

WIS: Workflow Information System

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WIS: Table of Content

- **Process Benchmarking With Workflow Management**
- Principles of Data Warehousing
- Technology and Architecture
- Predefined Standard Analyses
- Statistical Evaluations
- Early Warning System
- Scenario Specific Customer Defined Analyses
- Summary and Outlook

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WIS: Process Benchmarking With Workflow Management

- **What is Workflow Management ?**

- Automation of business processes
- Distribution of work
 - ◆ in the appropriate order
 - ◆ to the responsible agent
 - ◆ in the right time
 - ◆ with all relevant information
- Electronic forms instead of paper
- Active deadline monitoring
- Exception handling
- Monitoring and Benchmarking



WIS: Process Benchmarking With Workflow Management

- **Motivation and Goals**

- Rapidly increasing demand for information in consideration of recent challenges such as
 - ◆ Lean management
 - ◆ Globalization and decentralization
 - ◆ Short product life cycles and fast changing markets
- Business process reengineering (BPR)
 - ◆ Identify weak points and bottlenecks
 - ◆ Continuous improvement of both processes and organizational structure in order to reduce processing times and costs

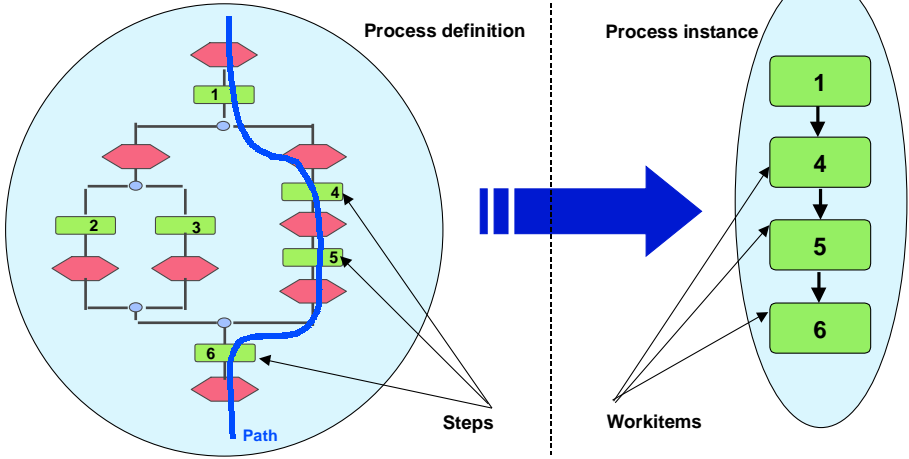


WIS: Process Benchmarking With Workflow Management

Build time

TERMINOLOGY

Run time



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WIS: Process Benchmarking With Workflow Management

Properties of a Workitem

scenario independent

- date and time

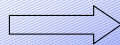
- ♦ creation, start, end
- ♦ desired, latest, real



duration
deadlines

- task

- ♦ dialog or batch



costs

- agent and department

- process instance and definition

- business objects

- ♦ business documents
- ♦ business entities

scenario specific

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WIS: Process Benchmarking With Workflow Management

- **Examples of Business Objects and Their Attributes**

- **Absence Form**
 - ◆ applicant and approver
 - ◆ total duration of vacation
- **Purchasing Order**
 - ◆ vendor
 - ◆ material
 - ◆ amount and price
- **Customer Complaint**
 - ◆ customer
 - ◆ product
 - ◆ priority



Purchasing Order
01/01/2000
Coca Cola Corp. Atlanta
100 x 12 Bottles \$ 500



WIS: Process Benchmarking With Workflow Management

- **Scenario Independent Key Issues**

- Frequency of processes and steps
- Duration of processes and steps
- Working versus waiting time
- Costs of processes and steps
- Critical steps and critical paths
- Time series
- Workload for certain organizational units
- Exceeded deadlines

