, a table is used that maps SAP transaction codes to SAP module identifiers (i.e. Financial, Sales & Distribution, Logistics, etc.). This table was built from a SAP 4.5 system. The reason for this is that on SAP R/3 3.0 and 3.1 systems, there were many transaction codes that could not be readily identified as belonging with a module. However, in 4.5, SAP has extensively extended the labeling. The only identifiable cost of this approach is that several modules were broken up into pieces and the older module identifiers temporarily retired. For more information on SAP modules please refer to Appendix B and Appendix F.

In summary, there are several analysis and summation processes performed by the INSIGHT collector that are not mapped to similar analysis processes when the SAP R/3's RSCOLL is invoked to post data to the MONI table. For this reason, some data discrepancies are to be expected. However, it should be noted that the INSIGHT collector does not make up data, just report it differently. There have been two occasions, out of over 175 runs, where the RSCOLL did not successfully update MONI for periods. In this case, it was obvious, as there are major deviations between data available through CCMS and INSIGHT.

## ***Troubleshooting the INSIGHT Collection Tool***

There are a couple of known problems in running the INSIGHT collection tool. Identification and resolution to each of these will be discussed in this chapter. Each of these problems in using INSIGHT stemmed from the many possible ways of setting up the SAP R/3 environment. These problems are:

- Hostname resolution to an IP address
- Inconsistencies between the clocks on the servers and the monitoring PC
- SAPOSCOL not running correctly on all servers
- User not authorized to run RFCs
- Cannot contact the “standalone” database.

### **Hostname resolution problems**

This is one of the more common problems. Identification of this problem should have occurred in the “Preparation for Running The Insight Collector” chapter. The problem arises when the users of a SAP R/3 system are attach through the company Intranet, while the SAP R/3 system has been configured to use a separate LAN between the application servers and the database.

Each of these two networks requires a separate adapter in the server hardware. Each adapter has a unique IP address. Separate IP addresses requires unique hostnames (a hostname is merely a reference to an IP address). The SAP R/3 system uses the hostname for the adapter and interface that is isolated for communicating with the database. INSIGHT uses the SAP R/3 information for data capture. However, those hostnames are not part of the IP resolution available to the rest of the network, as these addresses are only known to the SAP R/3 servers.

There are two ways to resolve this problem. One is to publish the hostname, and associated IP addresses to the network. This approach may also require the addition of routing statements if this SAP R/3 LAN is not readily available through the network. This is not the preferred solution. This type of environment is not set up casually. It could exist for many reasons: security, performance, reliability, or hardware architecture.

The second way to solve this problem is to add entries on the PC that is to run INSIGHT so that the PC can resolve hostnames into appropriate IP addresses for each server. What this means is to take the hostname known by SAP R/3 and associate it with the IP address of the adapter that is assessable from the Intranet to which the PC is connected. This approach is outlined below.

1. Logon to SAP and execute transaction "SM51".
2. The middle column, labeled “Host”, lists all of the application server names that need to be in the PC’s “hosts” file.
3. Verify that all servers are in the “hosts” file of the PC.
  - For Windows 95 & 98, find the “hosts” file in the Windows directory of the designated PC.
  - For Windows NT 4.0, the file is located in the \winnt\system32\drivers\etc directory.
  - If no “hosts” file is found, there is usually a sample “hosts.sam” file, which can be copied to “hosts”.

4. Edit this file using “Notepad” and verify that all the server hostnames, listed in SM51 along with their corresponding TCP/IP addresses, are in this file.
5. From the PC command prompt, ping each application server short hostname.
6. If this fails, contact local BASIS support for the correct IP addresses. These “public” IP addresses are associated with each of the servers.

**CAUTION:** If a hosts file already exists with entries, adding the entries above may cause problems. Instead, it requires the adding of an alias. This is a very easy process. Please review the example provided.

Hostname	Adapter	IP Address	Comments
appsrv	en0	1.1.1.1	Company Intranet
appsrvf	fd0	1.1.2.1	SAP restricted LAN

It is common that the hostnames associated with the different adapters will be very close in name. In this case, the last character of the hostname is all that changes. When looking at a “hosts” file for this environment, it is probable that the following entry already exists”

```
1.1.1.1      appsrv      # SAP application server 1
```

In order to alias this entry, all that is required is an addition to that line in the “hosts” file. The resulting line would look as follows:

```
1.1.1.1      appsrv appsrvf      # SAP application server 1
```

### **Inconsistencies between clocks**

Correlation is done between the data from the various SAP R/3 servers. In order for this to take place, the clocks on all the servers, and the monitoring PC, must be within 1 minute of each other. The problem of clock alignment is most often created by the monitoring PC not being in-sync with the SAP R/3 system. Another common source of this problem is an incorrect time zone on the PC.

In Version 2.4, the user of INSIGHT only gets an error message indicating that one of the clocks is more than 1 minute out of sync. This could be any server or the PC. In Version 2.5, the error message provides the detected time of each server clock along with the server name in order to assist in problem resolution.

### **SAPOSCOL not running correctly**

Verification of the correct operation was previously covered in the chapter on “Preparation For Running The INSIGHT Collection Tool”. As earlier indicated, if the checks show zero values, a BASIS specialist will need to be involved.

**User not authorized to run RFCs**

The requirements for a user of the INSIGHT collection tool were previously covered in the chapter on preparation for running INSIGHT. Basically, the following authorizations are required:

- S\_ADMI\_FCD(S\_ADMI\_ALL)
- S\_C\_FUNCT(S\_C\_FUNCT\_AL)
- S\_CPIC(S\_CPIC\_ALL)
- S\_DATASET(S\_DATASET\_AL)
- S\_RFC(S\_RFC\_ALL)

## **INSIGHT Data Analysis Process**

### ***Overview of the Analysis Process***

The analysis process uses the data from the INSIGHT collection tool. It does some statistical analysis and generates an EXCEL spreadsheet. The graphics from this spreadsheet are then pasted into a MSWord document that contains additional information about the monitored SAP R/3 environment plus text about the provided graphics.

The two programs that are used are an analysis program written in C++ and an EXCEL spreadsheet containing many Visual Basic macros. The analysis process generally runs in 10-20 minutes once setup is completed for a desired INSIGHT data capture. This process is designed to analyze ONLY prime shift interactive activity. When the analysis window is extended beyond this period, many problems arise that tend to invalidate the analysis (this will be discussed in more detail later).

### **Purpose of Analysis tool**

The Analysis tool reads data from several files which were generated by the IBM INSIGHT collection tool and generates an Excel spreadsheet with compiled information on the following elements:

1. Customer information (release levels, RDBMS type, etc.)
2. User distribution over time
3. Dialog step distribution over time
4. CPU utilization for all servers over time
5. User distribution ratio between modules
6. CPU consumption ratio between module
7. Dialog steps ratio between modules
8. Dialog step ratio among program type (SAP code, Custom code, Batch, Reporting)
9. CPU consumption ratio for database and application server by program type

## ***Installation of the INSIGHT Analysis Tools***

The installation of the analysis tools is straightforward. It requires the creation of a couple of directories and the extraction a couple of files from the ZIPPED distribution. The tools were originally tested using EXCEL97, MSWord97, Win98, and WinNT. However, analysis releases this year are only being exhaustively tested using Office2000 set of Microsoft tools.

There is not a “setup.exe” for doing this install. Nothing is registered in the operating system registry. The following files are required in order to successfully complete an analysis run:

- Analysis.exe
- Analysis.xls
- Pkzip25.exe

Besides these files, there is also a “README” supplied in the ZIP. The README is extensive and is included as with this document in Appendix A. This README should always be referred to. For this reason, the text below is only a brief synopsis of installation activities.

The steps are relatively simple.

1. Select a disk with sufficient disk space. This depends on the amount of data that will be processed. Plan on at least 10MB for each week of each analysis (20MB for larger systems). However, some customers have sent in data sets measured in the 100MBs range.
2. Add a directory in a convenient location. The naming is optional, but “INSIGHT” seems to be a commonly selected directory name.
3. Under this directory, add the following sub-directories:
  - “bin”
  - “input”
  - “tmp”
4. UNZIP the files from analysis.zip into the “bin” sub directory.
5. Place the data to be analyzed from the INSIGHT collection tool into the “input” directory.
6. Upon the execution of the “analysis.exe” program other sub-directories will be built at the same level as the source of the input data. These files will be
  - “customers”
  - “tmp”
  - “variance”

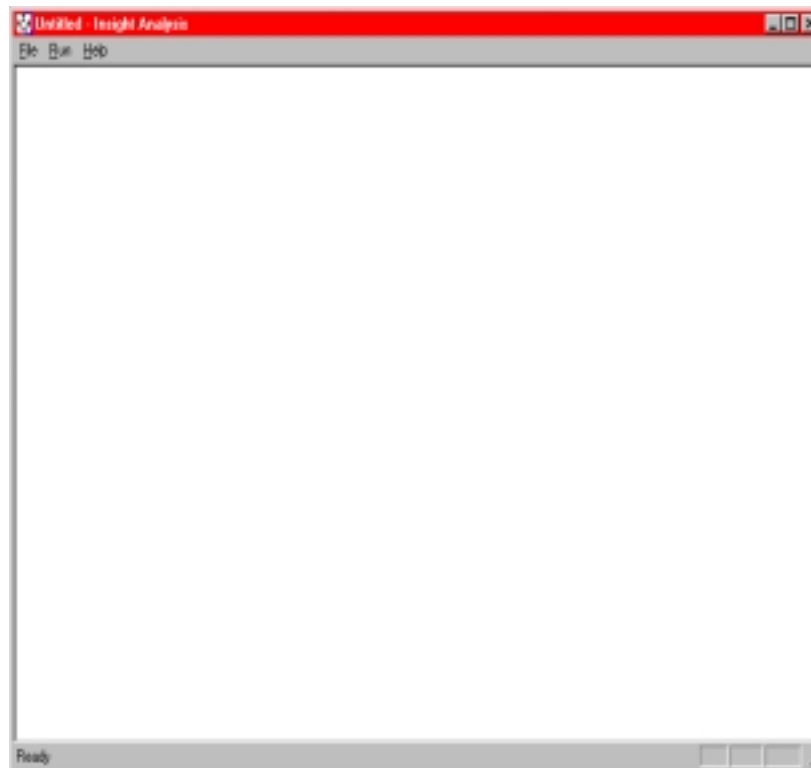


## Using the INSIGHT Analysis Process

### Starting an analysis run

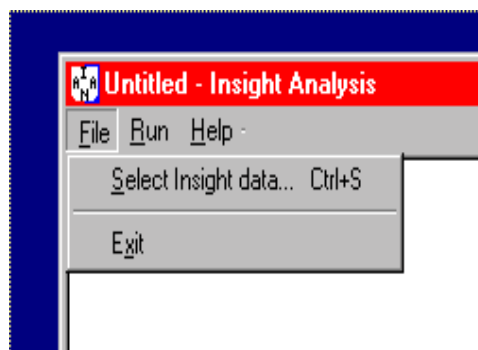
Extract the customer ZIP file into the “input” subdirectory. For a FINAL run, you have to use the default “input” directory, to ensure that the variance information is correctly stored in the “variance” directory.

Next, start the analysis tool. It can be found in the “bin” subdirectory, where it was placed. Double clicking on it is sufficient for execution. The following message box should appear:

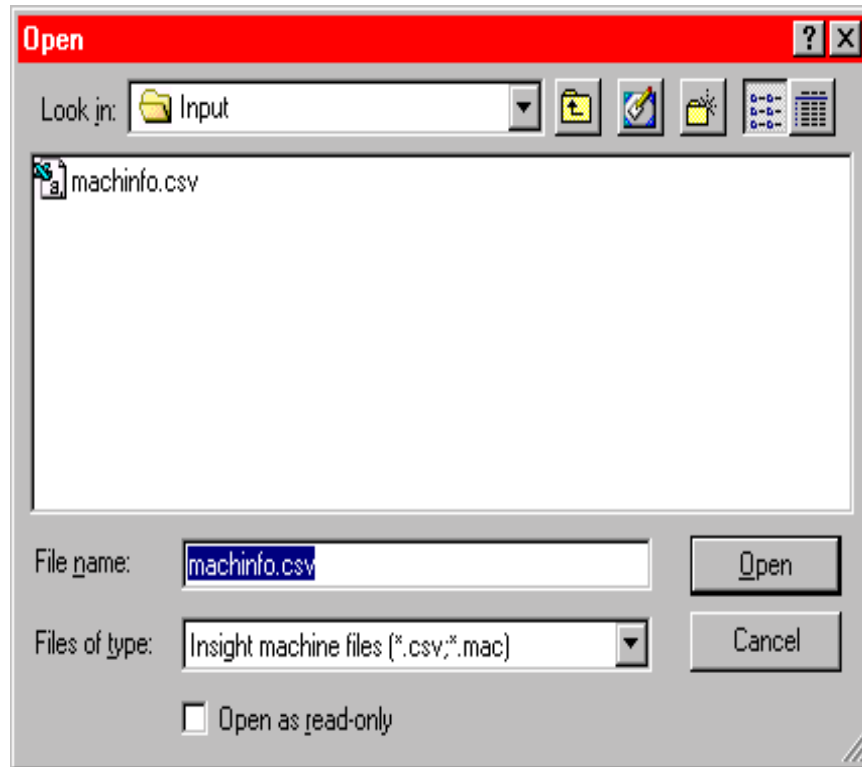


### Selecting the input data

Select the input directory “FILE→Select Insight data” (or use of the <CTRL> S key combination can skip the following menu and go directly to the pulldown window for selection of the desired INSIGHT dataset to be analyzed.

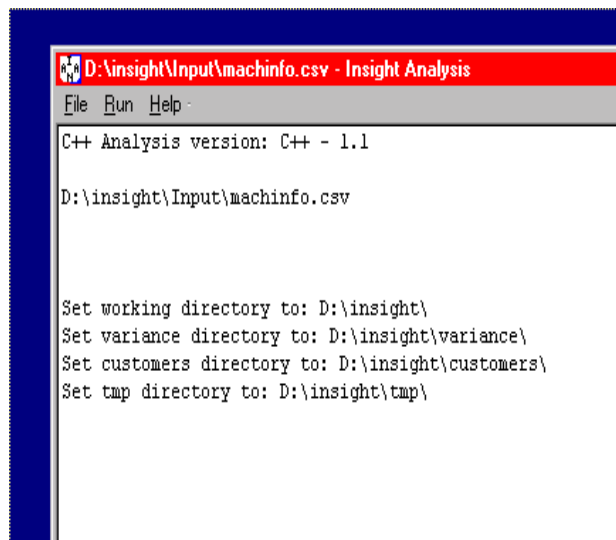


If you use the recommended directory structure, the correct input directory with the file “machinfo.csv” is shown, as shown below.



If this is a “test” run of the analysis process, and this input dataset is elsewhere, the pull down window at the top left of the screen can be used to locate the desired directory. If more than one file exists in this subdirectory, a problem exists that will need to be fixed manually. The analysis process does not currently support processing more than one set of collected data at a time.

Selecting the “OK” button will return the program to display the logging window with information about the directory used and some brief analysis results. This information will also be logged into the “tmp” subdirectory for later analysis. Here is a sample of what that output should look like.



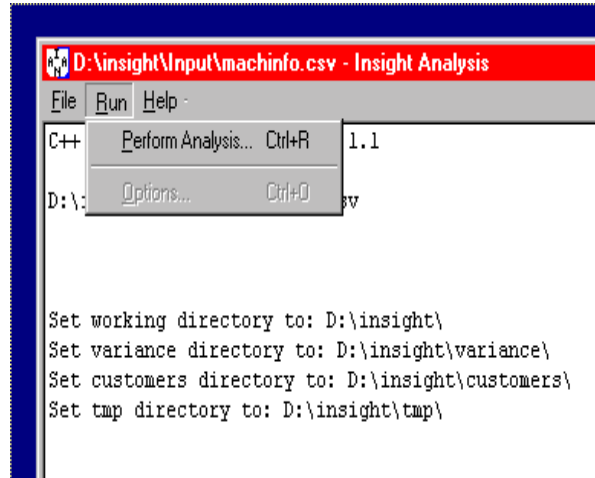
```

D:\insight\Input\machinfo.csv - Insight Analysis
File Run Help
C++ Analysis version: C++ - 1.1
D:\insight\Input\machinfo.csv

Set working directory to: D:\insight\
Set variance directory to: D:\insight\variance\
Set customers directory to: D:\insight\customers\
Set tmp directory to: D:\insight\tmp\

```

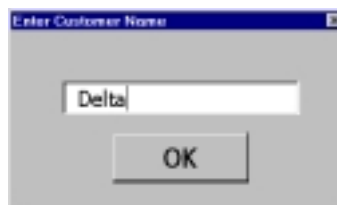
To start an analysis run, select “RUN→Perform Analysis” or shortcut keys <CTRL>R. Once this is performed, the current status of the analysis run is displayed on the status bar and in the log window



After reading in all “.SYS”, “.STA” and “.CPU” files from the input directory, EXCEL is started and you need to enter the following information into some Visual Basic Menu’s. (Information is queried only at the start of the analysis process so that once entered, the analysis can run to completion without further intervention).

### Entering Customer Data

First enter Customer Name. This name will be used as the name of the subdirectory in the subdirectory “customer” subdirectory for storing the results of a FINAL run. This is where the processor will need to look for the Excel spreadsheet that contains the graphics required for building the report to be returned to the customer.

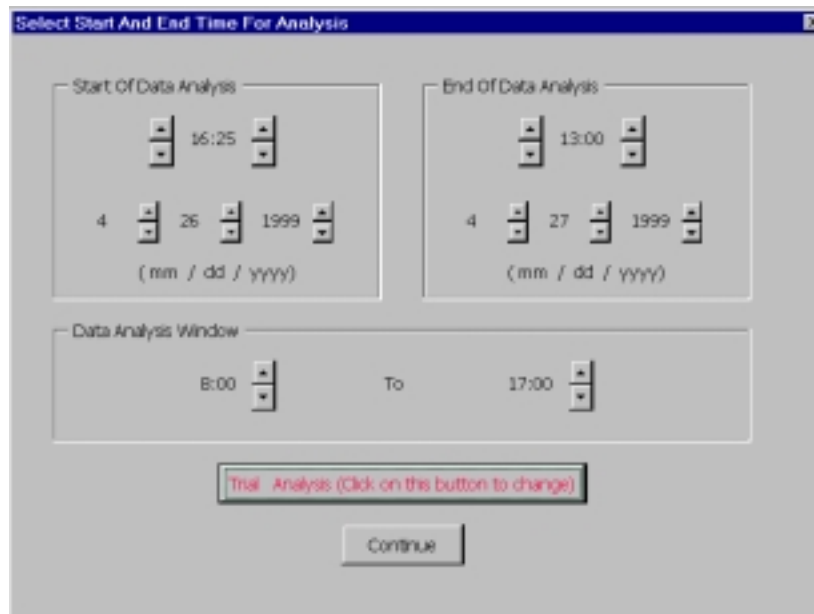


## Selecting Analysis Time Windows

The following screen shows the window used for selecting the desired time period for this customer. The “Start Of Data Analysis” and “End Of Analysis” spinner buttons, in the top section, are already populated with the range of valid customer data for this set of collected data. This time period can be changed for this analysis run by changing these values. In the lower part of this window, it is possible to change the prime shift window used for analysis in the “Data Analysis Window”. Any data from this collection that is not contained in these two sets of boundary conditions will not be used during this analysis run.

Once these two windows have been set, it is time to select the type of run (“Trial” or “Final”). This is the toggle button with red text. By selecting it once, it changes to “Final” in black text. Selecting it a second time will toggle it back to “Trial”. The difference in these two modes is simple. In “Trail” run mode, the resulting Excel spreadsheet will be left in the “tmp” subdirectory and the input data will be left in the “input” subdirectory. If final is chosen, the results will be moved to a subdirectory with the customer name appended with a date that resides under the “customer” subdirectory. Important note: if the input data is not in the “input” subdirectory on a final run, some new directories will be built at the level of the sub-directory containing the source data and some variance data will be lost. The input data will be ZIPPED” prior to its being moved from the “input” directory thus saving space.

When all this is completed, select continue.



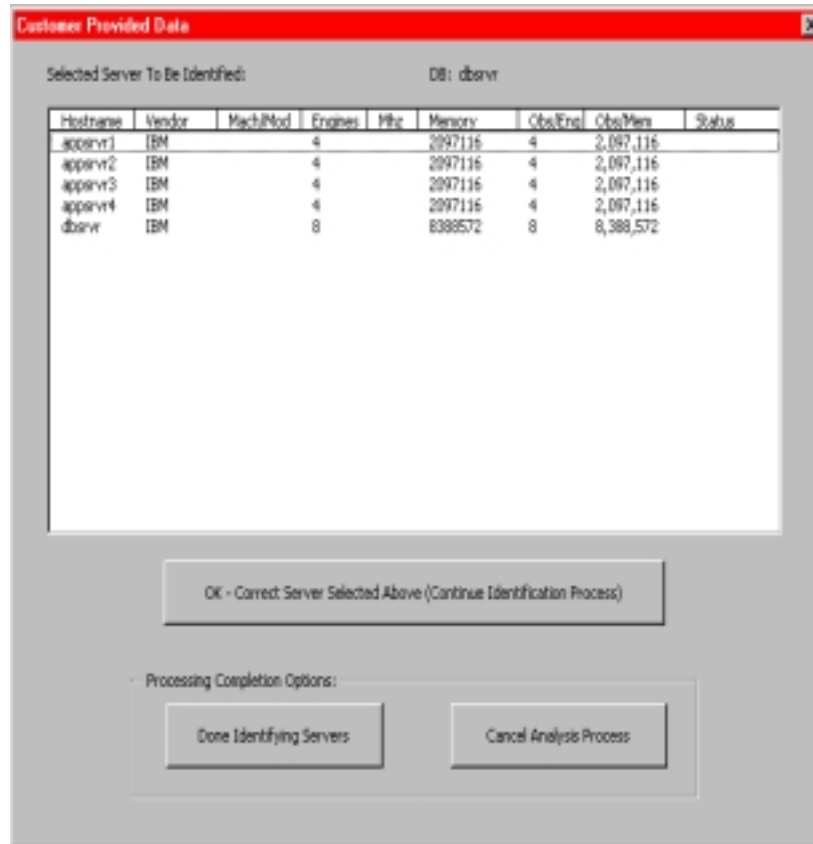
The screenshot shows a dialog box titled "Select Start And End Time For Analysis". It features three main sections for time and date selection:

- Start Of Data Analysis:** Time is set to 16:25 and the date is 4/26/1999.
- End Of Data Analysis:** Time is set to 13:00 and the date is 4/27/1999.
- Data Analysis Window:** Time is set from 8:00 to 17:00.

At the bottom, there is a red-bordered button labeled "Trial Analysis (Click on this button to change)" and a "Continue" button.

## Verifying Server Information

The next element to be displayed is a list box and contains the hardware that was configured for the target SAP R/3 from which INSIGHT data was collected.

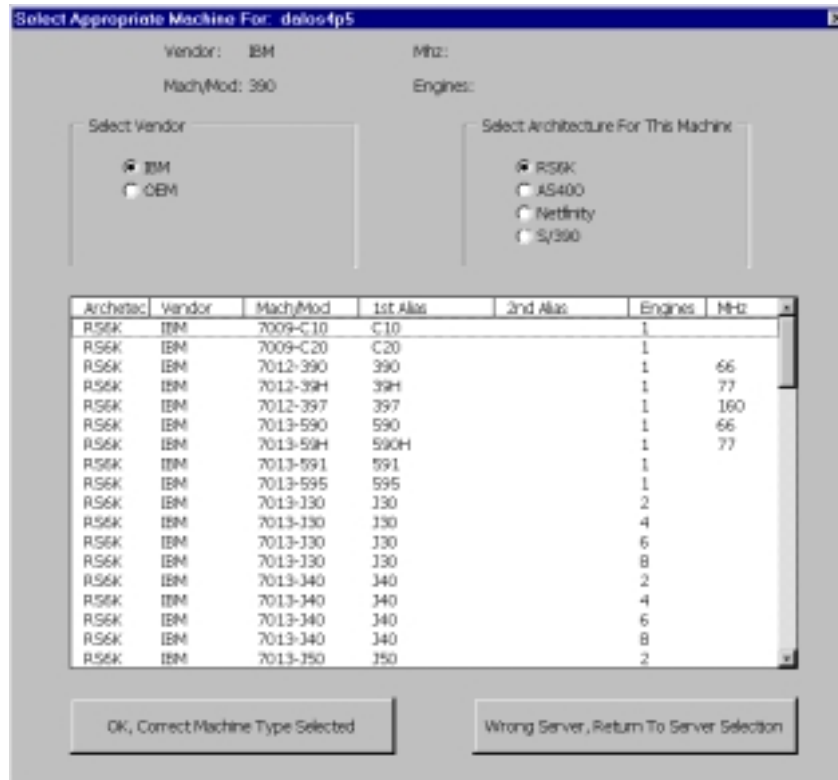


This server information was determined from the input files. The next step is to verify this information. This is done by selecting each server, in turn, from this list of known servers and then selecting the "OK" button.

## Selecting Server Machine Type

Having select “OK” on the previous screen, another list box will appear (shown below). Select the appropriate radio buttons for OEM or IBM, and the appropriate machine type. The OEM selection is currently not populated. Therefore, select an IBM machine of similar characteristics. Standard Windows key and mouse use should be used on this screen.

The data exists for the selected server is displayed at the top of the screen. If the incorrect server was selected, simply select the “Wrong Server” button and the processing will return to the previous screen.



Architec	Vendor	MachMod	1st Alias	2nd Alias	Engines	Mhz
RS6K	IBM	7009-C10	C10		1	
RS6K	IBM	7009-C20	C20		1	
RS6K	IBM	7012-390	390		1	66
RS6K	IBM	7012-39H	39H		1	77
RS6K	IBM	7012-397	397		1	160
RS6K	IBM	7013-590	590		1	66
RS6K	IBM	7013-59H	590H		1	77
RS6K	IBM	7013-591	591		1	
RS6K	IBM	7013-595	595		1	
RS6K	IBM	7013-130	130		2	
RS6K	IBM	7013-130	130		4	
RS6K	IBM	7013-130	130		6	
RS6K	IBM	7013-130	130		8	
RS6K	IBM	7013-130	130		2	
RS6K	IBM	7013-140	140		4	
RS6K	IBM	7013-140	140		6	
RS6K	IBM	7013-140	140		8	
RS6K	IBM	7013-140	140		2	

Assuming the correct server was selected, and a machine from the list box has been selected, again select the “OK” button.

This will take the processing to a verification step for this selection that is used to validate data inputted by the individual that used the INSIGHT collection tool. This verification screen will be shown next.

This verification screen is broken up into three vertical sections. They are:

- “Customer Entered” is data entered about the server environment by the user of the INSIGHT collection tool.
- “Observed” is data that was captured by the INSIGHT collection tool during execution from the RFC calls.
- “Selected” is the configuration that was just selected by the analyst currently using this tool.



After verifying this data, select either “Selection Correct” to continue the process, or “Return” which returns to the previous screen to select a different piece of hardware.

Upon selecting “Selection Correct” from this screen, processing will return to the server selection screen for further selection. As a sample, it would look like this:



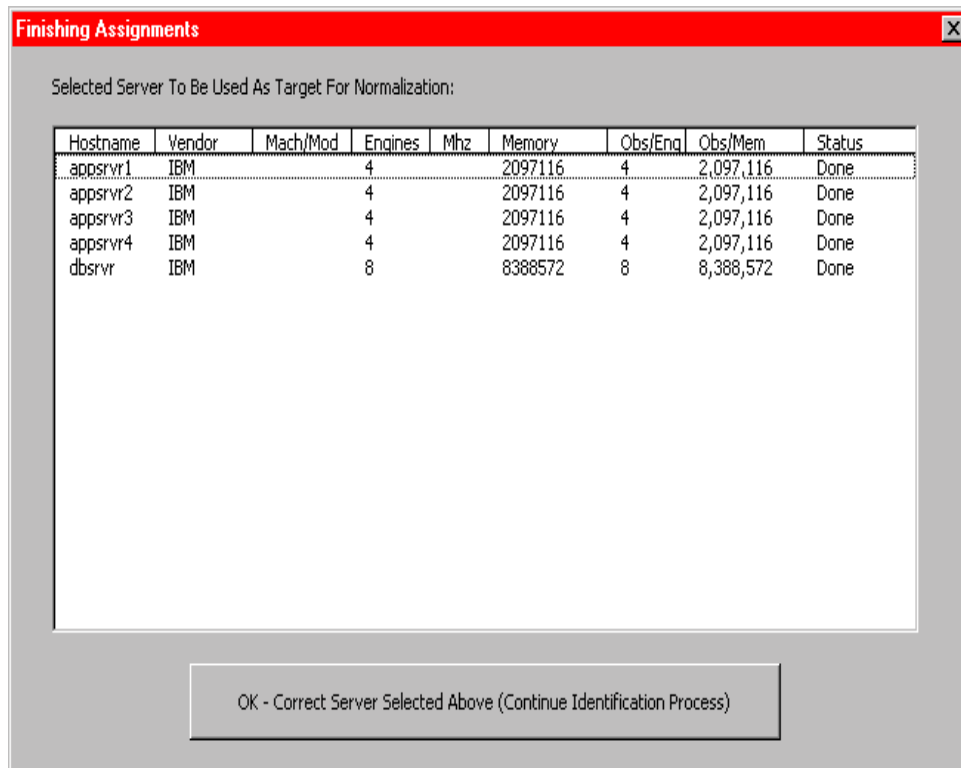
If a mistake is made, simply reselect the server from this menu and reprocess it.

## Finishing Data Analysis Input

Note the “Done” in the last column. This process of selection and identification is performed iteratively until all servers have been successfully identified. They should then all show “Done” in the last column.

The final step of the process is to select a target application server that can be used to normalize the various performance metrics. This is important if different speed application servers are in the configuration. It is started by selecting “Done Identifying Servers”

This final step of setup looks like this:



To complete the setup, simply pick the desired application server and select “OK”. There are a couple of caveats associated with this screen. The most important one is that a S/390 server cannot be selected as an application server as it is not currently a valid SAP application server. Thusly, no performance statistics exist in the database for use in normalization.

At this point, the process will run by itself to completion or an error condition. If an error condition occurs, it will be noted in the message box and in the log file located in the “tmp” subdirectory. The filename of the log is “Joblog.txt”.



## Completing The Analysis Run

At the completion of the analysis run, one of two things will happen as previously noted. Disposition of the results will occur depending on whether “Trial” or “Final” was selecting for run type. To recap what occurs:

“TRIAL”:

- Input data left in the input directory were it was located
- Output files located in the “tmp” directory

“FINAL”:

- A subdirectory is created to the “customer” subdirectory
- Subdirectory name is <Customer Name><timestamp>
- All files are ZIPPED and placed in this new subdirectory

At this point, the process can be rerun (after checking output), or a new “machinfo” file can be selected to start another analysis project.

## HOTKEYS Available

<CTRL>S: Select input directory.

<CTRL>R: Run analysis.

<CTRL>+ (in NUMLOCK mode): Increase size of font in log window.

<CTRL>- (in NUMLOCK mode): Decrease size of font in log window.

<CTRL>D: Activate debug output. Once started, there is no way to disable debug output besides restarting the program. In this version, it is an all or nothing selection. However, it is possible to select the type of dumped data. It can be dumped in a more human readable form, or in a similar format how it was created by the INSIGHT collection tool. For further information on the debug function, read the README in the appendix.

## ***Quality Assurance for the INSIGHT Analysis Process***

Quality assurance is always important when running the analysis process. There are several examples of potential quality problems presented in the following review of the graphics reported for an analysis run. These should be reviewed after an analysis run and used to start a dialog with a customer to verify the validity of the INSIGHT collection and the associated analysis process.

Here is a list of important considerations when evaluating a set of data::

- Was the INSIGHT collection process run for at least 3 days, preferably 4 days?
- Did the analysis window only select normal interactive user behavior during prime shift?
- Is there good correspondence between the various analysis reports that indicate consistency of system usage and good the selection of a INSIGHT data collection period?
- Does the “Machine Information” file correctly reflect the configuration and fully completed?

Basically, it is important that all elements of the analysis results appear to be consistent and explainable.

Another potential warning on data quality can be found in the “Customer Info” tab of the analysis.xls. Any rows that are marked in yellow indicate an intercept or capture ratio that is approaching limits. A red row indicates a row that contains data that is outside of reasonable bounds. The source of these variances generally comes from collection issues mentioned in the bullet above.

## ***Problem Determination for the INSIGHT Analysis Process***

### **Considerations with Excel when running the program:**

During the analysis run, started by “Perform Analysis” or CTRL-R, the program performs the following steps:

- If an EXCEL process is connected to the program, terminate the OLE connection and terminate the EXCEL process – no additional save!
- Starts a new EXCEL process with the variance.xls file from the “tmp” – directory. This instance is not iconized! It can only be found through viewing the started task list of the operating system.
- Stores data in the spreadsheet
- Get analyst input and minimize EXCEL
- Save spreadsheet
- Do the analysis
- Save spreadsheet

If the variance.xls spreadsheet is open in another EXCEL process, problems will be encountered during the save steps. Close the other EXCEL instances and try again. If problems persist during the save steps, it may be necessary to reboot in Win95/98 or with WinNT to kill all EXCEL processes with the NT task manager and then restart the analysis run.

- If it appears that there is a hang, also check that the EXCEL frame is not blinking. This implies that EXCEL is trying to post a message box. EXCEL to activate it and follow any directions from the analysis program or EXCEL.

### **Can't find the output or variance data not appended to data in variance directory:**

This can happen easily as a result of several conditions that occurred during the analysis run. These conditions are:

- The input data used for this analysis run was not located in the “input” subdirectory and a run type of “FINAL” was selected. When this occurs, the analysis program creates new subdirectories at the level of the subdirectory that contained the data. These subdirectories are “tmp”, “customers”, and “variance. To solve, rerun the analysis with the INSIGHT data in the “input” directory.
- The analysis program did not run to completion. Check the logging window, or the Joblog.txt file for error messages. Fix any indicated problems and rerun the analysis process.

**Missing files noted in the log:**

Messages about missing files have numerous sources and permutations. If these steps do not solve the specific problem, contact the author (noted in the README for assistance).

Missing <hostname>.\* file (where <hostname> is the TCP/IP short name of the server). This can come occur for several reasons, but the solution is the same for most cases. Follow these steps to identify the source of the problem:

1. Look at the filelist in the “input” subdirectory. There should be the following 4 files for each application server:
  - ✓ <hostname>.cpu
  - ✓ <hostname>\_<SID>.usr (<SID> is SAP instance ID)
  - ✓ <hostname>\_<SID>.sta
  - ✓ <hostname>\_<SID>.sys

The database server only needs the <hostname>.cpu file. However, it may show up as <RSCOLL\_NAME>.cpu.

2. Edit each “sys” file for what the correct hostname should be for the application servers (section 1 of the “sys” file and annotate simply as “Host”). Also check the “DB Host” name that is several lines lower in this file.
3. If the files are missing, contact the user.
4. If the files are miss named, correct the names of the files and reprocess.

**No valid records found**

This occurs when there is no single 5 minute interval that contains valid data for all servers. A common source of this problem is a corrupted file. Here is a list of checks to understand and resolve the problem:

- Check the length of each file in the filelist for the “input” subdirectory. If any are zero, there was data corruption. It could have happened at either source or receiving ends. They can be identified by transmission problem, ZIP format problems, or disk space problems. In each case, an error message should have been posted.
- Corrupted data can cause this problem. However, checks have now been added for format validity in the analysis tool. Therefore, this should not be the source of this problem.
- Missing data in a file can also cause this to occur. This is more difficult to identify and may require a trace. However, a review of the job log may point to the source of this problem.

**Invalid timestamps**

Every record of each data file contains timestamps. This type of error message can occur for several reasons. Here is a list of possible errors:

- The first timestamp in one file is after last timestamp in another associated file. This condition is possible but unlikely. It is probably from mixing multiple sets of INSIGHT collection efforts. The hostname is generally listed with this error to help start looking for this type of error. A good start would be to review the dates on the files in the “input” directory.
- A timestamp is corrupted. This error could come from multiple sources. The file should be displayed in the error message. Edit the file in “Wordpad” and browse the timestamp and date fields.

**The system seems to hang:**

This generally happens for two reasons. The first was discussed in the EXCEL discussions. The second probable cause is that the analysis process abended. The later case can be checked by looking for error messages or by checking the task list.

