



SAP BASIS Introductory Training Program

Day 4 : Agenda

System Monitoring and troubleshooting

Break

Web Enablement and Communication in SAP

Lunch Break

AS JAVA Architecture and Processes

Break

AS JAVA Architecture and Processes

Exercise & Break Out Session



System Monitoring & Troubleshooting

Monitoring Background Jobs – SM37

- Monitoring background jobs is an essential part of performance monitoring
- The transaction SM37 can be used to check the status of jobs running in the system
- Background jobs are essentially programs that are run by background work processes
(“B” of DVEBMGS)
- Since the programs may process large volumes of data, background work processes are allocated a higher memory limit for usage of heap and shared memory
- Background work processes take up a higher percentage of CPU utilization, so care must be taken to run high volume background jobs during a quiet window, that is, a duration where dialog users are not active in the system
- Typically in customer environments, such jobs are run during late evening, night and in early part of the morning

Using SM37

The screenshot shows the SAP Simple Job Selection dialog box. It has a menu bar (Job, Edit, Goto, System, Help) and a toolbar. The title bar says "Simple Job Selection". Below the title bar are three tabs: "Execute", "Extended job selection", and "Information".

The "Execute" tab is active. It contains the following fields and options:

- Job name:** A text field containing an asterisk (*).
- User name:** A text field containing "119361". An arrow points from a blue box labeled "Find jobs by user ID" to this field.
- Job status:** A section with several checkboxes: ☐ Sched., ☒ Released, ☒ Ready, ☒ Active, ☒ Finished, and ☒ Canceled.
- Job start condition:** A section with two date pickers: "From" (20.03.2009) and "To" (20.03.2009). Below these are two time pickers. There is also a text field labeled "or after event:" with a dropdown arrow. An arrow points from a blue box labeled "Find jobs by the ABAP report name" to this field.
- Job step:** A section with a text field labeled "ABAP program name:".

At the bottom of the dialog box, there is a status bar showing "IDS (1) 800", "idesecc", "OVR", and a red bar icon.

Find jobs by user ID

Find jobs by the ABAP report name

Features of SM37

Job Overview

Job overview from: 01.03.2009 at: : :
to: 20.03.2009 at: : :
Selected job names: *
Selected user names: *

☐ Scheduled ☒ Released ☒ Ready ☒ Active ☒ Finished ☒ Canceled
☐ Event controlled Event ID:
☐ ABAP program Program name :






| Job | Ln | Job Created B | Status | Start date | Start time | Duration(sec.) |
|-------------------------------------|----|---------------|----------|------------|------------|----------------|
| <input type="checkbox"/> RAPOST2000 | | 227099 | Canceled | 16.03.2009 | 14:00:07 | 0 |
| <input type="checkbox"/> RAPOST2000 | | 227099 | Canceled | 16.03.2009 | 14:00:07 | 0 |
| <input type="checkbox"/> RAPOST2000 | | 227099 | Canceled | 18.03.2009 | 10:08:22 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Released | | | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:01:20 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:06:24 | 1 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:11:24 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:15:43 | 1 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:21:24 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:26:24 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:31:24 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:36:24 | 1 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:41:24 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:46:24 | 0 |
| <input type="checkbox"/> RDDNEWPP | | DDIC | Finished | 01.03.2009 | 00:51:24 | 1 |

IDS (1) 800 idesecc INS

Features of SM37

- The job log provides critical information from a troubleshooting perspective. In the case of cancelled jobs, the ABAP dump name is provided.

| Job | Ln | Job CreatedB | Status | Start date | Start time |
|--|----|--------------|-----------|------------|------------|
| <input type="checkbox"/> ZIDSDATA | | MAASSBERG | Cancelled | 17.03.2009 | 04:00:12 |
| <input type="checkbox"/> ZIDSDATA | | MAASSBERG | Cancelled | 18.03.2009 | 04:00:20 |
| <input type="checkbox"/> ZIDSDATA | | MAASSBERG | Cancelled | 19.03.2009 | 04:00:27 |
| <input checked="" type="checkbox"/> ZIDSDATA | | MAASSBERG | Cancelled | 20.03.2009 | 04:00:35 |

| Job Log Entries for ZIDSDATA / 04002704 | | | |
|---|----------|---|---------------|
|   Long text  Previous Page  Next page  | | | |
| Job log overview for job: ZIDSDATA / 04002704 | | | |
| Date | Time | Message text | Message class |
| 20.03.2009 | 04:00:35 | Job started | 00 |
| 20.03.2009 | 04:00:35 | Logon of user MAASSBERG in client 800 failed when starting a step | 00 |
| 20.03.2009 | 04:00:35 | Job cancelled | 00 |

ABAP Dumps Analysis using ST22

- ABAP Dumps provide detailed information on the nature of the program failure

ABAP Runtime Error

Parameters

Standard

Today

8 Runtime Errors

Yesterday

2 Runtime Errors

Own selection

Date

20.03.2009

to

Time

00:00:00

to

00:00:00

Host

to

Work Process Index

to

User

119361

to

Client

to

To be stored

to

Runtime Error

to

Program Name

to



Exception

to

Start

ABAP Dump Details

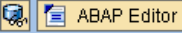
List of Selected Runtime Errors

Runtime Errors

| Current Date | Time | App.Server | User Name | Cli... | K | Name of runtime error |
|--------------|----------|----------------|-------------|--------|---|---------------------------|
| 19.03.2009 | 11:08:35 | idesecc_IDS_00 | 161259 | 800 | C | SYNTAX_ERROR |
| 19.03.2009 | 09:09:15 | idesecc_IDS_00 | BWALEREMOTE | 800 | C | DYNPRO_SEND_IN_BACKGROUND |

Runtime Error Long Text



- Runtime Error
 - System environment
 - System environment
 - User and Transaction
 - User view
 - What happened?
 - What can you do?
 - ABAP developer view
 - Short text
 - Error analysis
 - How to correct the error
 - Information on where to
 - Source Code Extract
 - Contents of system field
 - Chosen variables
 - Active Calls/Events
 - List of ABAP programs
 - BASIS developer view
 - Internal notes

Runtime Errors SYNTAX_ERROR

Date and Time 19.03.2009 11:08:35

Short text

Syntax error in program "SAPLJ1BR".

What happened?

Error in the ABAP Application Program

The current ABAP program "SAPLMR1M" had to be terminated because it has come across a statement that unfortunately cannot be executed.

The following syntax error occurred in program "SAPLJ1BR" in include "0IH_SAPLJ1BR=====E" in line 1807:

"The field "LV_TYPE_ISSS" is unknown, but there is a field with the similar name "LV_TYPE_PIS""

" "

" "

Troubleshooting ABAP errors using OSS Notes

What is OSS?

- OSS is an abbreviation for Online Support Services

What are OSS Notes ?

- SAP OSS Notes are technical solution briefs that provides information on the cause of an error, its solution and a recommendation on what technical steps are required to be taken to fix the problem

Where can I access OSS Notes ?

- OSS Notes are accessible via SAP Service Market Place Portal with the URL:
<https://service.sap.com/notes>

How to I gain access to the SAP Service Market Place ?

- You can request the SAP Super Administrator of the SAP environment for a "S" user ID and password with the authorization for viewing OSS Notes

Sample Usage of OSS Notes

The screenshot shows the SAP Support Portal search interface in Microsoft Internet Explorer. The browser's address bar displays the URL `https://websmp108.sap-ag.de/notes`. The page header includes the SAP logo and the text "SUPPORT PORTAL". A navigation bar contains links such as "HOME", "Help & Support", "Downloads", "Keys & Requests", "Data Administration", "Maintenance & Services", "SAP Support Infrastructure", "Release & Upgrade Info", and "Knowledge Exchange". The main content area is titled "SAP NOTES SEARCH" and features a section for "Extension of Notes Database" which explains the integration of Business Objects Notes into the SAP Notes database. Below this, there is a "Search options" section with various filters and a search button. The left sidebar contains a "You are here:" breadcrumb trail and a "Quick Link Information" section.

SAP Support Portal - Search for SAP Notes - Microsoft Internet Explorer provided by TATA CONSULTANCY SERVICES

File Edit View Favorites Tools Help

Address `https://websmp108.sap-ag.de/notes` Go

SAP SUPPORT PORTAL

Welcome, Chandrasekhar Kotillil

my Profile | my Inbox | my Favorites

Quick Links | Sitemap | Other Portals | Glossary

HOME Help & Support Downloads Keys & Requests Data Administration Maintenance & Services SAP Support Infrastructure Release & Upgrade Info Knowledge Exchange

Search for SAP Notes Request Help Report a Product Error Connect to SAP Look up Support Center Addresses

You are here:

- Search for SAP Notes
 - SAP HotNews
 - SAP TopNotes
 - SAP TopNotes Survey
 - Side-Effects of SAP Notes
 - Media Library
 - Note Assistant
 - Learning Map
 - Support Enabling Sessions

Quick Link Information

Access this topic directly at <http://service.sap.com/notes>

Copyright Privacy Imprint

SAP NOTES SEARCH

What's new

Extension of Notes Database

With the integration of Business Objects into SAP, the SAP Notes database was enlarged by Business Objects Notes. Business Objects Notes are linked to the **new application area BOJ*** — please keep in mind the asterisk * when searching. For more details please [refer to the Learning Map](#).

Number

Search options

Used Template no template used [Load Template](#)

Language ☐ German ☒ English

Search Term [Search](#)

Search Method

Search Range


Search behavior ☒ Linguistic search ☐ Exact search

Application Area [Select](#)

Restrictions [Select](#)

Additional Criteria [Select](#)

Browse through OSS Notes

 **Search for SAP Notes** Add to Favorites

Not satisfied?
▶ [New Search](#)

Redefine search terms
 ▶ go

Restrict your search by:
Priority (71)
 ▶ go
Category (71)
 ▶ go
Application Area (71)
 ▶ go
More Terms (70)
 ▶ go

SAP TopNotes
Year 2006 (1) ▶ go
Year 2004 (1) ▶ go
Year 2003 (3) ▶ go

Search Discussion Forums at SDN
The SAP Developer Network offers forums about SAP NetWeaver. SAP offers no guarantees and

View

Sort

Download

Language: **English**
You search for: **SAPLJ1BR**, Search Method **All Terms (AND)**, Search Range **All**
Search criteria: no criteria

71 SAP Notes found Page 1 of 1

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------------|----------|------------------|--------|---|--------------|---|---|---|
| | Ranking | Application Area | Number | Short text | Last Changed | | | |
| <input type="checkbox"/> | 1. 0.420 | BC-UPG-ADDON | 746130 | Shortdump in Transaction MIRO | 18.06.20 | | | |
| <input type="checkbox"/> | 2. 0.330 | IS-OIL-DS-TDP | 905014 | User exit to handle financial charges in tax commands | 08.12.20 | | | |
| <input type="checkbox"/> | 3. 0.310 | XX-CSC-BR | 605503 | J 1BCALCULATE TAXES: Shortdump in form FILL KEYS | 11.07.20 | | | |
| <input type="checkbox"/> | 4. 0.310 | XX-CSC-BR | 756039 | J 1BCALCULATE TAXES: Shortdump in form FILL KEYS (II) | | | | |
| <input type="checkbox"/> | 5. 0.310 | XX-CSC-BR | 896145 | J 1BCALCULATE TAXES: Short dump in form FILL KEYS | | | | |
| <input type="checkbox"/> | 6. 0.260 | IS-OIL-DS-TDP | 763440 | IS-OIL LOC BRAZIL transfer with movement 833/835 | | | | |
| <input type="checkbox"/> | 7. 0.250 | IS-OIL-DS-TDP | 623527 | Interstate sales - error calculation ICMS ST for | | | | |

For the search criteria, a number of OSS Notes are provided. You will need to spend sometime going through each OSS Note to see if its relevant to solving the ABAP dump

Sample OSS Note

Note 328897 - Tax Laws not taken from Dynamic Tax Exceptions

Note Language: English

Version: 2

Validity: valid since 03.11.2000

[PDF](#)

[Download Corrections](#)

[Compare Versions](#)

[SSCR](#)

Go to SAP Note: [Display](#)

Content: [Summary](#) | [Header Data](#) | [Releases](#) | [Support Packages](#) | [Correction Instructions](#) | [Related Notes](#)

Summary

Symptom

Tax Laws that are customized in the Dynamic Tax Exception Tables for IPI or ICMS are not being used when creating a sales order.