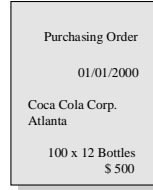


WIS: Process Benchmarking With Workflow Management



- **Scenario Specific Key Issues**

- **Vacation Approval**
 - ◆ approval rate per department
 - ◆ total vacation per employee
- **Purchasing**
 - ◆ total amount per material
 - ◆ total amount per vendor
- **Customer Service**
 - ◆ frequency of customer complaints per product
 - ◆ priorities per customer for given product
 - ◆ process duration per priority

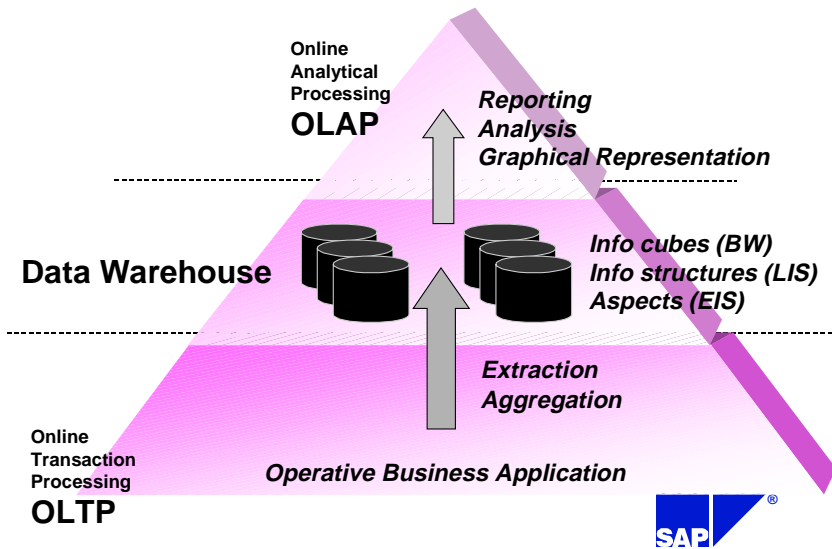


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- **Technology and Architecture**
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- **Statistical Evaluations**
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- **Scenario Specific Customer Defined Analyses**
- **Summary and Outlook**



WIS: Principles of Data Warehousing



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WIS: Principles of Data Warehousing

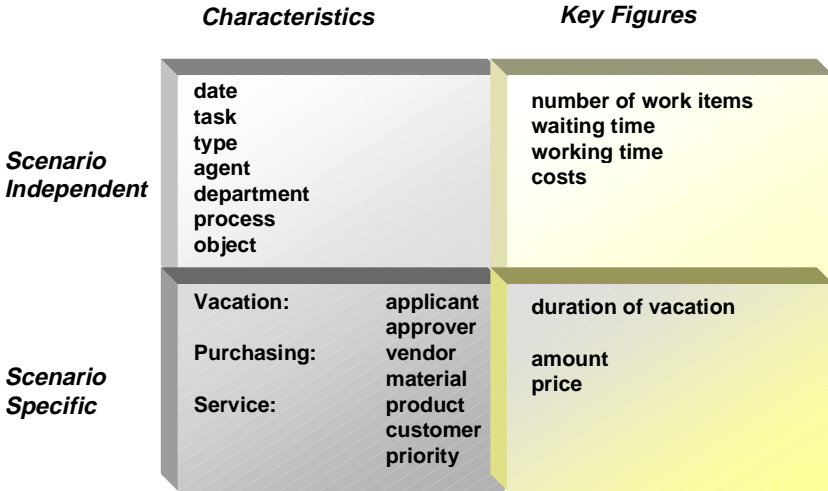
- **Info structures** are special database tables, whose fields can be distinguished into **characteristics** and **key figures**.
- **Characteristics** contain information, which can be used for **ordering, grouping** and **aggregation** of the data. At least one field with a **time period** is always part of the characteristics.
- **Key figures** contain the **measurable values** of interest.
- From a conceptual point of view **building a new information system** reduces to designing its info structures, i.e. **determination of characteristics and key figures**.