## Understanding the Analysis Results

### ***Overview of the Available Reports***

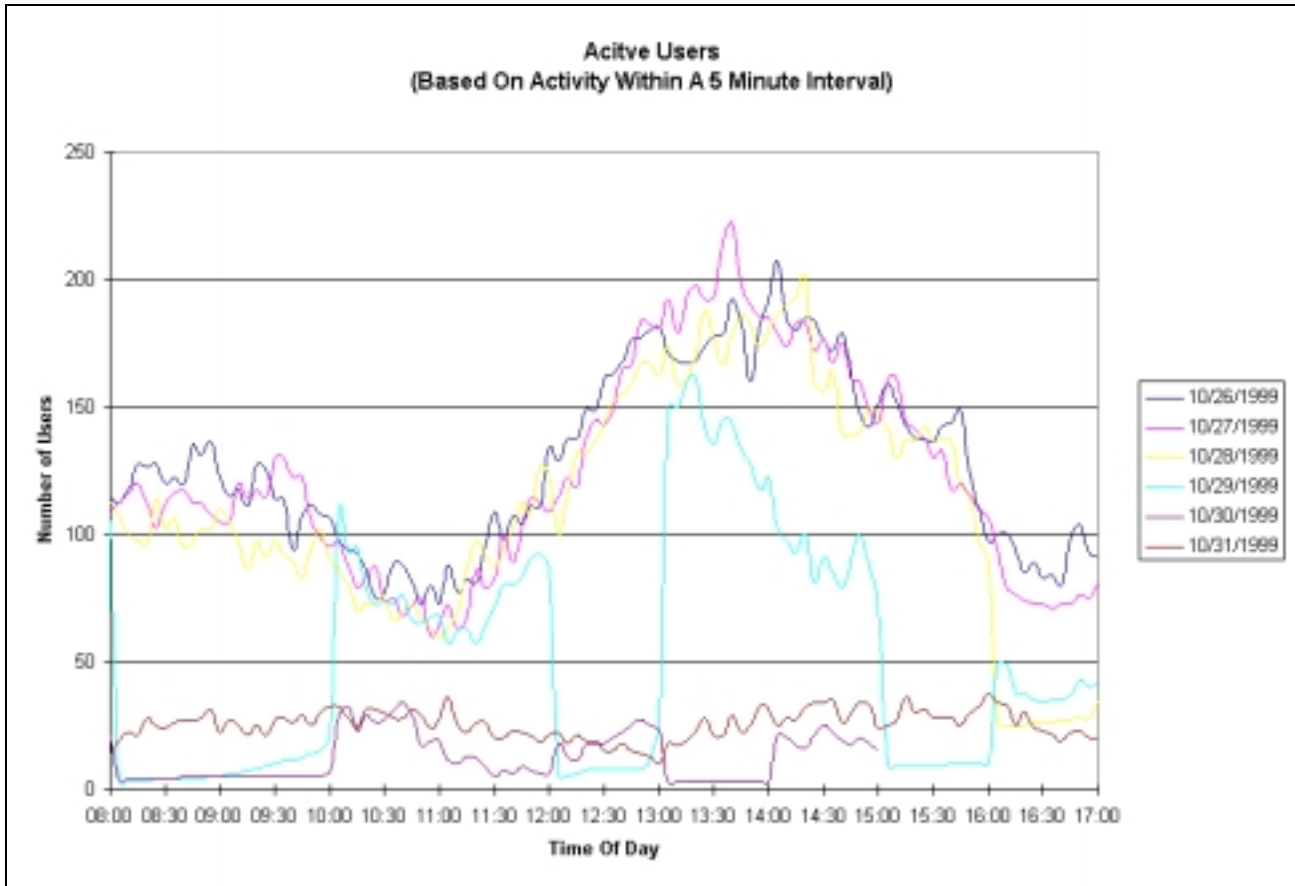
Parenthetically under each chapter heading is the chart name noted in the results delivered back to the user. There was a major enhancement made recently which included the addition of new charts, both chart labels are included and are noted below the chart title (which is also the chapter name). Older reports will be the first label, newer reports will be the second (i.e. old label / new label). The titles in the various graphics did not change. They should be checked when comparing and analyzing the results between the following examples and individual reports delivered by IBM. As another check, the older set of charts did not contain any response time graphics.

These graphics were for two purposes. The first and primary purpose was as a method of enticing users to use the tool and deliver the data to IBM in order to analyze for variation analysis. The second objective for these deliverables was to provide important information of interest to the user that cannot be collected from other sources, and thereby help with the accomplishment of the first objective.

The reports are broken into related areas. The first two charts (number of active users and dialog steps per hour) are included as a litmus test that the collection period is representative of what is to be analyzed. The next set of two charts represents response time information. These charts are followed by CPU utilization numbers for all servers. After two sets of charts are a series of pie charts providing analysis by SAP R/3 modules. The final three are pie charts represent a breakdown of utilization by functions (SAP code, custom code, reports, and batch). This grouping into four sets of charts is important as much of the analysis and resulting understanding of a system comes from analyzing the relationships within these groups.

The following sample charts were created to illustrate specific points and do not represent a complete set of data taken from one single analysis process. The data is, however, consistent across each of the four sets of charts described in the previous paragraph.

## Active Users (Chart 1 / Chart 1)



This chart is generated by counting the unique ACCOUNT identifiers (frequently referenced as USERIDS). These are itemized for each five minute sample window as presented by SAP R/3 using RFC calls to extract the accounting data stored by SAP in the STAT file. This number will differ from those the user counts reported in SAP R/3 transactions AL08 and ST07. The reason for this difference is that the two SAP R/3 transactions use different metrics for identifying users.

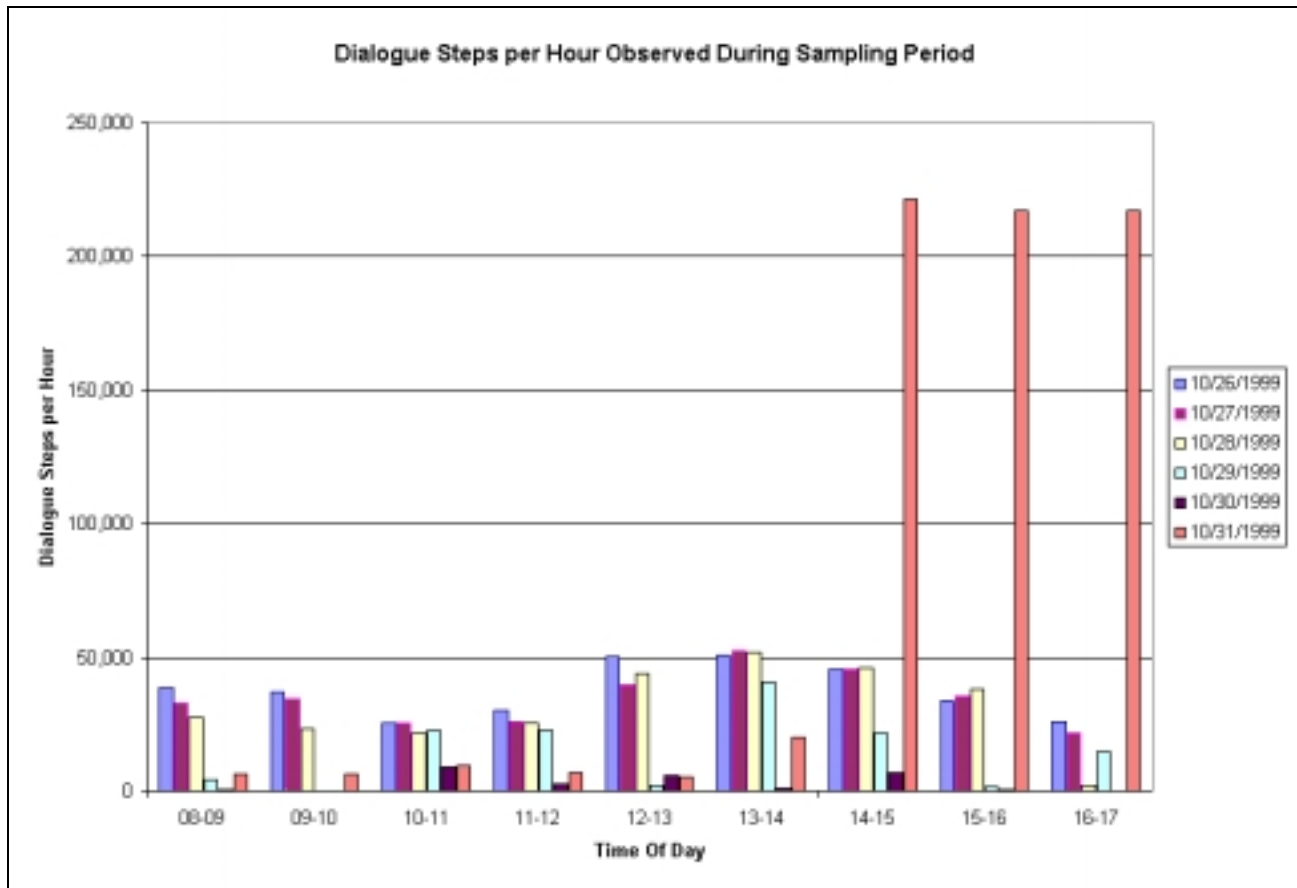
Specifically, the SAP R/3 system can identify logged on users, even when they are inactive. However, since there is no record written to the accounting file during a logon or logoff of a user, INSIGHT cannot determine number of logged on users. Additionally, the metrics used for identifying active users in SAP R/3 can be modified by using different time filters. In all cases, SAP R/3 represents the current view back a designated time increment and does not report active users on five minute boundaries as does INSIGHT.

This graphic provides information regarding the quality of the period used for the collection of data. In many cases, this graph will show approximately half the active user count that most administrators would expect (for reasons specified in the previous paragraph). A more significant indicator of the quality of the data that was collected is the shape of the presented curves in this graphic. They should represent peaks and valleys similar to those expected for the monitored system (remembering that this graphic represents an activity by a user within each five minute interval). For this reason, this graphic should more closely follow the classic camel hump utilization curve of transactional systems than other available sources of would predict.

This particular line chart shows that data was collected through the weekend and those days probably should have been excluded. Also on Friday the 29<sup>th</sup>, there are some apparent problems. It would be appropriate for the logs to be researched for this SAP R/3 system to validate the quality of data for that day. This chart shows approximately 200 active users during the peak online times of 1-3PM. Rules of thumb derived across many systems would suggest that the total logged on user count would be around 400-600 (a factor of 2-3). This customer had a total user community of 1400 named users on this system (which is correctly another 2-3 times the logged on). When doing evaluations, it is important to do some rule of thumb types of sanity checking in order to verify the validity of the data.



## Dialogue Steps per Hour (Chart 2 / Chart 2)



This bar chart represents the number of dialog steps that were recorded by SAP R/3 in the various STAT files (one per SAP R/3 instance) for each hour. It has been presented here in a bar chart form to more closely represent the numbers that would be presented out of SAP R/3's CCMS subsystem (CCMS reports many metrics based on hourly summations).

This graphic should provide two indicators of the quality of the data collection. The first is this graphic should tend to follow the curves presented in the preceding "Active User" chart. The second evaluation consideration is that these bars should represent what is expected from the target SAP R/3 system that was monitored.

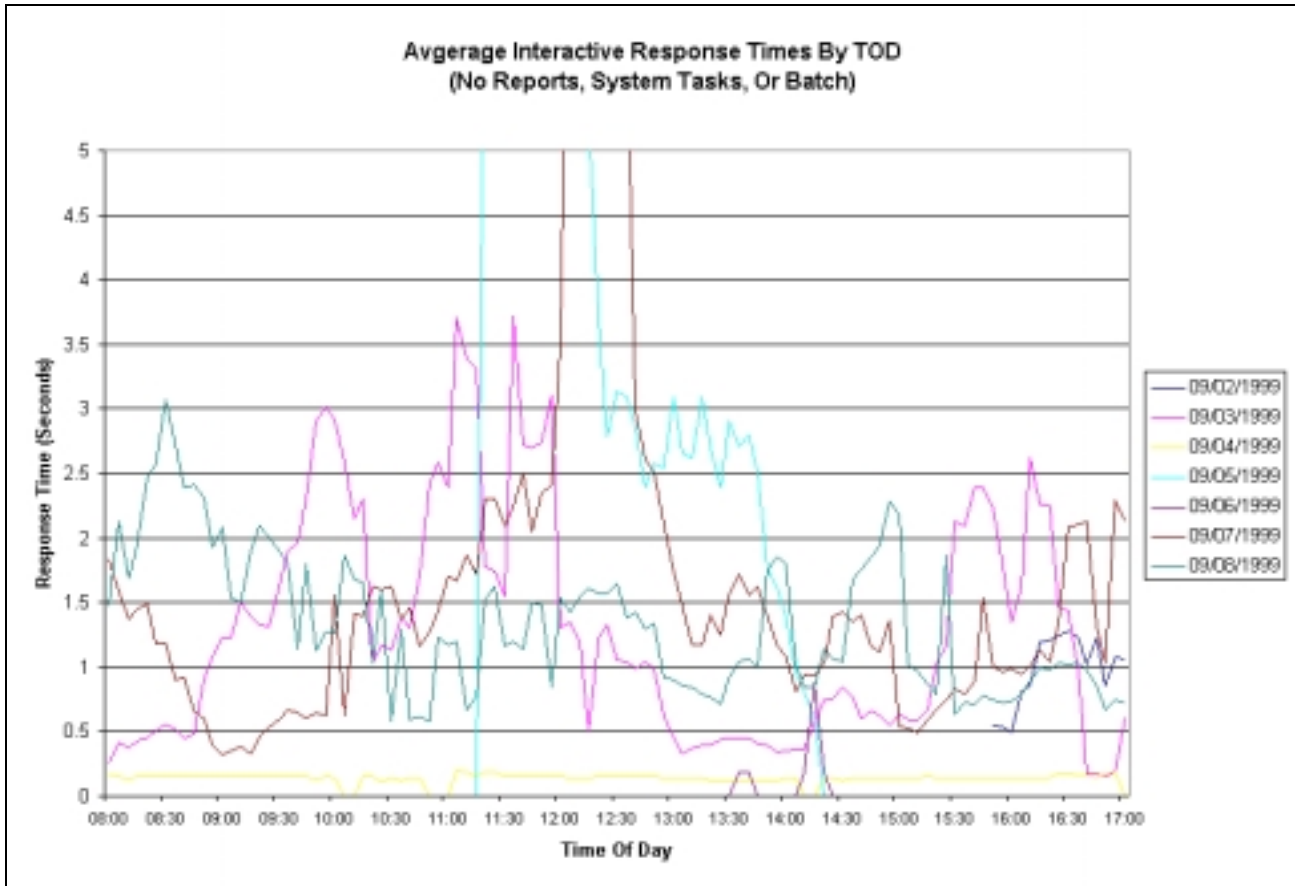
To date, there have been only a couple of significant variations between the data reported out of INSIGHT and that reported out of SAP R/3's CCMS. These variances have been tracked back to failures of the RSCOLL program to successfully complete posting of data from the STAT file (SAP R/3's accounting file) into the MONI table used by CCMS.

It is difficult to see if these bar charts tend to follow the interactive user chart. The reason is from the BDC that was kicked off around 2PM on Sunday the 31<sup>st</sup>. These large bars caused Excel to auto-scale

this chart. Careful inspection does show that the bars for the earlier part of the week do tend to follow the interactive user load. The observed BDC would also distort other charts, this data probably should be re-analyzed with Saturday, and Sunday removed.

Another check for collection and analysis quality is to compare these first two charts. The first chart (Active Users) showed a peak approximately 200 users during peak periods in the afternoon. The bar charts show this same period as having executed approximately 50K dialog steps. That represents about 250 dialog steps per user per hour. This rate of system usage for a single user may seem high. Most sizings performed for SAP systems use a default “normal” user of 120 Ds/Hr. Remember though, the user count is based on some activity being performed by a user every 5 minutes (or they are not included in the count). To that end, when a user is counted by INSIGHT, they are performing closer to what would be considered a power user. For analysis purposes, systems being used for MM, PP, SD, and LE have higher dialog step rates than other modules. A reasonable range for this Ds/Hr count from this calculation would be between 100-300 Ds/Hr.

## Average Response Time (Not Available / Chart 3a)



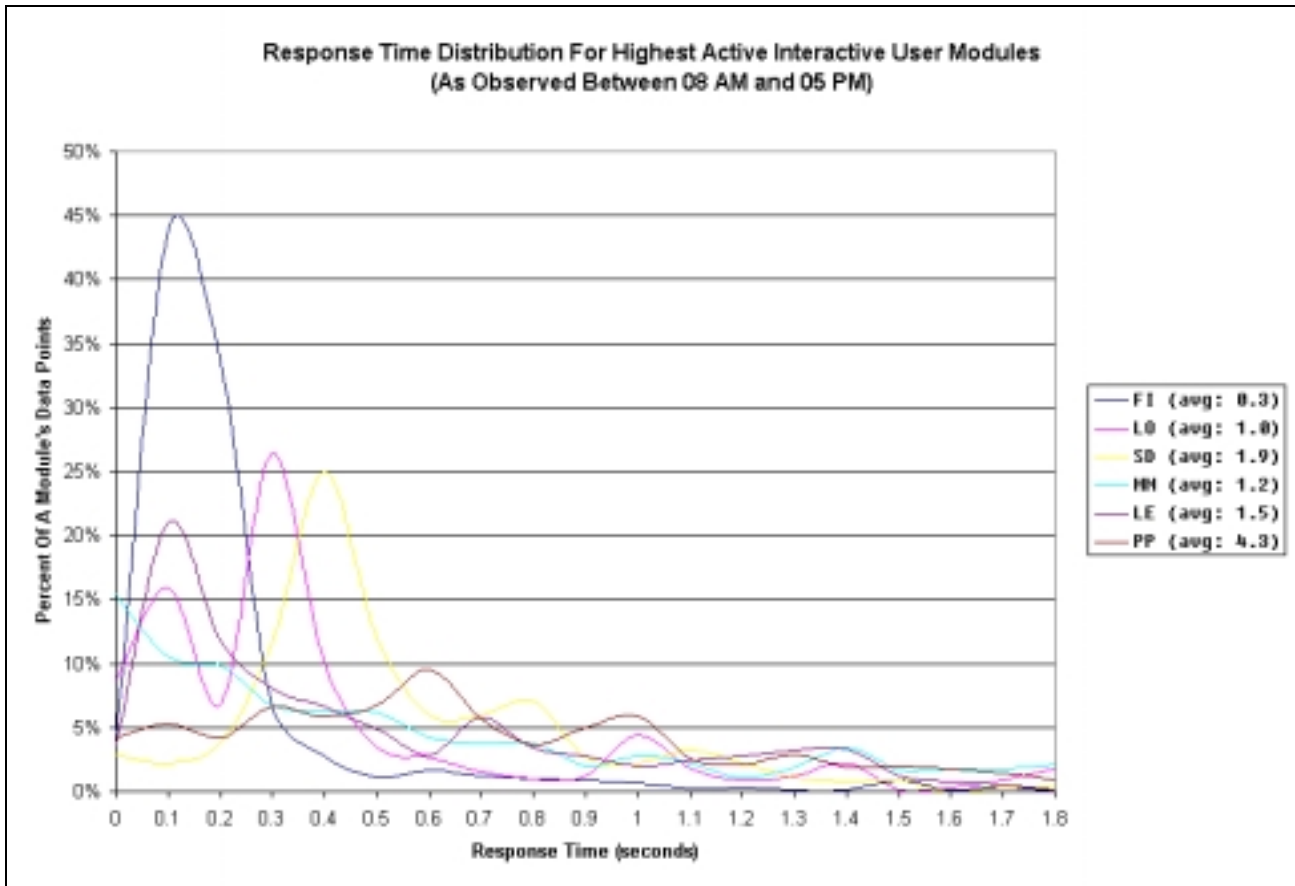
This chart shows the average response time observed during the analysis window. It excludes reporting, batch, and system transactions. The reason for the exclusion of batch and reporting should be obvious when trying to understand interactive response time. The reason for the exclusion of system transactions is simple. When a SAP R/3 system is functioning correctly, these transactions execute very quickly and are transparent to the user. Including these system transactions in the average would arbitrary change the interactive response time and it would not represent what is actually being experienced by the user community. The required analysis to generate this chart has only recently become available and requires the use of newer versions of the INSIGHT collector (V2.3 or higher).

This data is captured for each module by the INSIGHT collector and reported in 5 minute averages. These averages are simply summed across the various modules and plotted.

Considerable caution should be used when reviewing this chart. It is quite common in an SAP R/3 system for the average to be higher than the 90<sup>th</sup> percentile response time (that value for which 90% of the values are at or below). The reason for this phenomenon is quite simple. Here is a sample of the problem: 99 dialog steps completed in the 5 minute sample, each taking .001 seconds; while 1 dialog step completed in 1000 seconds. The average response time would be 10.099 seconds, the 90<sup>th</sup> and 95<sup>th</sup> percentiles would both be a millisecond.

Looking at this graphic shows something strange going on around noon on two different days. These days were the 5<sup>th</sup> and the 7<sup>th</sup> of September. These days preceded and followed Labor Day. The anomaly on the 5<sup>th</sup> is probably the result of an interface being executed to move data to or from another system. This type of work can be done with RFCs which will execute in a DISP+WORK (foreground interactive work process) and can run for a long time. No explanation is offered for the same peak on the 7<sup>th</sup>. If this was a daily scheduled job, the peaks should occur every day at about the same time. Evaluation of this peak needs to be undertaken by the user that collected the INSIGHT data (it could simply be that the work on the 5<sup>th</sup> failed to complete successfully and had to be re-run).

## Response Time Distribution – By Module (Not Available / Chart 3b)



This chart shows the response time distribution within the various modules. The y-axis is the percent of dialog steps within that module that were observed for each response time. The response times are presented on the x-axis and are in seconds. As an example, this graphic shows that 45% of the FI dialog steps had a response time of 1/10 second. Use of the following pie charts should be consulted to rank the modules by level of usage (it might be LO, SD or MM that is more noteworthy). As noted on the last chart, response time statistics only became available recently (it required changes to both the collector and the analysis tools).

The x-axis is auto-scaled to a value that represents 90% of the response time samples for this system. In other words, 90% of all interactive dialog steps completed on this system were at or below 1.8 seconds. This chart should be used in conjunction with the previous chart in order to get a better understanding of how responsive the system is being to interactive workloads. In the case of these two graphics, it is obvious that the average response time is not indicative of system performance. The averages reported on the previous average response time chart have been distorted by a few long running dialog steps are affecting the average.

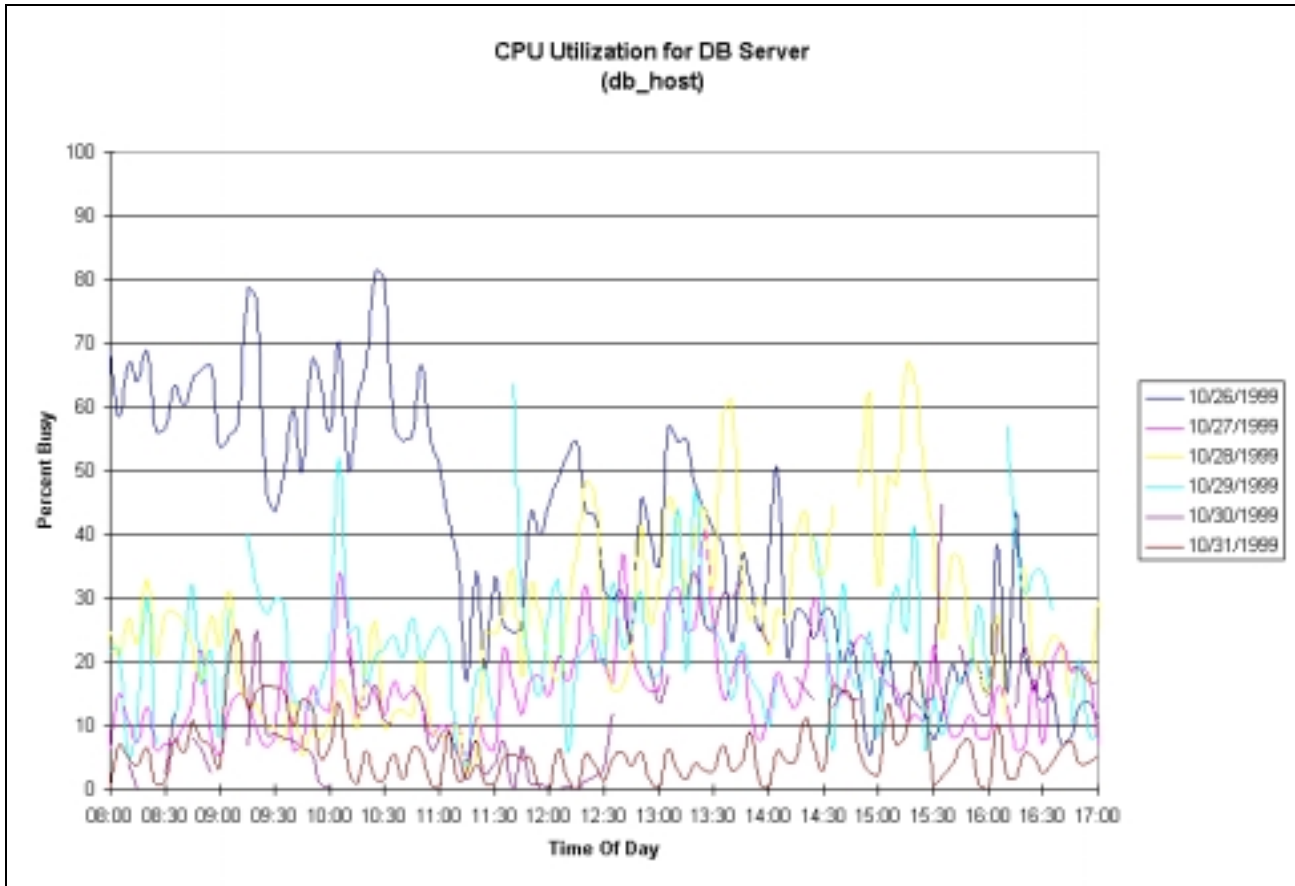
There is a second important reason for limiting the x-axis to a 90<sup>th</sup> percentile level. Without this cropping, a sample dialog step at 1000 seconds compresses the scale of the x-axis making it impossible to understand the response time profiles (all modules data simply becomes a line along the y-axis).

Not all observed modules are plotted on this chart. A selection of the selected modules is performed using the following criteria:

- The module must have at least 10K dialog steps sampled.
- The module must have at least 10% of the dialog steps observed during the analysis period.

The rationale for limiting the number of displayed modules was two fold. Ensure a large enough sample to be statistically valid and limit the number of lines to those busier modules thus improving the usability of the graphic.

## CPU Utilization for Database Server (Chart 3a / Chart 4a)



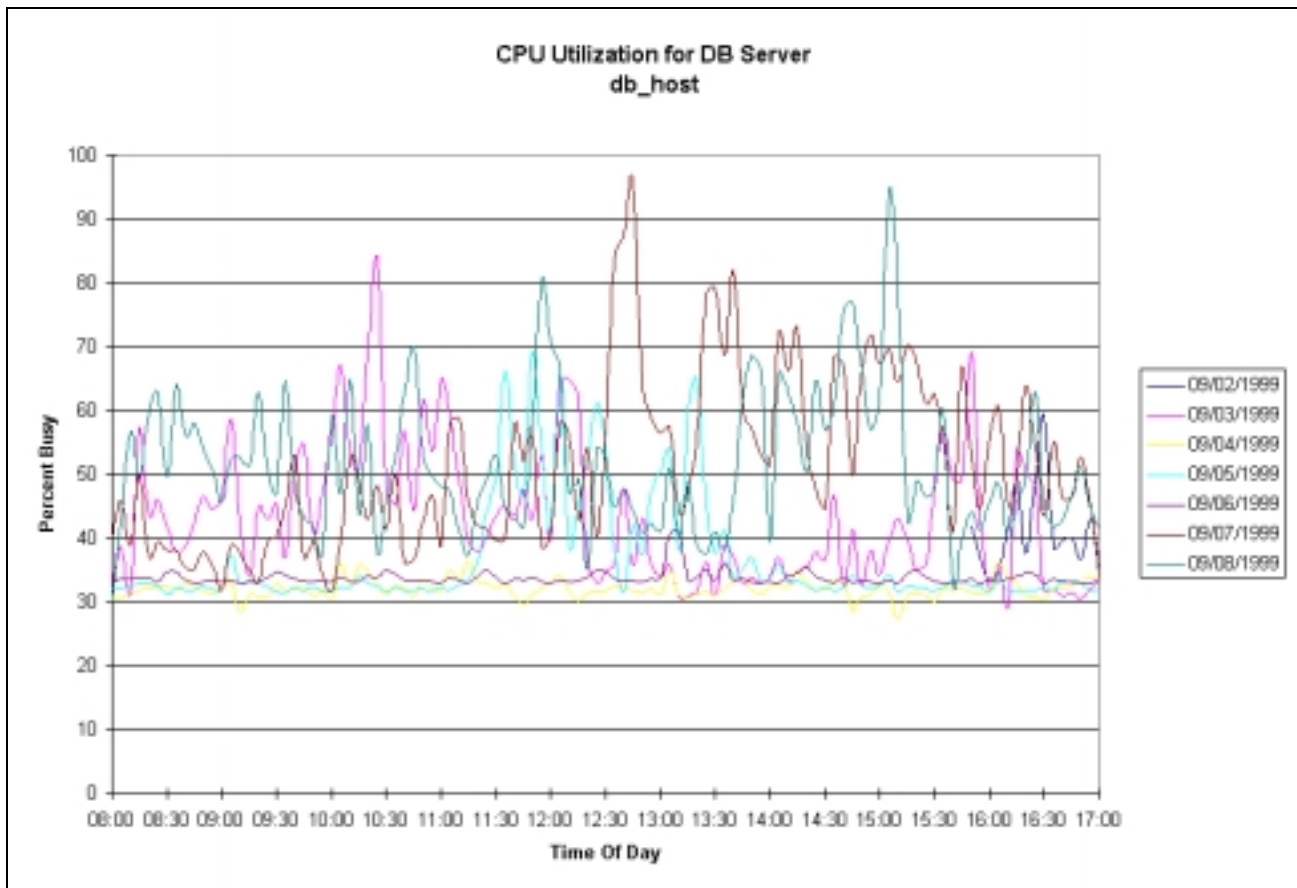
This chart shows the CPU utilization (user + system) for the database plotted by time. This chart may often look chaotic. As noted in the discussion of the INSIGHT collector, a 10 second sample is taken each minute for the total consumption of each server. (Unlike 1 10 second sample every hour reported by CCMS). For purposes of this chart, these 1 minute intervals are averaged across each 5 minute boundary. Without this averaging, this chart becomes an unusable set of squiggles.

Most notable in this sample chart is that it does not follow any expected user peaking. Each day appears to be random when compared with the next. There is a little “clumping” of lines in the 30-40% range starting around 12:30PM and concluding around 2:00PM (1400 hours). However, this clumping does not change the overall image presented for this system.

Explanations for this type of graphic can come from several sources. Since SAP's RSCOLL reports only consumption for the entire machine and not by application, there could be other work going on in the machine that could cause this phenomena. This is frequently true for AS/400 environments of on S/390 with dynamic LPAR defined. This type of chaos can also occur when heavy batch and reporting are allowed during the prime shift. Another potential source is enabling "ad-hoc" queries by the user community through dynamic reporting tools.

To summarize this first chart, if it *does not* tend to follow the "Active User" chart and the "Dialogue Steps per Hour" chart, the source of lack trending should be evaluated.

Here is another example of a potential issue.

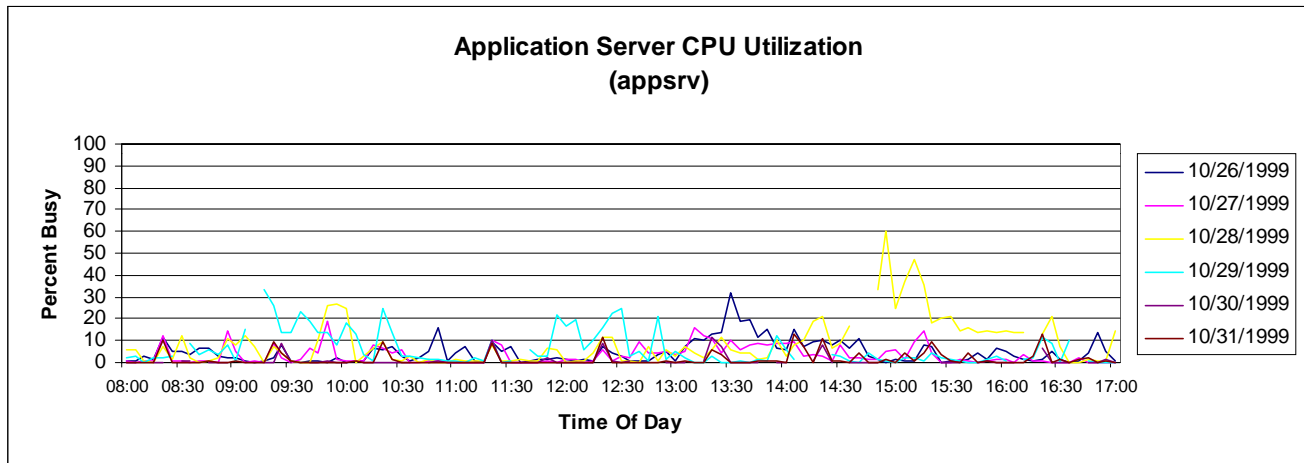


In this case, there is a constant background load of approximately 30%. On top of that constant workload on the database server, there is again an absence of trending based on active user loading. This particular customer sample had a typical "camel hump" active user activity in the first two charts. However, the numbers of users and dialog steps per hour would not normally warrant CPU utilization measured in the 10-20% utilization range (the uplift from the 30% "fixed" load). Later in this paper will be a discussion of types of workload (SAP, customer written, reporting, and batch).



For this sample, the analysis showed that less than 40% of the workload was from standard SAP interactive activities. The remainder of the workload on this system resulted from reporting, batch, and custom written transactions. This shows the resulting workload on the database that can occur when this type of daytime workload is allowed. The 30% constant workload is frequently observed in SAP systems that are used as “batch” processing machines and have a heavy interface load. The randomness (as already mentioned) frequently appears on heavily modified systems with a lot of reporting being executed.

## CPU Utilization for Application Servers (Chart 3b / Chart 4b)

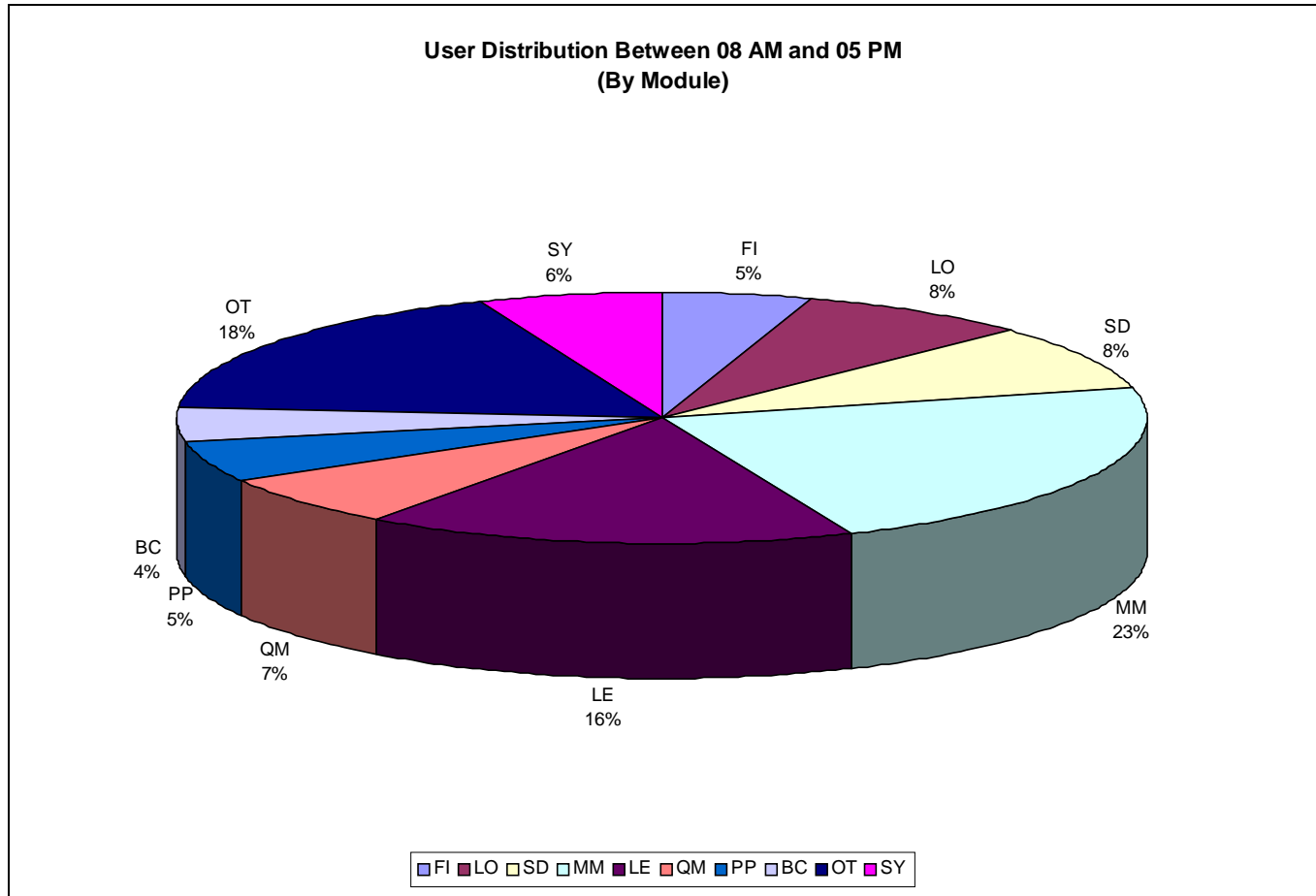


This chart is similar to the preceding, CPU utilization by time of day. The same considerations exist for these charts as already discussed for the database chart. Additionally, there is one of these charts for each application server. Therefore, they can be scanned to see how well load balancing is working across the various application servers.

One new element that has not been discussed is how this chart relates to the “Database Server CPU Utilization” chart. It turns out that all the application server charts belonging with the two previous database CPU charts, had a similar appearance to this sample. This comes from three potential sources.

1. Workload on the database not associated with SAP.
2. There are more applications servers then are needed for this SAP R/3 system.
3. High cost SQL calls in customer written code, reports, and batch. This later point is possibility worth investigating, as the database server tends to be a more expensive resource to scale then a set of application servers.

**User Distribution Between 8AM And 5PM - By Module  
(Chart 4a / Chart 5a)**



This pie chart, and the following three, depict information based on SAP R/3 modules as defined in the “Application Hierarchy” in SAP’s “Workbench”. The list is included in Appendix B at the end of this document. INSIGHT has several deviations from the application hierarchy and they are listed below and noted in this Appendix B. These deviations are as follows:

- BT refers to any program run in a batch (or background) work process.
- OT represents transactions and work that could not be identified as being part of another module.
- SY is the system activity used by SAP R/3. Such activities buffer syncs, spool, etc.
- CA is not listed as a separate module as it is better accounted for in conjunction with the module that invokes it.