Additional key words

Tax Law, ICMS, IPI, ISS, Brazil, Dynamic Exception, Exemption, Tax Group

Cause and prerequisites

This is relevant only for Brazilian company codes, where Dynamic Tax Exceptions are used.

Solution

Please apply the source code corrections given below.

Source code corrections



























Header Data

System Logs Analysis using SM21

The screenshot shows the SAP SM21 transaction window. The title bar includes a menu bar with 'System_log', 'Edit', 'Goto', 'Environment', 'System', and 'Help'. Below the menu is a toolbar with various icons. The main title is 'System Log: Local Analysis of idesecc'. A button 'Reread system log' is present. The 'System log entries imported' field shows '0'. The 'Selection' section contains filters for 'From date/time' (16.03.2009 / 16:00:00), 'To date/time', 'User', 'Transaction code', 'SAP process', 'Process No.', and 'Problem classes' (with radio buttons for 'Problems only', 'Problems and warnings', and 'All messages'). The 'Further restrictions' field is set to '<none>'. The 'Format' section includes 'No. pages for individual entries' (150), 'With statistics' (unchecked), and 'Output to' (Screen). A 'Settings' button is located at the bottom right.

| System Log: Local Analysis of idesecc | |
|---------------------------------------|---|
| Reread system log | |
| System log entries imported | 0 |
| Selection | |
| From date/time | 16.03.2009 / 16:00:00 |
| To date/time | |
| User | |
| Transaction code | |
| SAP process | |
| Process No. | |
| Problem classes | <input checked="" type="radio"/> Problems only <input type="radio"/> Problems and warnings <input type="radio"/> All messages |
| Further restrictions | <none> |
| Format | |
| No. pages for individual entries | 150 |
| With statistics | <input type="checkbox"/> |
| Output to | Screen |
| Settings | |

Details in SM21

| System Log: Local Analysis of idesecc | | | | | | | | | |
|---|-----|-----|-----|--------------|--|---|----|---|---|
|   Sys log doc.  Section  Section  Contents | | | | | | | | | |
| 13:23:16 | BTC | 013 | 000 | HOUSEKEEPING | |  | FB | J | DB_RTAB_ERROR at Table TSP0A, Error 64 rspogdio 2 |
| 13:23:17 | BTC | 013 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:23:17 | BTC | 013 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:25:15 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:25:15 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:25:15 | BTC | 014 | 000 | HOUSEKEEPING | |  | FB | J | DB_RTAB_ERROR at Table TSP0A, Error 64 rspogdio 2 |
| 13:25:15 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:25:15 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:25:15 | BTC | 014 | 000 | HOUSEKEEPING | |  | FB | J | DB_RTAB_ERROR at Table TSP0A, Error 64 rspogdio 2 |
| 13:25:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:25:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:26:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:26:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:26:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:26:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:26:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:26:16 | BTC | 014 | 000 | HOUSEKEEPING | |  | F7 | 7 | Spool: Invalid Output Device |
| 13:27:15 | BTC | 016 | 000 | SAPSYS | |  | D0 | 1 | Transaction Canceled 00 560 (193322 800) |
| 13:27:15 | BTC | 016 | 000 | SAPSYS | |  | D0 | 1 | Transaction Canceled 00 560 (193322 800) |
| 13:30:49 | DIA | 000 | 000 | SAPSYS | |  | Q0 | I | Operating system call gethostbyname failed (error no. 2) |
| 13:30:49 | DIA | 000 | 000 | SAPSYS | |  | Q0 | I | Operating system call gethostbyname failed (error no. 2) |

The information is read from the dev_w<x>, current work process log file

 This symbol signifies an error of "high priority"

 This symbol signifies a "warning", which is of low priority

Troubleshooting & Root Cause Analysis

Root Cause Analysis

When

- When was the performance issue first noticed ?
- Since when was this problem occurring ?
- Which are the days or hours when the users experienced poor response times ?



Where

- Is the problem affecting some users at a work location or is it affecting all users at the work location ?
- Is the problem being faced by users in certain departments but not in others ?
- Are users able to use other network devices in their work place ?

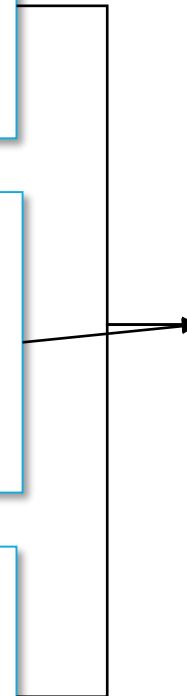


What

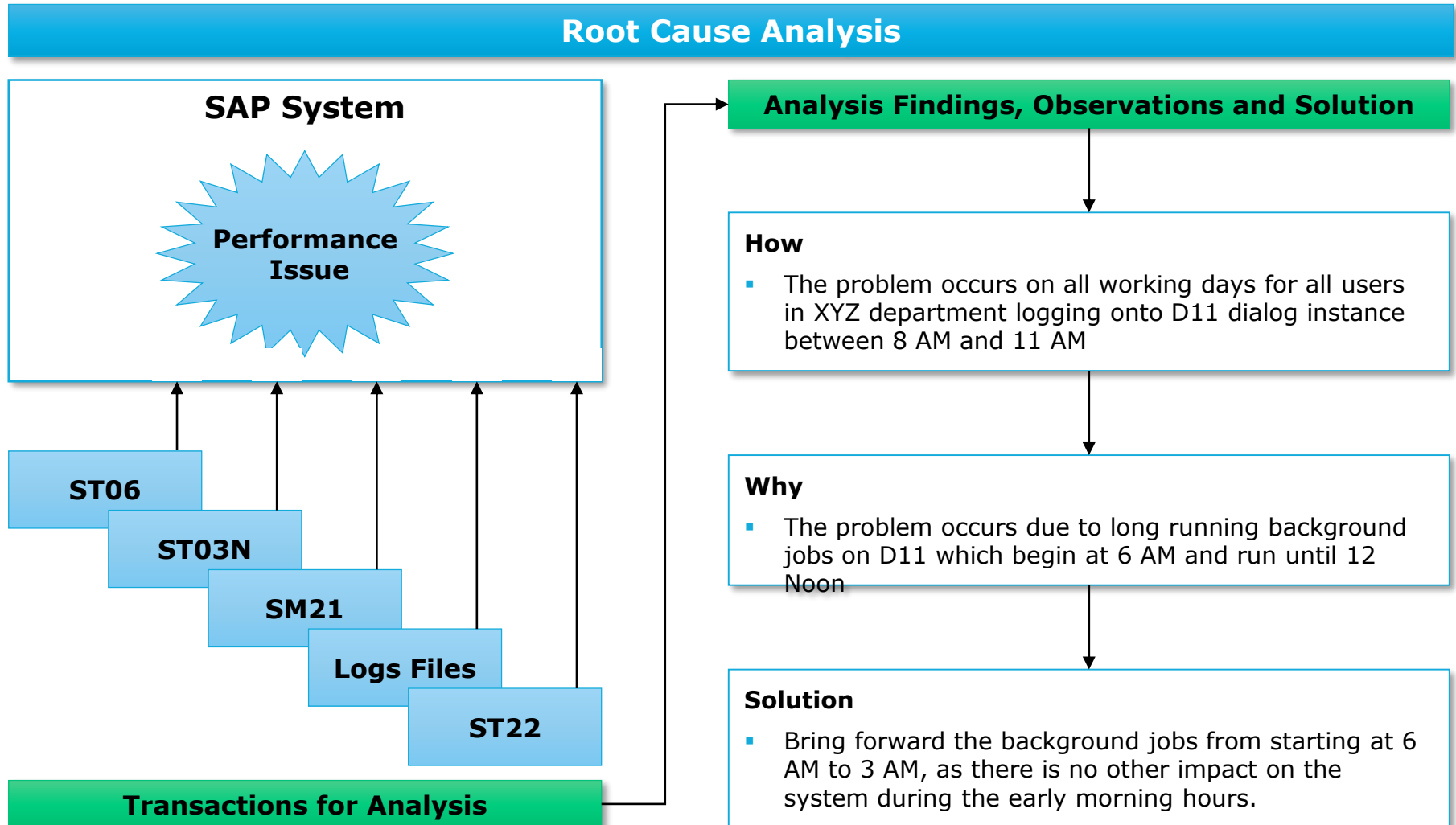
- What is the nature of the problem – ABAP dumps, poor response times, unable to login, long running background jobs etc ?
- What is the error message provided by the SAP system
- If this problem occurred in the past, what were the measures taken to fix it