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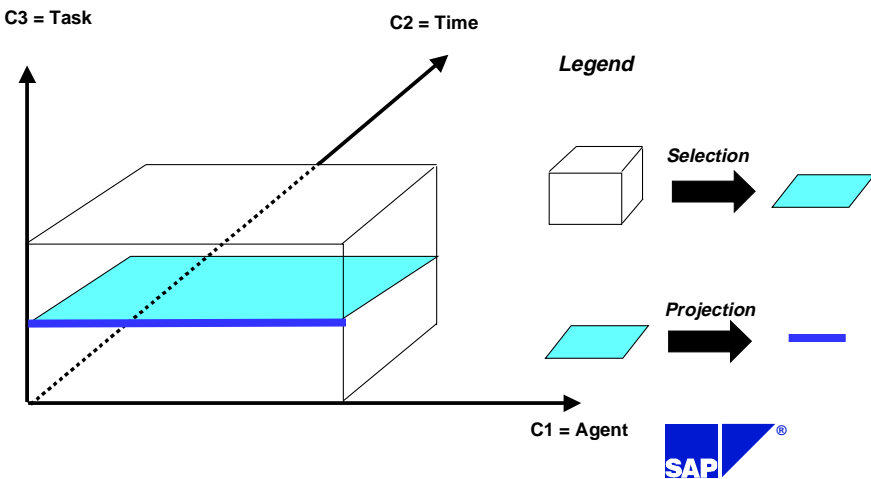
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WIS: Principles of Data Warehousing



WIS: Principles of Data Warehousing

From the Info Structure to the Standard Analysis I



WIS: Principles of Data Warehousing

● From the Info Structure to the Standard Analysis II

- The content of an info structure can be imagined as a subset of the n - dimensional space, where n is the number of characteristics
- Every info structure is associated with a straight forward evaluation report, the so called standard analysis
- Every linear subset (selection) drilled down by a certain characteristic (projection) can be represented as a ABAP list within that standard analysis
- There is free navigation between selections and projections
- The basic key figures should be additive



WIS: Principles of Data Warehousing

From the Info Structure to the Standard Analysis III

Agent	Number of	Mail Line	Working hrs
Total	17,000	8,030	2,813
ESTER LICBERT	15,000	8,560	1,993
Oliver MESSER	2,000	8,070	8,820



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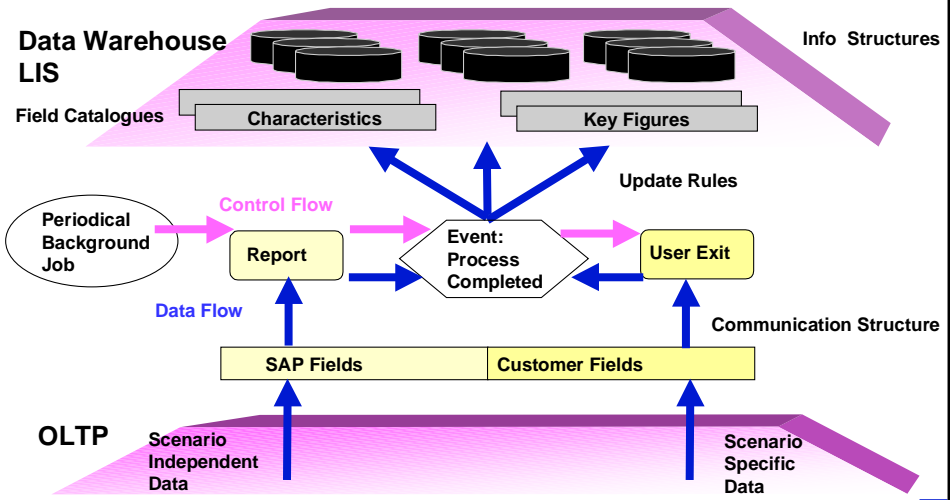


WIS: Technology and Architecture Preliminaries

- An **Event** in the sense of the Logistic Information System (LIS) is a point in time, where data are transferred from the OLTP into the data warehouse.
- The **LIS Inbound Interface** for external data consists of an event and a **Communication Structure**, which is a DDIC structure or an IDOC and determines the transformation format.
- The fields of the communication structure are to be grouped into **Field Catalogues**.
- The definition of the **Information Structures** is based upon these field catalogues.
- **Update Rules** define, how the data are mapped from the communication structure into the info structures.