This chart is created by tallying all the time spent in the various modules across all the users of the system. As noted, this user analysis is performed for the chosen analysis window, which is noted in the title of the chart. This data should track reasonably close with the number of users observed in SAP R/3 transaction “ST07”.

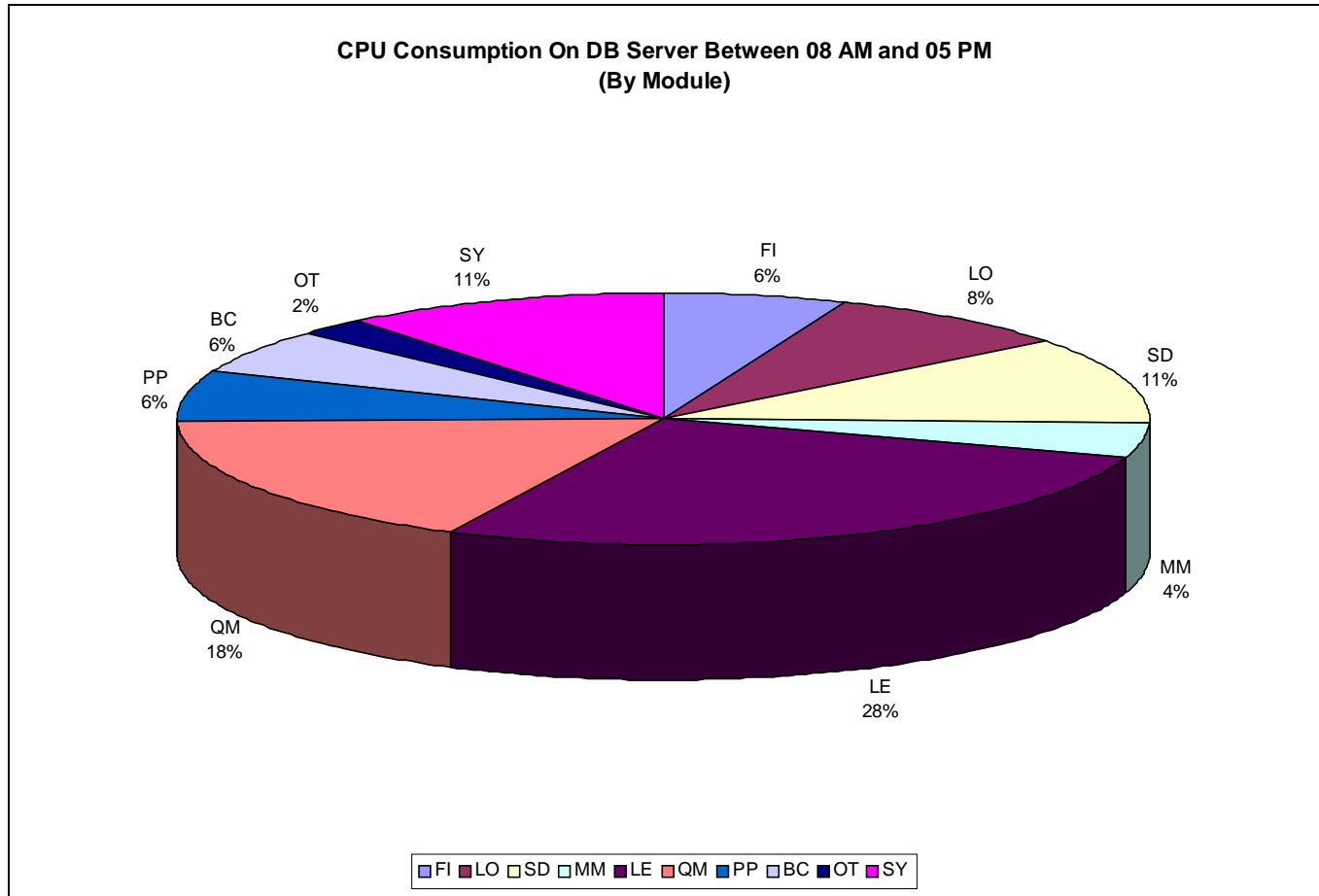
This chart had several important design points. The first was as another litmus test. Does the distribution of “user work time” represent what is expected for this capture period. Secondly, are there any anomalies worth pursuing. An example of this would be a large “OT” (other) percentage. Unlike other sources of information for this data, the INSIGHT process should routinely report less than 10% and frequently represents less than 5% for “OT”. The resolution of this issue was discussed earlier in this document. There are several valid reasons for large “OT” percentages. They are the high use of customer written code and the use of “IS” (Industry Solutions from SAP R/3 like banking, utilities, etc). Neither of these have mappings into SAP’s “Application Hierarchy”.

As with all pie charts, this chart represents ratios between the various elements against the sum of all elements. This may seem obvious. However, what is not so obvious is that a relatively small change in a very large contributor can hide other more interesting items that should be investigated in some of the pie rest of the pie charts in this set. The reason is that a smaller module may double in overall size from one chart to the next but as a percentage of the total may actually decrease. This is because of the impact resulting from a small percentage increase in a very large module will increase the total sufficiently to reduce the percentage contribution of the smaller module. The proof of this statement is left to the reader who can quickly accomplish this with a spreadsheet. Because of this phenomenon, many of the following discussions throughout the remainder of this document will frequently focus on the ratios between the elements of one chart and the next.

Having said that ratios are important, the first evaluation of this chart and the next three should be a visual one. Compare this chart individually to each of the other three pie charts in this set, not just sequentially as presented. Each module maintains the same color scheme from chart to chart but positions of modules may change because of changes in other modules. Note any obvious anomalies. An anomaly would be a large change in the size of the wedge from one chart to another. As noted earlier, a small change in a large wedge (up or down) can skew the rest of the ratios. Experience shows that large changes in smaller capacity consumers may or may not be worth investigation, but should at least be evaluated. Generally, there will be several modules having dramatic changes that are readily noticeable making the further investigation of these lesser elements not worth the time to pursue.

The analysis between the four graphics, that make up this set, will follow each of the following three graphics and refer back to previous pie charts in the set.

## CPU Consumption On DB Server Between 8AM And 5PM - By Module (Chart 4b / Chart 5b)



This graphic represents the ratios of CPU consumption, on the database, by the various SAP R/3 modules. Simply, the database is the least scalable element of a three-tier system. For this reason, special attention should be paid to how it is being used.

Visually, there are many significant changes in the appearance of this chart from the previous. They are:

1. The virtual disappearance of “OT”
2. “MM” becoming extremely small given the size represented in user time.
3. “QM” growing dramatically.
4. “LE” also grew but to a smaller extent.

Focusing on these big changes one at a time, these are the appropriate observations:

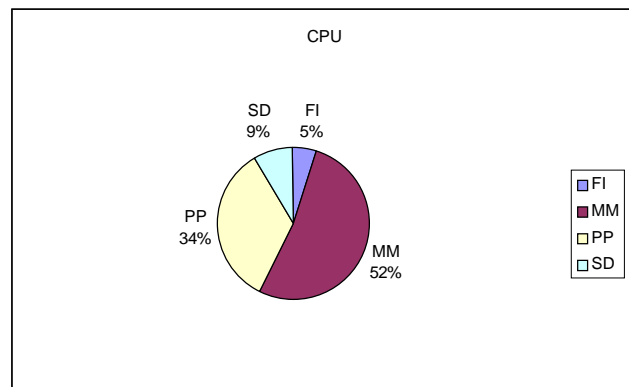
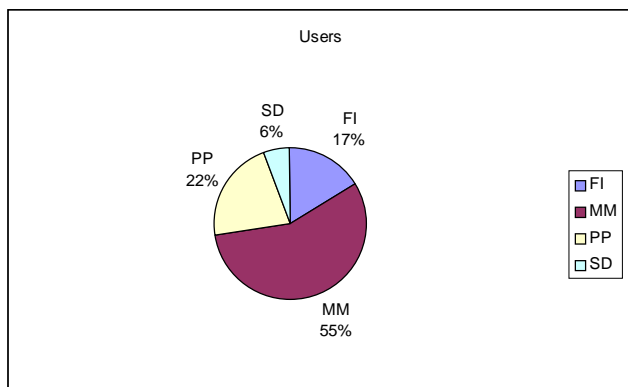
1. The change in “OT” is probably from many small menu changes and custom panels that were implemented prior to executing any SAP delivered code. All these interactions consume very little database capacity. Additionally, there may be custom screens used in generating reports that can consume time during data entry. The actual consumption is generally reported elsewhere.
2. The dramatic reduction in “MM” is interesting and no conclusions can be reached at this time.
3. “QM” illustrates expected phenomena. Some modules are more capacity intensive than others. The next obvious question is why is a generally light module like “FI” larger here than in the previous graphic (as well as others like “SY” which is generally considered to be a very light capacity consumer on the database)? The answer to this question cannot be found with just these two graphics but could be surmised as being a result of the large decrease in “MM”.
4. “LE” also grew significantly from the previous chart and needs to be evaluated in the context of the next couple of charts

Having looked this chart visually, let’s look at another example of how this can be misleading. Below is a table that contains a simple example. There are four columns. These columns are:

- Module identifier
- Number of users observed
- CPU hours consumed during the observation period
- Relative capacity consumption to the first module that this capacity consumption would represent

Module Identifier	Number of Users	CPU Hours Consumed	Relative Consumption Used
FI	30	3	1
MM	100	30	3
PP	40	20	5
SD	10	5	5

When this data is used to build a simplistic set of sample charts similar to those two being discussed, the following graphics result:





From these two sample graphics, it is obvious that just looking at the graphics visually can be misleading and should merely flag the need for additional evaluation. The PP module appears to be way out of line. However, it actually has the same relative consumption per user as SD. The relative weighting factors used in this example are those similar to ones used for sizings by most of the industry.

This points out the need for delving into the use of mathematics when anomalies occur. A simple way to better understand the results (when anomalies appear) is to unwind these ratios. The following steps are an example of how to proceed. First, the mathematics will be done using the simplistic example just shown, then again for the actual graphic pie charts used in this paper.

5. Create the following table, the ratio is calculated by dividing CPU % by User % for each module.

Module	CPU %	Users %	Ratio
FI	5%	17%	.31
MM	52%	55%	.93
PP	34%	22%	1.55
SD	9%	6%	1.55

- 6. Pick an arbitrary module (as a generalization, try using FI).
- 7. Finally, take each of the ratios and divide them by the selected ratio (in this case, .31 for FI). This will produce a relative CPU consumption (this is relative to observed FI). Here are the results.

Module	Ratio	Weighting
FI	.31	1.00
MM	.93	3.00
PP	1.55	5.00
SD	1.55	5.00

8. As can be seen from the “Weighting” column, nothing strange exists, it is just a visual anomaly of ratios.

Note: the choice of a module for this exercise is dependent only on choosing one that does not exhibit drastic variations from expectations. Generally, the lightest weight module that represents some meaningful consumption should be used (try not to use modules displaying less than 5% on either chart the “User” or the DB Consumption” pie charts).

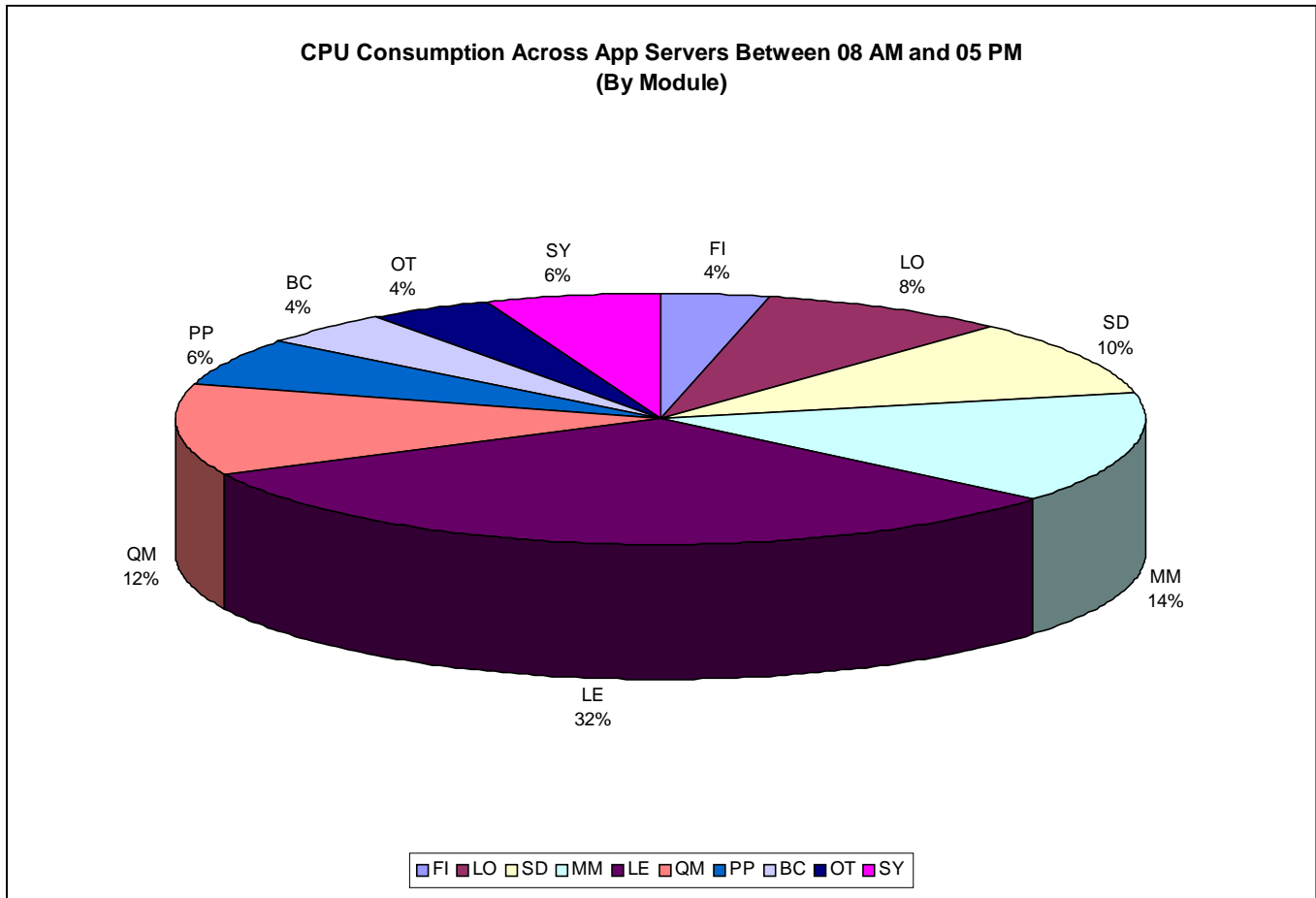
Given that visually, there were anomalies that could not be explained, it is now time to build the same grid for the original charts that were being reviewed. Here is that chart, based on the graphics being used in this section of four pie charts using the mathematics just discussed.

Module	CPU %	User's %	Ratio	Weighting
FI	6%	5%	1.20	1.0
LO	8%	8%	1.00	0.8
SD	11%	8%	1.38	1.1
MM	4%	23%	0.17	0.1
LE	28%	16%	1.75	1.5
QM	18%	7%	2.57	2.1
PP	6%	5%	1.20	1.0
BC	6%	4%	1.50	1.3
OT	2%	18%	0.11	0.1
SY	11%	6%	1.83	1.5

This shows that LE was not a problem. LE “appeared” visually to be a problem only because of the anomaly surrounding the unrealistically low consumption by the MM module. The data provided, to this point, does not provide us with any insight as to the source of this MM variance.



### CPU Consumption Across App Servers Between 8AM And 5PM - By Module (Chart 4c / Chart 5c)



This chart represents the ratios of the total CPU time consumed on the application servers for each module. It should be compared to the previous two pie charts.

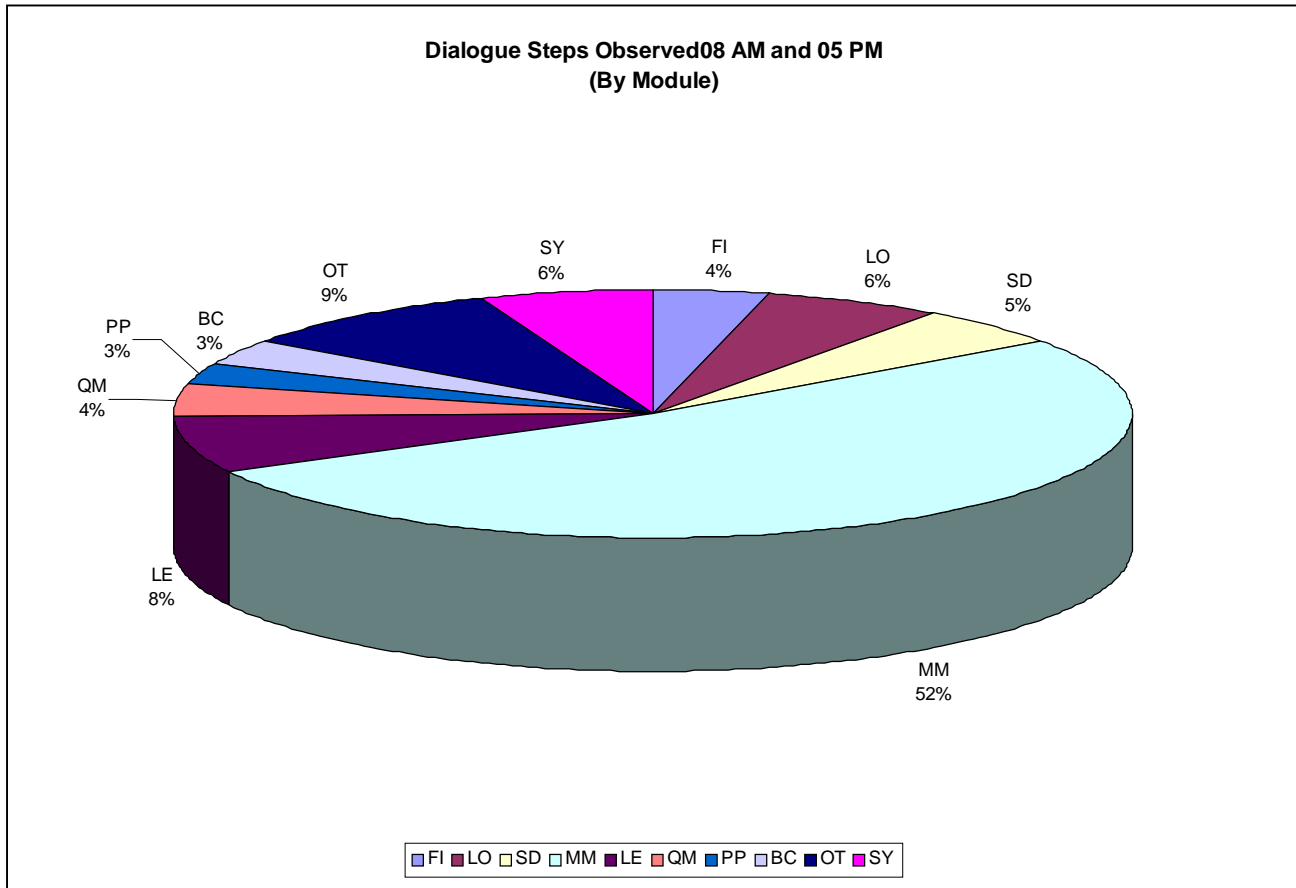
As already noted, there are visual anomalies when comparing this pie chart against the “User” chart. However, this chart appears reasonably consistent with the DB CPU Consumption chart. To verify that similar dynamics exist as those observed for the DB CPU Consumption chart, we should again go through the exercise of mathematics as discussed for the previous pie chart. The resulting chart is as follows:

Module	CPU %	User %	Ratio	Weighting
FI	4%	5%	0.80	1.0
LO	8%	8%	1.00	1.3
SD	10%	8%	1.25	1.6
MM	14%	23%	0.61	0.8
LE	32%	16%	2.00	2.5
QM	12%	7%	1.71	2.1
PP	6%	5%	1.20	1.5
BC	4%	4%	1.00	1.3
OT	4%	18%	0.22	0.3
SY	6%	6%	1.00	1.3

From this table, it is obvious that the MM module CPU consumption per user is still below expectations. Given that this is the largest percentage of the user community, it continues distort this graphic. There may be a question about OT at this point. It contains a relatively large contribution to the User chart. This will be discussed in further detail in the last pie chart of this sequence (which is next).

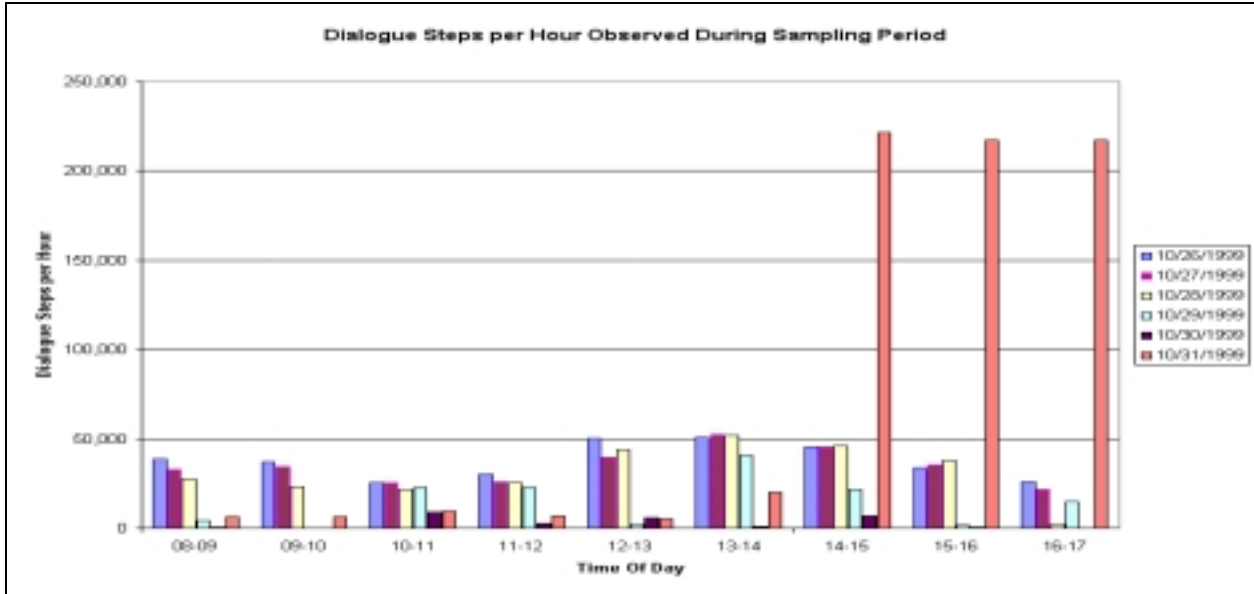
Now that both application and database graphics have been analyzed, another interesting observation can be made. The FI module is generally considered one of the lighter consumers of resource. Given several more intense modules like PP, MM, and SD, it would be expected to see weighting ratios in the 3+ range, for at least a few of these heavier consumers of capacity, but none exist. This implies that the FI module, for this customer, might be more capacity intense then would normally be expected.

**Dialogue Steps Observed Between 8AM And 5PM - By Module  
(Chart 5 / Chart 6)**



This graphic represents the number of dialog steps observed per module during the prime shift window. In general, it should look similar to that of the “User Distribution”. When there are significant deltas between this chart and the user chart, questions should again be asked. In this case, MM is again displaying a significant deviation from expectations.

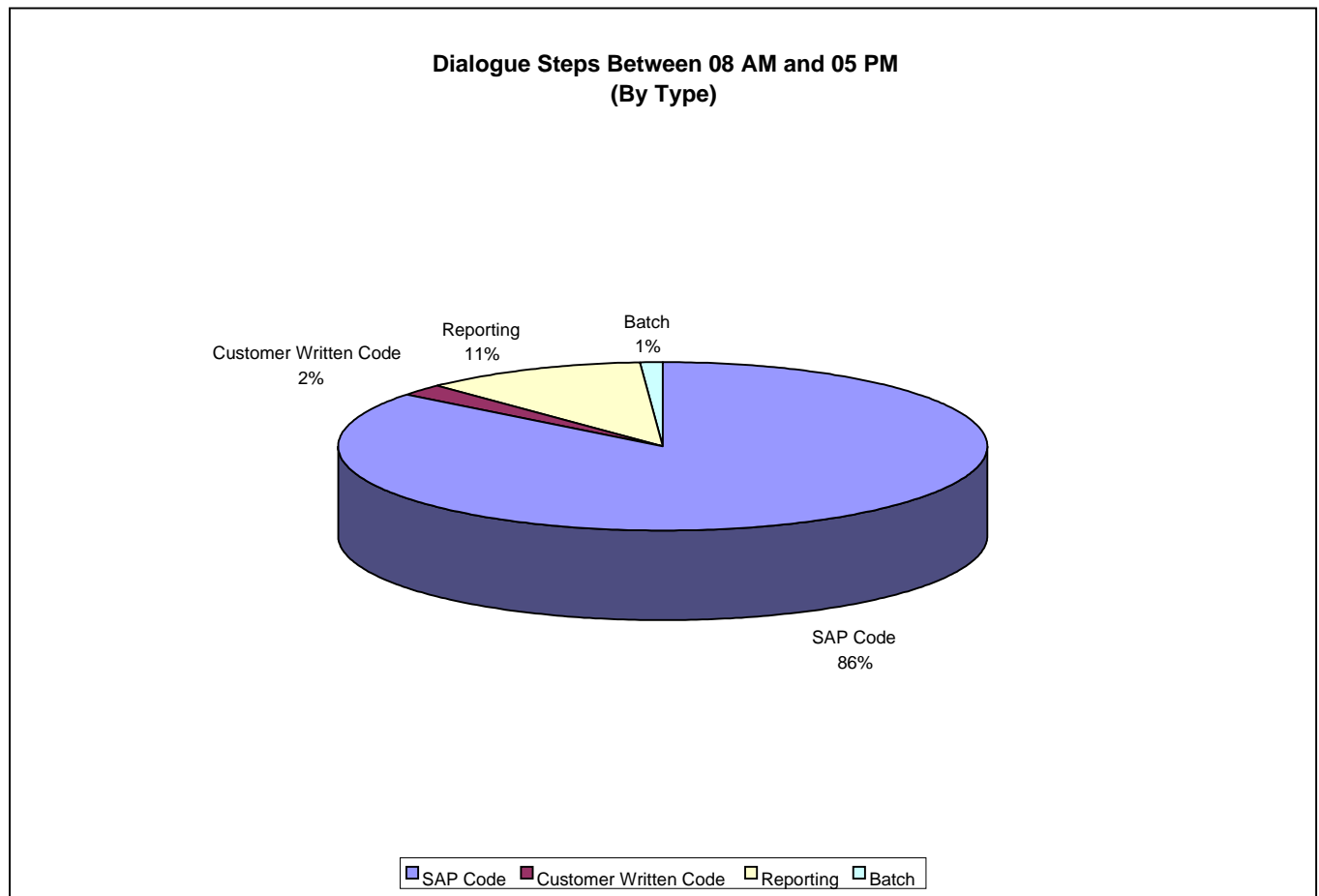
This set of four pie charts came from a customer that was doing a relatively light workload during the week and then started a BDC Sunday afternoon. (The chart being next referenced was not part of the samples used in this paper. This set of four pie charts was selected to illustrate a series of analysis issues and are separate from those line and bar charts preceding this section). The BDC execution referred to, can be easily seen in the following graphic that was part of the original deliverable to the user:



This points out the importance of running the INSIGHT collection tool during a representative period. In this case, the data would have been of better quality if the user had advised the analyst to drop the data after 2PM on Sunday as it skewed the preceding pie charts. Fortunately, it was possible to understand and analyze the previous three charts through the mathematics and preceding discussions. The reason for the very light MM consumption on the database and application servers cannot be determined, but is probably the result of a BDC consuming very little in the way of resources while invoking many Dialogue Steps.

The final discussion for this set of four charts is for OT. Now that all the data is in, a 5% ratio for both users and dialog steps greater then compares to extremely small utilization on both the database and application server. The first comment is that OT is not consuming enough resource to waste much additional time evaluating. The second comment is that these could represent things like custom menus to assist user navigate between work processes.

## Dialogue Steps Between 8AM And 5PM - By Type (Chart 6 / Chart 7)



Now that the discussion of the graphics for SAP R/3 modules is completed, we will look at types of workload. The remaining graphics in this paper, as well as the deliverable back to the user, will present a different perspective of capacity consumption. These views cannot be obtained from other sources currently available. The elements of the remaining graphics were created around another analysis point and were intended to uncover additional sizing and capacity variance in the SAP R/3 environment. The four key contributors that could be identified were: SAP delivered code, customer written code, reports, and batch.

The SAP R/3 delivered code section of the pie chart (referred to as “SAP Code”) is trying to display and understand the impact of normal customization made through traditional SAP R/3 customization processes. Some of these customizations could be costly and cooberate anomalies seen in previous charts that were based on SAP R/3 modules. A simple example would be the impact of availability checking in the SD module.

The “Reporting” ratio displayed in this pie chart has been identified in several fashions already discussed. If it was executed from the “SAP Reporting Tree” or generated out of SAP’s “Report Writer”, it is assigned to the reporting group. Another decision point for identifying work that is considered reporting is if it generates more than 5KB characters to the WAN, (typical interactive transactions send less than 2KB characters to the WAN). If the transaction codes SA38 or SE38 were used, it is considered to be a report. Finally, the dialog step must have been run in a foreground process (also called interactive or DISP+WORK work process).

Note: All ABAP/4 program names are technically referred to as the “report” name in SAP R/3 and should not to be confused with the “reporting” displayed in these series of graphics.

Batch represents those programs run in a background process. Background is often misunderstood as it executes at the same priority as the interactive “Disp+Work” transactions. It is merely a scheduling vehicle provided by SAP. The number of these “Background” processes can be controlled in order to prevent significant interactive performance degradation. During prime shift, these batch jobs are frequently just bigger reports that would take too long to run in a foreground process.

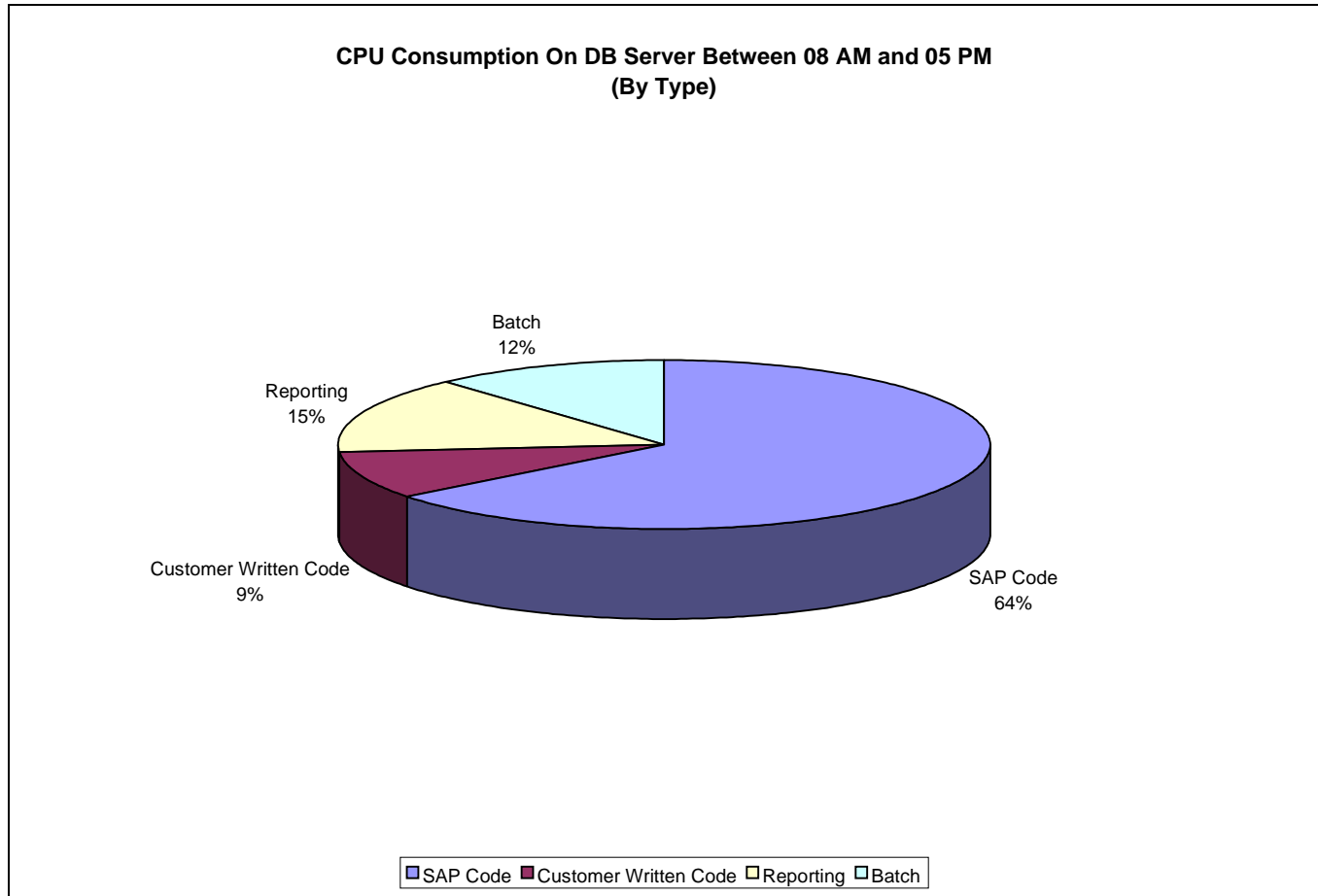
“Customer Written Code” is simply what it sounds like. It is code that is identified by SAP’s required naming conventions for modified or new code. However, if a particular dialog step has already been identified as belonging to batch or reporting, that is where it will be accounted for and not in this percentage.

Having described the sources of the various wedges in this graphic, the next discussion is one of “what does it all mean”. This graphic represents dialog step counts that were observed within the analysis window (as noted in the title of the chart). As already noted, this analysis window is set by the individual that ran the analysis tools and generated the graphics. As previously noted, a dialog step is a unit of work in SAP. Some dialog steps are more capacity intense than others. This pie chart is to display these units of work and capacity consumption analysis will follow in subsequent charts. A business unit of work (like entering an order) will normally take multiple interactions with the system and therefore multiple dialog steps. Each of these individual interactions with the system are a unit of work for the system and consume resources.

Statistics are actually captured by INSIGHT for reporting and customer written code, for each SAP R/3 module, but that level of detail cannot be displayed in a reasonable fashion. However, this higher level of granularity is important when doing the detailed analysis of the potential sources of variance in capacity consumption. This type of statistical analysis is meaningless on an individual INSIGHT run but can provide guidance in improving things like sizing efforts for new equipment.

An important ratio can be extracted from this chart. This ratio is the ratio of customer written programs to the interactive workload. In this case, the interactive workload is 2% + 86% which equals 88%. Of that 88%, only 2.3% of the work was completed by these custom written programs ( 2 / 88 ).

## CPU Consumption On DB Server Between 8AM And 5PM - By Type (Chart 7a / Chart 8a)



This chart is similar to the previous one. However, it displays CPU consumption on the database server.

An important ratio to calculate is similar to the one calculated on the previous chart (which was 2.3% of the interactive dialog steps were customer written). However, these “customer written” programs represent 12.3% of the database capacity consumed. This simplistic analysis suggests that customer written code is approximately 5 times more capacity intensive than that code delivered by SAP and might suggest the need for code reviews of this existing custom written code.

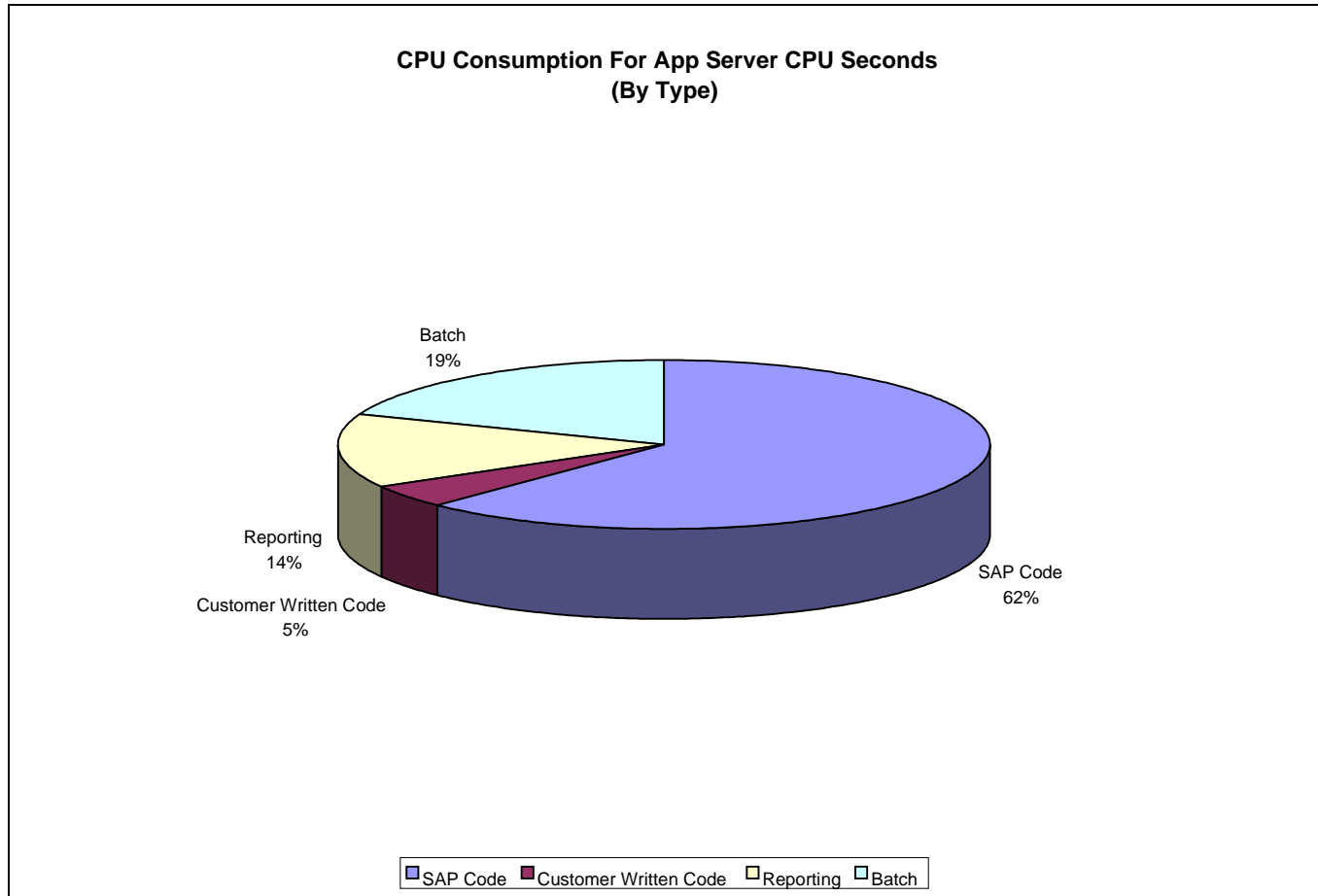
Also apparent in this graphic is the large increased percentage for batch, but this is to be expected. The entire execution of a batch program is just one unit of work (the dialog step, as represented on the previous chart). These jobs are typically run in the background because they run too long for them to execute in an interactive work process (this phenomena is similar for the reporting percentage).