SAP System

**Performance
Issue**



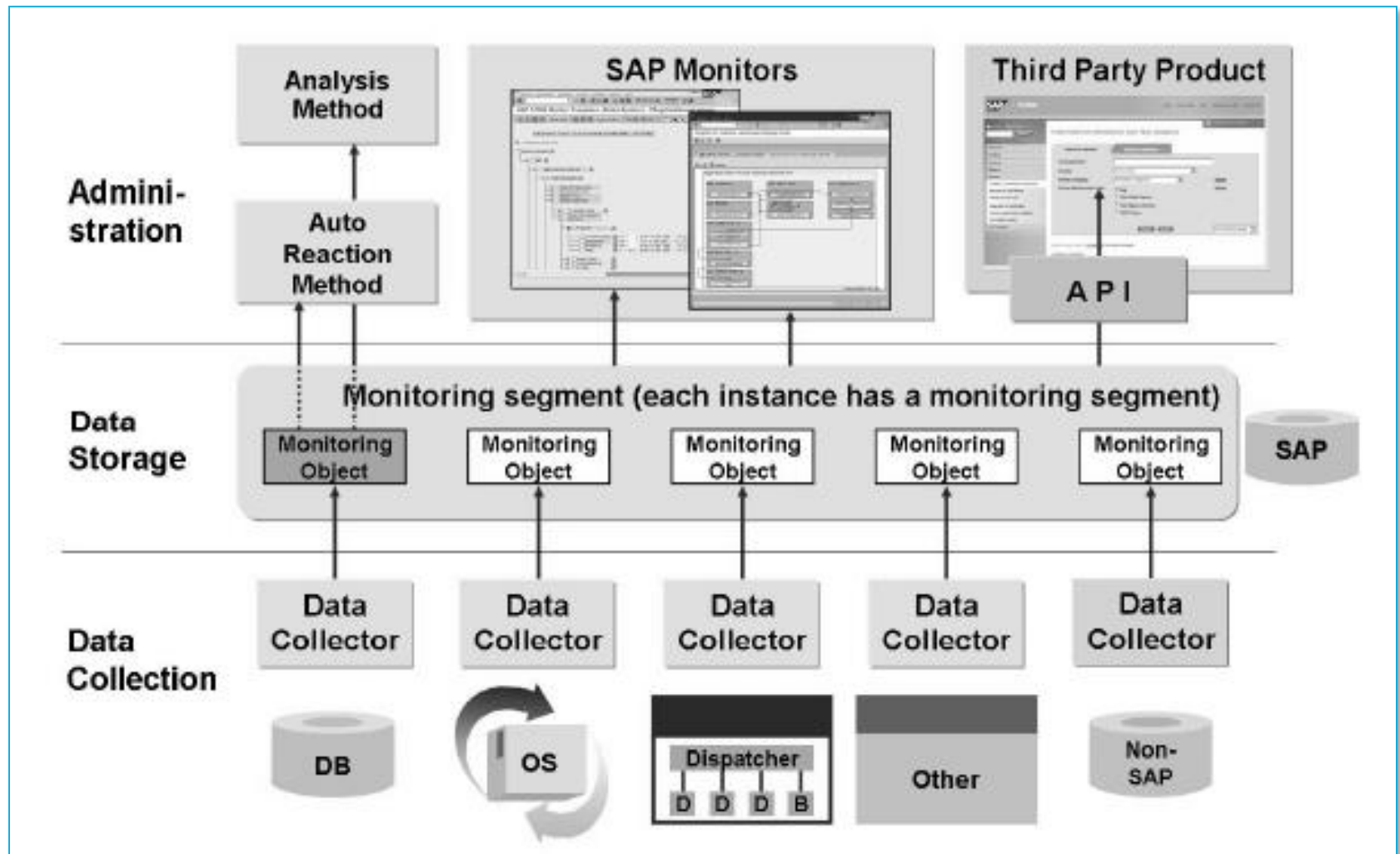
Troubleshooting & Root Cause Analysis



CCMS Monitoring Overview

- CCMS stands for Computing Center Management System
- CCMS is used for central monitoring of the entire SAP landscape
- CCMS brings under a single transaction all the necessary performance data of SAP systems
- CCMS is started from transaction RZ20
- The system which does the central monitoring is called a "CEN", i.e. the central system
- CCMS can also monitor the performance of SAP interfaces, third party systems connected to SAP as well as non-SAP applications with which data is exchanged

CCMS Monitoring Architecture



Details of the architecture

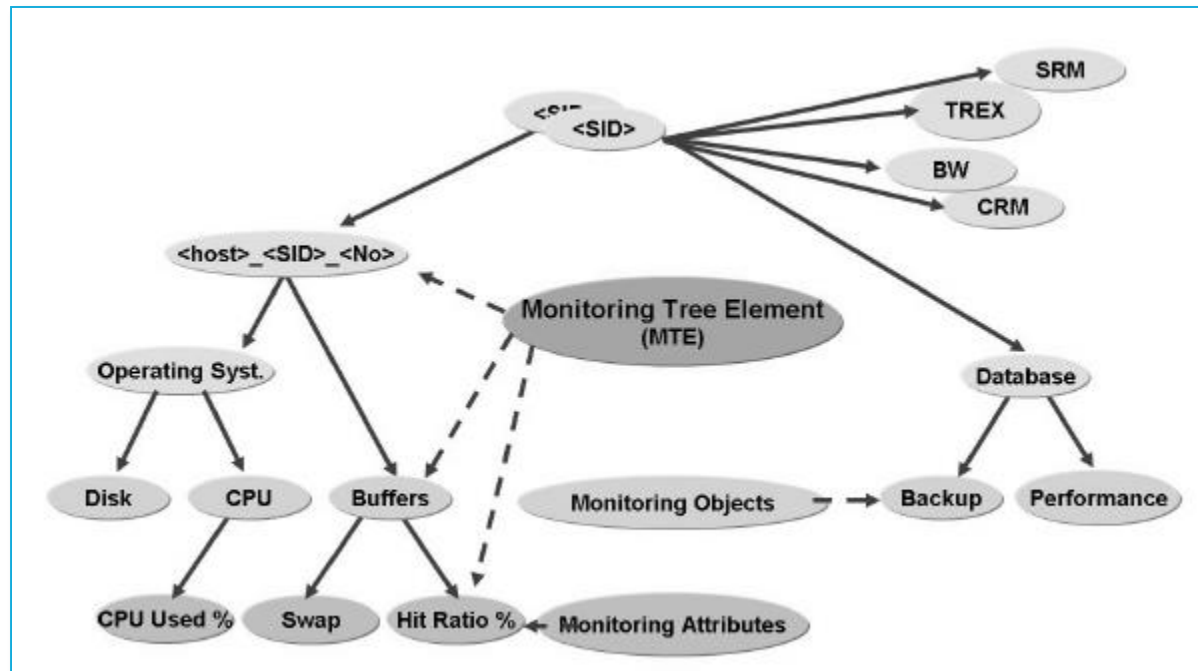
At the **data collection** level, small subareas of an SAP system are monitored by special programs called data collectors. Data collectors can be ABAP, C, or Java programs. There are several hundred data collectors in ABAP alone. Each data collector checks its subcomponent at regular intervals and stores the collected monitoring data in the main memory of its host.

At the **data storage** level, the area of the main memory that contains the monitoring data from the data collector is called the monitoring segment. As the main memory data is always overwritten, it can be permanently copied to database tables. You can then analyze the data later. The data collection and storage elements must be present on every component that is to be centrally monitored.

Caution: Note that every instances of an SAP system has its own monitoring segment in shared memory. This means that for an SAP system with eight instances, there are eight different monitoring segments. The number of monitoring segments is determined by the number of instances. Whether or not several instances run on the same hardware, for instance, is of no significance here.

The **administration level** allows the data from the monitoring segment to be displayed and evaluated. SAP provides an expert tool, the CCMS Alert Monitor (transaction RZ20) as a display transaction. The SAP Solution Manager can show the data in a business process-oriented context. If the system identifies a problem, it can execute a prepared automatic reaction, such as informing the responsible person. The analysis method then helps you to investigate the problem. The CCMS Alert Monitoring Infrastructure can be extended. You can integrate your own components using data collectors that you have written yourself. Third-party vendors and partners can export the monitoring data from the monitoring segment using various interfaces.

CCMS Monitor Structure



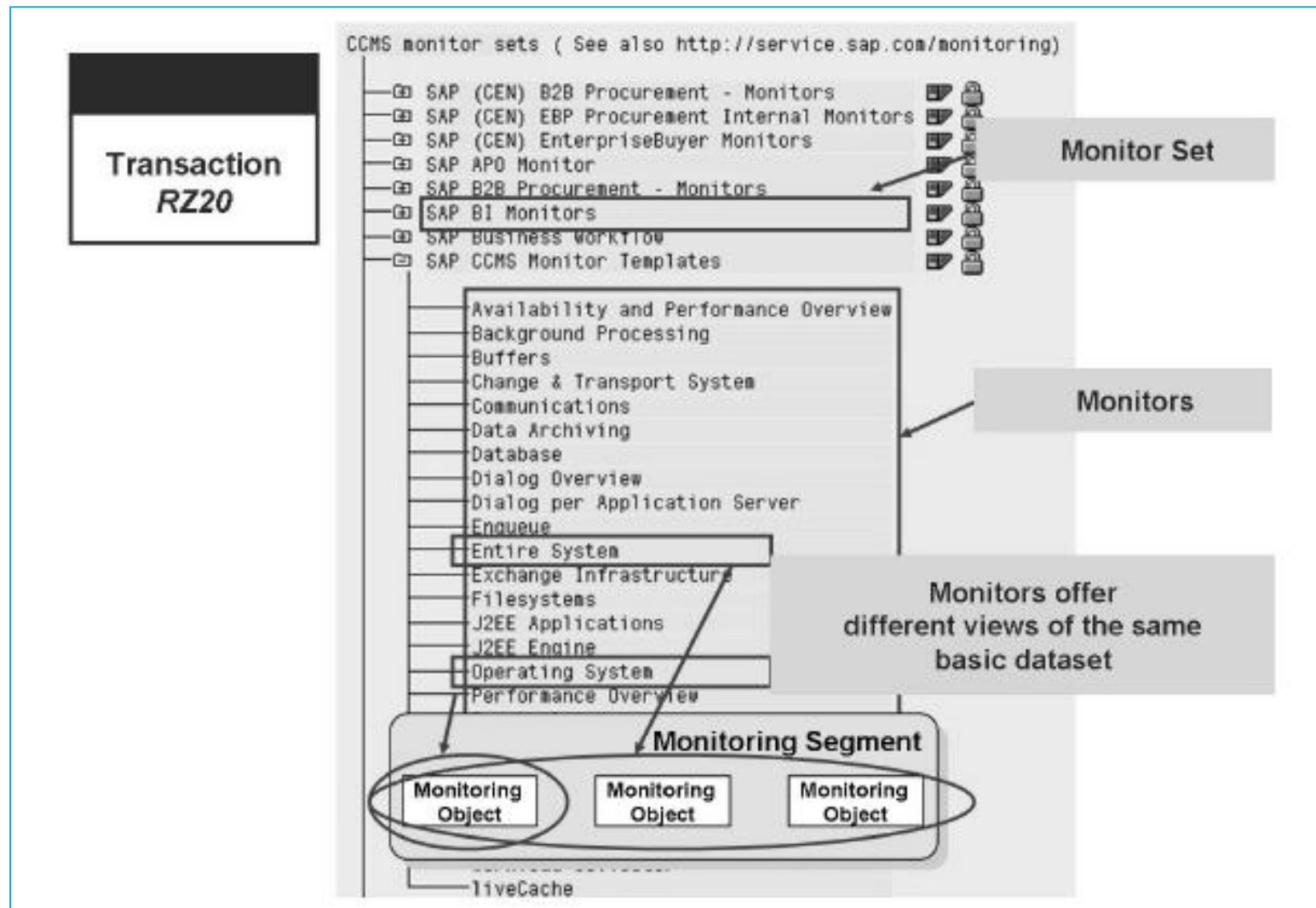
The CCMS Alert Monitor (transaction RZ20) displays the monitoring data from the monitoring segment in a tree structure. The tree structure allows a clear display when you are displaying a large number of measured values.