WIS: Technology and Architecture Overview



WIS: Technology and Architecture Raising the Event

call function 'MCWF_ENTRY_EVENT_AA'

```

exporting
  I_ZEITP           = 'AA'

tables
  XMCWF_TRANS      = I_MCWF_TRANS

exceptions
  no_activate_infostructure = 1
  others              = 2.
    
```

internal table with reference to the communication structure, which has to be filled before



WIS: Technology and Architecture

Update Rules

Update Rule Configuration for WIS Total time completed:

- Event: Update
- Background: Consecutive updating
- Source table: MCWF_TRANS
- Source field name: TIME_TOTAL Total time completed
- Source table: WIS
- Table to be updated: MCWF_TRANS
- Table key: MC_WIS Primary key
- Extended code use:
 - Format: T88 Process Step
 - Requirement:
 - Program name:
 - Field name:
 - Assembly:

- instructions first given in form of table entries
- for every key figure of an info structure
- depending on the values of the characteristics
- full flexibility through formulae and requirements
- switch on / off (activation)
- syntax check
- generation of coding (form routines)
- compiling instead of interpreting (performance)
- update protocol (logging)

Characteristic	Source Field	Source Table	IS	L	NA	Field	Req.
Work Item	MCWF_TRANS	MC_WIS	R	R			
Field ID	MCWF_TRANS	MC_WIS_FIELD	R	R			
Work Item Type	MCWF_TRANS	MC_WIS_TYPE	R	R			
Process Instance	MCWF_TRANS	MC_WIS_INST	R	R			
Process Definition	MCWF_TRANS	MC_WIS_DEFN	R	R			

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WIS: Technology and Architecture

Summary

- Technically the WIS is an application (20) within the Logistic Information System (LIS).
- The LIS inbound interface for external data is used to transfer the data (event AA).
- The data are delivered by the report RMCADATA, which has to be scheduled periodically.
- The transformation format is described by the communication structure MCWF_TRANS (DDIC).
- A customer function EXIT_SAPLMCWF_001 has been implemented in order to keep the framework open for extensions.
- The standard LIS approach via field catalogues (FWF*), info structures (S300 to S305) and update rules (update group 100) applies.



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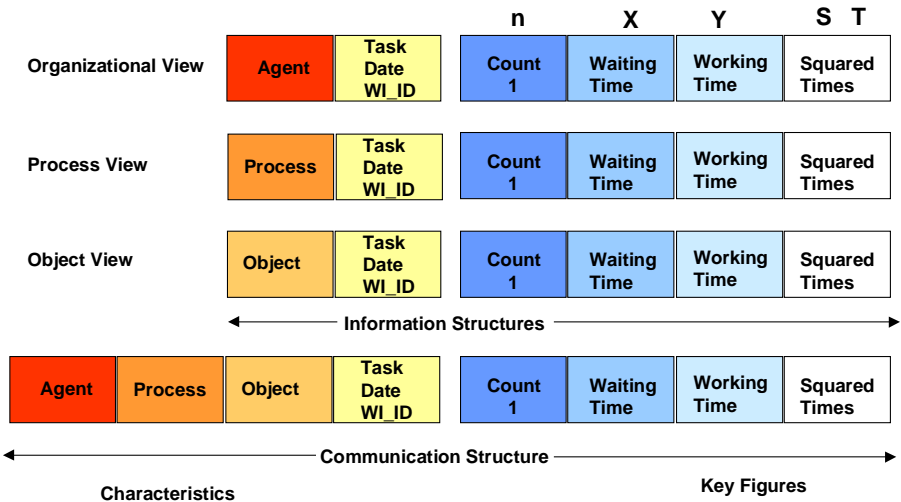