In this example, we can see that 27% of the capacity being consumed on the database server was in support of batch and reporting. This is in contrast to the 20% uplift frequently used for forecasting consumption when no better information is available.

Another caution flag that can be observed from this graphic is the percentage of capacity being consumed by other than “SAP Code”. As already noted, custom written code can have an impact on capacity consumption. Add to this a large consumption by reporting and batch, and the performance of a typical SAP R/3 system will start to become unstable. (This phenomenon was mentioned in conjunction with the “Average DB Utilization” line chart. The next questions is frequently how much is of this type of activity is acceptable. That is one of the answers that this project hopes to understand.



## CPU Consumption For App Server CPU Seconds - By Type (Chart 7b / Chart 8b)



This last graphic represents the CPU consumption totaled for the application servers during the analysis window. In this case, it appears very similar to the consumption profile for the database server. The ratio of customer written consumption to total interactive consumption, in this chart, shows only 7.5%. When compared to the ratio for the database of 12.3%, one might suspect that data is being retrieved from the database in a less than optimal fashion by these custom written programs. A good starting location of review might be SQL in these programs.

Hopefully, batch and reporting will display a higher percentage for the application server than for the database server. In this example, they do. This is important as the application layer of SAP R/3 is significantly more scalable than the database server. Therefore, when ever possible, it is wise to write code that utilizes as little on the database by exploiting functionality on the application server.

## APPENDIX A (README.doc for Analysis Process)

### ***Purpose of document***

This document is the user manual of the C++ version of the Analysis tool.

Analysis version: 1.0

Document version: 0.1

Document date: 03/14/2000 5:21 PM

Author: Ralf Schmidt-Dannert

### ***Purpose of Analysis tool***

The Analysis tool reads data from several files which were generated by the IBM Insight tool and generates an Excel spreadsheet with compiled information on:

10. Customer information
11. Variance analysis
12. User distribution over time
13. Dialog step distribution over time
14. CPU utilization for all servers over time
15. User distribution by module
16. CPU consumption by module
17. Dialog steps for each module
18. CPU consumption by program type (SAP code, Custom code, Batch, Reporting)

Output from Insight version 2.0 onwards can be analyzed.

### ***Setting up the ENVIRONMENT***

The C++ Analysis program is delivered in a self-extracting ZIP executable. This ZIP file has the following contents:

- |                          |   |
|--------------------------|---|
| 1. C++AnalysisReadme.doc | - this document   |
| 2. Analysis.exe          | - the C++ analysis program                                |
| 3. pkzip25.exe           | - ZIP program used to compress files                      |
| 4. variance.xls          | - template EXCEL spread sheet needed for the analysis run |

The following directory structure is recommended:

- bin (where the analysis tools live – contains the 4 files above)
- tmp (used for temporary work files)
- customers (the location of the analysis done for various customers, including their Insight data)
- input (a staging directory into which the data collected by the customer is placed prior to analysis)
- variance (comma delimited files containing data to be eventually used for cross customer analysis)

The “bin” directory needs to be created by hand before extracting the C++ Analysis files. The C++ Analysis ZIP-file has to be extracted into this directory.

The default “input” directory should be created in the same subdirectory as the “bin” directory.

All other directories are created automatically during the analysis run in the same sub directory where the “input” directory is located.

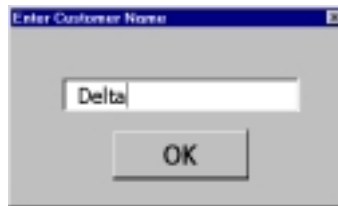
TIP: The directories used for an analysis run are shown at the top of the output in the log window and in the log file job\_log.txt.

**IMPORTANT:**

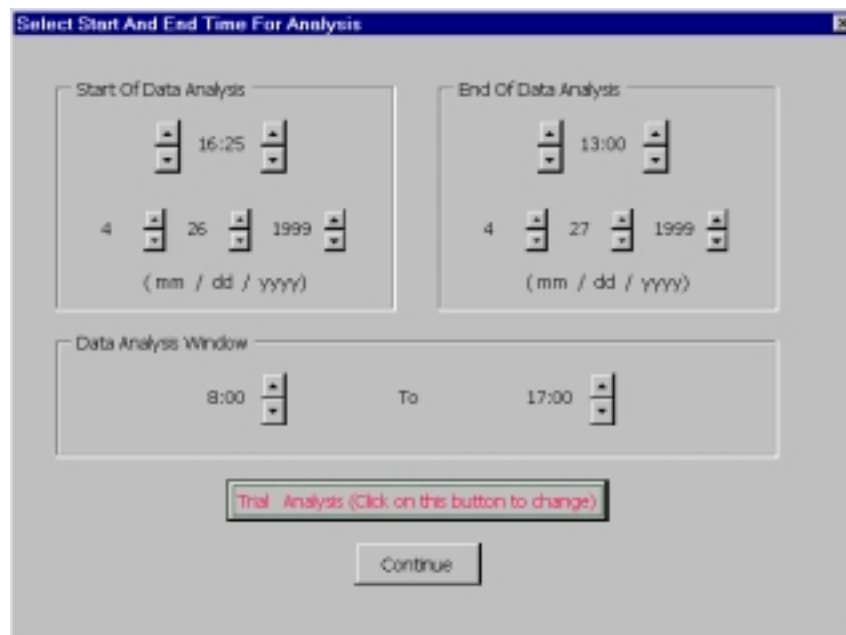
With the C++ Analysis tool you can select input data from another directory than the directory “input”. The tool creates the directories “tmp”, “customers” and “variance” in the same subdirectory where the directory with the customer input data is located. You therefore should only do TEST runs with an input directory other than the default “input” directory.

**Performing an analysis run**

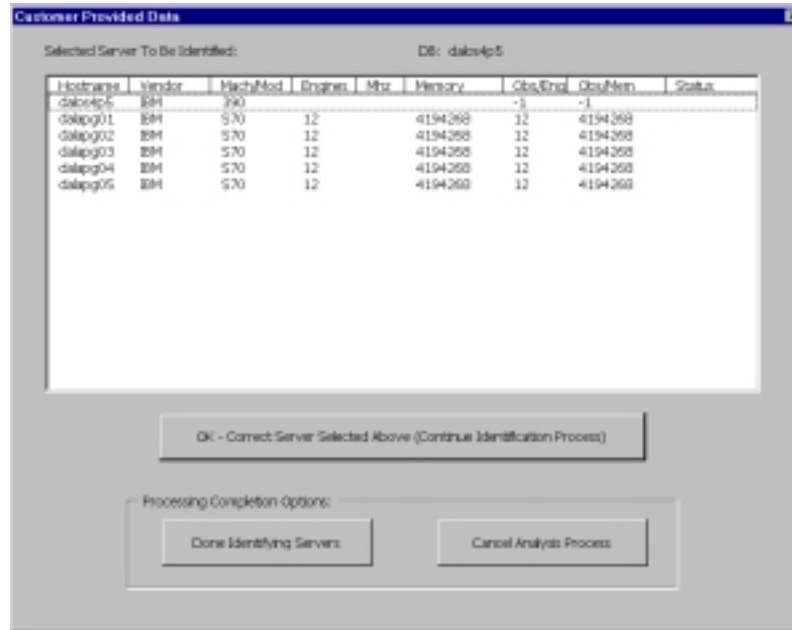
1. Extract the customer ZIP file into the input directory. For a FINAL run, you have to use the default “input” directory, to ensure, that the variance information is correctly stored in the “variance” directory.
2. Start the C++ Analysis
3. Select the input directory “FILE→Select Insight data” or <CTRL>-S with the extracted customer data by selecting the machine info file in that directory. If you use the recommended directory structure, the correct input directory with the file “machinfo.csv” (Insight < 2.4) or “<SID>.mac” (Insight >2.4) is shown. Select the file and press OK. The log window shows the machine info file selected and also displays, what directories for results are used.
4. Start the analysis run “RUN-> Perform Analysis” or <CTRL>-R.
5. The current status of the analysis run is displayed on the status bar and in the log window.
6. After reading in all “.SYS”, “.STA” and “.CPU” files from the input directory, EXCEL is started and you need to enter the following information:



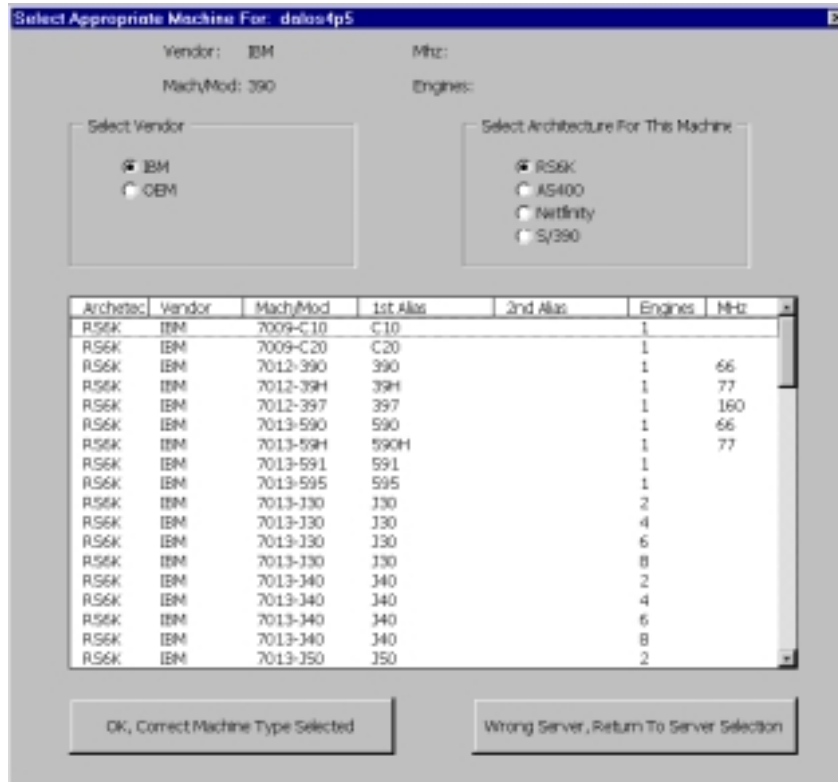
- a. Customer Name – this name is also used as directory name in the customers directory for storing the results of a FINAL run



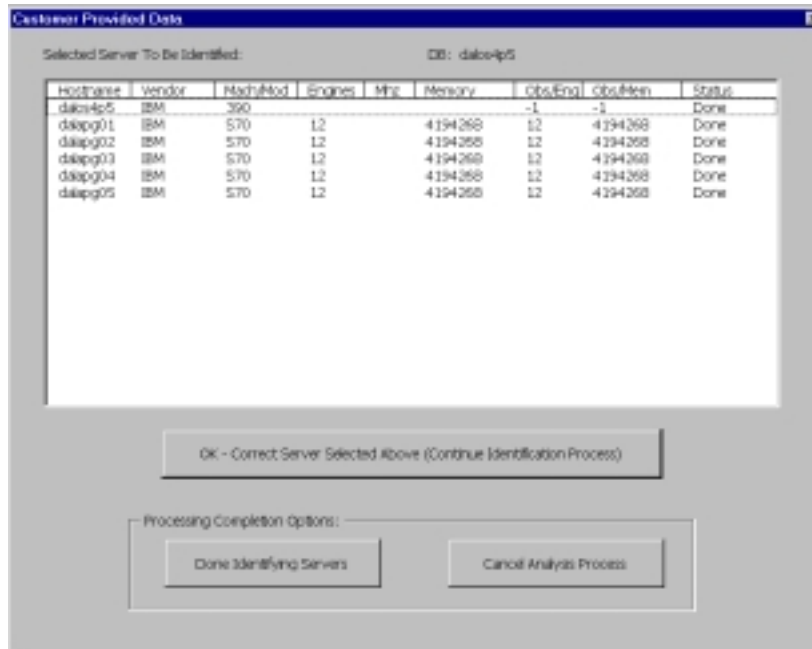
- b. The following screen shows the time period with valid customer data in the upper part. You can change the time period used for the analysis run by changing the values for “Start Of Data Analysis” and “End Of Data Analysis” in the upper part. In the lower part you can change the daily “Data Analysis Window”. All data from intervals not in this daily time window is not used during the analysis run. To do a FINAL run where the variance information is stored in the variance directory, click on the button “Trial Analysis...”.



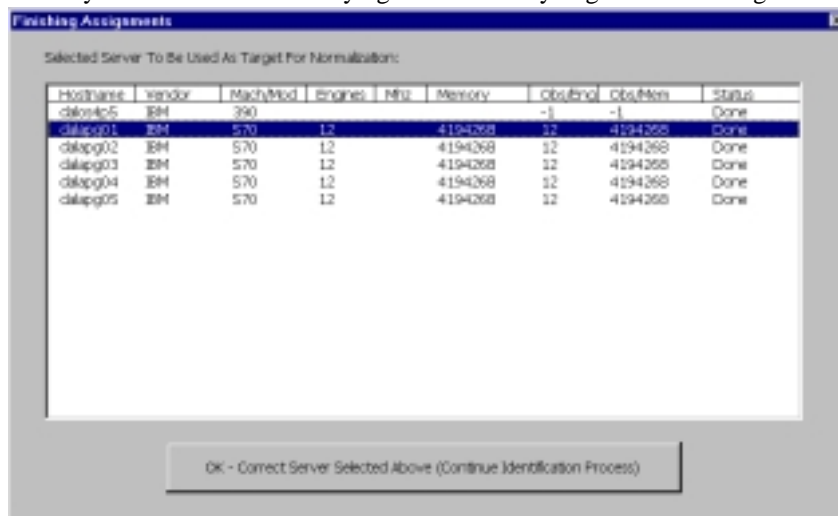
- c. The next window shows you the server information determined from the input files. The next step is to verify this information by selecting the correct server from a list of known servers. For this you select one host line with the mouse and select the button “OK – Correct Server Selected Above ...”. This brings up a new screen, where you select the correct machine.



d. Repeat this step until the status for all host lines is shown as “Done”.



- e. Then you select “Done Identifying Servers” and you get the following new screen:



- f. In this screen you select the server to be used as the target for the normalization step. After selection of the host continue with “OK – Correct server...”. Do not select an OS/390 server as normalization target, because there is no normalization information for the application servers available.
- g. Click on “Done Identifying Servers” and the EXCEL window is minimized. There is no further user interaction needed, until the analysis run is completed
- h. The program now performs the following steps:
1. Save the current EXCEL spread sheet
  2. Get the user input from EXCEL
  3. Analyze the data from the STA and CPU files according to the user input
  4. Perform the Capture Ratio Analysis
  5. Read all “.USR” files and do the analysis of the user data
  6. Store the results of the analysis run into the EXCEL spread sheet and save the spread sheet
  7. If this is a FINAL run the following additional steps are performed:
    - a. Create a new directory for this customer in the “customers” directory
    - b. ZIP all files from the input directory and store it in the customer specific directory
    - c. Copy the log file “job\_log.txt” and the final EXCEL spread sheet “variance.xls” into in the customer specific directory
    - d. Remove all files from the input directory if the user wants to.
  8. If you want to rerun the analysis with the same customer data you only need to select “RUN-> Perform Analysis” or <CTRL>-R. The log screen is NOT cleared in this case, but the variance.xls spread sheet is reset.
  9. If you want to make another run with different customer data select “FILE->Select Insight data” or <CTRL>-S and then “RUN-> Perform Analysis” or <CTRL>-R. The log screen is cleared and all data is reset.

## **HOTKEYS**

<CTRL> - S: Select input directory.

<CTRL> - R: Run analysis.

<CTRL> - + in NUMLOCK mode: Increase size of font in log window.

<CTRL>- - in NUMLOCK mode: Decrease size of font in log window.

<CTRL> - D: Activate debug output. There is no way to disable debug output besides restarting the program. In this version it is an all or nothing selection, but you can select, if the dumped data is more human readable or it is dumped in a similar format it was read in. This is only used when dumping the internal STA file information. If you activated the debug mode, you will be asked twice during the analysis run, if you want to dump the internal data structures. Select "NO" if you want to skip this dump. The dump is written to the log screen and to the file "job\_log.txt". If you are analyzing a large amount of data, the object dump can take up to a few minutes.

## **Problem determination**

Considerations with Excel when running the "C++ Analysis" program:

- During the analysis run, started by "Perform Analysis" or CTRL-R, the program performs the following steps:
  - If an EXCEL process is connected to the program, terminate the OLE connection and terminate the EXCEL process – no additional save!
  - Start a new EXCEL process with the variance.xls file from the tmp – directory. It is not iconized!
  - Store data in the spreadsheet
  - Get user input and minimize EXCEL
  - Save spreadsheet
  - Do the analysis
  - Save spreadsheet
- If the variance.xls spreadsheet is open in another EXCEL process, you will encounter problems during the save steps. Please close the other EXCEL instances and try again. If you still encounter problems during the save steps you need to reboot WIN-98 or with Windows NT kill all EXCEL processes with the NT task manager and then restart the analysis run.
- If things seem to hang, also check that the EXCEL frame is not blinking. If it is, click on it to activate Excel and directions from the "C++ Analysis" or EXCEL will be displayed.

Can't find the output or variance data no appended to data in variance directory:

- With the C++ Analysis tool you can select input data from another directory than the directory "input". The tool creates the directories "tmp", "customers" and "variance" in the same subdirectory where the directory with the customer input data is located. You therefore should only do TEST runs with an input directory other than the default "input" directory.

## APPENDIX B (SAP R/3 Module Abbreviations)

<u>ID</u>	<u>Module Name</u>
AC	Accounting - General
CO	Controlling
CS	Customer Service
EC	Enterprise Controlling
EHS	Environment Management
FI	Financial Accounting
IM	Investment Management
IS-RE	Real Estate Management
LE	Logistics Execution
LO	Logistics - General
MM	Materials Management
PA	Personnel Management
PE	Training and Event Management
PM	Plant Maintenance
PP	Production Planning and Control
PS	Project System
PT	Personnel Time Management
PY	Payroll Accounting
SD	Sales and Distribution
TR	Treasury
BC	Basis Components
CA	Cross-Application Components
SY	System Tasks
BT	Batch
OT	Other (Not Identified)

- BT refers to any program run in a batch (or background) work process.
- OT represents transactions and work that could not be identified as being part of another module.
- SY is the system activity used by SAP R/3. Such activities buffer syncs, spool, etc.
- CA is not listed as a separate module as it is better accounted for in conjunction with the module that invokes it.



## APPENDIX C (INSIGHT V2.4 README)

### ***Overview of Process:***

This software will extract performance statistics and dialog step information from the designated target production system. This information will then be analyzed by IBM to provide you with information on how your SAP system is being used. The provided collection tool is designed to have a minimal impact on your production environment (see notes below). If you have any questions, please contact Jim Dilley at (650)286-6832.

The actual data collection process is as follows:

- Every minute, the designated PC will issue an RFC call to each server retrieving performance statistics (returned by the SAP Operating System Collector); this information will be written to a local file on the PC. This activity is measured in milliseconds and should be undetectable on the servers.
- Each hour, the designated PC will issue an RFC call to each Application Server and retrieve dialog step statistics. The dialog step statistics are processed and written to a local file on the PC.

*This process was designed to have a minimal impact to the production environment during the day.*

Only accounting data is used in this process (as noted in the "stat" record). For more information on the type of data being accessed, use SAP transaction "ST03".

It is recommended that several days worth of data be collected during a period of the month with reasonably high usage.

## **Usage Requirements:**

A dedicated PC:

- PC must be running Windows 95, 98, or NT 4.0.
- At least a 90MHz Pentium, 32MB RAM, 40MB disk free
- A dedicated virtual memory allocation of 256MB.
- PC must be on LAN with direct TCP/IP access to all production servers (except a dedicated database server).
- The TCP/IP address of all server short host names (as seen in SM51) must be resolved by either “hosts” file entries, or DNS with a consistent, fully qualified domain. In an SP environment, short host names may require an alias to resolve switch host names from the PC over a token-ring or Ethernet network.
- The PC and all server clocks must be synchronized to the minute.
- The PC must be powered on during the entire data collection process

SAP system requirements:

- SAP system must be at 3.0 or higher.
- The SAP OS collector (saposcol) must be setup and running on all application servers in the target system.
- If the database is on a dedicated server (no SAP instance), saposcol and rfcoscol must be installed and working. Also, an RFC destination (TCP/IP connection in SM59) must be configured to access the remote saposcol from the Central Instance. This RFC destination is entered into the SAPOSCOL field of the DB Server property page.
- SAP statistics recording must be enabled (stat/level = 1).
- A SAP user ID of type CPIC must be created and assigned a profile (e.g. Z:INSIGHT) with the following authorizations:

S\_ADMI\_FCD(S\_ADMI\_ALL),  
S\_C\_FUNCT(S\_C\_FUNCT\_AL),  
S\_CPIC(S\_CPIC\_ALL),  
S\_DATASET(S\_DATASET\_AL),  
S\_RFC(S\_RFC\_ALL).

**Installation Instructions:**

1. On the designated PC, copy setupinsight.exe to a temporary directory.
2. From Windows Explorer, double click on setupinsight.exe to begin installation. Follow the installation process and reboot. Insight is designed to be uninstalled later.
3. Verify that all servers are in the "hosts" file of the PC. (optional)
4. Logon to SAP and execute transaction "SM51".
5. The middle column, labeled "Host", lists all of the application server names that need to be in the PC's "hosts" file.
6. While on the "SM51" screen, note the third column labeled "Type", and identify the host that is running "enque", this will be the name of the server that has the message server running (the name of the message server will be needed during setup).
7. For Windows 95 & 98, find the "hosts" file in the Windows directory of the designated PC. For Windows NT 4.0, the file is located in the \winnt\system32\drivers\etc directory.
8. If no "hosts" file is found, there is usually a sample "hosts.sam" file, which can be copied to "hosts" and then edited.
9. Edit this file and verify that all the server names listed in SM51 and their corresponding TCP/IP addresses are in this file.
10. From the PC command prompt, ping each application server short host name.
11. Verify that the collector is running on each server (application and database). This can be done in the following manner.
12. Logon to SAP and execute transaction "SM51".
13. Highlight an application server and select "OS collector". For each application server, verify that some non-zero statistics are returned.
14. For a dedicated database server, execute transaction OS07. Select the appropriate SAPOSCOL destination. Verify that some non-zero statistics are returned.

### **Usage Instructions:**

1. From the Windows Start menu, select Programs > Insight > Insight 2.4.
2. Note that data collection will not start until the setup is complete and verified, this setup is required each time that *Insight* is executed.
3. Once *Insight* is started, select "Program" from the menu bar.
4. From the "Program" pull down, select "Properties".
5. There will now be three property pages displayed: Logon, DB Server, and Options.
6. In the "Logon" property page, setup up the three data groups ("Message Server", "System", and "User"). These groups will be set up similar to the setup of a "SAPGUI".
7. "Message Server" data group.
  - Short host name of the Message Server.
  - Fully qualified domain if using DNS.
  - The "SAP Router" string is not normally needed. If it is, contact your network administrator for your string.
  - The "System" group contains two required entries. The two digit "System" and 3 digit "Client" can be acquired as noted in the installation instruction "Step 3" in the installation instructions.
  - The "User" group will need to be a CPIC user with authorization, and will also need to be filled in each time this tool is started (however, it should only be started once for a data collection effort).
- a. The "DB Server" property page is used only if a dedicated database server is used (no SAP processes running on the database). If this situation applies to your production environment, follow the steps below:
  - Check the "Dedicated Database Server" box which will enable entry into the SAPOSCOL field.
  - The "SAPOSCOL" field, enter the RFC destination used by SAP to query DB CPU statistics (check OS07).
- b. The "Options" property page is used to select data collection and reduction options. The defaults are set for *Insight* requirements.

Note: *Snapshot* users should disable all default options and select only "Work Process" information and "Write Stat Records To File".

- c. When all the fields you require are completed, click on the "Apply" box at the bottom of the screen. At this time, the program will go through the following steps:
    - Log on to Message server; query for all application servers.
    - Connect to each application server to verify accessibility.
    - **Insight** will now idle until the "Start" button is pushed.
  - d. Now click the "Continue" button. **Insight** is now configured.
8. Click on the "Start" button, and the program will start collecting data.
  9. If the Machine Information option was selected, a Machine Info dialog will appear. Please verify and complete the machine specific information for each server in your SAP system. When finished, click the OK button. You can go back later to enter information by selecting Program > Machine Info from the menu.
  10. The program is now running and will collect performance statistics every minute. (The amounts of resources used for this process are measured in milliseconds once every 5 minutes on each server).
  11. Each hour, **Insight** will pull dialog step statistics from each application server.
  12. At the completion of the collection effort, stop **Insight** by using the "Stop" button and the "Exit". The "Stop" button should not normally be used during the collection effort. It stops the program from collecting data. If the "Stop" button is pushed, pressing the start button can restart **Insight**.
  13. If the **Insight** data is to be e-mailed back to IBM, execute the supplied file "zip2file" from the **Insight** installation directory. This will execute PKZip to compress the **Insight** data files for shipment to IBM. The resulting Zip file is SAP\_DATA.ZIP and will be placed in the **Insight** installation directory.
  14. If the data is to be shipped to IBM with diskettes, execute the file "zip2diskette". A single diskette can generally hold about 5-10 application servers worth of data for a week. If the files will not fit on a single diskette, "PKZip" will span multiple diskettes. (These diskettes should be pre-formatted). Send the data diskettes back to IBM in the enclosed envelope for analysis.

## APPENDIX D (INSIGHT V2.5 README)

### ***Overview of Process:***

This software will capture performance and dialog step statistics on your SAP production system. The statistics are written to the hard drive of the Windows PC dedicated for the collection process. When complete, the statistics are sent to IBM for analysis. A report will be sent to you detailing how your production system is utilized. The provided collection tool is designed to have a minimal impact on your production environment (see notes below).

It is recommended that you collect at least four days of statistics during a peak period to improve the quality and value of the report.

## Usage Requirements:

A dedicated PC:

- PC must be running Windows 95, 98, or NT 4.0.
- At least a 90MHz Pentium, 32MB RAM.
- Disk space requirements: multiply the total expected number of dialog steps *Insight* will process by 0.00025.  
Example: *Insight* is expected to run for four days processing one million dialog steps per day.  $4,000,000 \times 0.00025 = 1,000\text{MB} = 1\text{GB}$  of disk space.
- For Windows NT: Minimum total virtual memory of 256MB.
- PC must be on LAN with direct TCP/IP access to all production servers (except a dedicated database server).
- The TCP/IP address of all server short host names (as seen in SM51) must be resolved by either “hosts” file entries, or DNS with a consistent, fully qualified domain. In an SP environment, short host names may require an alias to resolve switch host names from the PC over a token-ring or Ethernet network.
- The PC and all server clocks must be synchronized to the minute.
- The PC must be powered on during the entire data collection process.
- Disable power management (suspend) during the collection process.

SAP R/3 system:

- SAP release must be 3.0d or higher.
- The SAP OS collector (saposcol) must be setup and running on all application servers in the target system.
- If the database is on a dedicated server (no SAP instance), saposcol and rfcoscol must be installed and working. Also, an RFC destination (TCP/IP connection in SM59) must be configured to access the remote saposcol from the Central Instance. This RFC destination is entered when prompted with the Dedicated Database dialog box.
- SAP statistics recording must be enabled (profile parameter: stat/level = 1).
- A SAP user ID of type CPIC must be created and assigned a profile (e.g. Z:INSIGHT) with the following authorizations:

S\_ADMI\_FCD(S\_ADMI\_ALL),  
S\_C\_FUNCT(S\_C\_FUNCT\_AL),  
S\_CPIC(S\_CPIC\_ALL),  
S\_DATASET(S\_DATASET\_AL),  
S\_RFC(S\_RFC\_ALL).

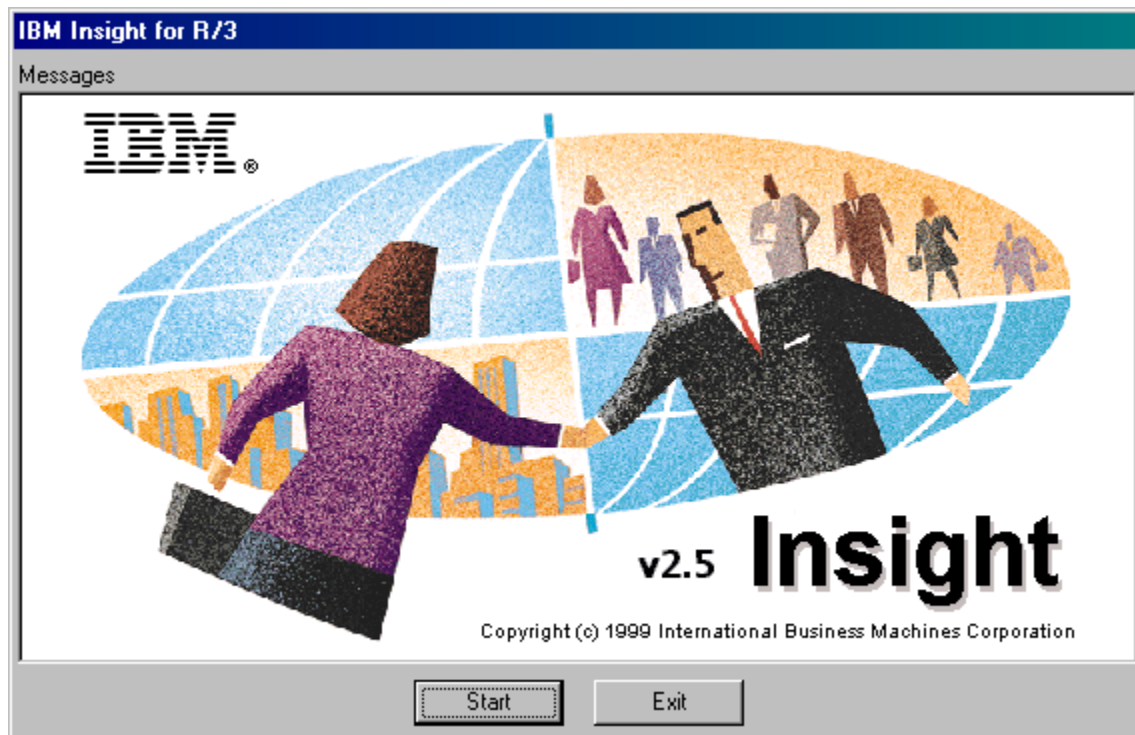
### **Installation Instructions:**

1. On the designated PC, copy the installation executable “setupinsight.exe” to a temporary directory.
2. From Windows Explorer, double click on setupinsight.exe to begin installation. Follow the installation process and reboot. **Insight** is designed to be uninstalled later.
3. Ping all SAP application server hosts from PC.
  - a. Using SAPGUI, logon to SAP and execute transaction "SM51".
  - b. The middle column, labeled “Host name”, lists all of the short host names that must be directly accessible via TCP/IP from the PC.
  - c. While on the "SM51" screen, note the third column labeled “Type”, and identify the host that is running “enque”, this will be the name of the server that has the message server running (the host name of the message server will be needed for initial logon).
  - d. **If using DNS**, ping each host with name and domain from the PC command prompt (ex: C:\> ping appsrv01.yourcompany.com).
  - e. **If not using DNS**, the Windows “hosts” file must be maintained. For Windows 95 & 98, find the “hosts” file in the Windows directory of the PC. For Windows NT 4.0, the file is located in the \winnt\system32\drivers\etc directory. If no "hosts" file is found, there is usually a sample "hosts.sam" file, which can be copied to "hosts" and then edited. Edit this file and verify that all the server names listed in SM51 and their corresponding TCP/IP addresses are in this file. From the PC command prompt, ping each short host name (ex: C:\> ping appsrv01).
4. Verify that the SAP operating system collector (saposcol) is running on each server (application and database). This can be done in the following manner.
  - a. Logon to SAP and execute transaction "SM51".
  - b. Highlight an application server and select “OS collector”. For each application server, verify that some non-zero statistics are returned.
  - c. For a dedicated database server, execute transaction OS07. Select the appropriate SAPOSCOL destination. Verify that some non-zero statistics are returned.

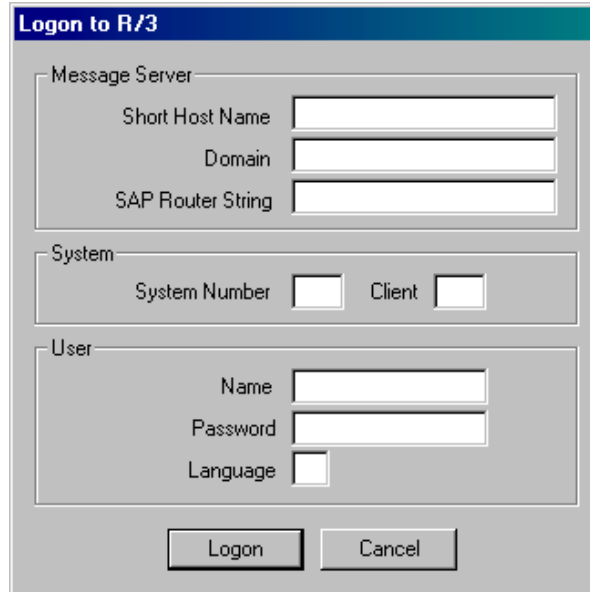


**Usage Instructions:**

1. From the Windows Start menu, select Programs→Insight→Insight 2.5.
2. Press the “Start” button.



### 3. Logon to R/3.

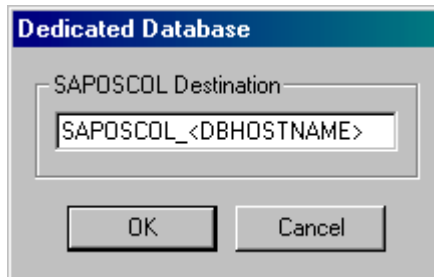


The dialog box titled "Logon to R/3" contains three sections: "Message Server", "System", and "User".

- Message Server:** Includes input fields for "Short Host Name", "Domain", and "SAP Router String".
- System:** Includes checkboxes for "System Number" and "Client".
- User:** Includes input fields for "Name", "Password", and a dropdown menu for "Language".

At the bottom of the dialog box are two buttons: "Logon" and "Cancel".

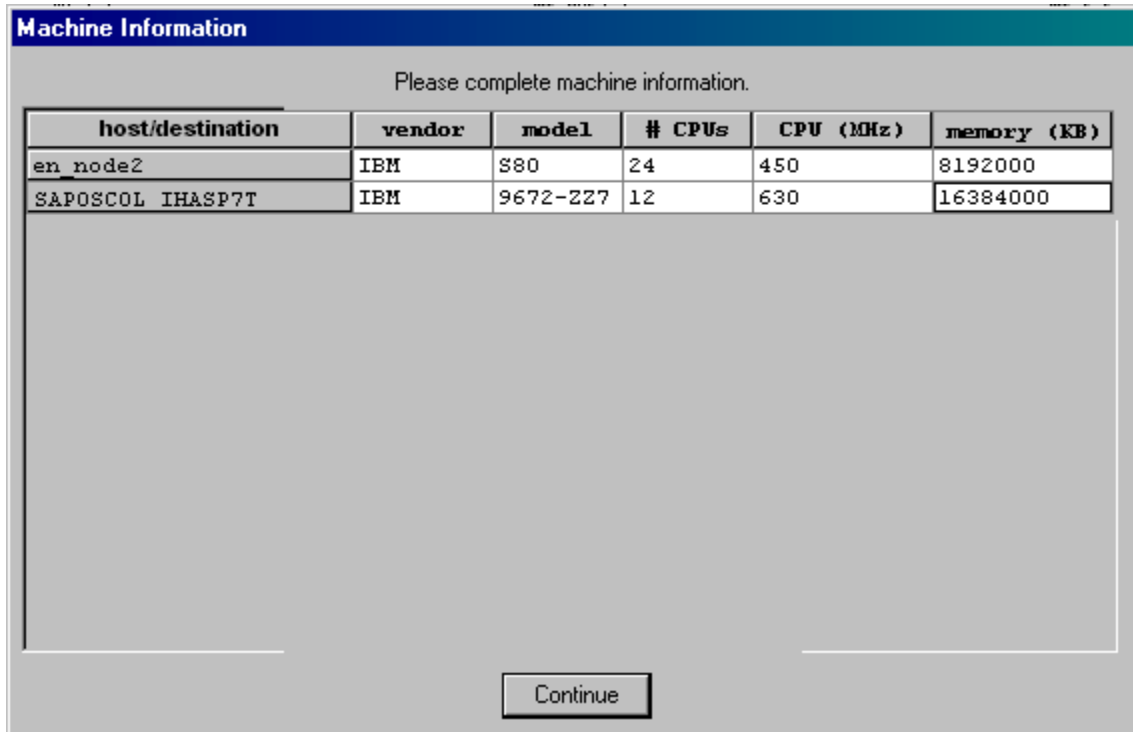
- Enter the message server short hostname (ex: appsrv01). Do not enter an IP address or a domain suffix.
  - If using DNS, enter your company's domain (ex: yourcompany.com).
  - If required, enter a SAP Router string.
  - Enter the message server system number (ex: 00).
  - Enter the client number where the CPIC user has been created.
  - Enter the CPIC user name, password, and language (ex: SAPCPIC, ADMIN, EN).
  - Press the "Logon" button.
4. If database is dedicated, meaning no R/3 instance running on the same host as the database, you will be prompted with the following dialog box.