Any node in the tree is called a Monitoring Tree Element (MTE)

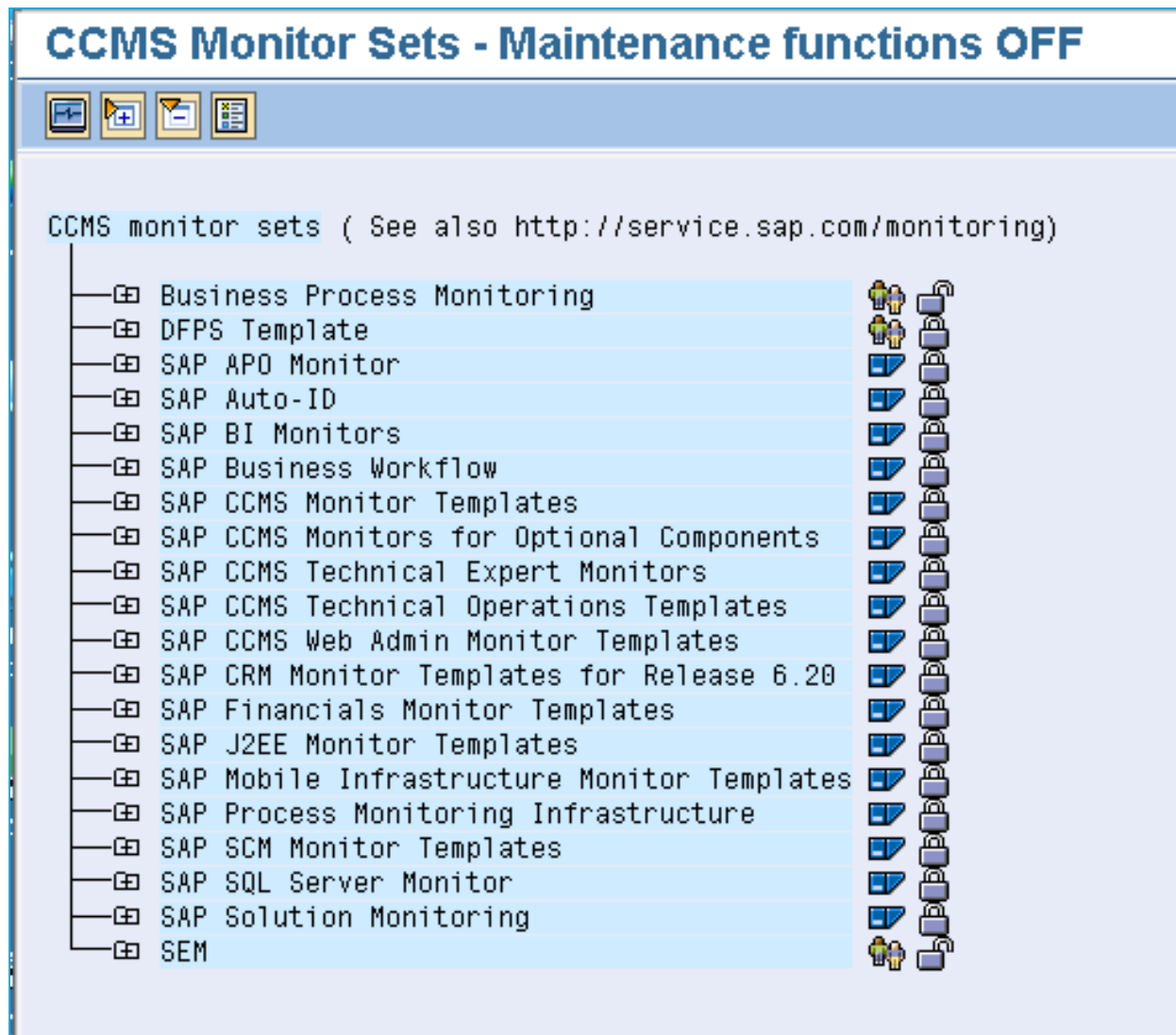
The measured values that are collected by the data collectors are displayed at the lowest level in the leaves of the tree. The leaves are known as monitoring attributes

Threshold values can be stored for a monitoring attribute. SAP delivers default threshold values. However, in order to customize the monitor as well as possible for your system environment, you should check these threshold values, and adjust them if required

Alert Monitor – RZ20



Using the Alert Monitor – RZ20



Sample View of RZ20 MTE Attributes

SAP CCMS Technical Expert Monitors (All Monitors)

View: Current system status (20.03.2009 , 18:48:04)

Node display off

- ☐ Transactional RFC and Queued RFC
- ☐ Update
- ☐ Workload Collector
- ☐ idesecc_IDS_00
- ☐ OperatingSystem
- ☐ DatabaseClient
- ☐ R3Services
- ☐ Gateway_Summary
- ☐ Dialog
 - ☐ ResponseTime
 - ☐ FrontendResponseTime
 - ☐ QueueTime
 - ☐ Load+GenTime
 - ☐ RollTime
 - ☐ DBRequestTime
 - ☐ Utilisation
 - ☐ PrivMode Utilisation
 - ☐ NumberOfWpDIA
 - ☐ ErrorsInWpDIA
 - ☐ ErrorFreqInWpDIA

| Monitor | Value |
|----------------------|----------|
| ResponseTime | 262 msec |
| FrontendResponseTime | 280 msec |
| QueueTime | 1 msec |
| Load+GenTime | 27 msec |
| RollTime | 4 msec |
| DBRequestTime | 0 msec |
| Utilisation | 1 % |
| PrivMode Utilisation | 0 % |
| NumberOfWpDIA | 11 |
| ErrorsInWpDIA | 1 |
| ErrorFreqInWpDIA | 0 /min |

Attributes

[illegible]

Sample View of RZ20 MTE Properties

SAP CCMS Technical Expert Monitors (All Monitor

View: Current system status (20.03.2009 , 18:48:04)

Node display off

- ☐ Transactional RFC and Queued RFC
- ☐ Update
- ☐ Workload Collector
- ☐ idesecc_IDS_00
- ☐ OperatingSystem
- ☐ DatabaseClient
- ☐ R3Services
 - ☐ Gateway_Summary
 - ☐ Dialog
 - ☐ ResponseTime 262 msec
 - ☐ FrontendResponseTime 280 msec
 - ☐ QueueTime 1 msec
 - ☐ Load+GenTime 27 msec
 - ☐ RollTime 4 msec
 - ☐ DBRequestTime 0 msec
 - ☐ Utilisation 1 %
 - ☐ PrivMode Utilisation 0 %
 - ☐ NumberOfWpDIA 11
 - ☐ ErrorsInWpDIA 1
 - ☐ ErrorFreqInWpDIA 0 /min

Properties

Monitoring: Properties and Methods

Properties of IDSidecc_IDS_00\R3Services\Dialog\ResponseTime

MTE class R3DialogResponseTime

General PerformanceAttribute Methods Addnl info

Performance properties assigned from group R3DialogResponseTime

Comparison Value

- ☐ Last reported value
☐ Average in the last hour
☐ Average in the last quarter of an hour

- ☐ Smoothing over last 1 min.
☐ Smoothing over last 5 min.
☒ Smoothing over last 15 mins

Threshold values

| | | |
|-----------------------------|-------|------|
| Change from GREEN to YELLOW | 2,000 | msec |
| Change from YELLOW to RED | 3,000 | msec |
| Reset from RED to YELLOW | 2,000 | msec |
| Reset from YELLOW to GREEN | 1,000 | msec |

Alert is triggered if the comparative value

- ☐ falls below threshold value ☒ exceeds the threshold value

Break





Web Enablement & Communication

SAP Web Server Concepts

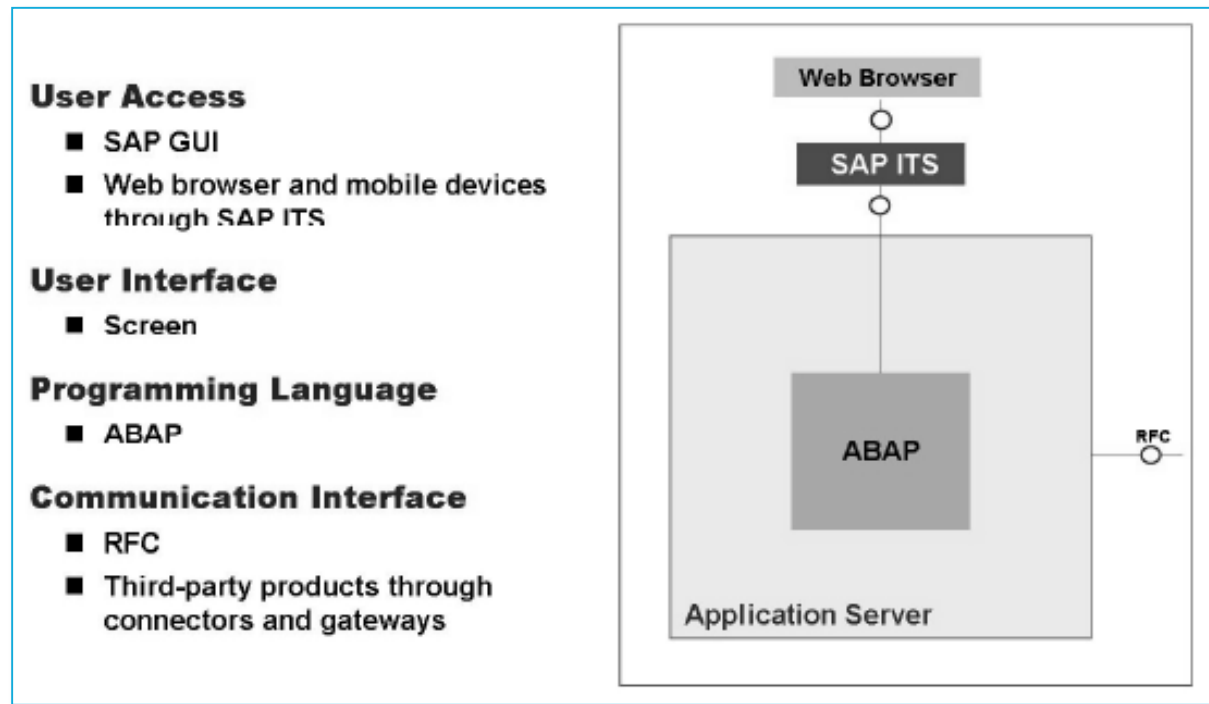
The SAP Internet Transaction Server (ITS) is used with Web applications (IACs) and with SAP GUI for HTML. Depending on the system release and scenario in question, the functions of the SAP ITS can be implemented by means of a standalone ITS or using the ITS integrated in the AS ABAP

The Internet Communication Manager (ICM) is the process that turns the conventional ABAP application server into a Web server or Web Client

The Internet Communication Framework (ICF) provides an environment for handling HTTP(S) requests in the ABAP work process using Web applications such as BSPs

The SAP Web dispatcher distributes HTTP(S) requests to a suitable application server (instance)

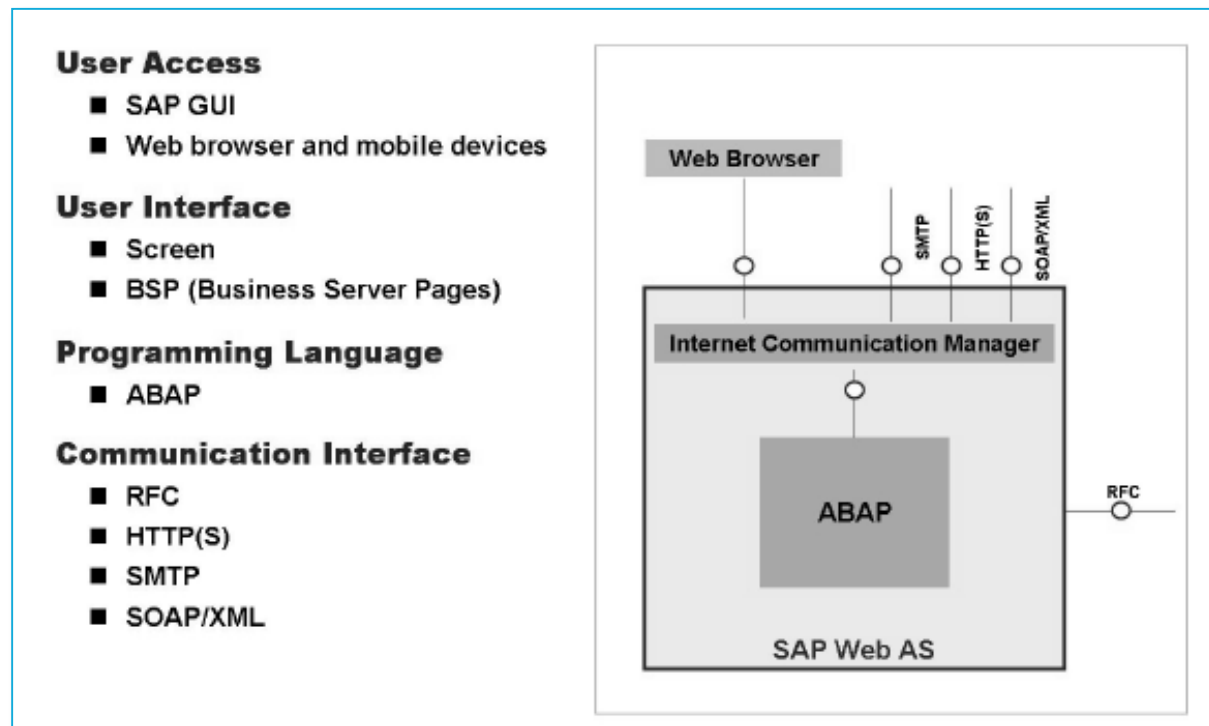
SAP Internet Transaction Server (ITS)



Web applications that were developed specifically for SAP ITS are called Internet Application Components (IACs). These include Employee Self Services (ESS) that are based on SAP R/3 and SAP R/3 Enterprise or the SAP Online Store. The SAP GUI for HTML also uses the SAP ITS.