WIS: Predefined Standard Analyses

- Business content, which is available within the SAP standard
- There are 4 scenario independent analyses, which are different views upon the completed workitems
 - Organizational View (S300)
 - Process View (S301)
 - Object View (S302)
 - Group View (S303)
- There are 2 scenario specific analyses
 - Example Scenario Vacation Approval (S304)
 - Integration of PM / QM / SM Workflow Templates (S305)



WIS: Predefined Standard Analyses



WIS: Predefined Standard Analyses

- Group View is very similar to Object View, the latter is based on `_WI_Object_Id`, the former on `_WI_Group_Id`.
- All scenario independent info structures and hence the corresponding standard analyses have common key figures
- Among the characteristics they share the fields `WI_ID`, `TASK` and `DATE`.
- They differ in the remaining characteristics `AGENT`, `PROCESS` and `OBJECT`, which can be regarded as orthogonal dimensions.
- As long as `WI_ID` is part of the characteristics, no aggregation is achieved.



WIS: Predefined Standard Analyses

- **Configurable User Settings**
 - standard drilldown (sequence of characteristics)
 - pre-configured selection criteria
 - characteristics display as key or description
 - column selection and column width
 - key figures display as absolute or percent
 - list header w/o drill down log
- **Selection Versions**
 - save online selection
 - needed for background scheduling



WIS: Predefined Standard Analyses

- **Further Generic Functionality**
 - sorting and filtering
 - online documentation for key figures (F1-Help)
 - export to excel
 - send as a R/3 mail
 - archiving of stored selection versions
 - additional key figures through list methods
 - ◆ ABAP Forms
 - ◆ determine ratios or means
 - ◆ see example on next slide



WIS: Predefined Standard Analyses

The basic key figures

n

number of workitems

$$X = \sum_{k=1}^n X_k$$

$$Y = \sum_{k=1}^n Y_k$$

cumulated waiting (working) time

$$S = \sum_{k=1}^n X_k^2$$

$$T = \sum_{k=1}^n Y_k^2$$

cumulated squared waiting (working) time

are all additive. From them we can derive additional non-additive key figures with values depending on the chosen drill down. For example we have

$$\sigma = \sqrt{\frac{1}{n} \sum_{k=1}^n (Z_k - \bar{Z})^2} = \frac{1}{n} \sqrt{n(S+T) - (X+Y)^2}$$

the statistical deviation of the total time $Z = X + Y$. Notice that this deviation can be computed without knowing the individual