The dialog box titled "Dedicated Database" contains a single input field labeled "SAPOSCOL Destination" with the text "SAPOSCOL\_<DBHOSTNAME>" inside. Below the input field are two buttons: "OK" and "Cancel".

Verify that the database SAPOSCOL destination provided is valid as defined in transaction OS07. Press the "OK" button. Insight will attempt to connect to the remote destination.

5. The program is now running and will capture performance statistics every minute. Status messages will scroll in the *Insight* “Messages” window.
6. After four days of data collection, stop *Insight* by pressing the "Stop" button.
7. Post-processing will reduce the captured stat records by module.
8. Complete the machine information spreadsheet. Press the “Continue” button.



host/destination	vendor	model	# CPUs	CPU (MHz)	memory (KB)
en_node2	IBM	S80	24	450	8192000
SAP0SC0L IHASP7T	IBM	9672-ZZ7	12	630	16384000

Continue

9. Quit *Insight* by pressing the “Exit” button.
10. Please take time to complete the survey questionnaire (SURVEY.DOC) found in the *Insight* installation directory.
11. Execute the batch file "zip2file.bat" (zip2file.cmd for NT) in the *Insight* installation directory. This will execute PKZip to compress the *Insight* data files for shipment to IBM. The resulting Zip file is SAP\_DATA.ZIP and will be placed in the *Insight* installation directory. Please e-mail this Zip file to [ibmerp@us.ibm.com](mailto:ibmerp@us.ibm.com) for analysis.

Thank you for your time and patience.

## APPENDIX E (INSIGHT Question & Answers)

### Common Questions & Answers for IBM Insight for SAP R/3

Question:

I cannot download the file from the Insight web page, who can help me?

Answer:

Please call 1-800-426-0222 or email us at [ibmerp@us.ibm.com](mailto:ibmerp@us.ibm.com) and supply us with an email id that can take file attachments up to 5MB and we will email the tool to you.

---

Question:

Can I obtain the analysis tool in addition to downloading the Insight collector?

Answer:

At present there are no plans of delivering Insight analysis tools to other organizations within or outside of IBM.

---

Question:

How long should I run Insight for?

Answer:

Minimum 4 days, Maximum 10 days. Please insure that the PC running Insight stays powered up for the entire collection duration. In some cases, you will need to disable the power management features on the workstation such that it does not automatically stop Insight.

---

Question:

I am setting up Insight and I have a technical question about setup, what should I do?

Answer:

- First, we strongly recommend that you read the README file provided with the Insight tool. This documentation is also accessible from within Insight by clicking on the "Help" option.
  - Second, make sure that you are aware of the "Prerequisites" for Insight. If you are not a SAP Basis person yourself, please seek help from one of the SAP Basis people from your technical infrastructure team to help setup Insight.
  - Third, if you are still having problems please send us an email at [ibmerp@us.ibm.com](mailto:ibmerp@us.ibm.com) and mention "Insight Technical Question" in the subject heading.
-

Question:

During the monitoring period do I need to start and stop Insight daily?

Answer:

No, in fact we would prefer if you did not start and stop Insight. All you have to do is start Insight and let it run continuously for the number of days you want to run it. Starting and stopping Insight daily causes fragmented data and you will only get the output back for a "single" day instead of all the days due to this fragmentation. Insight reporting process is extremely sensitive to SAP servers abnormally going down during the data collection process. We expect that all SAP servers were up and running in the time frame during which Insight data was collected otherwise we cannot guarantee an accurate Insight analysis.

---

Question:

During Insight setup I am prompted for my SAP system's hardware information, (Machine Model, Number of CPUs, Memory) can I leave all or some of these entries blank?

Answer:

We strongly recommend that you take the time to find out this information and enter it correctly. Incomplete or incorrect information may cause incorrect reporting for your system.

---

Question:

During Insight setup time there are other options than "default", do I need to select any of them?

Answer:

At this point in time please use only the "default" options (those which are in place at the time of installation). IBM is currently not supporting analysis above and beyond these "default" options. Selecting additional options will only increase the size of your data-set and will delay your analysis results.

---

Question:

Can I run Insight remotely?

Answer:

We strongly recommend that the PC running Insight should be "LAN attached" to your SAP production system.

---

Question:

We have a SAP production system, three development systems, two test systems and a training system. Can IBM provide Insight analysis reports for all of these systems?

Answer:

Only "Production Systems" are eligible for Insight analyses. Non-Production systems are excluded from the IBM Insight for SAP R/3 program.

---

Question:

If I send the Insight data to IBM how long will it take for IBM to get the results back to me?

Answer:

Once the data is received by IBM it is checked for data integrity, if there are no issues then it can take a minimum of "5 working days" for you to get the results back. No exceptions are made. Insight is not a reactive process, we expect you to plan all activities well in advance and IBM will do its best to have the data delivered back to you in a reasonable time frame. If a backlog exists, it may take longer than 5 days for you to get the results back.

---

Question:

I know that Insight is a free value-add from IBM, how often can I request an Insight analysis report for my SAP Production System?

Answer:

At this point in time IBM is limiting one SAP SID (System ID) report per quarter. Based on your needs and IBM's workload additional reports may be requested. You should communicate with us through [ibmerp@us.ibm.com](mailto:ibmerp@us.ibm.com) and get your request approved before you send in new data.

---

Question:

What happens if I run Insight on a system, and this same system has significant workload on it from software not associated with the SAP application?

Answer:

The RFC mechanism provided by SAP only collects CPU statistics for an entire machine. No delineation is made by SAP for what the sources of this load might be. This means, for example, that if two SAP R/3 systems are running on a single machine, both R/3 systems are contributing to the same total reported CPU utilization. As such it is impossible for IBM to allocate specific resource consumption amounts against a specific one of these two SAP systems. This same logic applies if there is other significant load coming from some non-SAP related/reported source.

---

## APPENDIX F (SAP R/3 Module Functions)

### CA *Cross-Application Components*

- Test class
- Process model objects cross-application
- Data transfer: Elements from application basis
- Component hierarchy, cross-application
- Application Development R/3 - General Object Number
- Application Development R/3 - Status Management
- Cost Accounting budget and planning
- CA application components
- Process model objects CA
- Data transfer: Elements from application basis
- Cross-Application Components
- European Monetary Union: Euro
  - EUROx Table Maintenance
  - Additional Functions for the Euro
  - Local Currency Changeover
    - EMU development class: FI-AA
    - EMU Conversion: Application Basis
    - All objects for EURO conversion
    - EMU converter programs IS-RE, TR-TM, IS-B
    - Euro LC Changeover: Generated Programs
    - EMU Local Currency Conversion Tool (New Objects in P30)
    - EMU: LC conversion tool (new objects P40)
    - EURO conversion: Financial Accounting
    - FI-SL: EURO
    - EURO conversion: Controlling
    - EURO conversion: Materials management
- Document Management System
  - Document Management
  - R/3 applications development: Customer document management sys.
  - DMS - Document Distribution
  - Document Management
  - Document Processing
  - Find Document
  - Document Distribution
- Classification System
  - Cross application objects classification
  - R/3 Application development: PP Classification System
  - R/3 Customizing: Classification
  - API functions classification system
  - Distribution
  - Basic Objects for Classification
  - Classification
  - Characteristics
  - Classes
  - Object Selection
  - Environment
    - Generated Customizing Classes (no longer in use, 4.5A)
    - Classification system functions for ALE
    - Classification System and SAP BW
- CAD Integration
  - CAD Integration
  - R/3 Customizing PPS: CAD integration
  - Objects Supported

- └─ CAD Function Libraries
- └─ Business Framework Architecture
  - └─ Tools for environment analysis/de-coupling - no delivery !
  - └─ BFA: Classes SBF\_BAPI and SBF\_WEB for return transport 3.1
  - └─ ALE Integration Technology
    - └─ Process model objects ALE
    - └─ Application Link Enabling
    - └─ Application Link Enabling: IDOC Handling
    - └─ ALE Application
    - └─ Modeling
    - └─ Duplication
    - └─ Communication
    - └─ Utilities
      - └─ Application Link Enabling: Customizing
      - └─ Application Link Enabling
  - └─ BAPI Interface Technology
    - └─ BAPI basis functionality, cross-application
    - └─ BFA: Application objects
    - └─ Business Framework BAPI
    - └─ Internet outbound BAPI for Business to Business
    - └─ Business Framework BAPI, central modules, tools
  - └─ Web Basis
    - └─ WWW connection: Cross-application development
    - └─ Demos and sample solutions for Internet courses
    - └─ BFA WebBasis
    - └─ Development class for basis WWW project
- └─ Central Business Partner
  - └─ Business partner 3.0
  - └─ CA-BP: Application components
  - └─ Business Partners
  - └─ Business Partner Relationship
- └─ General Application Functions
  - └─ Analysis of Dictionary changes - only SAP internal
  - └─ Official document numbering
  - └─ Transaction usage monitor
  - └─ XPRA transaction, only used in-house
  - └─ System switch: Sets specific system instance
  - └─ Cross-Application Mass Maintenance
    - └─ Mass Maintenance Tool: Generic Part
  - └─ Technical Application Support
    - └─ Business Transaction Events (Open FI)
    - └─ FI Cross-application Objects
    - └─ Application Basis - Financial Accounting
    - └─ Basis objects FI-FM
    - └─ Cross-application Objects in Asset Management
    - └─ IS-RE cross-application objects
    - └─ Cross-Application Objects FI (Fiscal Year Variants Only)
    - └─ CO Cross-application Objects
    - └─ Tools for (external) data transfer
    - └─ Application Basis - Cost Accounting
    - └─ Application Basis - Logistics
    - └─ MM Cross-application Objects
    - └─ Application basis for MRP (originates from MD, MD0\*)
    - └─ New Mass Processing and Batch Input
    - └─ Non-application-specific-objects HR
    - └─ Cross-application objects in Position Management
    - └─ Application Basis Travel Management
    - └─ SD Cross-application Objects
    - └─ Application Basis - Sales
    - └─ R/3 Central Application Development: Subseq. Screen Proc.
    - └─ R/3 Central Basis Development: Field Selection



- Only contains R3TR TABL AUTHA
- R/3 Application development: PP Message Management
- R/3 Customizing: PPS Message Management
- Application Basis Accounting
- Check Reports not for Delivery
- Platform-independent File Names
- Table maintenance
- Correction Programs with Customer Delivery
- Generic list types
- Parallel processing
- Technical Core Competence
- Basis Time-Dependent Tables
- R/3 Central Basis Development: Action Log
- R/3 central Basis development: Dialog boxes etc.
- R/3 Central Basis Development: Objects
- R/3 Central Basis Development: Profiles
- R/3 Central Basis Development: Basis Utilities
- R/3 Central Basis Development: Service Functions
- Basis-Related Help Functions, Application Log, Formula Intpr
  - Batch Heading
  - Messages, notes and tab
  - Report/report interface
  - R/3 application development for BW hierarchy interface
  - Switching between BW and hierarchy interface
  - Matchcode OCX shell

#### —Business Application Support

- Basic Data: Service Master
- Applications Monitor
- R/3 Central Basis Development: Change Documents
- R/3 Central Basis Development: Measurement Units
- R/3 Central Basis Development: Check Digit Procedure
- Development class for BOR objects currency/ex.rate etc.
- Business Object Technology (BOT)
- Financial year variants in the Basis
- Financials: Components in Basis
- Religious denominations
- Forecast Basis separation
- Report Painter
- R/3 Central Basis Development: Factory Calendar
- R/3 Central Basis Development: Change Documents
- R/3 Central Basis Development: Function Module TOOLS
- R/3 Central Basis Development: Measurement Units
- R/3 Central Basis Development: Number Ranges
- R/3 Central Basis Development: Number Ranges for Test Tools
- R/3 Central Basis Development: Combined Maintenance Objects
- R/3 central Basis development: Scheduling ('TimeStream')
- R/3 central Basis development: Time zones
- Holiday Calendar, Factory Calendar, Appointment Calendar
- Message Control
- Units, Change Documents, Number Ranges

#### —Mathematical Functions

- R/3 Central: Statistics Functions
- R/3 Central Basis Development: Floating Point on Screen
- Conversion utilities
- Formula Interpreter

#### —Data Transfer Workbench

#### —Address Management

- Central address management objects in the application system
- R/3 Central Basis Development: Address Management
- R/3 central Basis development: Regional structure

#### —Data Retention Tool

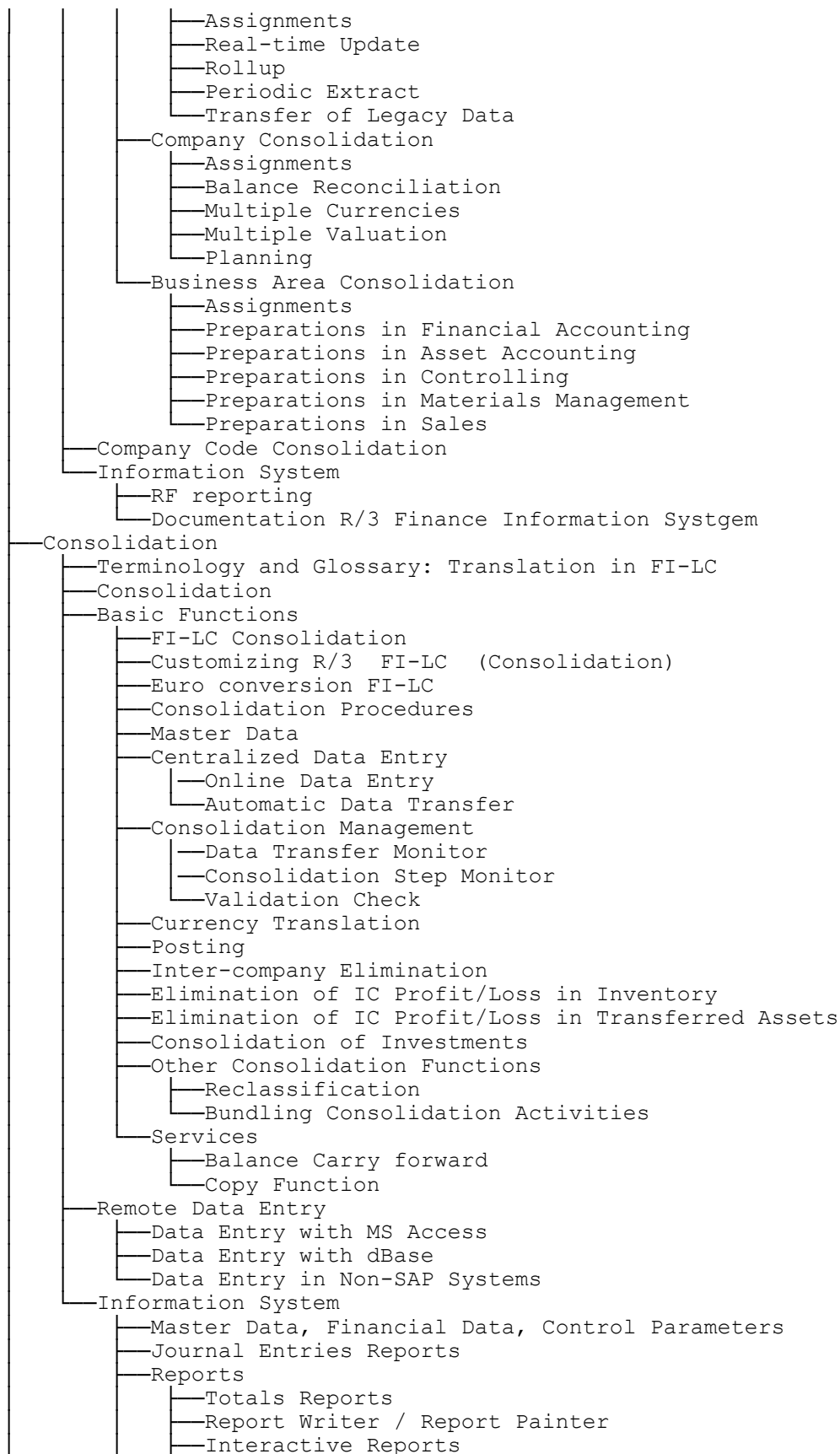
- Help Functions
  - Online help
  - New Help Processor
  - HELP
- Personalization
- Documentation and Translation Tools
  - Terminology/Glossary
    - New Glossary for 4.0
    - Terminology - Database
    - SAPterm Terminology Database
  - Translation Tools
    - Replace Industry-Specific Short Texts
    - Transport: Languages (not delivered)
    - Online Translation Environment (SE63)
    - Processes for Translation Control
    - R/3 translation memory
    - Cleanup Programs, Language Cleanup
  - Documentation Tools
    - Documentation Maintenance
    - Namespace extension: Development class w/o namespace
    - SAPfind
    - Basis Hypertext Documentation
    - SHVC -> SBIN Transport Layer
    - Online text repository
  - SAP Knowledge Engineer
    - Info Repository tables for Information Workbench
    - SAP Knowledge Engineer: Translation of keywords
    - Information Workbench
    - IWB: Administration
- Intermediate Document Interface/EDI
  - IDoc interface (Logistics segment definitions)
  - IDoc interface (application objects)
  - IDoc interface (processing, administration, definition)
  - IDoc Processing and Interface Maintenance
  - IDoc Definition Tools
- Computer Aided Test Tool
  - CATTs (test modules and processes)
  - CATT Tool
    - Test data storage for CATT
    - Computer Aided Test Tools
    - CATT Unused Objects from SCAT
  - CATT-Modules and Test Cases
    - CATT - test procedures R/2
  - Test Workbench
    - Test Plan Management Tool
    - Test Workbench
    - Test Workbench
- SAP Business Information Warehouse Extractors
- Open Information Warehouse
  - Business Information Warehouse - Customizing BW-WX
  - Business Information Warehouse: Daten extraction
  - Business Information Warehouse: Generation Services
  - Business Information Warehouse: IDocs in 4.0 format
  - Business Information Warehouse: Meta-data maintenance
  - Business Information Warehouse: Central objects
  - SD Extractors
- Time Sheet
- IMG for development class CATS
- Cross-application time sheet

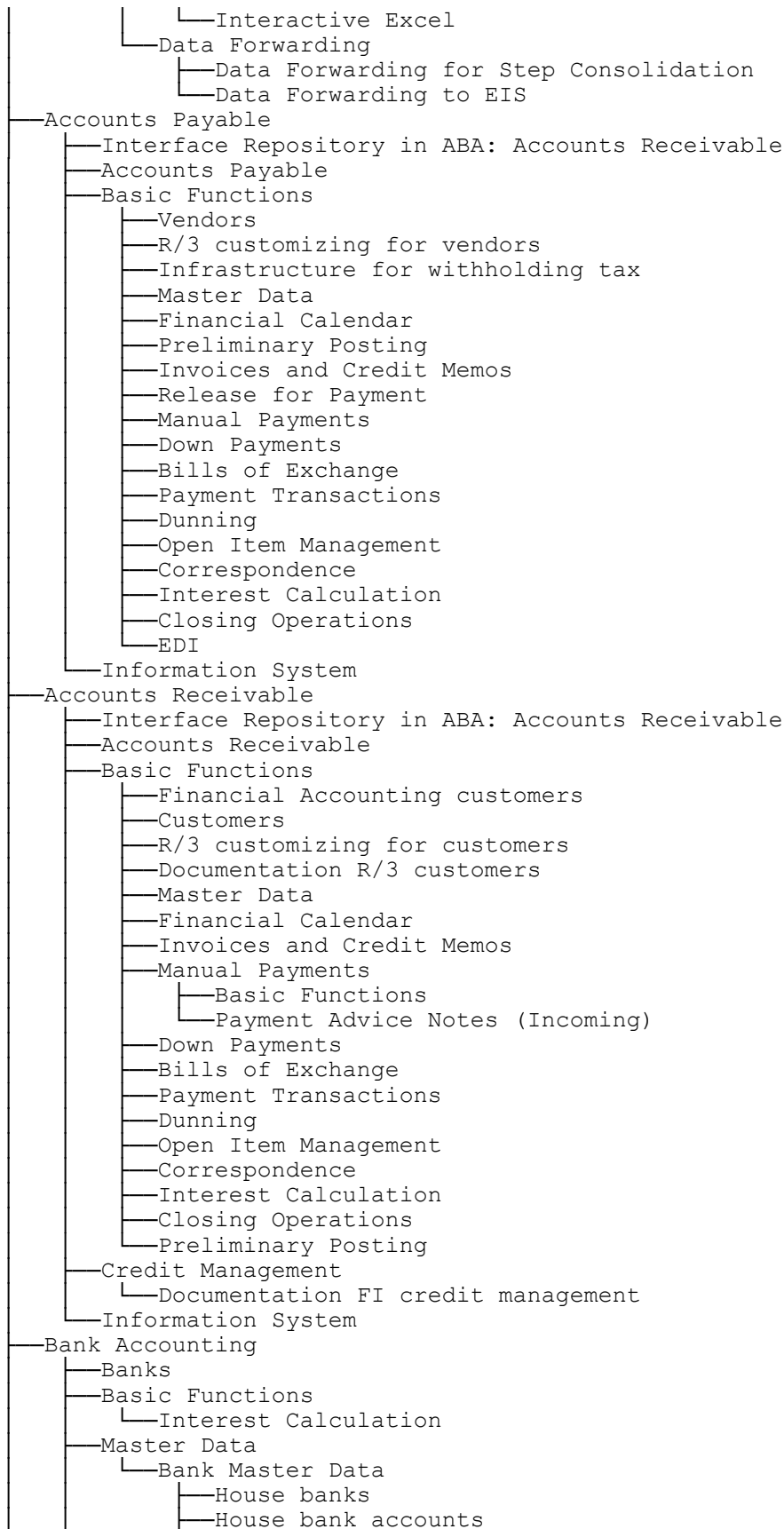
## **AC    *Accounting - General***

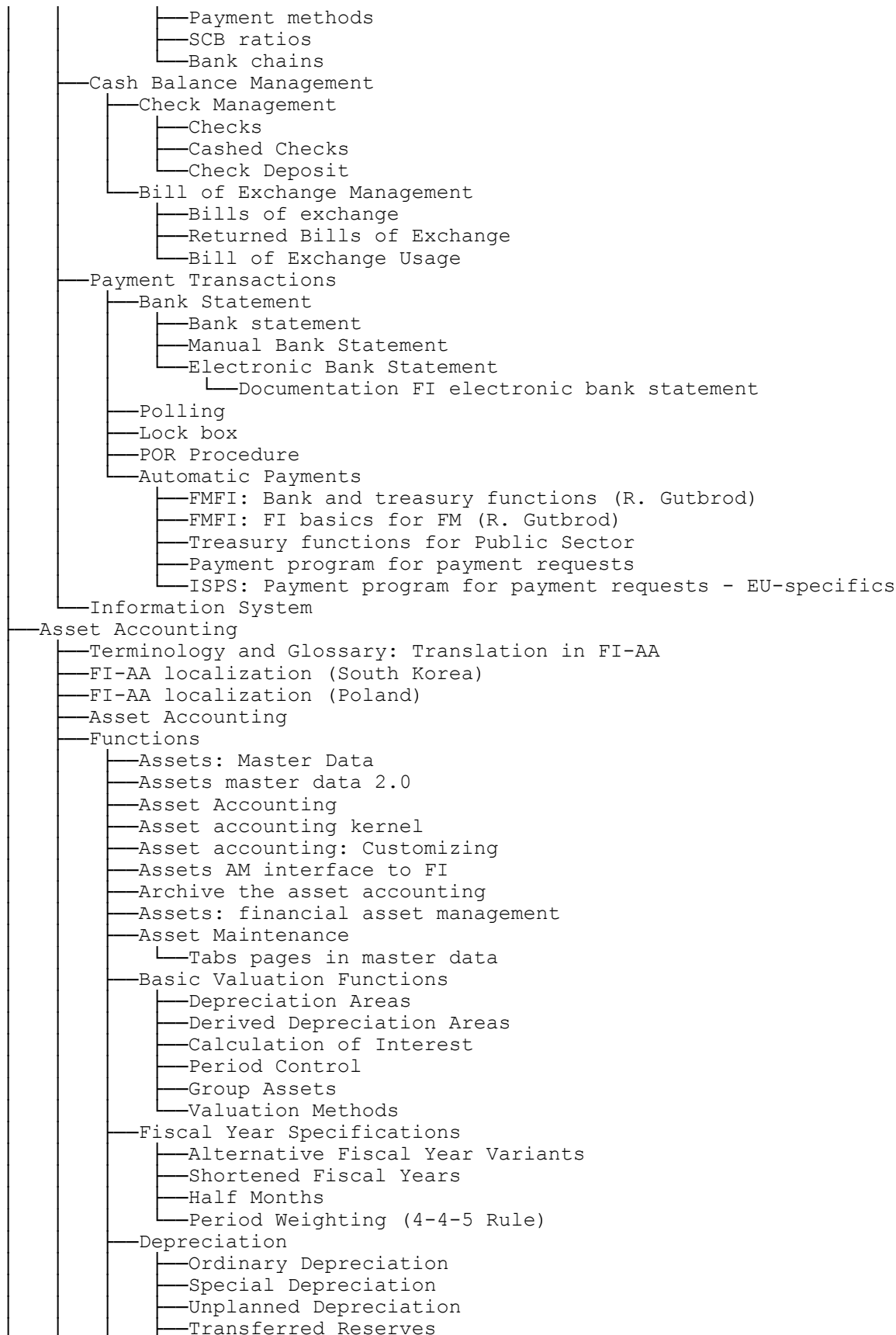
- Application components AC
- Terminology and Glossary: Translation in AC
- Interface Repository in ABA: Accounting - General
- Coding Block
- Cross application: Coding block
- Accounting Interface
- External data transfer via IDocs and BAPIs to accounting

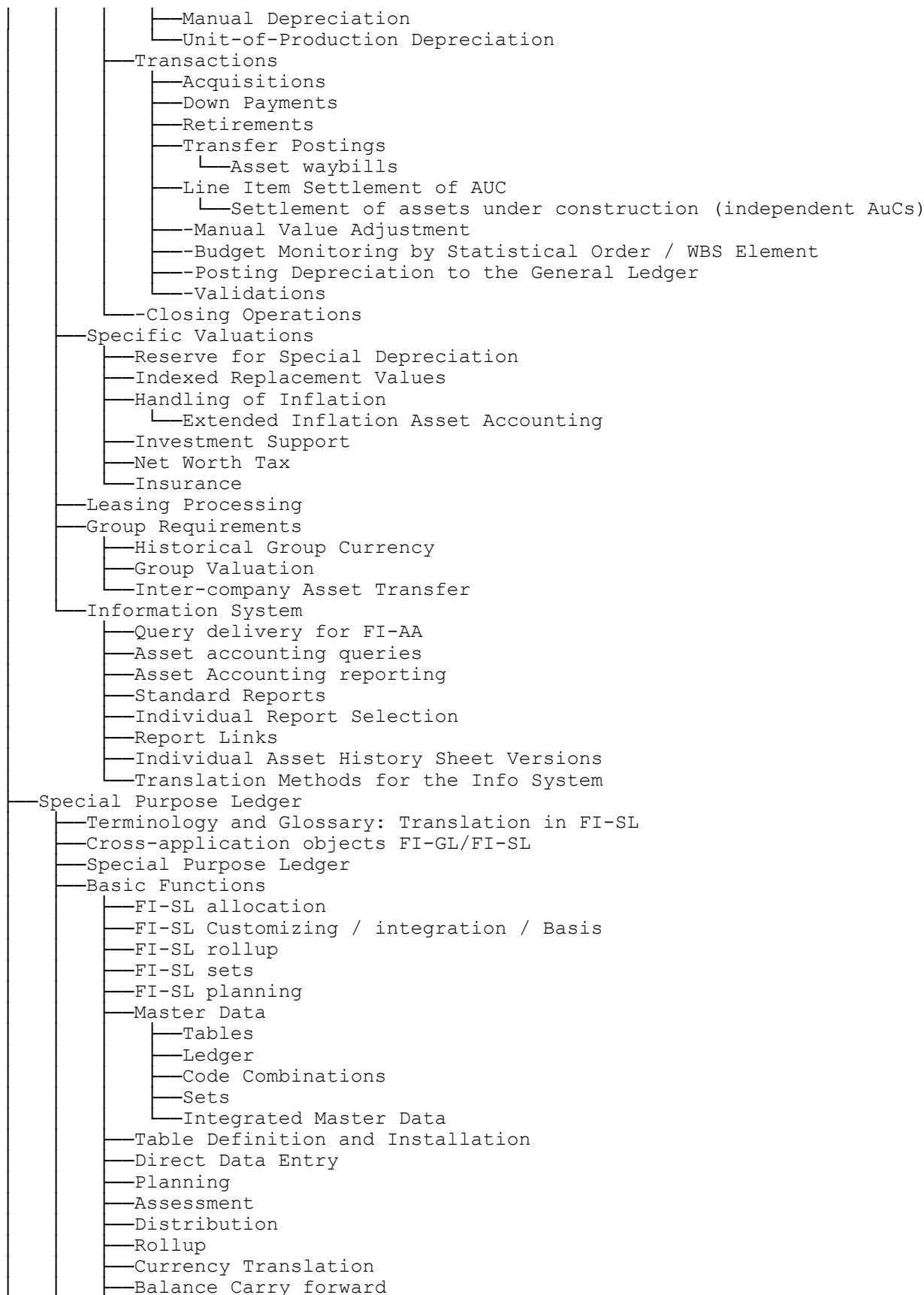
## FI **Financial Accounting**

- FI ABAP queries
- Application components FI
- Cross-application data input DB/archive/...
- Attached Payment Media
- Archiving of FI objects
- Data transfer FI-AP, FI-AR, FI-GL to BIW
- Dunning
- Payments
- Documentation FI closing operations
- Business Framework: Business Transaction Events
- Documentation FI customers and vendors
- Documentation FI posting
- Link to interface management layer in FI (BTE)
- Documentation FI general topics taxes, currencies
- User exits for localization Argentina
- Earmarked Funds: Additional Developments
- Updating Funds Management
- International development: FI-GL/AP/AR
- Financial Accounting Argentina
- Extended inflation FI
- Tax processing Argentina
- Correction programs with delivery (RW)
- Financial Accounting
- General Ledger Accounting
  - Interface Repository in ABA: G/L accounting
  - Documentation FI general ledger
  - Basis functions G/L accounting
  - General Ledger Accounting
  - Basic Functions
    - Documentation financial accounting configuration and organization
    - Financial accounting 'Basis'
    - Banks
      - R/3 customizing for banks
    - External Statutory Reporting
    - G/L Accounts
      - R/3 customizing for G/L accounts
      - Documentation R/3 G/L accounts
    - Documentation financial accounting closing operations
    - Interface to external systems for tax calculation
    - Library of basic functions for in/external tax systems.
    - jurisdiction handling for in/external tax systems
    - tax calculation by in/external tax systems
    - determination of tax data for in/external interface
    - Master Data
      - Standard G/L Account Maintenance
      - Cross-Company G/L Account Maintenance
    - G/L Account Posting
    - Planning
    - Financial Calendar
    - Open Item Management
    - Closing Operations
    - Interest Calculation
    - Document Parking
  - Flexible Structures
  - Business Area Accounting
  - Foreign Currency Accounting
  - Preparation for Consolidation
    - Assignments and Data Transfer