SAP ITS is therefore required for existing Web applications (in IAC technology) and the SAP GUI for HTML, regardless of the basis release of the corresponding SAP system.

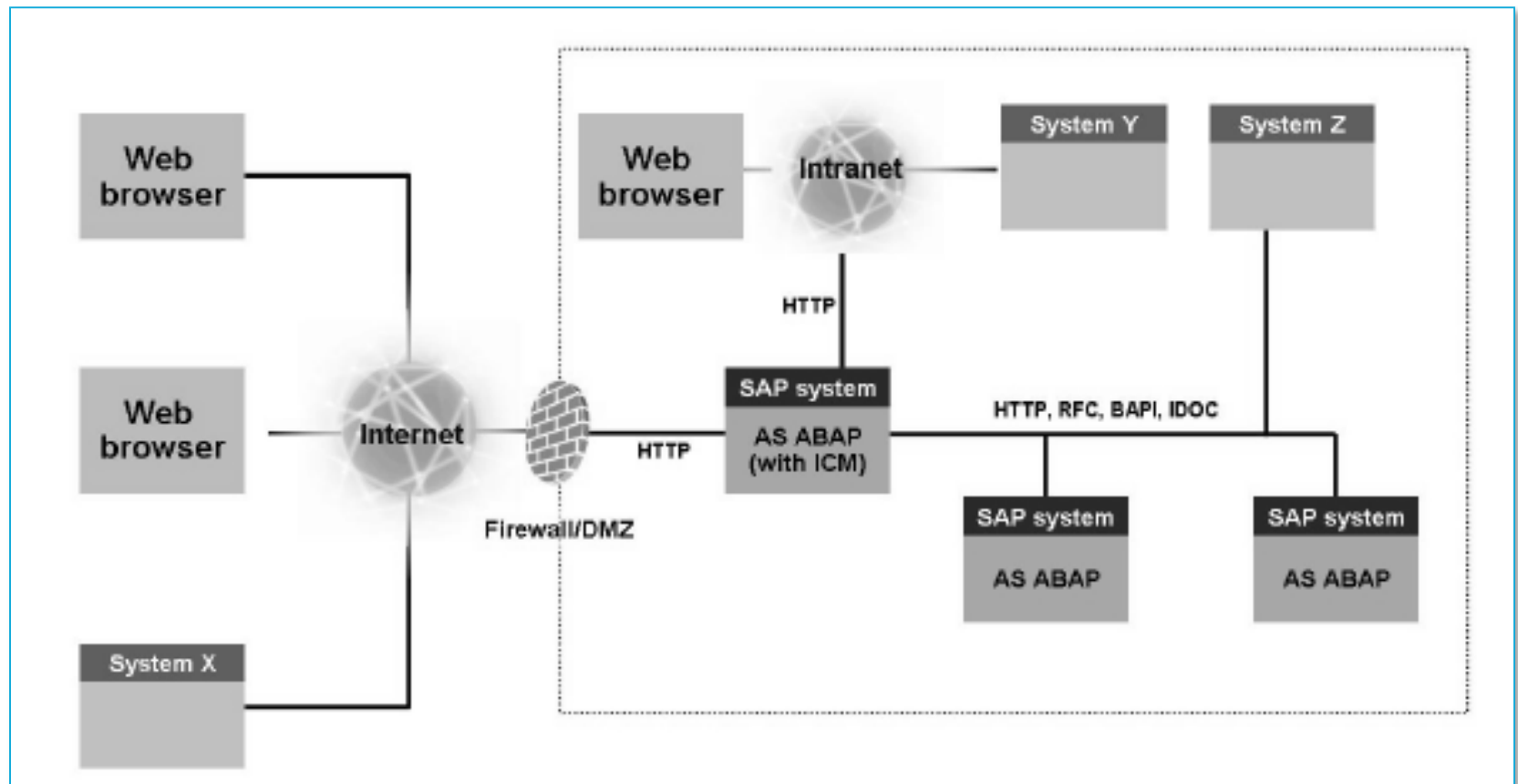
SAP ICM



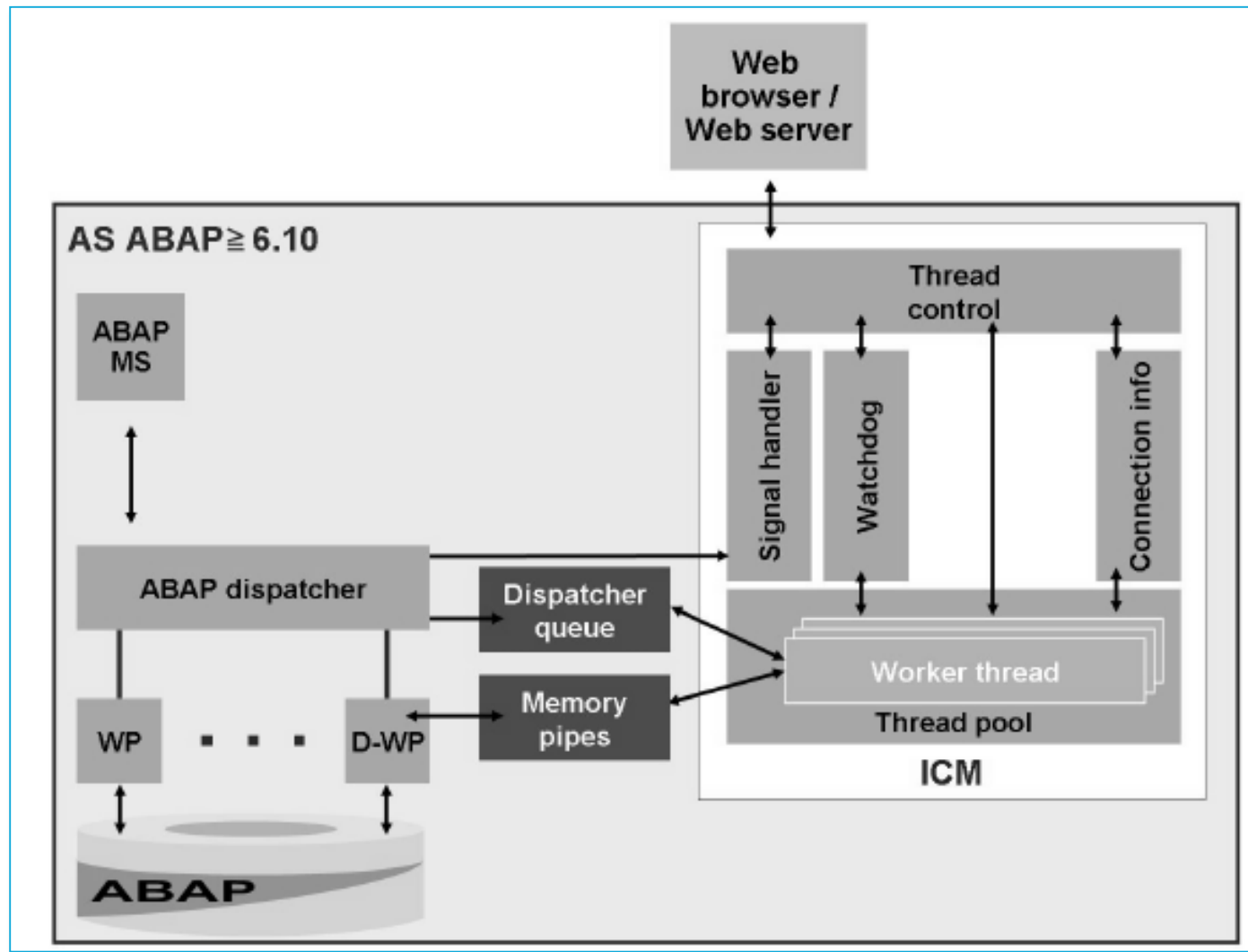
SAP Kernel has been extended with the Internet Communication Manager (ICM) process to process HTTP requests directly from the internet or to send HTTP client requests to the internet

The ICM process forwards requests to the Internet Communication Framework (ICF), which supports numerous programming models. This is how the SAP CRM, SAP BW, and SAP XI software components use this infrastructure. A programming model for such applications are the Business Server Pages (BSPs)

Architecture of the ICM Process



Internal Structure of the ICM Process



ICM Monitoring using SMICM Transaction

Transaction SMICM can be used to start and stop the ICM process

The http trace and logs can be viewed using SMICM

ICM Monitoring interface showing a list of transactions and a context menu.

| No. | Thr | Status |
|-----|-----|------------------|
| 1 | 4 | Available |
| 2 | 5 | Available |
| 3 | 6 | 20,520 Available |
| 4 | 7 | 20,412 Available |
| 5 | 8 | 20,542 Available |
| 6 | 9 | 20,520 Available |
| 7 | 10 | 20,563 Available |
| 8 | 11 | 20,409 Running |
| 9 | 12 | 20,535 Available |
| 10 | 13 | 20,441 Available |

- ICM monitoring
- Parameter settings
- Statistics
- ICM server cache
- Evaluation of trace files
- Maintenance mode

Internet Communication Framework

The Internet Communication Framework (ICF) provides a way for different systems to communicate with each other over the Internet using standard protocols (such as HTTP and SMTP). No additional programming libraries (for AS ABAP) are required from SAP. However, for the HTTPS protocol, the SAP Cryptographic Library (SAPCRYPTOLIB) must be installed and configured (see SAP Note 510007). Your system platform only must be configured to be Internet capable. This scenario allows for the most flexible setup of the overall communication requirements

The ICF allows a response to a request to be generated using an application. An HTTP request is sent from a client (such as a Web browser) to the server. It is then forwarded to an application by the ICF. Here, data is collected and sent back to the client as a response by the ICF. The response data is then displayed in the browser

HTTPS Request Processing

An HTTP(S) request is processed in the following steps:

1. The request is sent from the user's Web browser to the ICM using the HTTP
2. protocol. The ICM uses the requested URL to determine whether the application called is implemented in the ABAP or Java stack of the SAP NetWeaver Application server. This example uses an ABAP application that must be processed by a dialog work process
3. The ICM stores the data received in a memory pipe (in the shared memory) and informs the ABAP dispatcher
4. The ABAP dispatcher adds the ICM request to the dispatcher queue, creates a new context (if there is no context that is processed statefully), and selects a work process for processing
5. The task handler in the work process reads the data from the memory pipe and transfers it to the ICF controller, which is implemented using function module `HTTP_DISPATCH_REQUEST`
6. The ICF controller transfers the request to the ICF manager, which is implemented by the ABAP class `CL_HTTP_SERVER`. The ICF controller creates a server control block and fills it with the HTTP request data that it requested from the ICM
7. The client is then authenticated, whereby several logon options are available
8. The HTTP request handler determined previously is called (this can process the request data, call further applications, access the response object, and so on). When the HTTP request handler is ready, it returns control to the ICF controller
9. The task handler writes the response back to the memory pipe (response serialization) and signals to the ICM that it has finished processing the request
10. The ICM returns the response to the Web browser

Activating Web Services using SICF

Specific web services that will be executed by the ICF can be activated and managed in SICF

Maintain service

Create Host/Service External Aliases System Monitor Inactive

Filter Details

Virtual Host: Service Path:

Service:

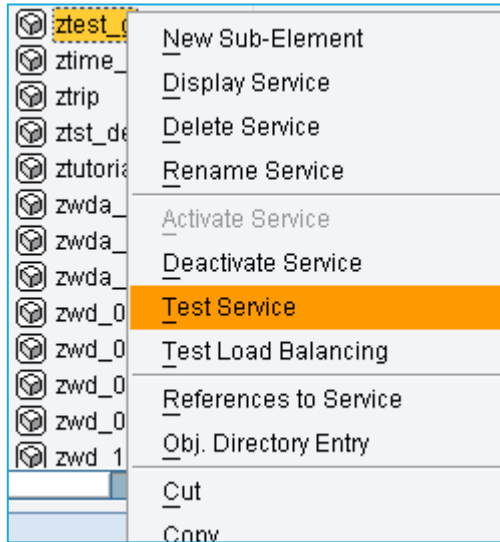
Description:

Lang.: English **Detail**

Filter Reset

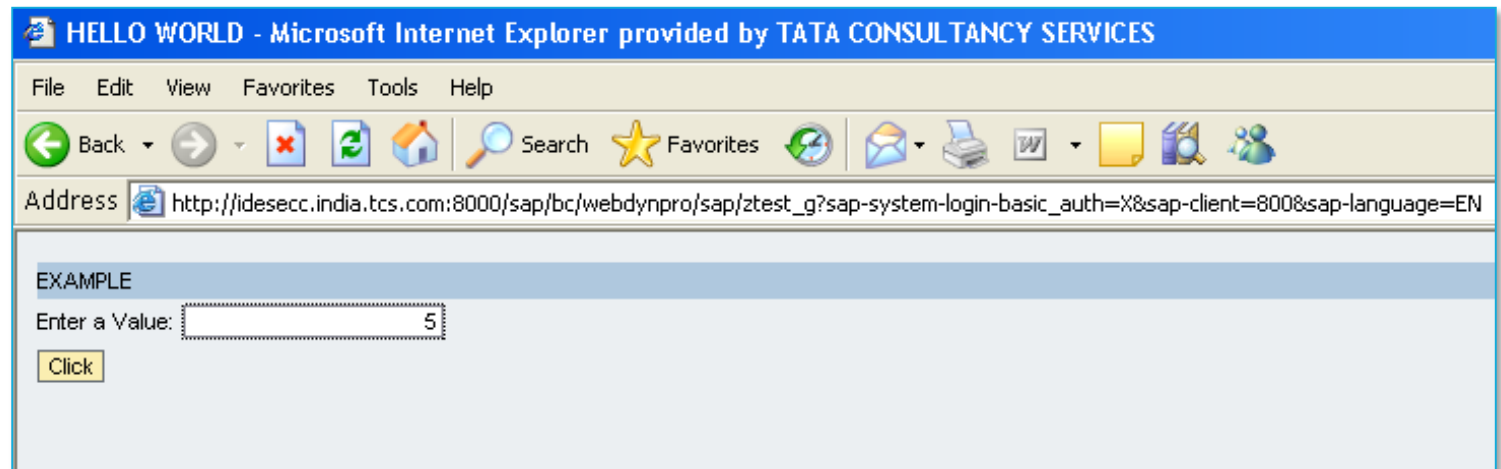
| Virtuelle Hosts / Services | Documentation | Referenz Service |
|----------------------------|---|---|
| bc | BASIS TREE (BASIS FUNCTIONS) | |
| approval_100 | Link to Approval Service | /default_host/sap/bc/bsp/sap/hrrcf_approval |
| bsp | BUSINESS SERVER PAGES (BSP) RUNTI... | |
| gcdsmic | namespace | |
| sap | NAMESPACE SAP | |
| absenceform_nev | Service for Recording Notification of Absence | |
| aco_bsp_admin | Create Administration Authorization | |
| aco_substitutes | Edit Substitute | |
| aco_usr_grp_bsp | BSP for User Group Maintenance | |
| alertinbox | Alert Inbox (Plain BSP) | |
| alertinboxwap | Alert Inbox (WAP) | |
| bexlogon | BEx Logon | |
| bkbtest | | |
| bkbtest_sch | Test | |

Calling Web Service using SICF



Please NOTE the structure of the URL. The port number for calling the ICM is always 80xx for an AS ABAP WAS, where xx is the instance number

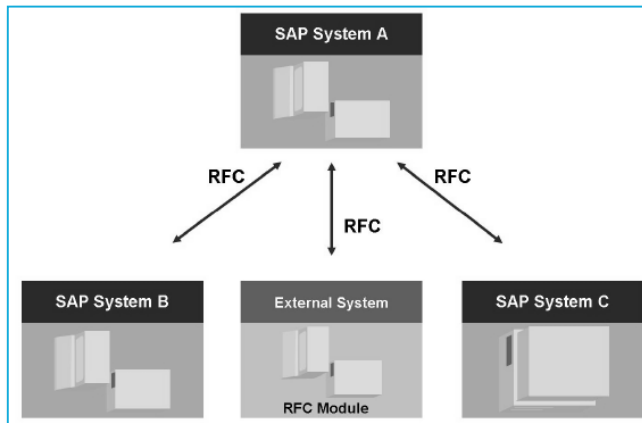
The fully qualified host name must be maintained in Instance profile parameters, i.e., icm/host_name_full



SAP Communication & Integration Technologies

RFC Fundamentals

Remote Function Calls have been used for many years as the technical interface with which SAP and non-SAP systems are usually connected. It is irrelevant whether data exchange is synchronous or asynchronous, periodic or aperiodic, or transactional. Many conceivable variants are supported.



- A Remote Function Call(RFC) is the call of a function module that is running in a different system to the calling program. You can call a function module in the same system as an RFC too. However, RFCs are normally used when the calling and called function modules are running in different systems.
- In the SAP system, the RFC interface system provides this function. The RFC interface system allows function calls between two SAP systems or between an SAP system and an external (non-SAP) system.
- RFC is an SAP interface protocol that is based on the Common Programming Interface for Communication (CPI-C) and allows cross-host communication between programs. This enables external applications to call ABAP functions and SAP systems to contact (RFC-enabled) external applications. RFC means that ABAP programmers do not have to write their own communication routines. For an RFC call, the RFC interface converts all parameter data to the format required in the remote system calls the communication routines that are required to communicate with the remote system handles errors that occur during the communication.
- The RFC interface is easy for the ABAP programmer to use. The processing steps for calling external programs are integrated into the CALL FUNCTION statement.

Managing RFC Connections using SM59

| RFC Connections | Type | Comment |
|-------------------------------------|------|--|
| ABAP Connections | 3 | |
| HTTP Connections to External Server | G | |
| Internal Connections | I | |
| SNA/CPI-C connections | S | |
| TCP/IP connections | T | |
| SERVER_EXEC | T | Starts Program 'RFCEXEC' on Application Server |
| SLD_NUC | T | Automatically generated for System Landscape Directory (SLD) |
| SLD_UC | T | Automatically generated for System Landscape Directory (SLD) |
| TCS051014_PORTAL_EP1 | T | |
| VFOLDER | T | Virtual folder for AL |

RFC Destination TCS051014_PORTAL_EP1

Connection Test Unicode Test

RFC - Connection Test

Connection Test TCS051014_PORTAL_EP1

Connection Type TCP/IP Connection

On HP multiprocessor machines, the specified time values may be incorrect.

| Action | Result |
|-------------------|---------|
| Logon | 26 msec |
| Transfer of 0 KB | 13 msec |
| Transfer of 10 KB | 17 msec |
| Transfer of 20 KB | 14 msec |
| Transfer of 30 KB | 13 msec |

RFC Destination TCS051014_PORTAL_EP1

Connection Test Unicode Test

RFC Destination TCS051014_PORTAL_EP1

Connection Type T TCP/IP Connection

Description

Description

Description 1

Description 2

Description 3

Administration Technical Settings Logon & Security MDMP & Unicode Special Options

Activation Type

☐ Start on Application Server

☒ Registered Server Program

☐ Start on Explicit Host

☐ Start on Front-End Work Station

Registered Server Program

Program ID TCS051014_PORTAL_EP1

Start Type of External Program

☒ Default Gateway Value

☐ Remote Execution

☐ Remote Shell

☐ Secure Shell

CPI-C Timeout

☒ Default Gateway Value

RFC Usage Variants

Synchronous RFC (sRFC)

For communication between different systems and between SAP Web AS and SAP GUI

Asynchronous RFC (aRFC)

For communication between different systems and for parallel processing of selected tasks

Transactional RFC (tRFC)

A special form of asynchronous RFC. Transactional RFC ensures transaction-like processing of processing steps that were originally autonomous

Queue(d) RFC (qRFC)

Queued RFC is an extension of tRFC. It also ensures that individual steps are processed in sequence

RFC is a superordinate term for various implementation variants. sRFC is the synchronous call of function modules. This means that the client waits until the server has completed its processing

Within an SAP system, an RFC can also be executed asynchronously in another work process. This variant is called aRFC

Continued..