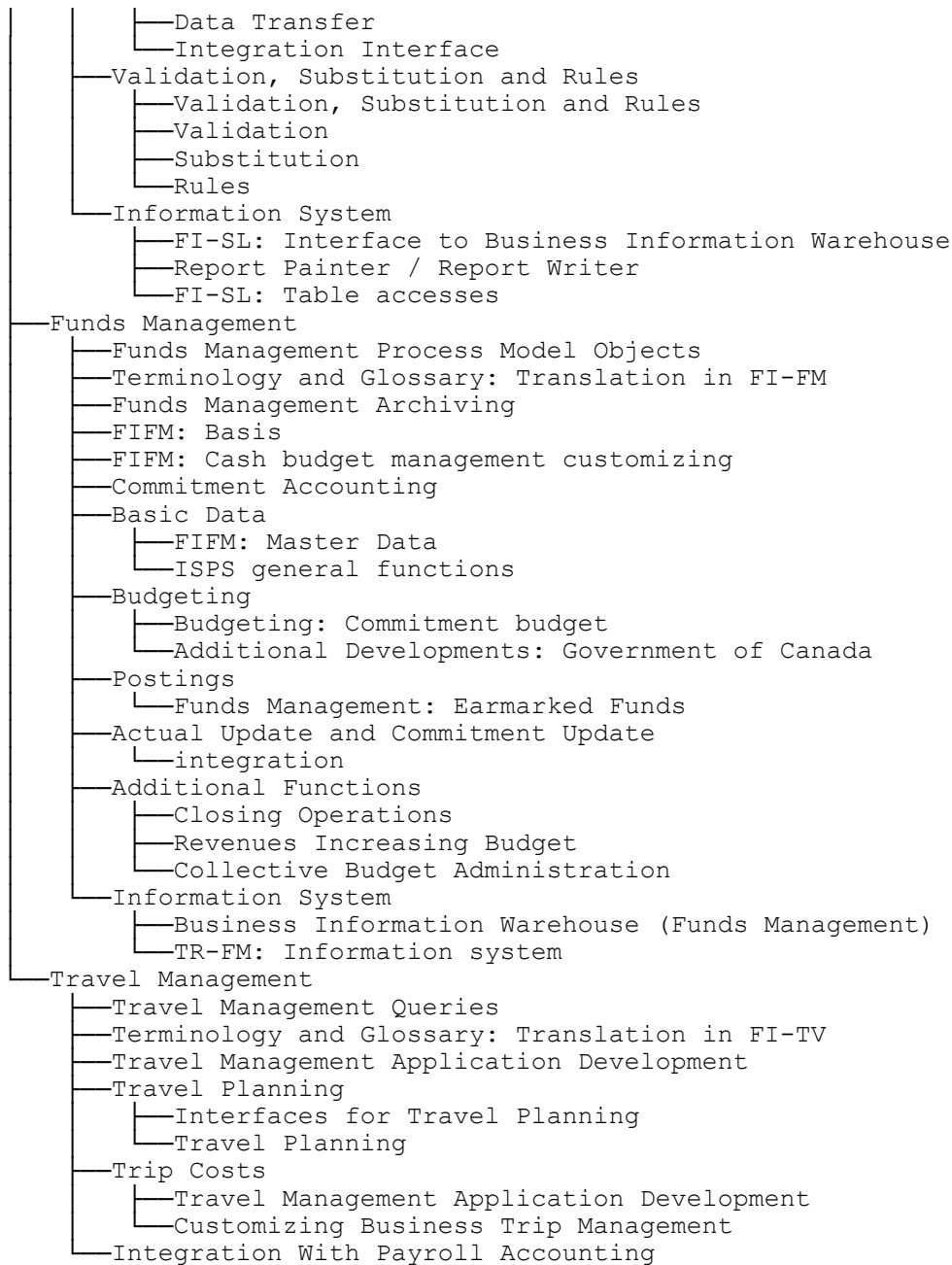






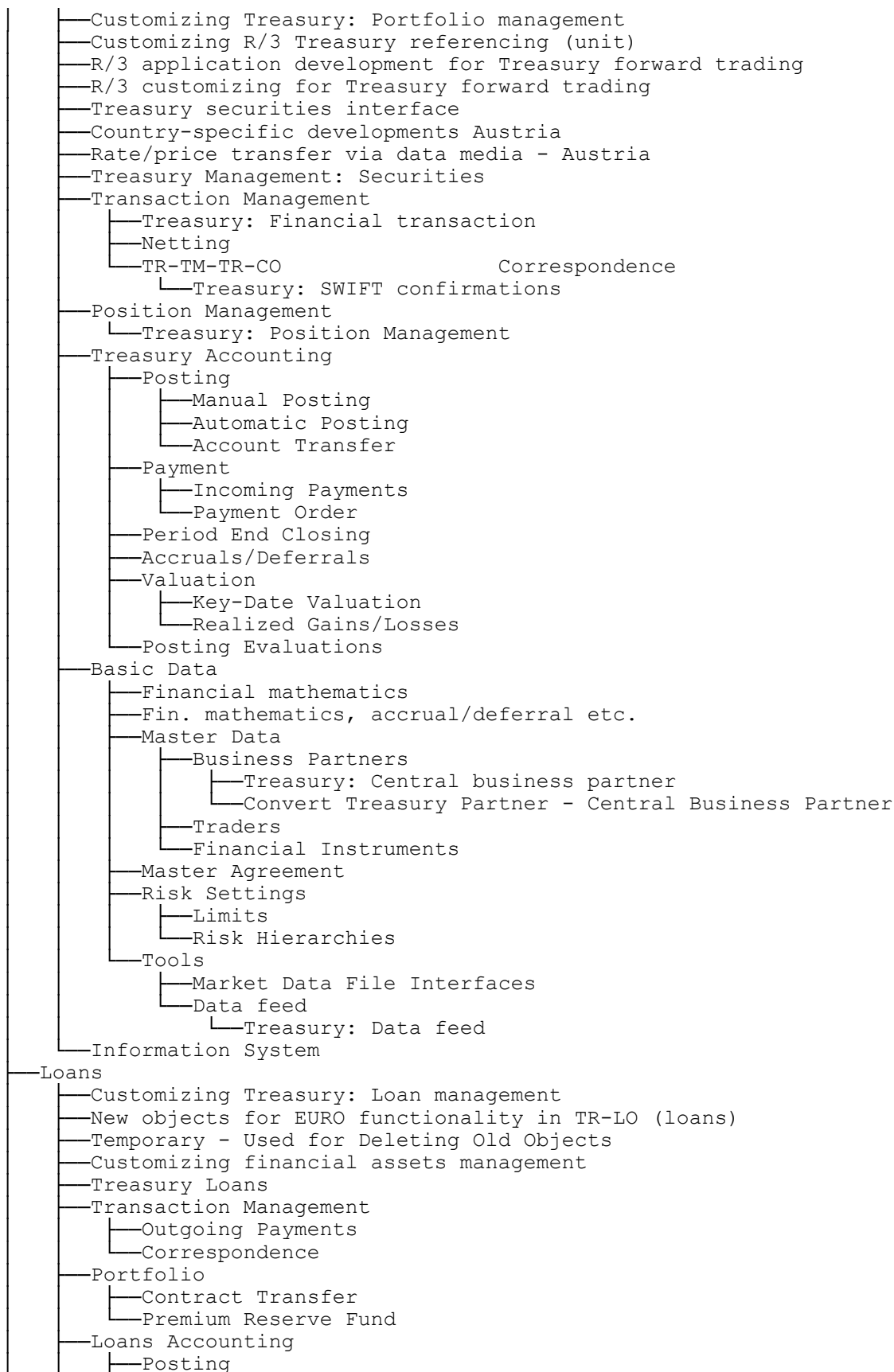


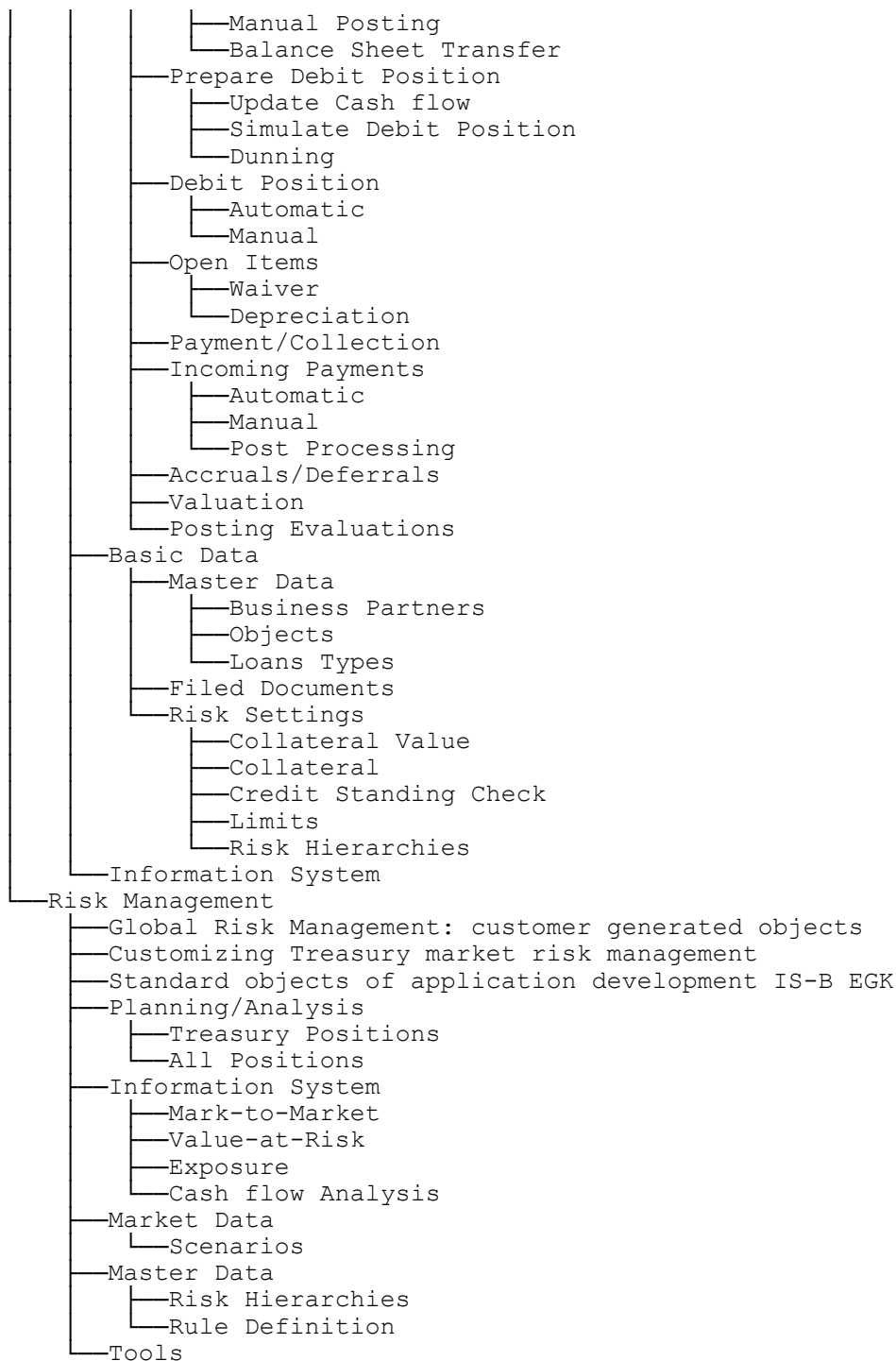




## TR Treasury

- EMU: Treasury compare programs for local currency conversion
- Application development R/3 Treasury information system
- Application development R/3 Treasury Information System -BIW
- Application development R/3 Treasury Information System -EIS
- TR - Objects from FVV in both Loans/Securities areas
- R/3 application development for Financial Assets Management
- Treasury
  - Cash Management
    - Terminology and Glossary: Translation in TR-CM
    - Cash Management
    - Basic Functions
      - Cash Management
      - R/3 customizing for cash management and forecast
      - Cash mgmt and forec. recording with payment request (EU)
      - Treasury: Central control data bank
      - R/3 customizing for Treasury general
      - Treasury: Cash Management (SWIFT, BAI, Fed Wire)
      - Bank accounting: External payment information
      - Bank accounting: Bank master - activities
      - R/3 customizing for interest scale
      - Financial Accounting interest scale
      - Creation internal RW documents
      - Data model Treasury Management
      - Input
      - Check
        - Comparing Value Dates
        - Comparing Payment Advice
        - Comparing Bank Terms
        - Cashed Checks Analysis
      - Status
        - Cash Position
        - Liquidity Forecast
      - Planning
        - Cash Concentration
        - Cash Transfer
        - Planned Item Processing
        - Telephone Transfers
      - Tools
        - Comparing CM
        - Distribution
        - Payment Order
      - Environment
      - Information System
  - Cash Budget Management
    - Basic Data
    - Planning
    - Posting
    - Integration
    - Information System
  - Treasury Management
    - Terminology and Glossary: Translation in TR-TM
    - Business Partner
    - R/3 customizing for Treasury money, forex, forward
    - Treasury: Cross Application
    - R/3 Customizing for Treasury foreign exchange
    - R/3 application development for Treasury money market
    - R/3 customizing for Treasury money market
    - Application development R/3 treasury hedging
    - Customizing R/3 treasury hedging
    - Treasury: Limit management

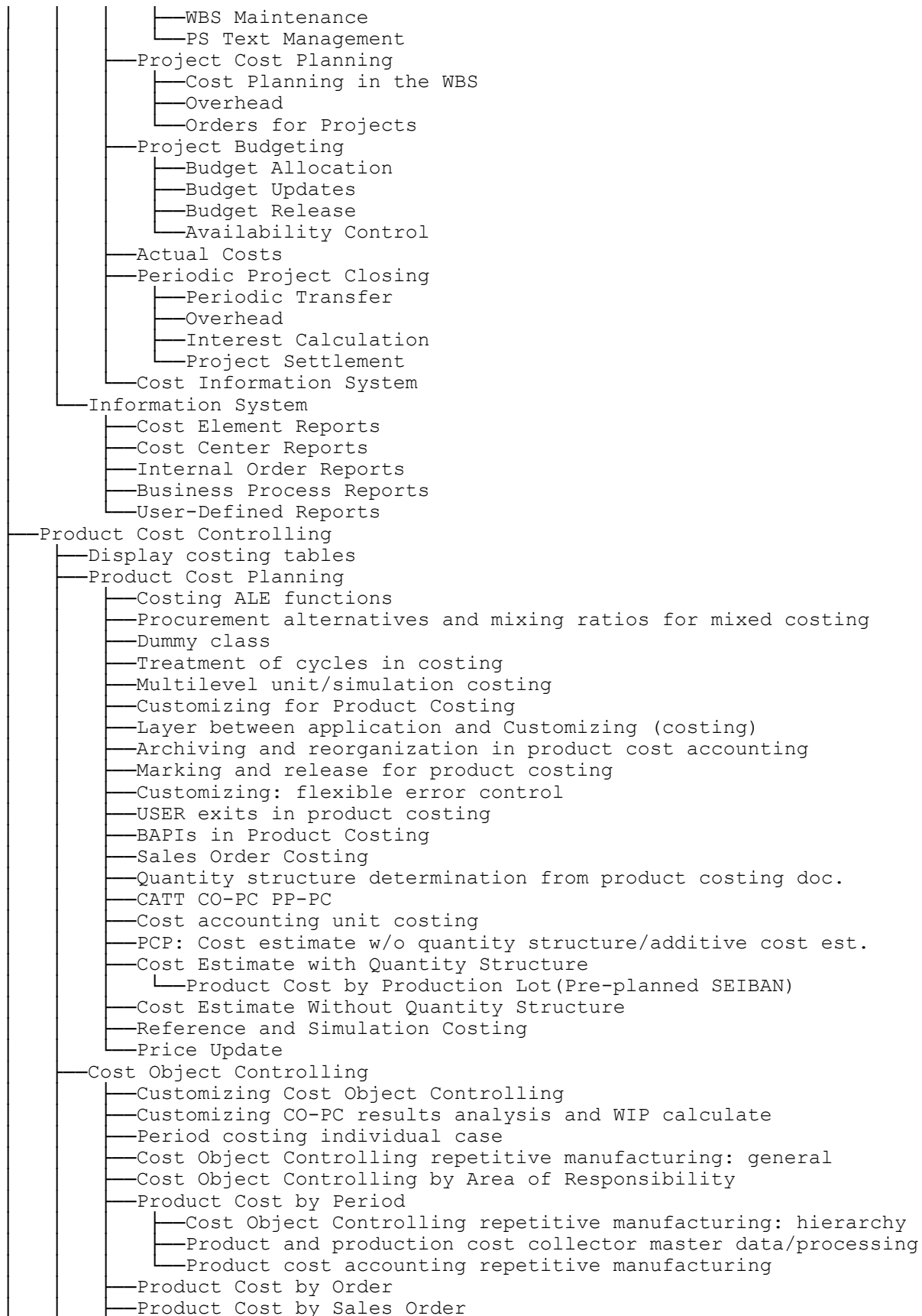


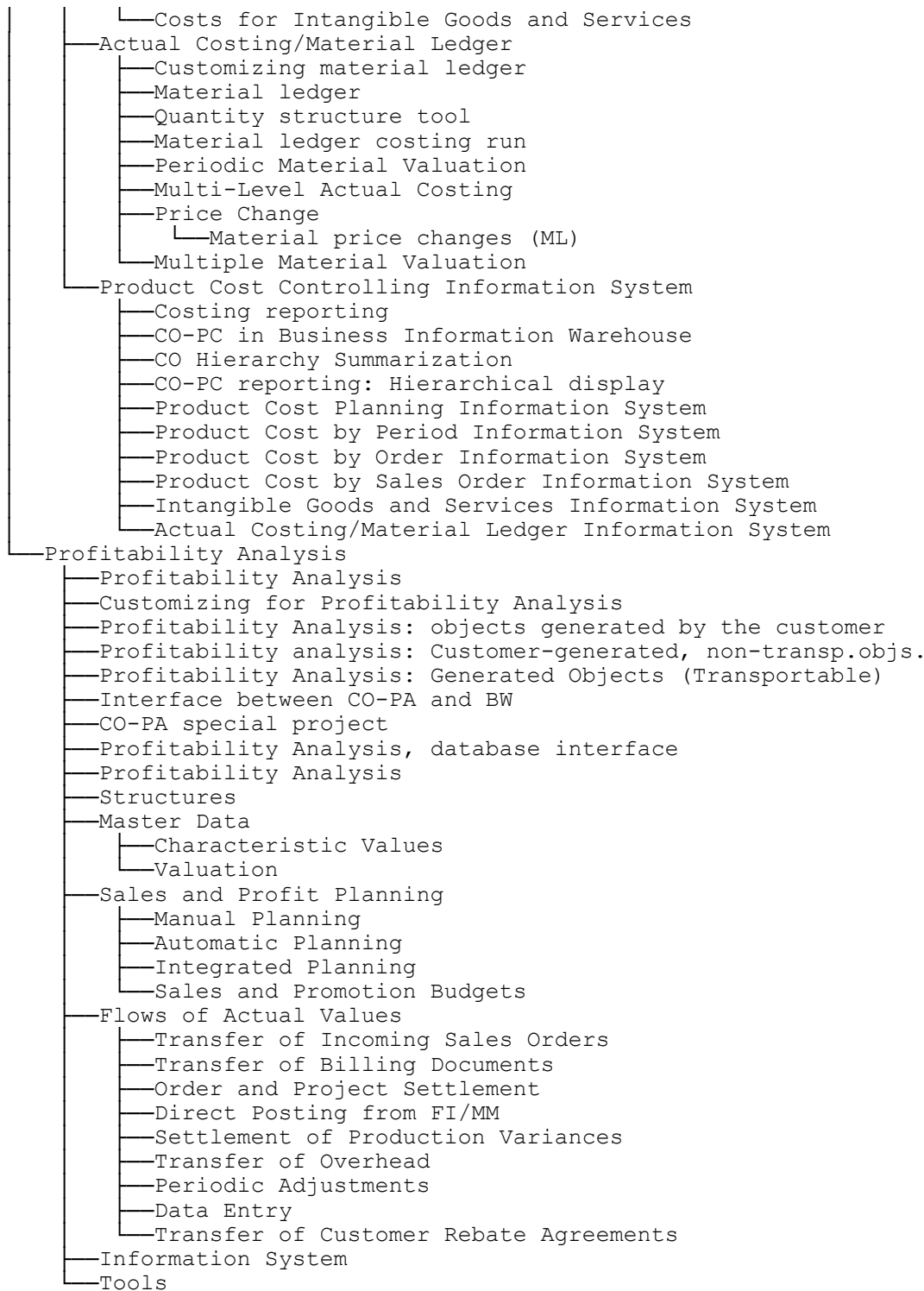


**CO Controlling**

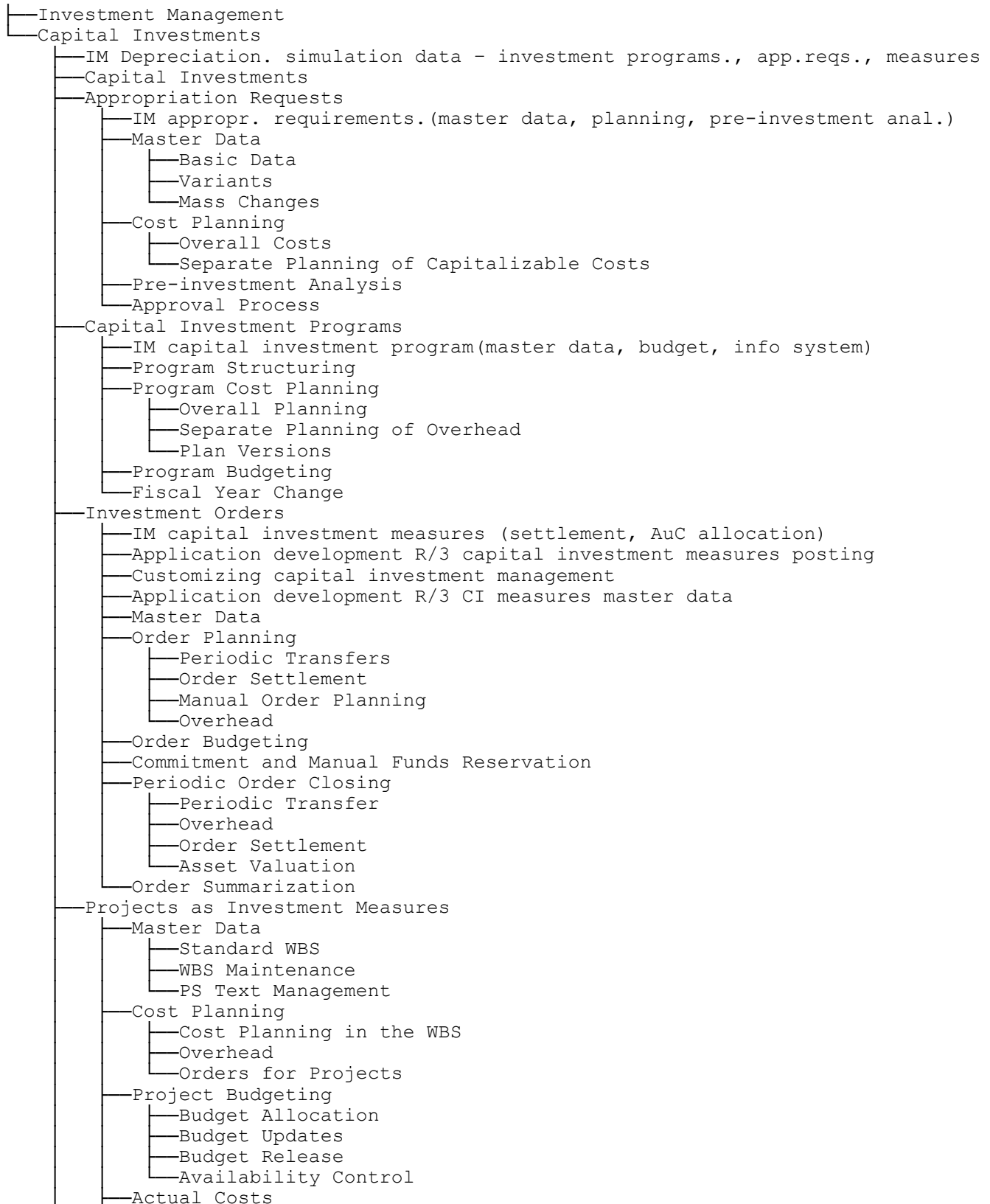
- Joint venture development
- Overhead Cost Controlling
- Data model from CO for the Business Information Warehouse
- Cost accounting: Manual actual postings
- Cost Accounting actual data RK-S
- CO analysis programs
- Overhead Cost Controlling

- Interface Repository in ABA: Overhead Cost Controlling
- CO-OM: Reporting
- CO mass processing
- Cost accounting overheads
- CO-OM Internet applications
- Development class: InfoSource CO-OM
- Overhead Cost Controlling
- Cost Element Accounting
  - CO-RCL reconciliation ledger
  - Cost Elements
  - Reconciliation Financial Accounting / Controlling
- Activity Types
  - Cost Accounting: Calculation of variances
  - CO-OM-ACT: Performance analysis
- Statistical Key Figures
- Cost Center Accounting
  - Cost Accounting allocations RK-S
  - CO: Objects flagged for deletion
  - Cost Accounting, planning RK-S
  - Cost Accounting, planning processor
  - Customizing R/3 Cost Accounting
  - CO-CCA Calculation of imputed costs
  - Application-specific rollup (cost centers)
  - Cost centers ALE
  - Variance analysis RK-S/RK-K
  - Master Data
  - Cost Center Planning
  - Planning Closing
  - Cost Center Budgeting
  - Commitments and Funds Commitments
  - Period-End Closing
  - Cost Center Summarization
- Activity-Based Costing
  - Cost Accounting activity based cost
  - Process template
  - Activity-Based Costing
  - Master Data
  - Process Costs: Plan Postings
  - Process Costs: Actual Postings
- Overhead Orders
  - Cost Accounting: Cost collector RK-A
  - Cost Accounting commitment management
  - Customizing R/3 Cost Accounting, Orders
  - Cost Accounting, Orders
  - Master Data
  - Order Planning
    - Manual Order Planning
    - Periodic Transfers
    - Overhead
    - Order Settlement
  - Order Budgeting
  - Commitments and Funds Commitments
  - Periodic Order Closing
    - Periodic Transfer
    - Overhead
    - Interest Calculation
    - Order Settlement
  - Order Summarization
- Overhead Projects
  - Master Data
  - Standard WBS





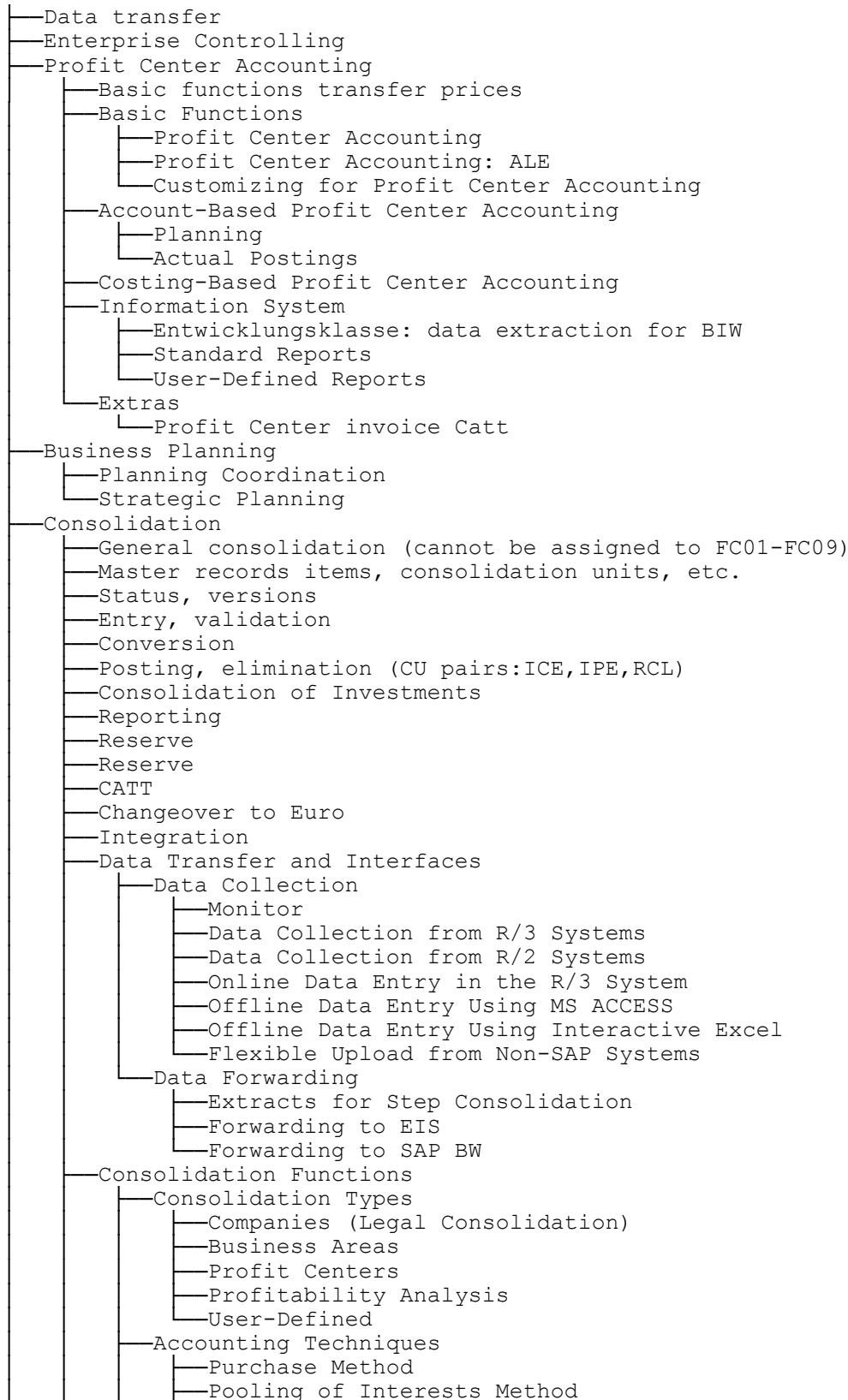
## IM Investment Management

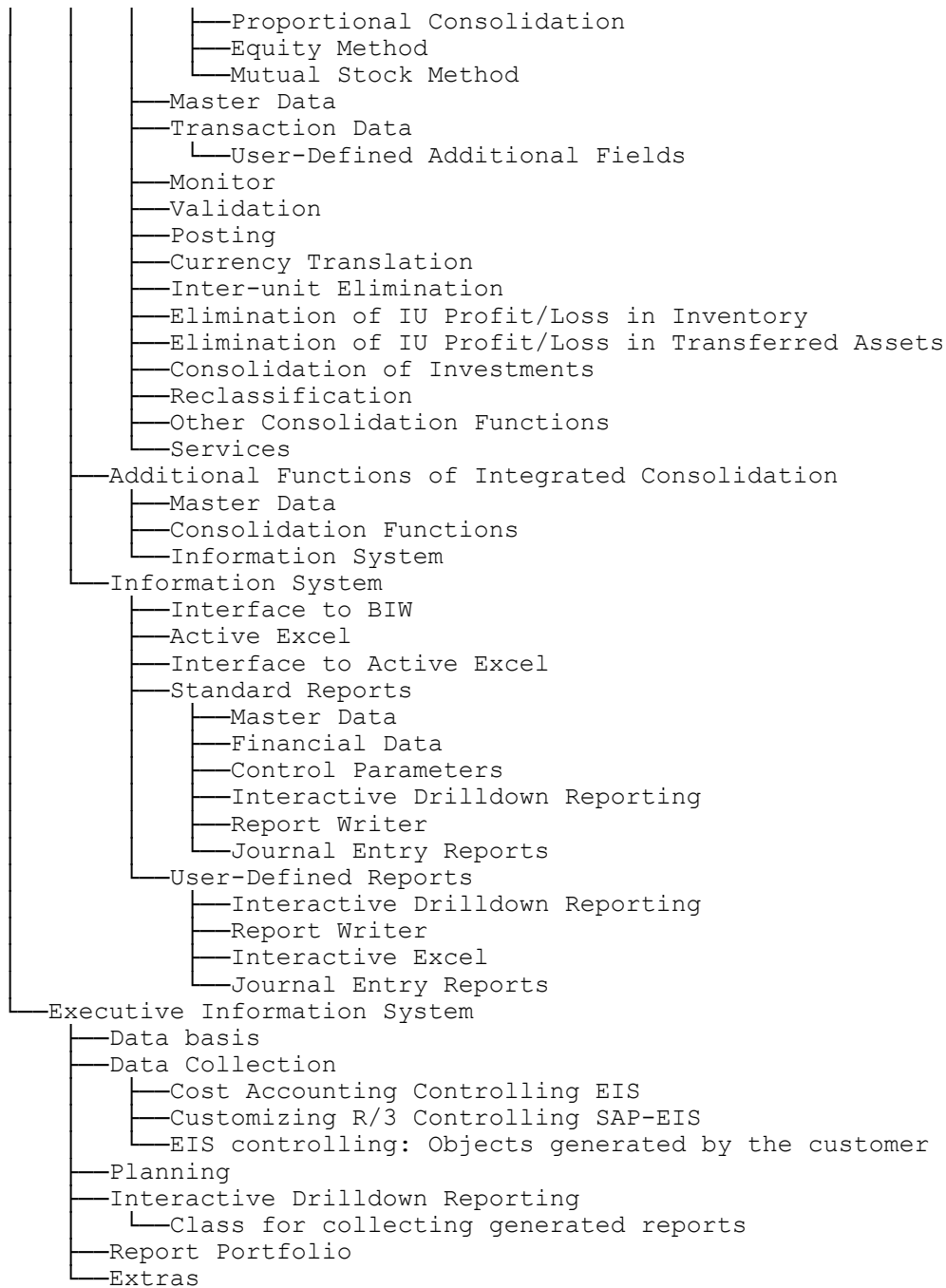


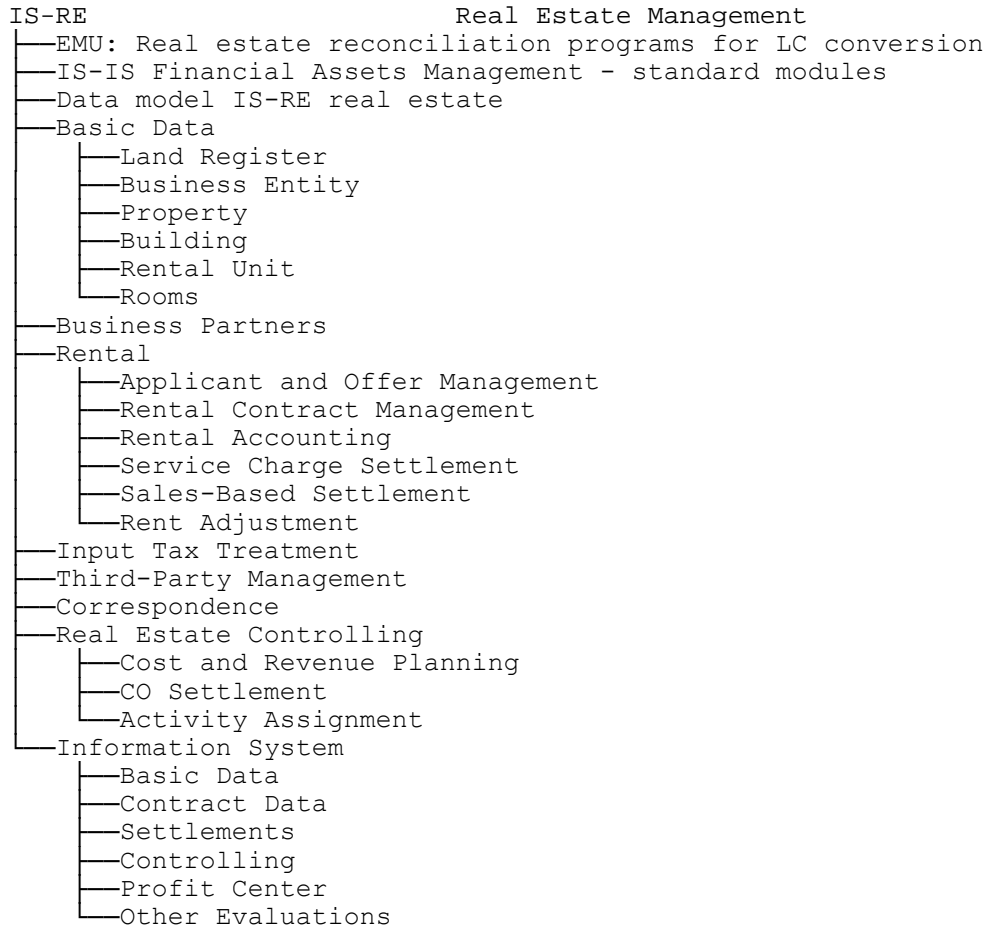


- └─ Periodic Project Closing
  - └─ Periodic Transfer
  - └─ Overhead
  - └─ Interest Calculation
  - └─ Project Settlement
  - └─ Asset Valuation
- └─ Information System
  - └─ IM information system summarization
  - └─ Appropriation Requests
  - └─ Investment Programs
  - └─ Investment Program Summarization
  - └─ Project Costs
  - └─ Investment Orders
  - └─ Capitalized Assets

## EC Enterprise Controlling



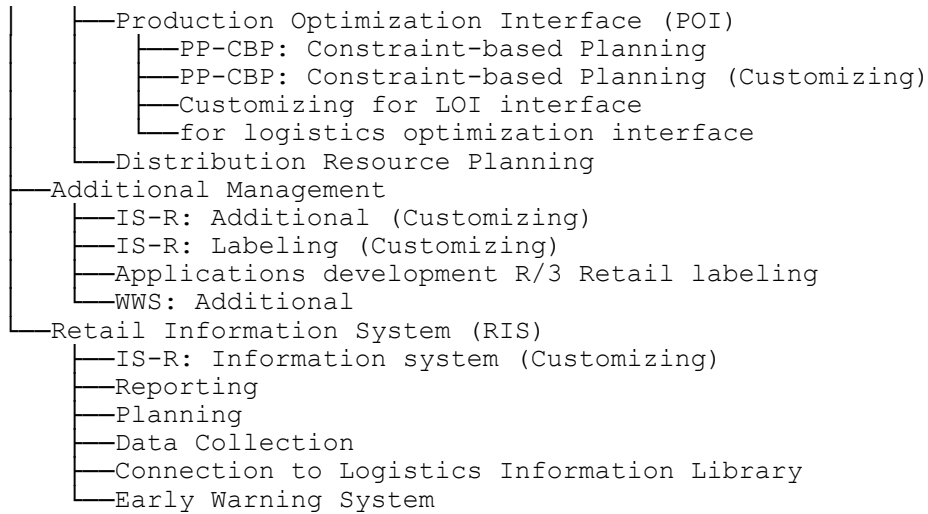




## LO Logistics - General

- Process model objects LO
- Process model objects retail
- Service Management Structures
- Integration of HR personnel system in Logistics
- DDS: Document distribution system
- Correction programs with delivery (RL)
- IS OIL: Standard objects
- IS-Oil BDRP Bulk Distribution Requirement Planning
- IS-R: Master data distribution
- Trading contract
- IS-R: Online Store Workbench (Customizing)
- IS-R: Online Store Workbench
- Logistics Basic Data
  - Terminology and Glossary: Translation in LO-MD
  - Stock determination
  - IS-R: General customizing
  - ISR: Online Store (Customizing)
  - IS-R: Master data distribution (Customizing)
  - EMU conversions in retail
  - Plant Master
    - IS-R: Site
    - IS-R: Store master
  - Material Groups
    - ISR: Fashion Management, Generic Materials
    - IS-R merchandise categories
  - Material Master
    - Data transfer R/3 material master as of 3.0
    - Objects for de-coupling HR - LO-MD-MM
    - IS-R: Integrated article maintenance
  - Assortment
    - Assortment Maintenance
      - IS-R: Assortments
    - Assortment List
  - Business Partners
    - Customer Master
    - Vendor Master
  - Bills of Material
    - Sales Order BOM
  - Serial Numbers
  - Product Catalog
    - Cross-application objects retail
    - Advertising medium: BAPI & IAC prod.catalog
    - Advertising medium customizing
    - Product catalog and layout
  - Retail Pricing
    - IS-R: Sales pricing (Customizing)
    - IS-R: Sales pricing
  - Season
    - Season Processing
    - Markdown Planning
  - Promotion
    - IS-R: Promotions (Customizing)
- Product Data Management
  - PDM-specific ALE developments
  - General Functions
    - Repository Browser
      - Product structure browser
- Batches

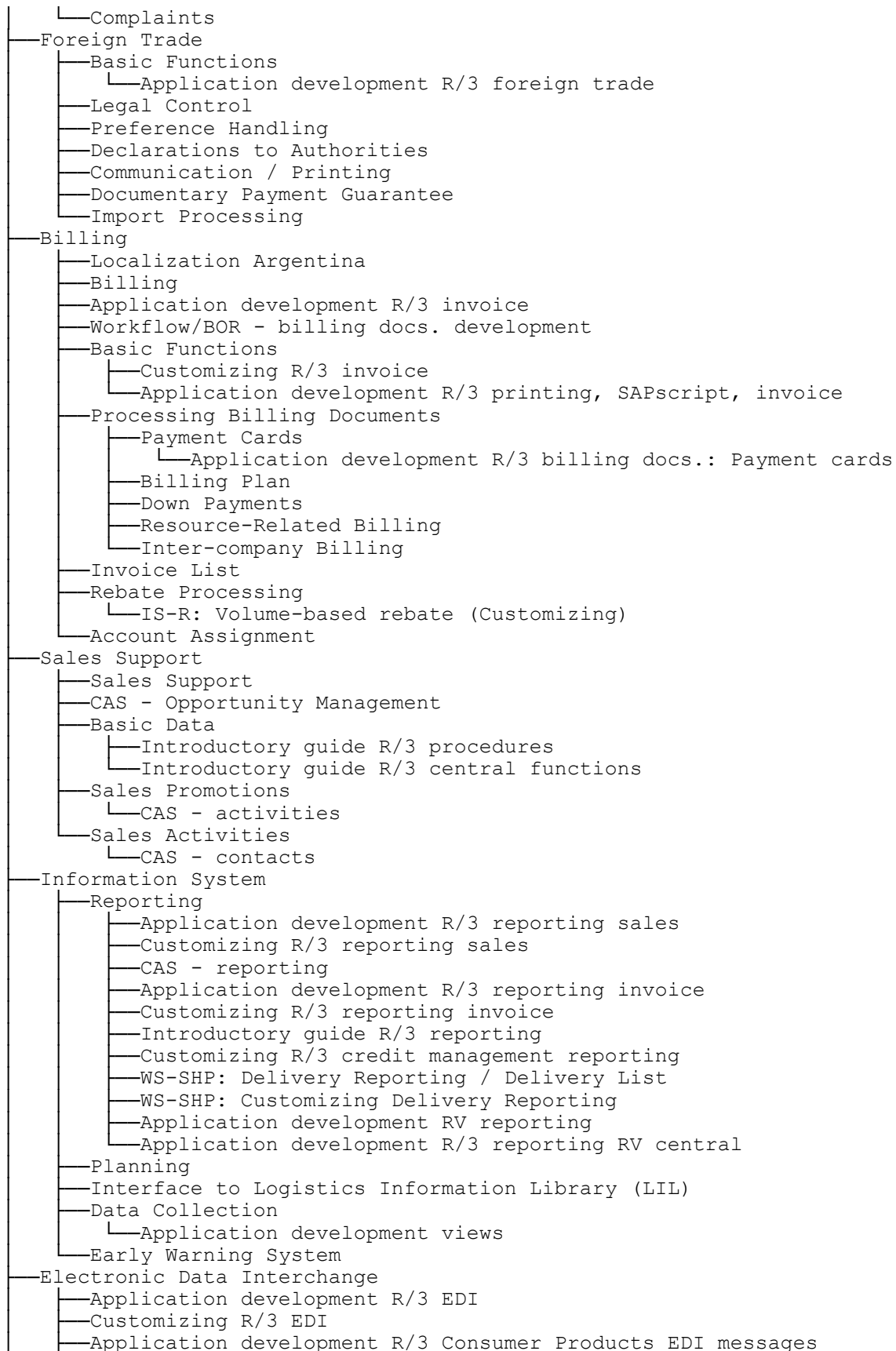
- Customizing R/3 batch determination
- BAPI Processing in Batch Management
- Batch management proportion/product units
- Batch Specification
- Batch Status Management
- Batch Determination
- Batch Where-Used List
- Active Ingredient Management
- Forecast
  - Forecast Models
  - Model Selection
  - Forecast Procedures
  - Model Monitoring
  - Reference Material in Forecast
- Variant Configuration
  - APIs, variant configuration and message log
  - Variant Configuration and Instance
  - Variant Configuration
  - Distribution of objects from variant configuration
  - Configurator BAPI
  - Object Dependencies
    - R/3 Customizing Variants / Configuration
    - Individual Dependency
    - Dependency Net
  - Configuration Profile
  - Variant Tables
  - Variant Functions
  - Simulation
  - Reporting
- Engineering Change Management
  - Engineering Change Management
  - F4 help for effectively search help generation
  - Change Master Management
    - R/3 Customizing: PPS Engineering Change Management
  - Linked Objects
  - Reporting
  - Change Documents
- Logistics Information System (LIS)
  - Customizing Logistics Information System
  - Logistics information system / SAP-BIW
  - Logistics information
  - LO-LIS-REP Reporting
    - Statistics update transport: Customizing
  - Planning
    - IS-R: Planning system (Customizing)
  - Data Collection
    - R/3 application development: Logistics Information Warehouse
    - Workflow-LIS connection
    - R/3 application development: objects generated for LIS
  - Logistics Information Library
  - Early Warning System
- Merchandise Distribution
  - ISR: Merchandise Distribution (Customizing)
  - ISR: Cross-Docking and Floor-Ready Merchandise
  - IS-R: Shipping/picking
  - Allocation
    - IS-R: Allocation table (Customizing)
  - Collective Purchase Order
  - Distribution Processing
- Supply Chain Planning Interfaces (SCPI)
  - IMG: Supply-chain planning interfaces



## SD Sales and Distribution

- Sales and Distribution
- Development Klass for NuSkin Objects
- Master Data
  - Introductory guide R/3 organization and environment
  - Application development R/3 SD master data: Payment cards
  - SAPforms: Example Scenarios in SD
  - Material Maintenance
    - Introductory guide R/3 master data
    - Customizing R/3 Sales and Distribution master data
    - Item Proposal
    - Material Listing / Exclusion
    - Material Determination
  - Conditions
  - Agreements
    - Customer-Material Information
    - Rebate Agreements
    - Promotions / Sales Deals
- Basic Functions
  - Basic Functions
  - SD: for future deletion of marked objects !
  - Maintenance Functions for Schedules
  - Time segment
  - SD: Workflow components
  - Free Goods
  - Pricing and Conditions
  - Availability Check
    - ATP information and simulation for Internet
  - Credit Management
    - Customizing R/3 credit management
  - Material Determination
  - Output Determination
    - Introductory guide R/3 messages
    - Customizing R/3 output control
    - SD Output Determination Wizard
  - Word Processing
  - Taxes
    - Tax per document
    - Handle accumulated taxes across different items and levels.
  - Account Determination
    - SD Account Determination Wizard
    - Customizing R/3 SD central functions
- Sales
  - Sales
  - Sales and distribution organizational data
  - IS-R: Credit card management (Customizing)
  - Basic Functions
    - Customizing R/3 sales
    - Application development R/3 printing, SAPscript sales
    - ALE development in sales and distribution
    - Internet/Intranet - development in sales
  - Customer Inquiries / Quotations
  - Outline Agreements (Customer)
    - Application development R/3 outline agreement
    - Customer Contracts
    - Customer Scheduling Agreement
    - Service Contracts
  - Sales Orders
    - IS-R: Sales order (Customizing)

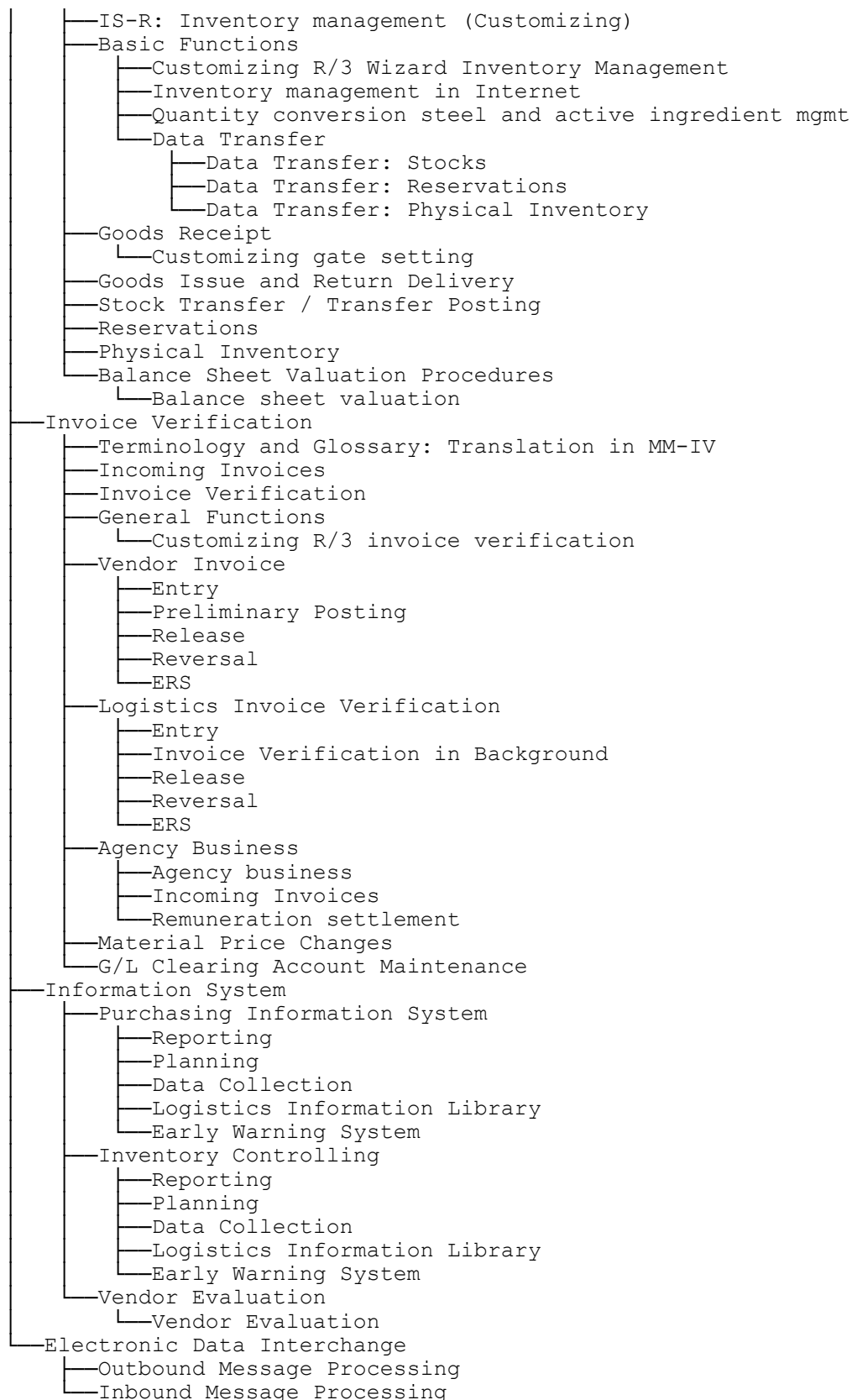




- Outbound Message Processing
- Inbound Message Processing
- POS Interface
  - Application development R/3 Sales
  - IS-R: SMMS interface (Customizing)
  - IS-R: POS interface (Customizing)
  - IDoc and segment definition
  - IS-R: SMMS interface
  - IS-R: POS interface
  - POS Interface - Inbound
  - POS Interface - Outbound

## MM Materials Management

- Materials Management
- Base data Materials Management
- Consumption-Based Planning
  - Development Material Requirements Planning
  - IS-R: Stock planning (Customizing)
  - ISR: VMI (Customizing)
  - Retail: Replenishment
  - VMI Functionality from a retailer view
  - Consumption-Based Planning (see also PP-MRP)
    - Application development R/3 Stock planning
  - Processing Planned Orders (see PP-MRP)
- Purchasing
  - Terminology and glossary: translation in MM-PUR
  - Purchasing
  - Purchasing
  - IS-R: Customizing purchasing
  - Retail development for fruit and vegetables
  - IS-R: Organizational units
  - Basic Functions
    - Customizing R/3 Purchasing
    - Internet/Intranet developments in purchasing
    - Intra-European Import and Export
    - Taxes
    - Confirmation Control/Shipping Notification
    - Release (Approval)
      - Release of RFQ/Quotation
      - Release of Requisitions
      - Release of Outline Agreements
      - Release of Purchase Orders
    - Message Determination
  - Vendor-Material Relationships and Conditions
    - Subsequent Settlement
    - IS-R: Conditions (Customizing)
    - Info Record
    - Subsequent Settlement
    - Conditions
  - Sources of Supply
    - Quota Arrangement
    - Source List
  - RFQ/Quotation
  - Outline Purchase Agreements with Vendors
    - Contract
    - Scheduling Agreement
  - Purchase Requisitions
  - Purchase Orders
    - Document index processing
    - Retail - Load Building
- External Services Management
  - Service master
  - R/3 services management
  - Basic Functions
  - Master Data
  - Service Entry
- Inventory Management
  - Terminology and Glossary: Translation in MM-IM
  - Customizing R/3 inventory management
  - Inventory Management
  - IS-R: Inventory Management

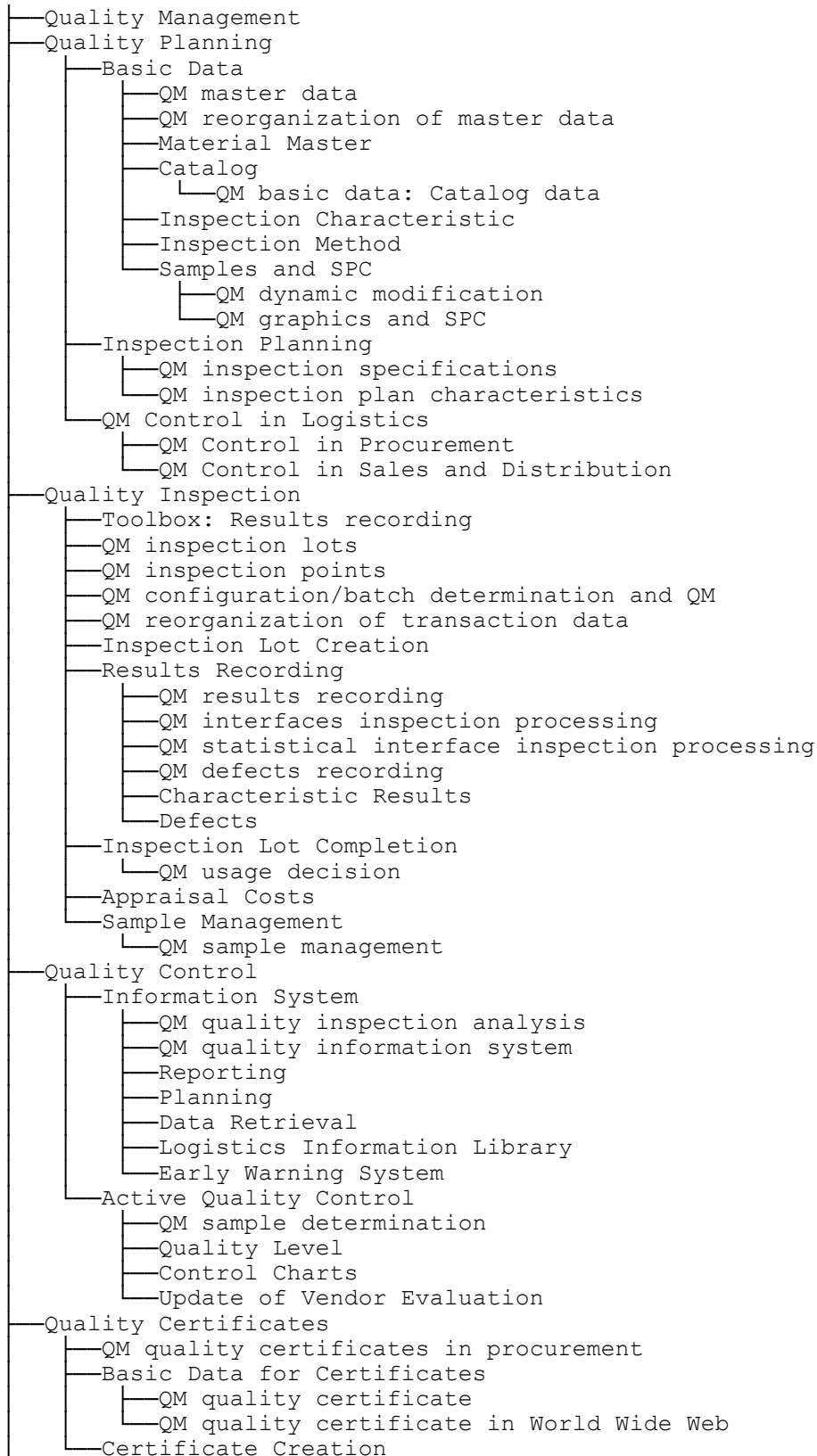


## LE Logistics Execution

- Logistics Execution: Implementation Guide
- WS-SHP: Changes to Deliveries
- Decentralized WMS integration
  - Central Processing
  - Local Operations
- Warehouse Management
  - Mobile Computing in warehouse logistics
  - Application development Warehouse Management (WM)
  - Warehouse Management
  - IS-R: Warehouse management (Customizing)
  - Master Data
  - Planning and Monitoring
  - Stock movements
  - Inventory at the Storage Bin Level
  - Storage Unit Management
  - Interfaces
  - R/2-R/3 Link
    - Decentralized WM system
  - Other Functions
    - Warehouse Management (WM) Customizing
    - Retail: Gate settings
- Shipping
  - Shipping
  - Lists in shipping
  - WS-SHP: General Processing for Shipping
  - WS-SHP: Business Objects Shipping
  - Technical Documentation Shipping
  - Function Analysis
  - Basic Functions
    - S&D Hazardous Mats. and Substances (Environment, Health & Safety)
    - WS-SHP: Customizing Shipping
    - WS-SHP: Print, SAPscript
    - Application development R/3 SD decentralized shipping
    - Customizing R/3 SD decentralized shipping
  - Delivery Processing
    - Batch Processing
    - Database Accesses Delivery Processing
    - Dialog Processing Inbound Delivery/Outbound Delivery/Posting Change
    - Pricing / Conditions in the Delivery
    - Quantity Correlation Bill of Materials Delivery Groups
    - Message Handling
    - Partner Processing in the Delivery
    - Route Schedule
    - Processing Description Text
    - In-complete Log Delivery
    - Availability Check
  - Picking
    - IS-R: Shipping/picking (Customizing)
  - Packing
    - Packing / Handling Units
    - Customizing Packing / Handling Units
  - Goods Issue
    - WS-SHP: Goods Movements
  - R/2-R/3 Link
    - BAPIs for Decentralized Warehouse Processing
- Transportation
  - Application Development R/3 Transportation Inform. System
  - SD R/3 transport processing

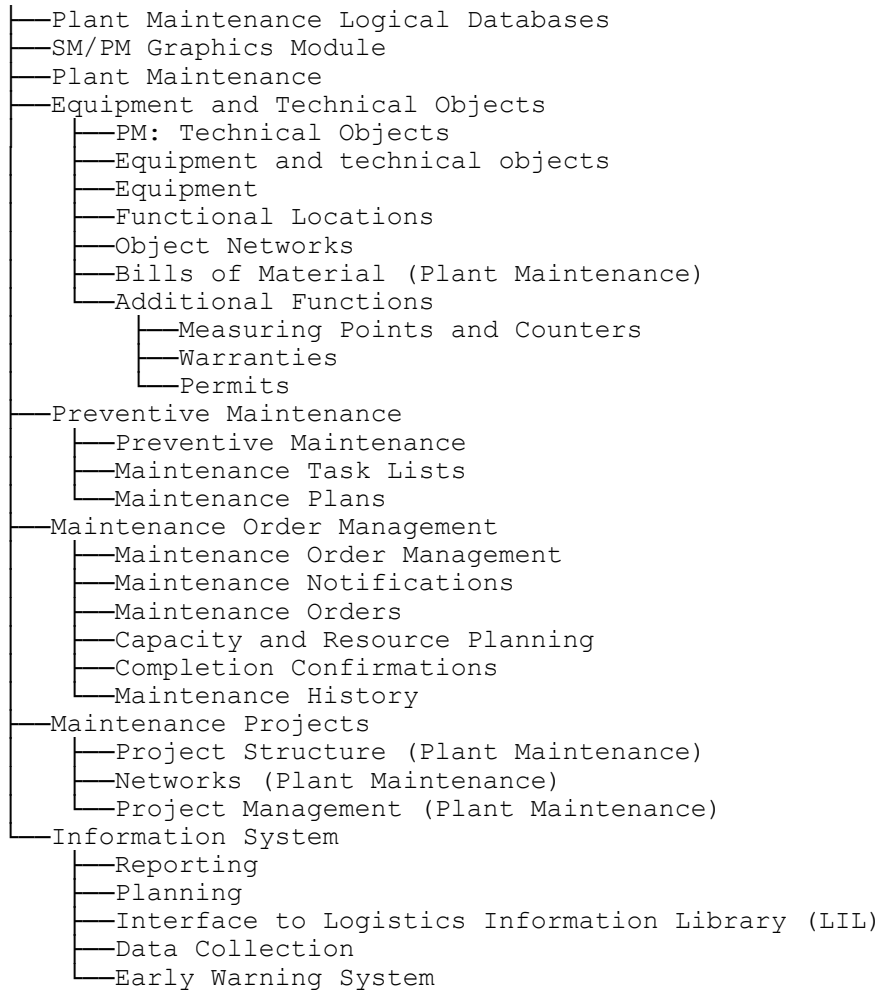
- Transport: Business objects
- SD R/3 customizing transport processing
- Freight charges and classes
- Interfaces to external transport systems
- Shipping communication (delivery/transport)
- Transportation Planning and Processing
- Freight Processing
  - Scales
  - VOFM Routines for Calculator
  - Shipment costs
- Interfaces

## QM Quality Management

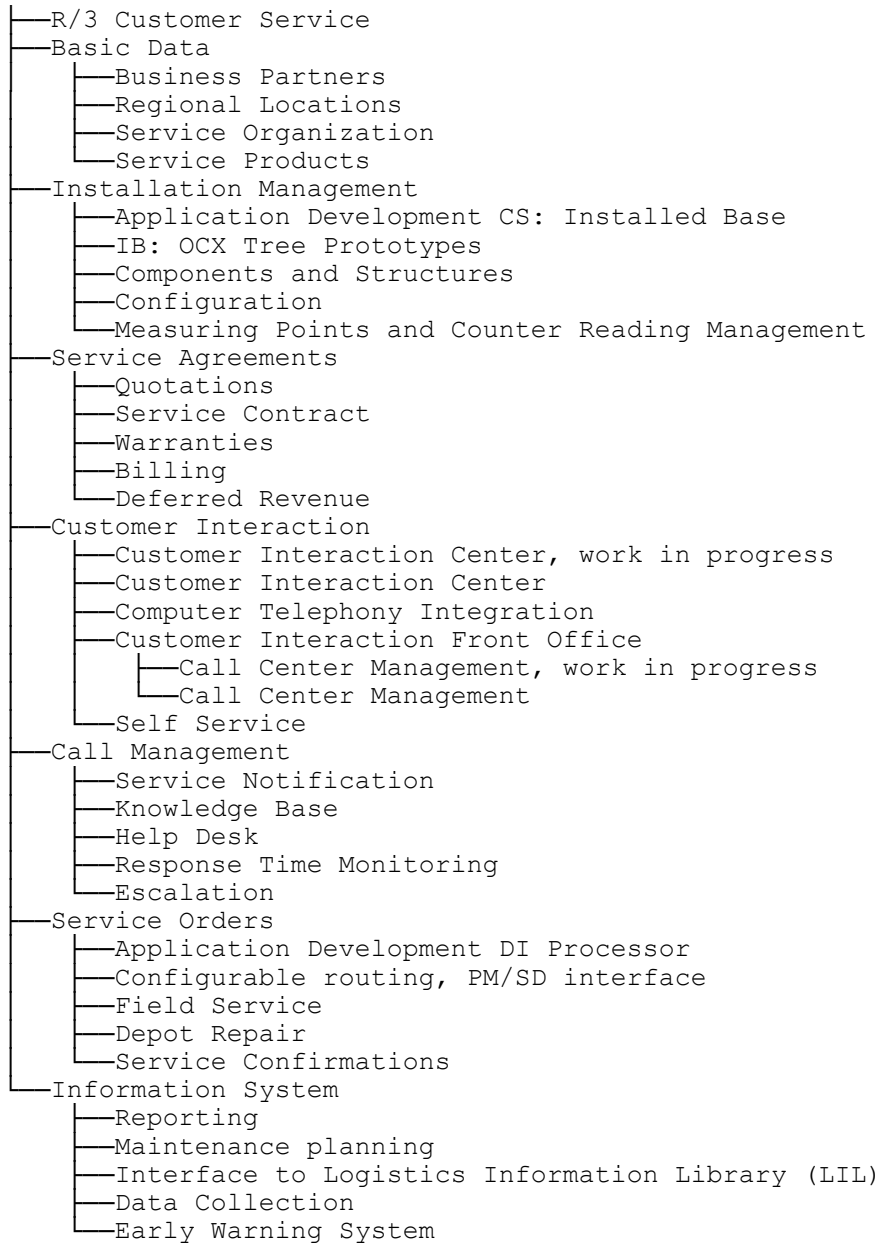


- Quality Notifications
  - QM quality information system (Q messages and errors)
  - QM quality notification
  - Creating Quality Notifications
  - Processing Quality Notifications
  - Nonconformity Costs
- Test Equipment Management
  - Master Data
  - Calibration Planning
  - Calibration Inspection



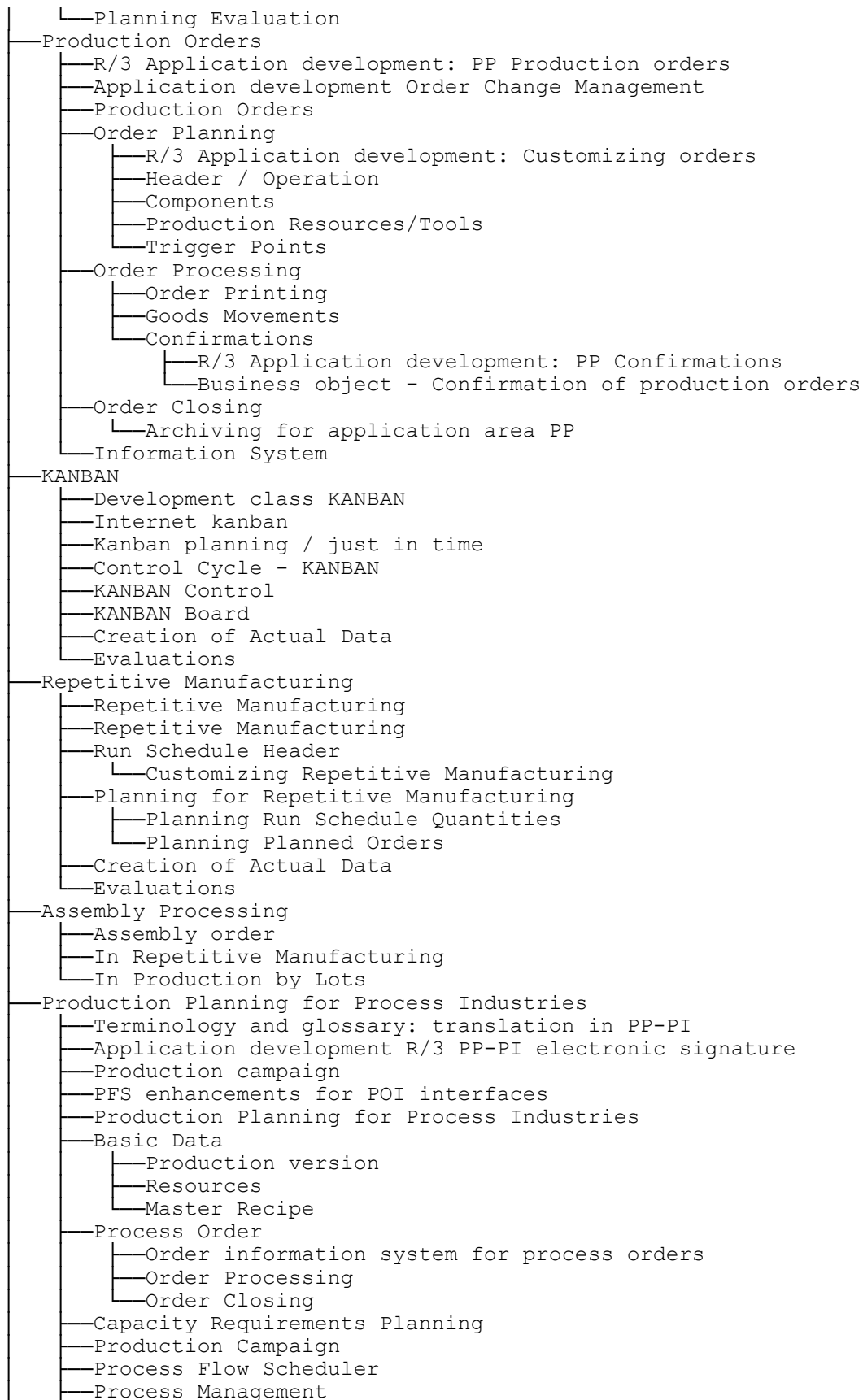
**PM Plant Maintenance**

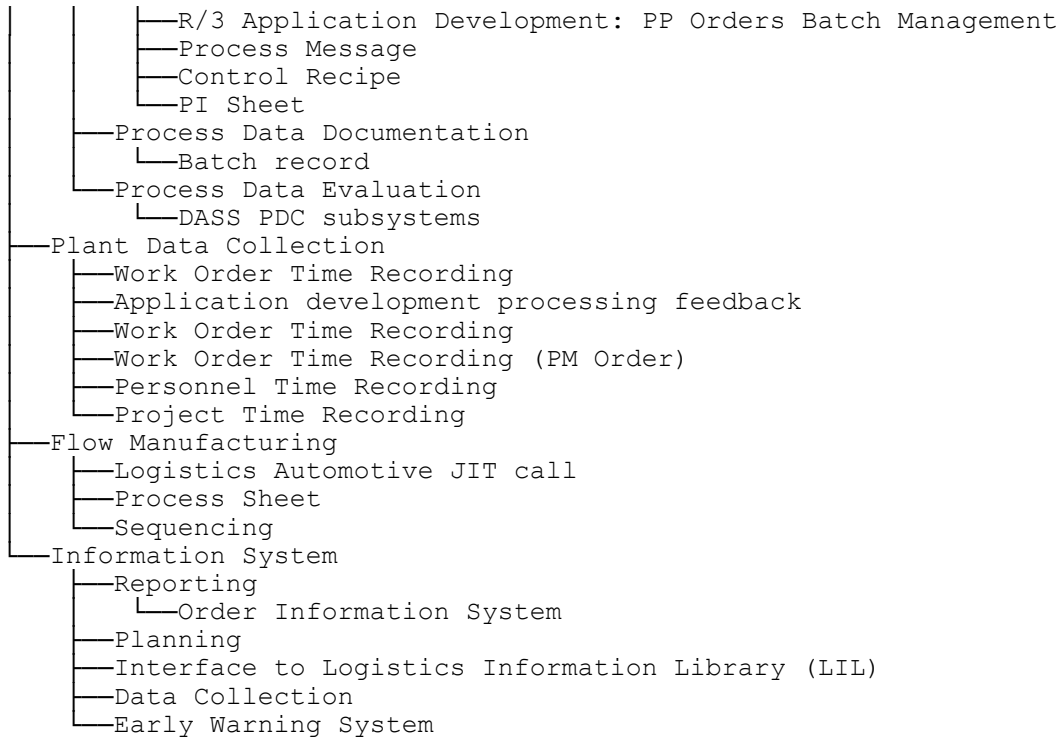
## CS Customer Service



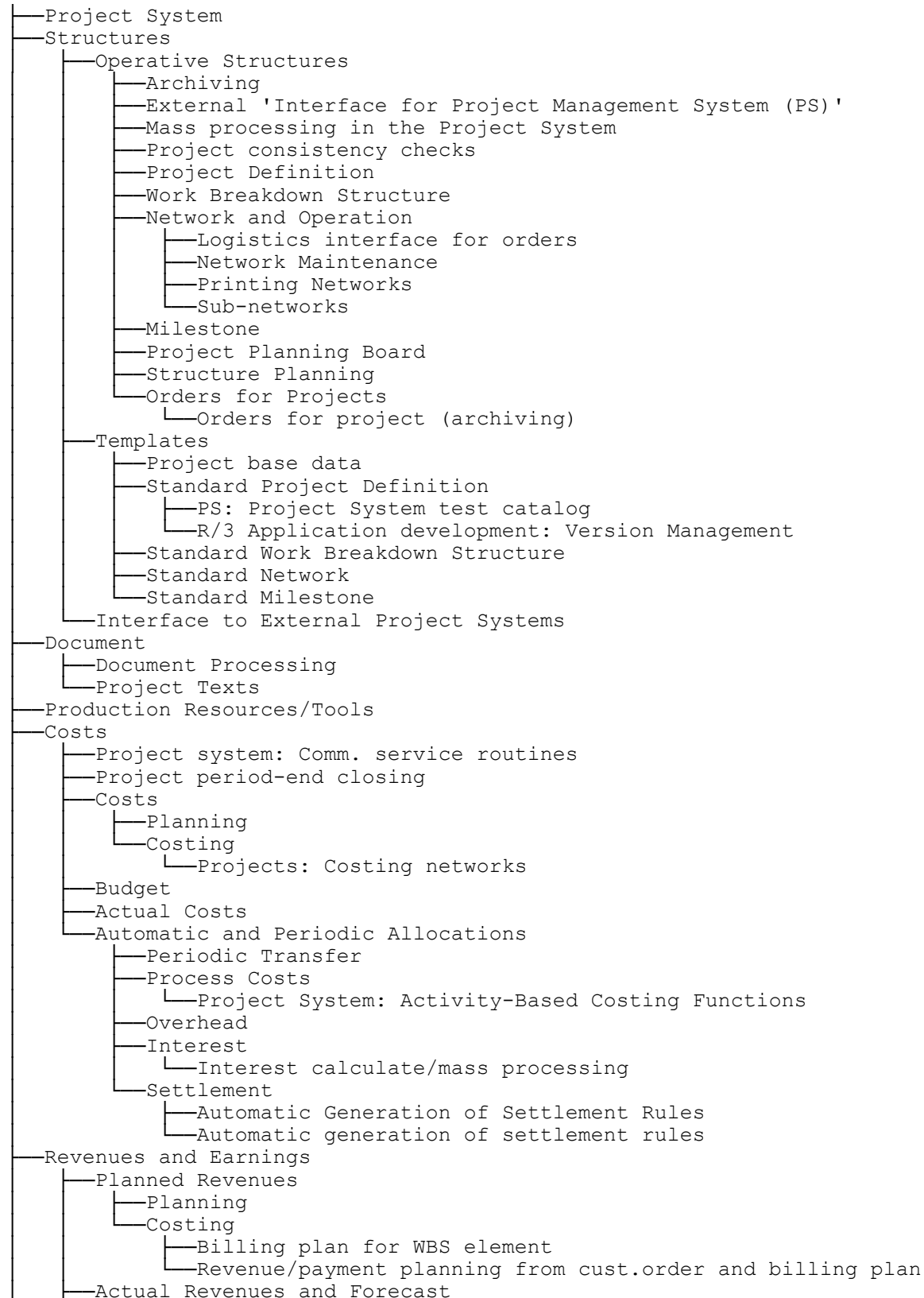
## PP **Production Planning and Control**

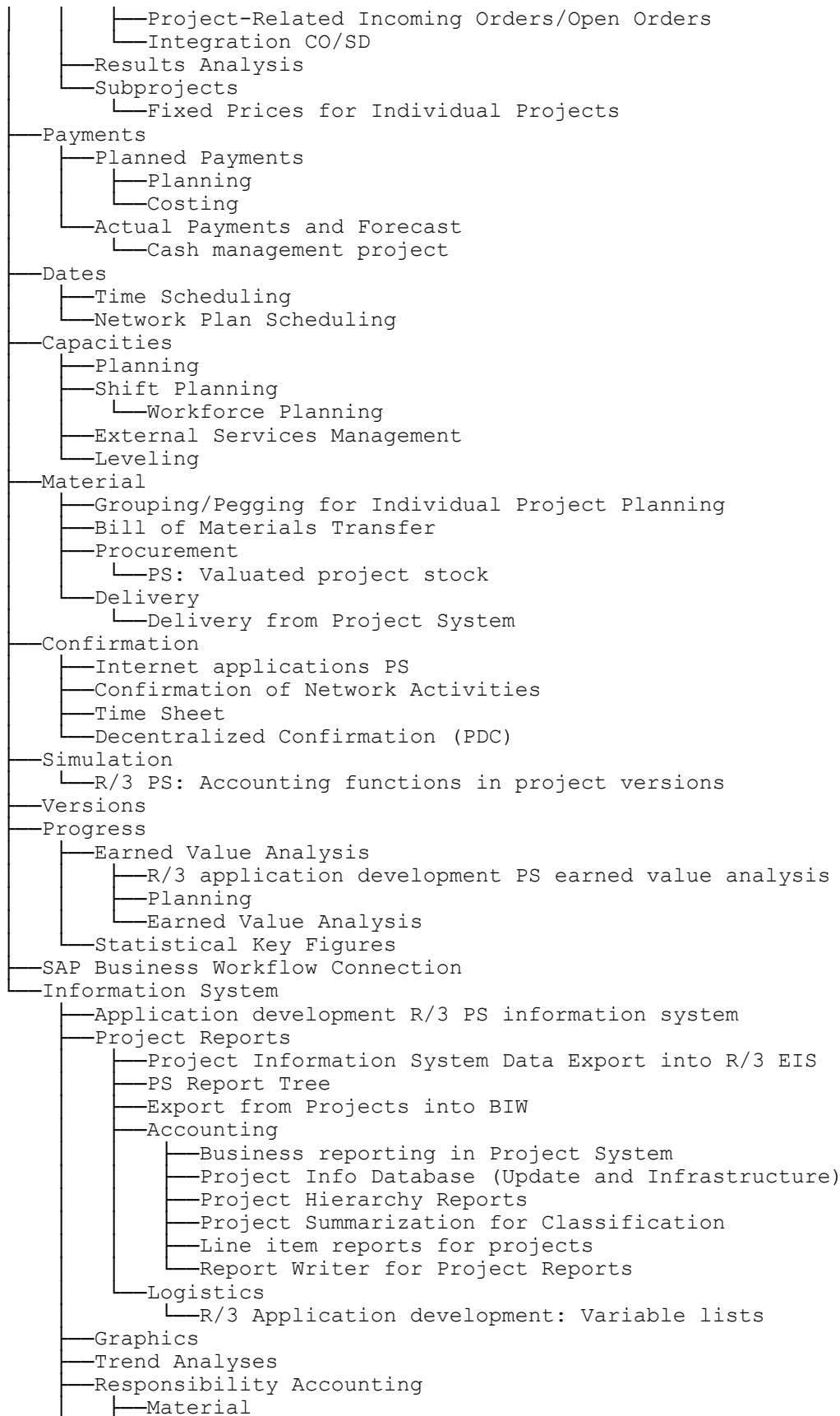
- General objects from C classes
- Semiconductor Planning - Dynamical objects
- Logistics Automotive Line Design
- PP Archiving
- Production Planning and Control
- Basic Data
  - Production Basic Data
  - Bills of Material (See LO-MD-BOM)
  - Work Center
  - Routing
  - Computer Aided Process Planning
  - Production Resources/Tools
- Sales and Operations Planning
  - Sales and production rough-cut planning
  - Basic Data
  - Sales Plan
    - Sales & Operations Planning: Customizing
  - Production Plan
  - Distribution Requirements Planning
    - Distribution Resource Planning
- Master Planning
  - Process Flow Scheduler - Embedding
  - Production planning
  - Material Forecast
  - Demand Management
    - Application development R/3 purchasing
  - Master Production Scheduling
  - Long Term Planning (Simulation)
- Capacity Requirements Planning
  - Capacity requirements planning
  - Scheduling
    - R/3 Application development: R/3 Scheduling
    - Customizing scheduling
  - Capacity Loads
  - Capacity Evaluations
    - R/3 Application development: Capacity Planning
  - Capacity Leveling
    - CIM integration: HR link (PDC)
    - CIM integration: Customizing
    - CIM integration: Capisce Link to Business
    - CIM integration: SFC level interface optimization
    - CIM integration: Global interface optimization
    - CIM integration: SOP level interface optimization
    - CIM integration: WM link (PDC)
    - CIM integration: Capisce XXL link
    - Customizing Capacity Planning
    - Customizing Resource Planning
    - Customizing planning table
    - Manpower planning
- Material Requirements Planning
  - Production lot planning
  - Material Requirements Planning
  - Basic Data
    - Customizing R/3 requirements planning
    - Customizing R/3 independent requirements management
  - Planning Execution
    - Materials Planning
  - Procurement Proposal