There is also tRFC, the transactional Remote Function Call. Transactional RFC is asynchronous and ensures that data that is sent more than once due to network problems can be recognized at the server side, by assigning a Transaction Identifier (TID). This allows you to prevent data being processed more than once, leading to erroneous information in the application. Due to the asynchronous processing, however, parameters can only be transferred from the client to the server in this case returning information or status information directly is not possible

qRFC with Send Queue is an extension of tRFC. It creates a layer between applications and the tRFC and only allows the tRFC to transfer a Logical Unit of Work (LUW) to the target server when its predecessors are no longer in the associated wait queues. After a qRFC LUW is executed, the qRFC manager automatically processes the next waiting qRFC LUW in accordance with the sequence in the wait queue

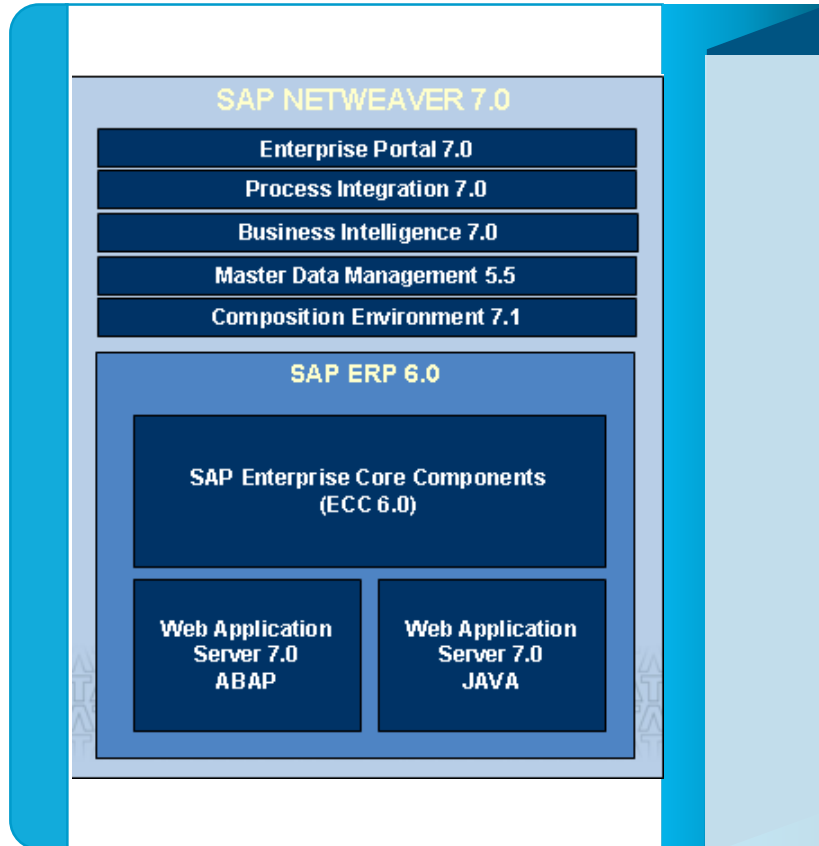
Lunch Break



AS JAVA Architecture & Processes

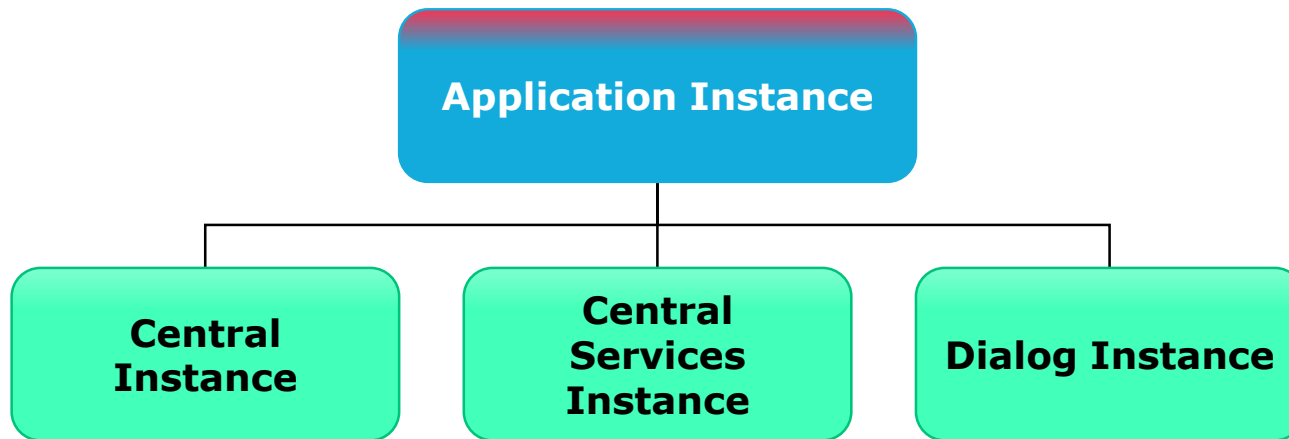


Netweaver Architecture



- The Application server JAVA is a usage type of the SAP Netweaver platform
- The AS JAVA has a dedicated database schema
- AS JAVA can coexist with AS ABAP systems in what is known as Dual stack architecture
- In dual stack systems , there is only 1 database instance , but there are 2 schemas one each for ABAP and JAVA

SAP AS JAVA Instance



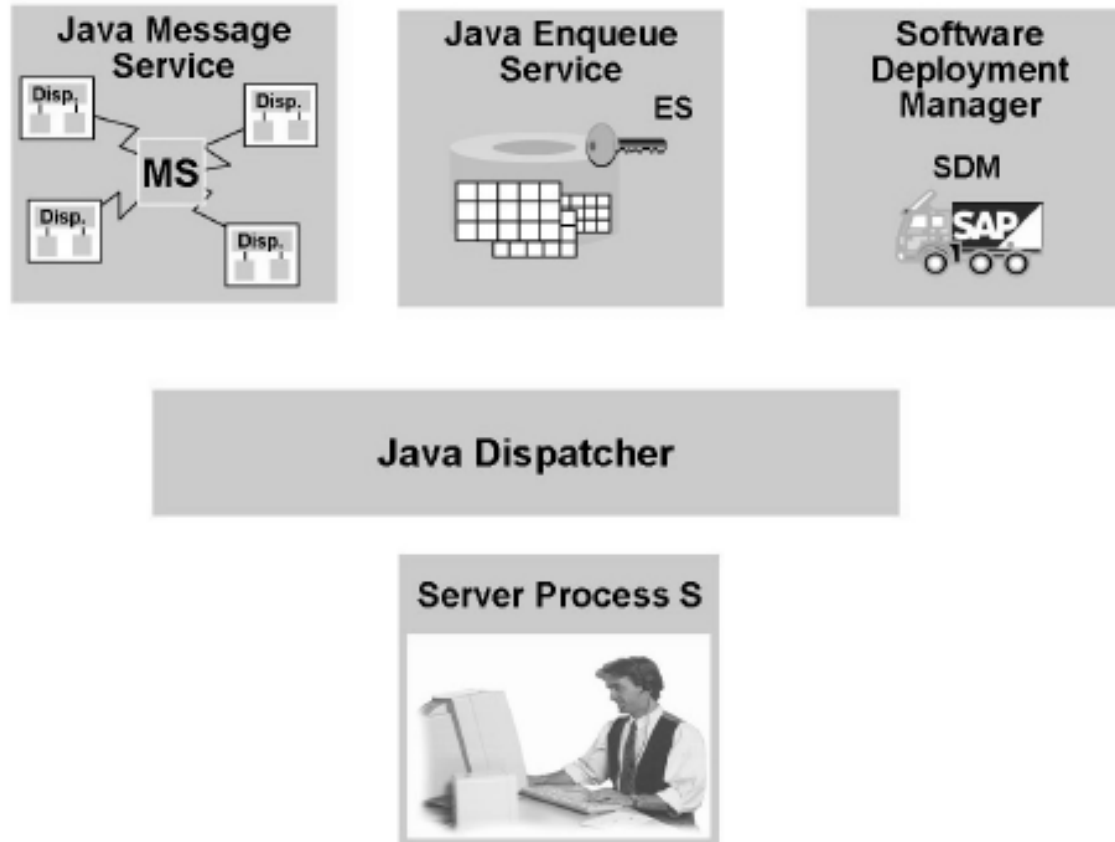
| Type of Application Server | Instance Name | Name of Processes |
|----------------------------|---------------------------|---|
| JAVA Application Server | Central Instance | Software Deployment Manager(SDM) , Dispatcher |
| | Central Services Instance | Message Server , Enqueue Server |
| | Dialog Instance | JAVA Server Processes |



Each SAP system can have only 1 Central Instance , 1 Central Services Instance and only 1 Database instance. It can have any number of additional dialog instances

AS JAVA Process Overview

AS Java Processes



Summary of AS JAVA Processes

The following processes exist in AS Java:

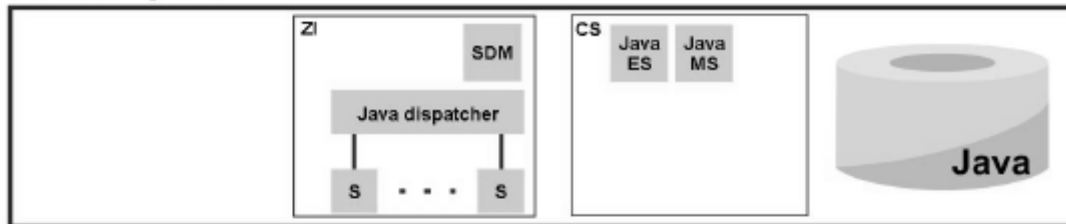
- 1.The dispatcher distributes incoming requests to the server processes.
- 2.The server process executes the Java applications. Every server process is multi-threaded and can thus process a large number of requests in parallel (in contrast to the ABAP work processes).
- 3.For each dispatcher there is at least one server processes and there can be up to 16 server processes.
- 4.The Java message service manages a list of Java dispatchers and server processes. It is responsible for the communication within the Java runtime environment.
- 5.The Java enqueue service manages logical locks that are set by the executed Java application program in a server process.
- 6.The Software Deployment Manager (SDM) is the standard tool used to install Java software components on the SAP Web AS Java.

Types of Netweaver Server Configurations

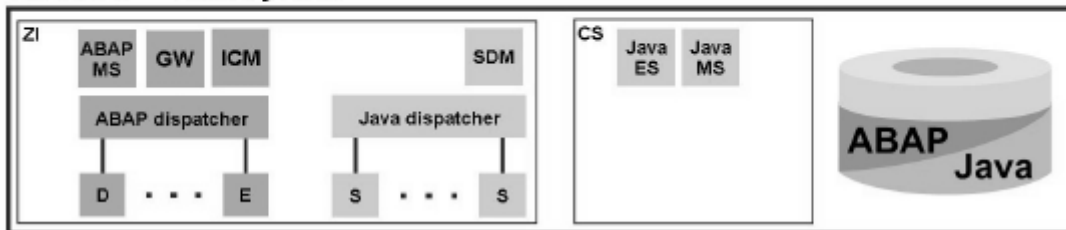
AS ABAP System



AS Java System



AS ABAP + Java System

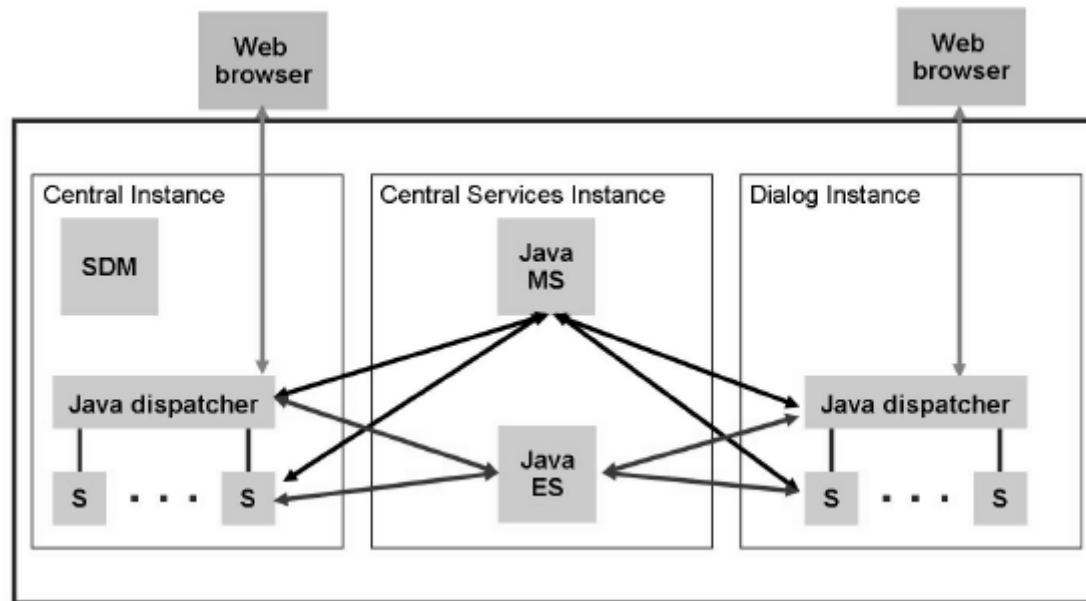


AS ABAP system: Complete infrastructure in which ABAP-based applications can be developed and used.