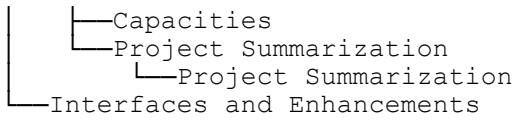




## PS Project System







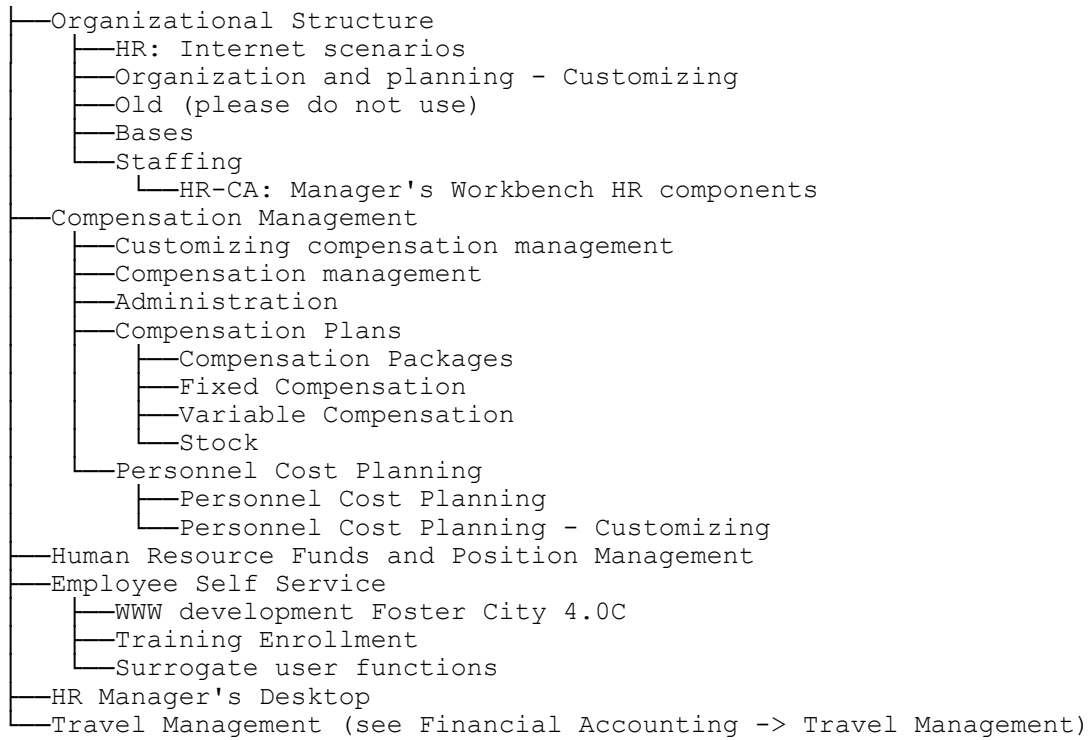


## **EHS Environment Management**

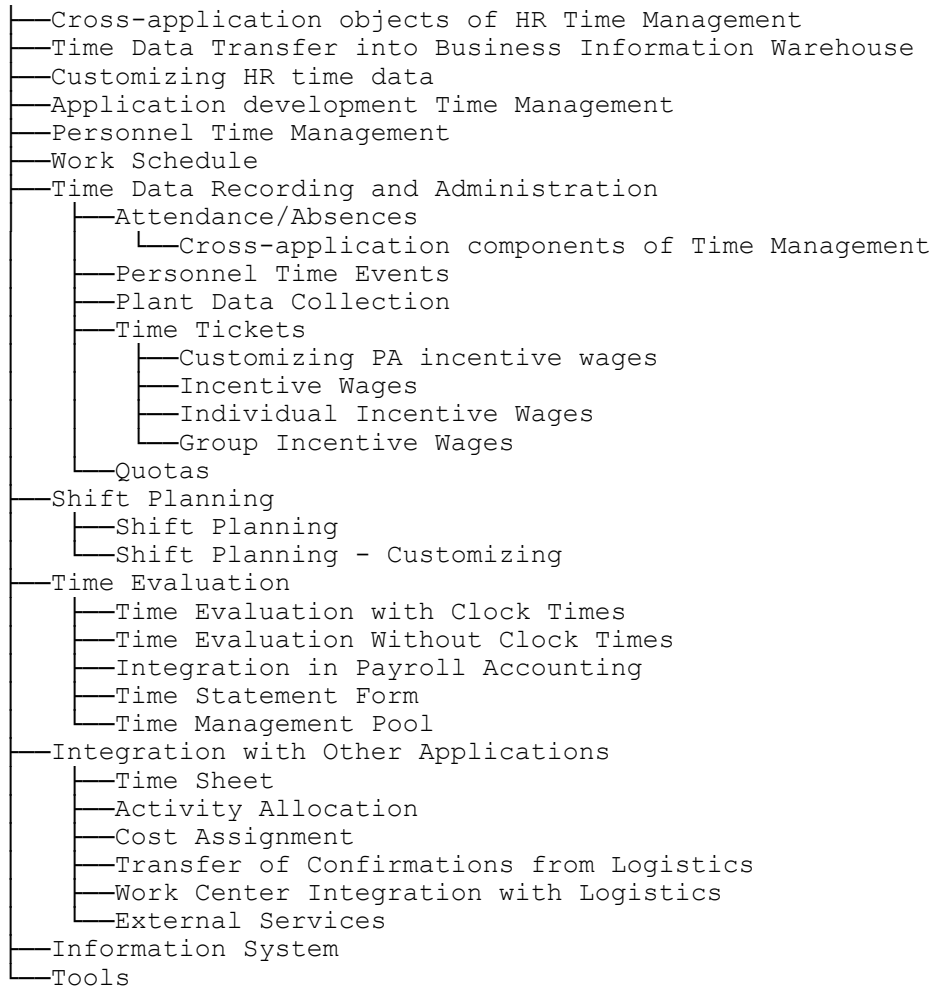
- EHS-H : occupational health
- Application Components EH (HR)
- Product Safety
  - Company environment information system
  - Substance Management
  - Report Management
  - Phrase Management
  - Reporting: Start Generation
  - Report Shipment
  - Substance Information System
  - Interfaces
- Dangerous Goods Management
  - PI-EH&S Dangerous goods management
  - EH&S Component: Dangerous Goods Management
  - Dangerous Goods Basic Data
  - DG Interfaces
  - Dangerous Goods Master
  - DG Checks
  - DG Papers
- Occupational Health
  - Master Data
  - Time Scheduling
  - Medical Service
  - Reporting

## PA Personnel Management

- HRMS Private Sector: Retail Staffing Management
- Application components PA
- Personnel Administration
- Personnel planning and development
- Recruitment
  - HR customizing for applicant administration
  - HR applicant administration
  - Recruitment
  - Workforce Requirements and Advertising
  - Applicant Administration
    - HR: Integration with Resumix
  - Applicant Selection
- Personnel Administration
  - Singapore: Provisional P30 standard objects
  - PA: Archiving
  - HR-HK: Master data
  - HR master data: India
  - Customizing HR master data
  - HR: for future deletion of noted objects!
  - Correction program
  - Personal Data
  - Payroll Data
  - Organizational Data
    - Bases
    - External Time Recording and Evaluation
    - Tools
- Benefits
  - Benefits - Customizing
  - Benefits
  - Benefits - Internet and BAPIs
  - Administration
  - Plans
    - Health
    - Insurance
    - Savings
    - Stock Purchase
    - Flexible Spending Accounts
    - Credit
    - Miscellaneous
  - COBRA
    - Initial Notification
    - Enrollment
- HR Information Systems
  - HR queries
  - Ad hoc query
  - ABAP Query: Human Resources
  - Customizing ABAP/4 Query: Human Resources
  - HR Transfer to BIW
- Personnel Development
  - HR development - Customizing
  - Appraisal Systems
  - Development Plans
  - Personnel Development
  - Qualifications and Requirements
  - Career and Succession Planning
    - External Training Administration
  - Development Plans
  - Appraisal Systems



## **PT Personnel Time Management**



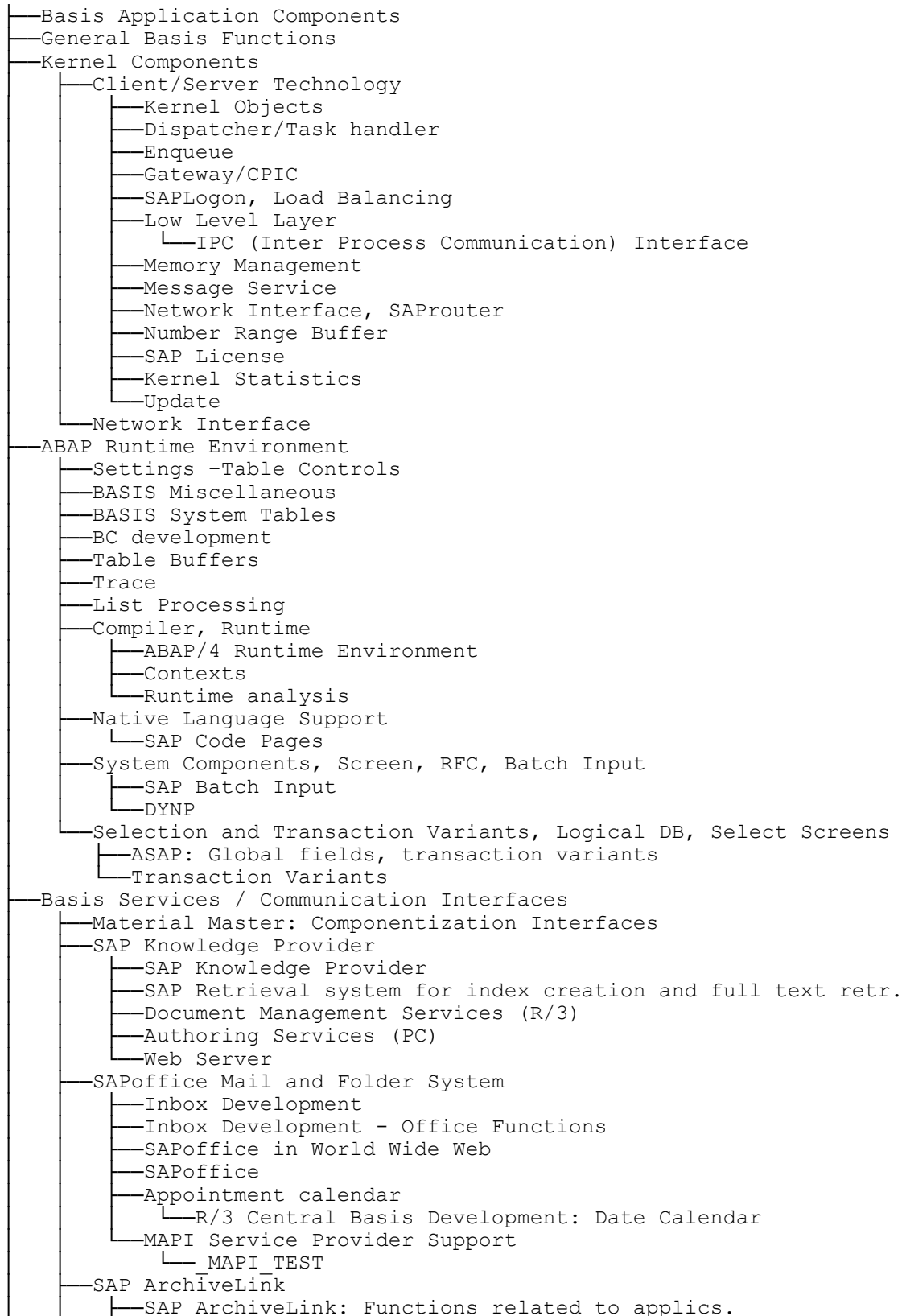
## **PY Payroll Accounting**

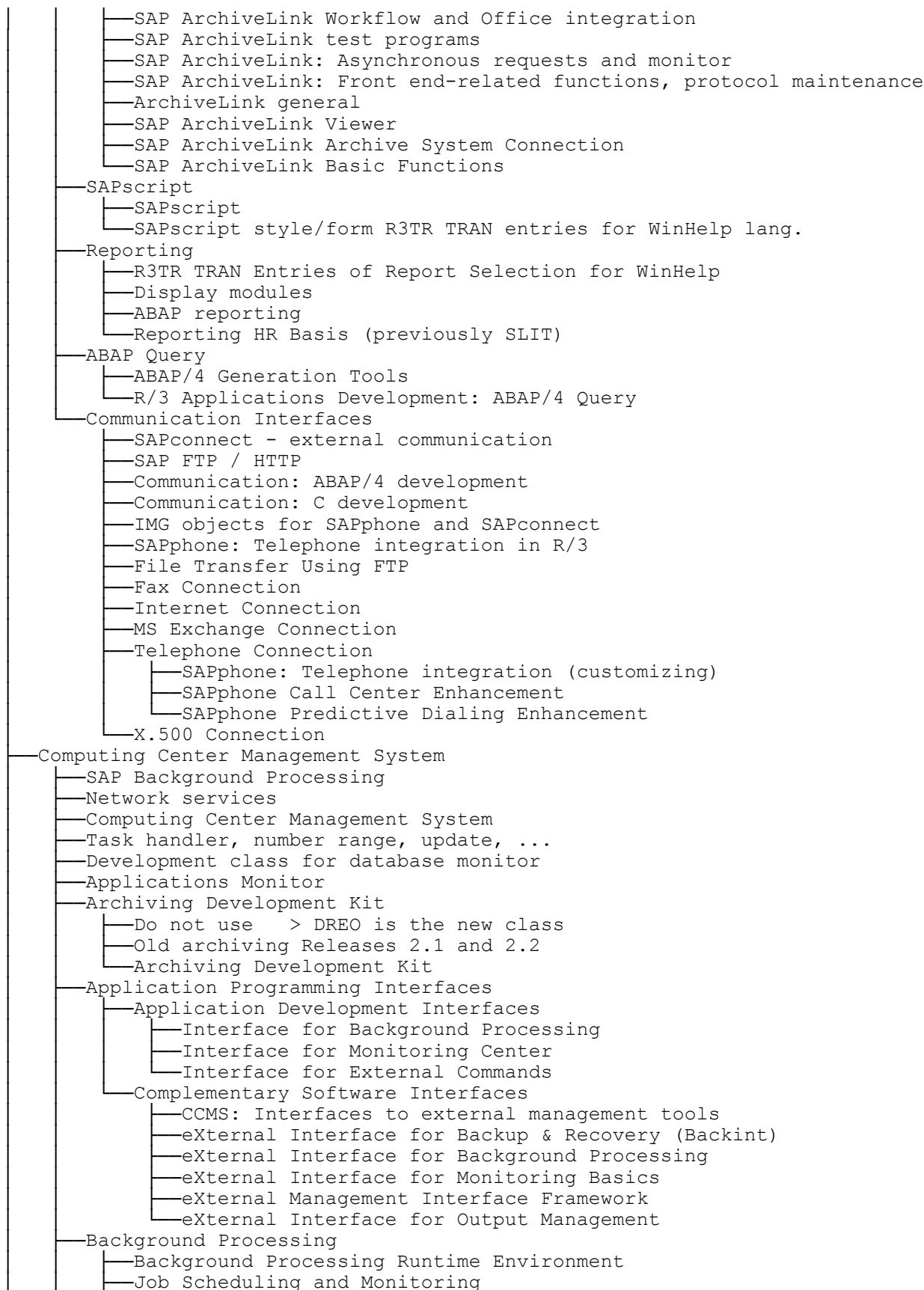
- HR customizing: India
- HR payroll accounting: India
- Application components IN
- Application components PD
- Correction program without delivery
- Application components PY
- Payroll Accounting
- Customizing HR
- HR master data
- HR accounting
- Gross
  - Bases
  - Integration with Time Management
  - Shift Change Compensation
  - Activity with Higher Rate of Pay
  - Employee Remuneration Information
  - Wage Type Valuation
    - Absences
    - Overtime
    - Time Bonuses
    - Hourly Wage
  - Factoring
  - Key Figures / Statistics for Cost Accounting
  - Special Payments
  - Family-Related Bonuses
- Net
  - Tax
  - Social Insurance
  - Additional Payments and Standard Wage Maintenance
  - Loans
- Deductions / Calculating the Bank Transfer Amount
- Subsequent Activities
  - Data Medium Exchange
  - Remuneration Statement
  - Payroll Account
  - Payroll Journal
  - Data Transfer to Other Applications
  - Cash Breakdown List
  - Cash Payment Processing
- Reporting
- Evaluations/Statistics
- General
  - HR: Garnishment - International components
  - Customizing HR accounting
  - Development of the R/3 HR payroll application
  - HR: Documentation System
  - Tools
  - Bases
    - Payroll accounting log
  - Forms
    - Evaluation utilities payroll accounting
  - Data Transfer
    - HR-PAY: Payment program/data medium exchange
    - PY: Posting transfer

## **PE Training and Event Management**

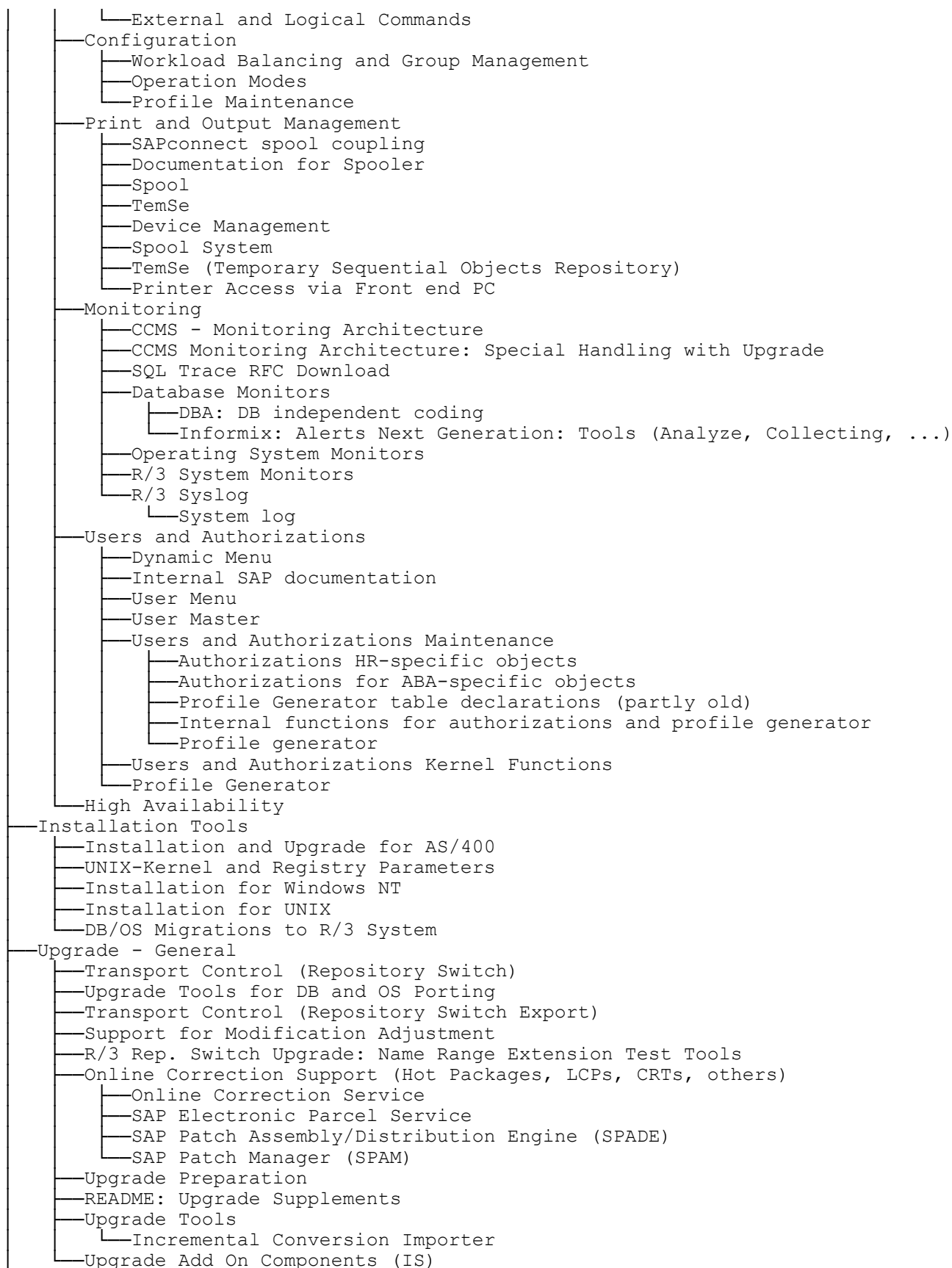
- Training and Event Management
- Training and Event Management - Customizing
- Application components PE
- Integration
  - Time Management
  - Materials Management
  - Budget Management
  - Billing and Cost Allocation
- Training and Event Preparation
  - Resource Management
- Business Event Catalog
- Day-to-day Activities
  - Correspondence
- Recurring Activities
- Information Menu
- Room Reservation Management
  - Room Reservations
  - Room Reservations Planning - Customizing

## BC Basis Components

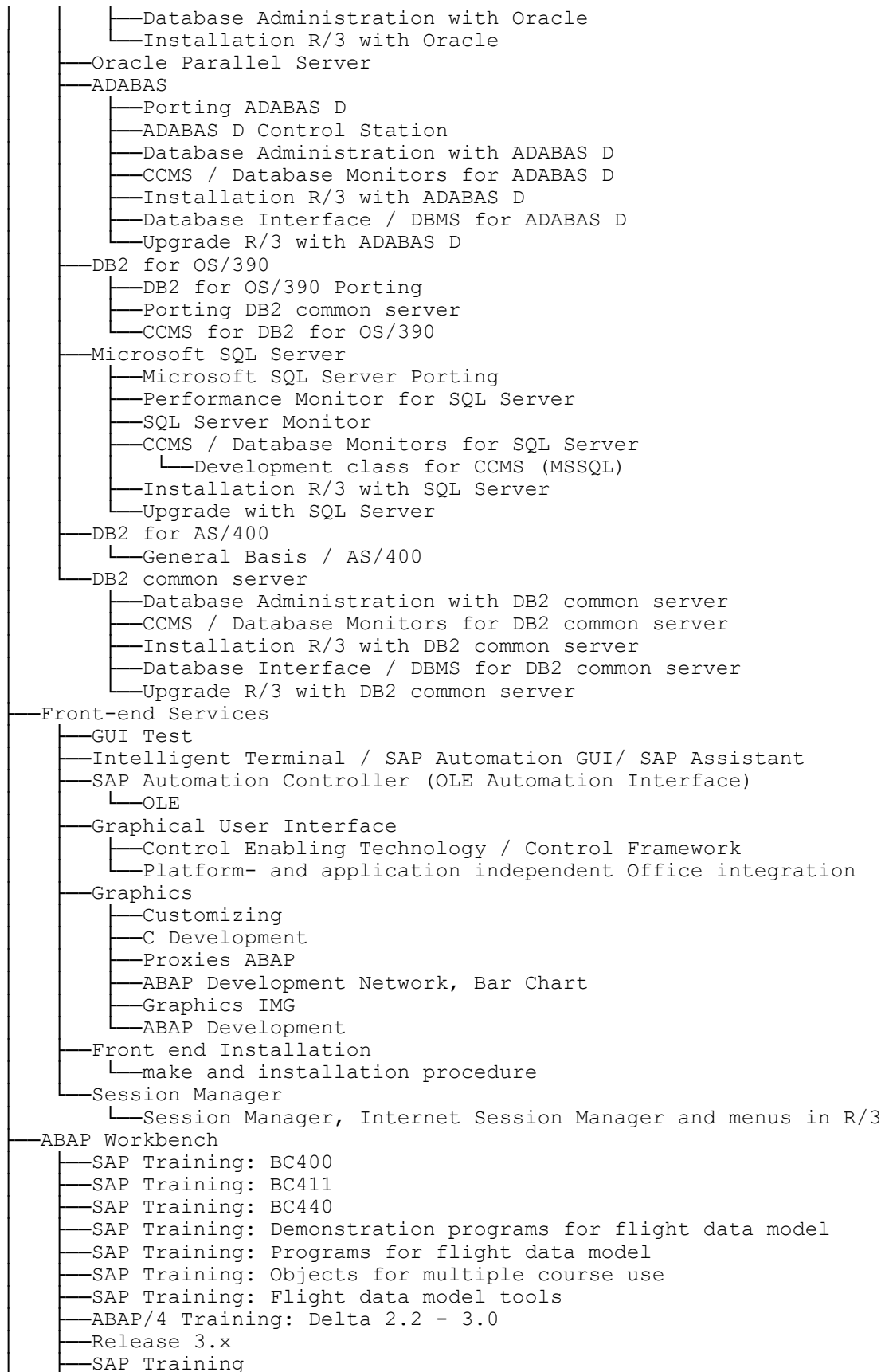




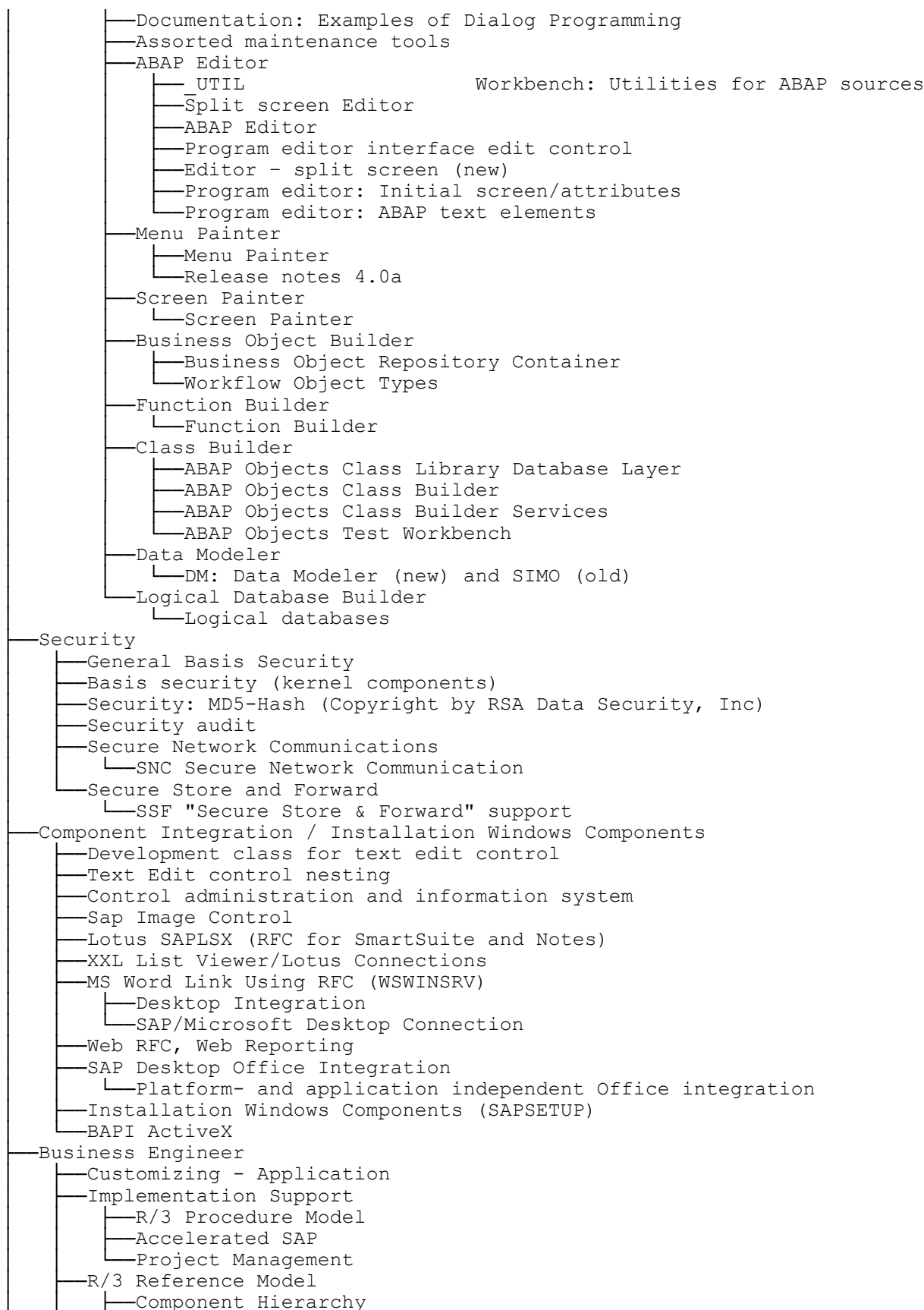


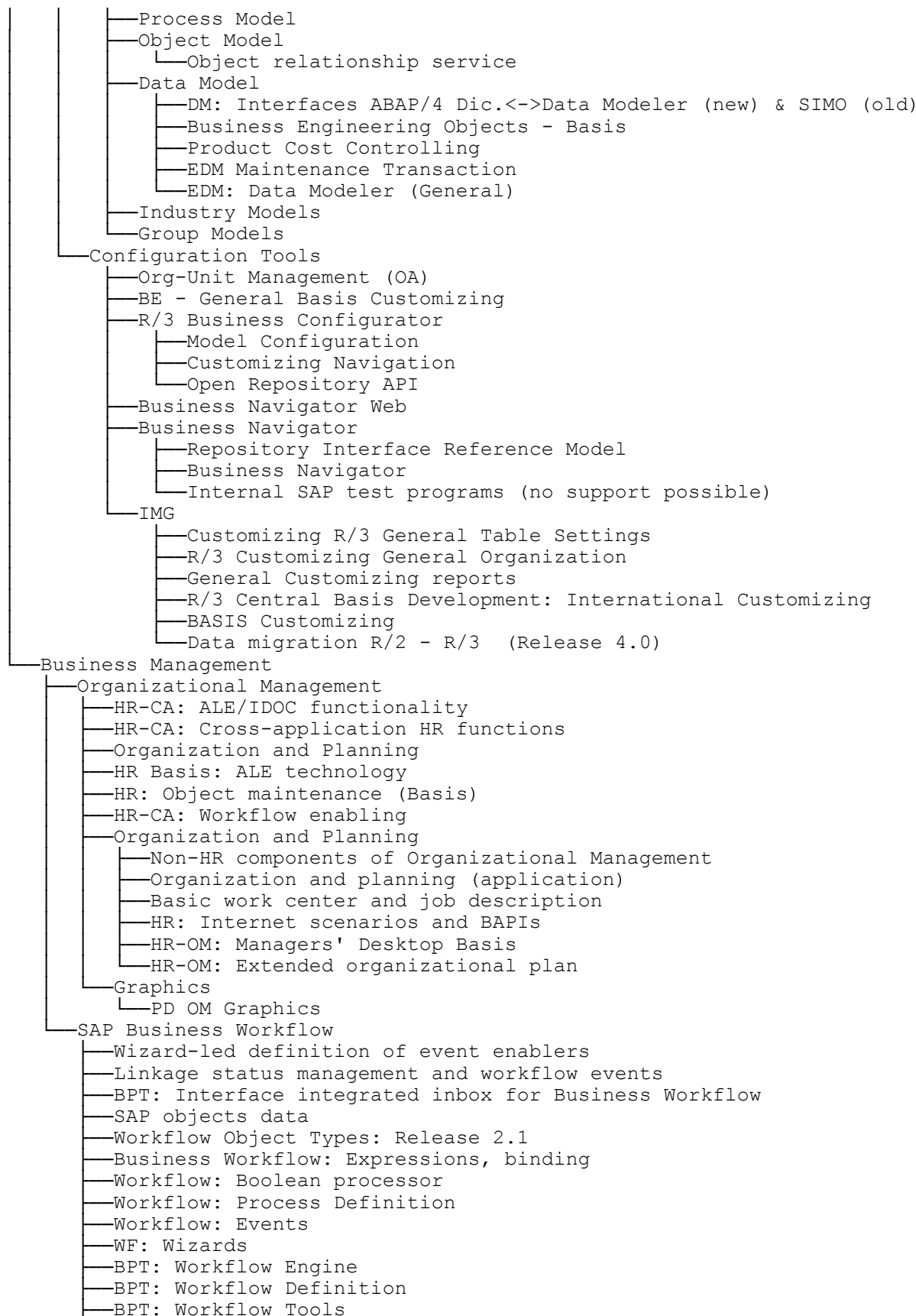


- Change & Transport System
  - Development Class for Generation Namespace /1SAP1/
  - Access to Global Tables
  - IDES/training/R/3 standby
  - Online Correction Service
  - Correction and Transport System: Example Data for BC325
  - Transport Control 1
  - Transport Tools
  - Workbench / Customizing Organizer
    - CTS: Central Functions (Including Authorizations)
    - CTS: Object Directory & Development Classes
    - CTS: Log Interface
    - CTS: Namespaces and Naming Conventions
    - CTS: Object Editing (Including Transport Objects)
    - CTS: Request Editing
    - CTS: Transport Control & System Configuration
    - Objects from SL group marked for deletion
    - Environment Analyzer
    - Workbench Organizer and ABAP Transport Tools
    - Workbench Organizer Components
    - Generation Tools in Version Management
    - Basis Versions
    - Final assembly export and merge tools - not to be delivered
  - Language transport
  - Transport System Composite Notes
  - Transport Tools
    - Transport Services
  - Transport Management System
    - Transport Management System
    - Transport Information
  - Client Copy
    - Basis: Client Copy Control
    - Client Copy & Adjustment Tools
- Operating System Platforms
  - IBM AIX
  - IBM AS/400
  - HP-UX
  - Bull AIX
  - Digital UNIX
  - SUN Solaris
  - SNI SINIX, ReliantUNIX
  - Windows NT
  - Data General
  - Sequent Dynix/PTX
  - NCR, UNIX
- Database Interface, Database Platforms
  - DB-Independent Database Interface
    - Trace for SQL, Enqueue, RFC, Memory
  - Informix
    - Informix Porting
    - Informix Database Monitor
    - Database Administration with Informix
    - CCMS / Database Monitors for Informix
    - Installation R/3 with Informix
    - Database Interface / DBMS for Informix
    - Upgrade R/3 with Informix
  - Oracle
    - ORACLE Database Monitor
    - CCMS / Database Monitors for Oracle
      - DBA: Oracle-specific Components
      - General Oracle functions for all development projects



- ABAP Workbench delta course 3.X -> 4.0
- Test objects in deliverable development classes
- Menu storage in general hierarchy tool
- Test procedures DWB
- Customizing Tools
  - Central R/3 Customizing: International Customizing
  - Entity copy
  - Customizing profiles
  - R/3 Customizing Tools 4.0
  - R/3 Customizing Tools
  - Customizing tools from Release 4.0
  - Customizing Import
  - Table Maintenance Editor
    - Basis View Maintenance
  - Change Log for Customer Changes
  - Hierarchy Maintenance
    - Hierarchy maintenance. tool - R/3 display component
    - Hierarchy maintenance. tool - DB-independent tool
    - Hierarchy maintenance tool - structure for IMG etc.
    - General hierarchy maintenance: Archiving / change documents
    - General hierarchy maintenance tool
- ABAP Dictionary
  - Activation Program, Conversion Program, DB Utility, MC, SPDD
  - Dictionary Maintenance
    - DDIC Editor
- Utilities
  - SAPscript training
  - Example Objects for the ABAP/4 Manual
  - Application packets
  - ABAP/4 Development Workbench
  - Metrics
  - Tools for program analysis
  - Logging of Text Changes for Workbench Objects
  - ABAP/4 Development Workbench Tools
  - Controls
  - General list modules
  - Dialog Design
  - Hierarchy framework
  - Object dependencies
  - Ergonomics: Example Transaction, Check Reports etc.
  - Tables, structures, etc. for Reuse Library
  - Reuse Library
  - Object Reuse: Not delivered to customers
  - Standard Modules for Formatting Lists
  - Modeling and Prototyping
  - Metrics: Number of function calls
  - Table Maintenance
  - Class Browser
    - ABAP/4 Object Visualization
  - Repository Information system
    - Repository Information System
    - Repository Interfaces
  - Repository Browser
    - ABAP Workbench
    - Indexes for Navigation and Where-used List
    - Navigation Tools
  - Data Browser
- Customer Enhancements
  - Enhancement concept
  - Small editors
- Tools: Editors, Painters, Modelers





- SAP Business Workflow: Customizing
- Workflow: Temporary Development Class
- SAP Business Workflow: Demo objects and documentation
- BPT: Workflow Information System Development 3.0
- Business Workflow: Worklist client
- Workflow: Error Messages
- Workflow: Processor
- Business Workflow: WAPI interfaces
- Workflow: Workflow Trace Functions
- Business Workflow: Utility functions (dev.class independent)
- Business Workflow: Office Integration
- Desktop objects
- Workflow: Work items
- Business Workflow: Utilities
- BPT: Workflow: Work list
- SAP Business Workflow: Customizing