AS Java system: Complete infrastructure for developing and using J2EE-based applications.

AS ABAP+Java system: Complete infrastructure in which ABAP-based and J2EE-based applications can be developed and used. Such a system should only be installed if explicitly required by the application. For example, SAP NetWeaver PI 7.0 or SAP Solution Manager 4.0

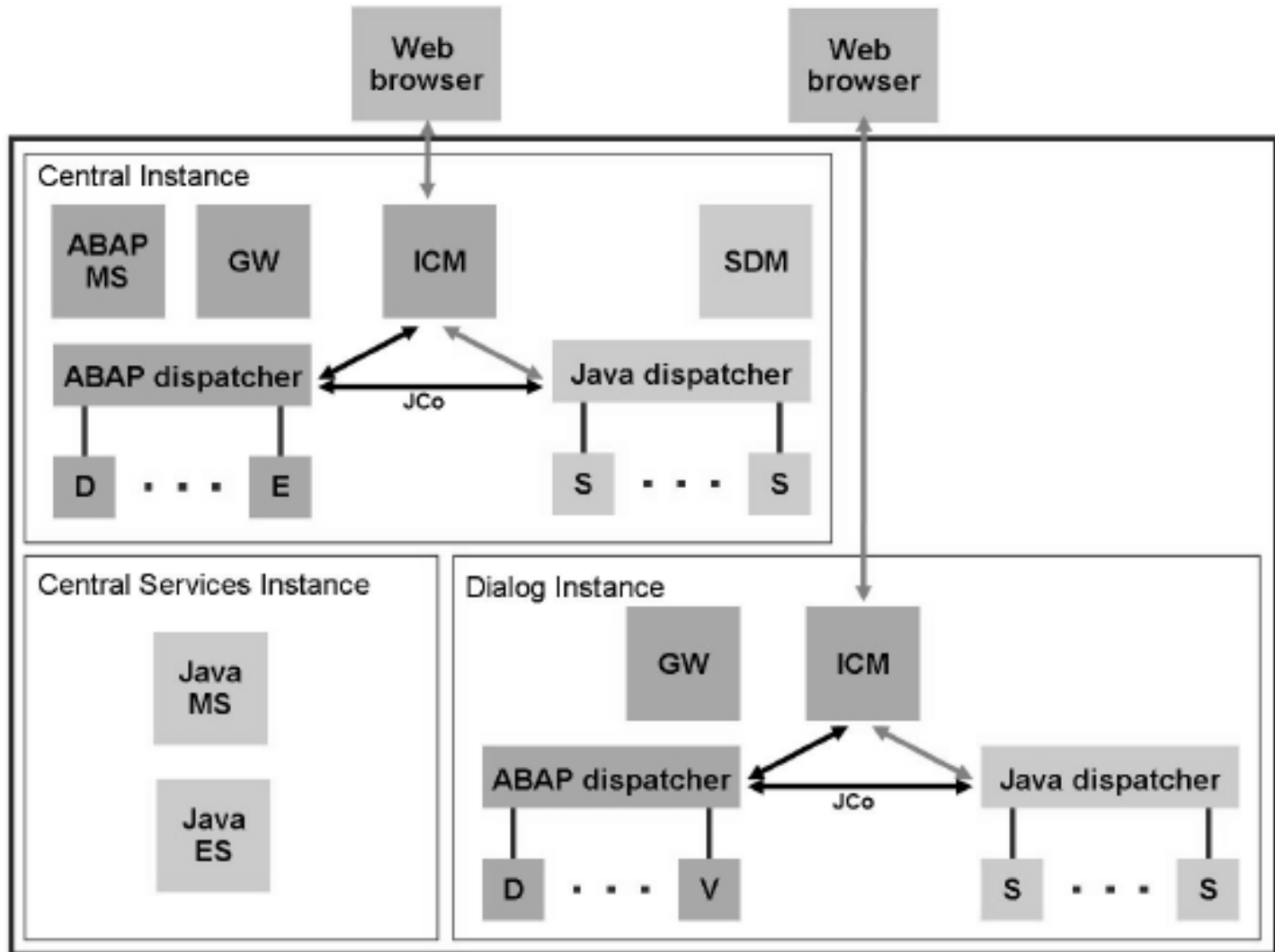
AS JAVA Architecture



In AS Java, the central instance is distinguished by the fact that the Software Deployment Manager (SDM) runs there. The central services Message Service (MS) and Enqueue Service (ES) run in the central services instance (CS instance). All other instances of the system are usually called dialog instances.

Note: The entirety of the Java environment (all processes and the database scheme) is also referred to a Java cluster, and the individual processes (dispatcher and server) as nodes of the Java cluster.

Dual Stack Architecture

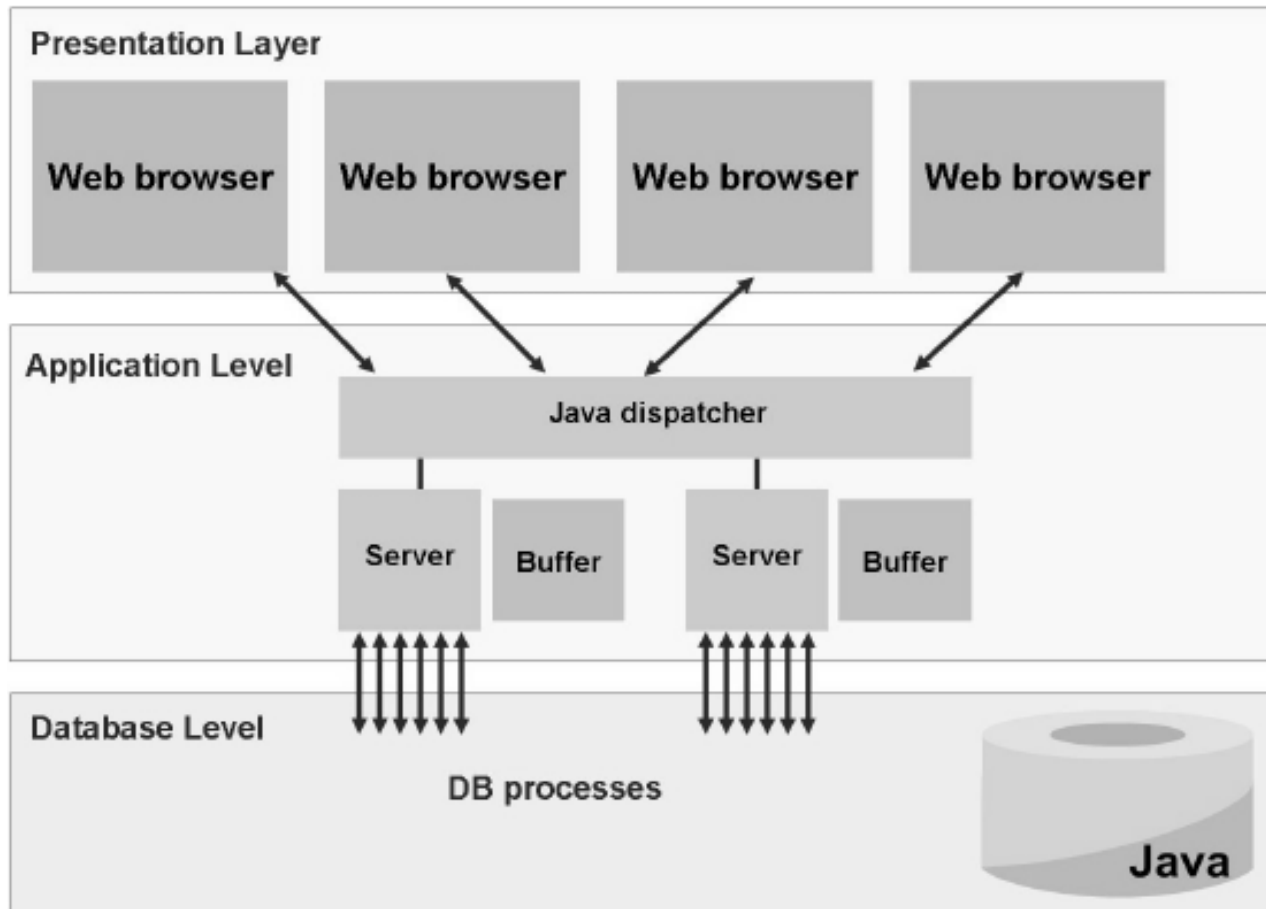


Key architecture principles of Dual stack systems

The central instance of an AS ABAP+Java system can be recognized by the following processes:

- ABAP-MS, enqueue work process and SDM. The central services of the Java runtime environment (Java-MS, Java-ES) are also provided in the Java central services instance here. All other instances are usually called dialog instances.
- Since both runtime environments are capable of answering requests via web protocols, the Internet Communication Manager must now decide whether the request is addressed to the ABAP or the Java runtime environment. It decides this by means of the URL of the request. In case of a request to the ABAP runtime environment, for example, the call of an ABAP Web Dynpro, the ICM forwards the request to the ABAP dispatcher and the work processes respond to the request. If the request is a request for the Java runtime environment, for example, the call of a Java Server Page (JSP), the ICM forwards the request to the Java dispatcher and one of the server processes responds to the request.
- In an AS ABAP+ Java system, data is also kept in separate database schemas (but in the same database installation). That is, work processes can only access ABAP data and server processes can only access Java data. In the data exchange, both runtime environments then communicate using the SAP Java Connector (JCo). This communication is necessary, for example, if billing data that is stored in the ABAP data schema is supposed to be displayed in a Java user interface.
- The SAP JCo is integrated into the AS Java and is also used when an AS Java system has to communicate with a remote AS ABAP system.

Processing User Requests in Java



A web browser is the standard user interface for AS Java. A user request for AS Java is usually an HTTP request that is received by the Java dispatcher. The dispatcher forwards the processing requests to one of the server processes of "its" instance.

Details on request processing

1. The actual processing takes place in the server process, whereby the user who sent the request is usually assigned the same server process again for the next request.
2. The dispatcher and server processes of AS Java are also called nodes. All processes of AS Java together with the database schema form the Java cluster. In contrast to the processes of AS ABAP (excluding the ICM), the cluster nodes of AS Java are multithreaded. This means that an AS Java process consists of many threads and one request can be processed in each thread. Hence, one server process always processes many user requests in parallel.
3. To process user requests it is often necessary to read data from the Java schema of the database or to write to it. To do so, each server process is connected multiple times to the Java schema of the database via a connection pool (DB pool).
4. Once processing is complete, the processing result from the server processes is returned to the web browser via the dispatcher.

Break



Exercise

Exercise

- Login to the server at the OS Level
- Identify the structure of the AS JAVA Instance , note the location of the profile files , log files and the kernel
- Start the browser and goto the URL : `http://servername:5<instance Number>00/`
- Navigate to system info link to get a clear understanding of the instance properties and the software components
- Now start the quicklink /nwa to start the Netweaver Administrator
- Using the logs & trace option under monitoring , open the latest files and note the nature of the logs created
- Start the Visual admin and walk through the dispatcher and server nodes. Note the manager & service names and their properties
- Start the config tool and navigate through the nodes & properties