$$X_k \quad Y_k.$$

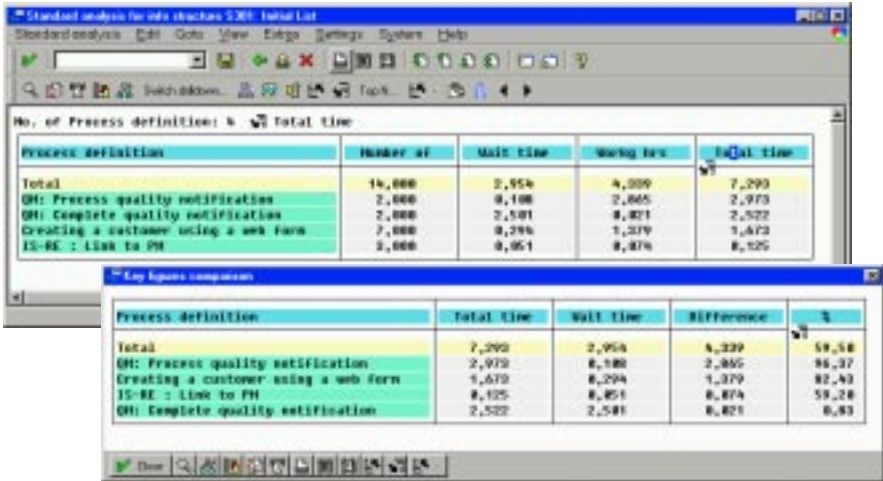


WIS: Table of Content

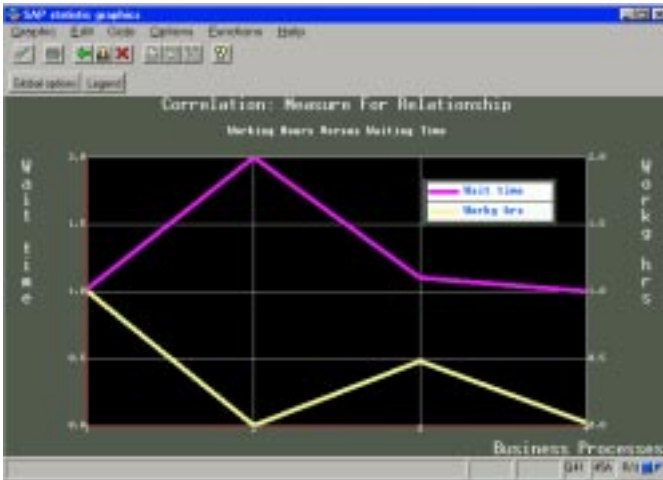
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WIS: Statistical Evaluations Comparison of Key Figures



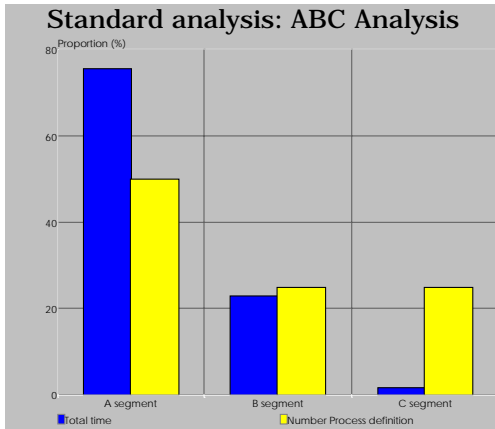
WIS: Statistical Evaluations Correlation of Key Figures



The evolution and the relationship of two key figures is normalized and visually represented according to the current order in the list.

WIS: Statistical Evaluations

ABC Analysis

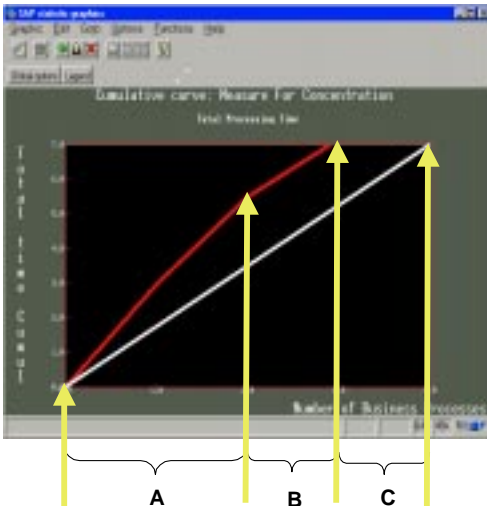


- A** The 50% most expensive processes afford 75% of the time.
- B** The 25% next expensive processes afford 22% of the time.
- C** The remaining 25% of the processes afford the remaining 3 % of the time.



WIS: Statistical Evaluations

Cumulative Curve



- Continuous ABC-analysis
- The red cumulative curve always lies above the white diagonal
- The area between them is a measure for the concentration



WIS: Statistical Evaluations 3D Graphics

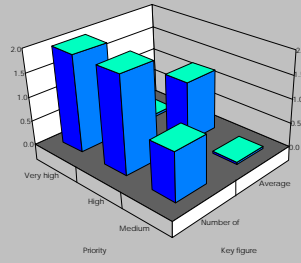
Statistical analysis for data structure: L005, Follow-up

Notification type Customer Complaint

No. of Priority: 3

Priority	Number of	Total time	Average	Dispersion
Total	3,000	3,700	1,233	0,877
Very high	2,000	3,120	1,560	0,804
High	2,000	2,200	1,100	0,278
Medium	1,000	0,380	0,380	0,000

Notification type Customer Complaint



WIS: Statistical Evaluations Portfolio



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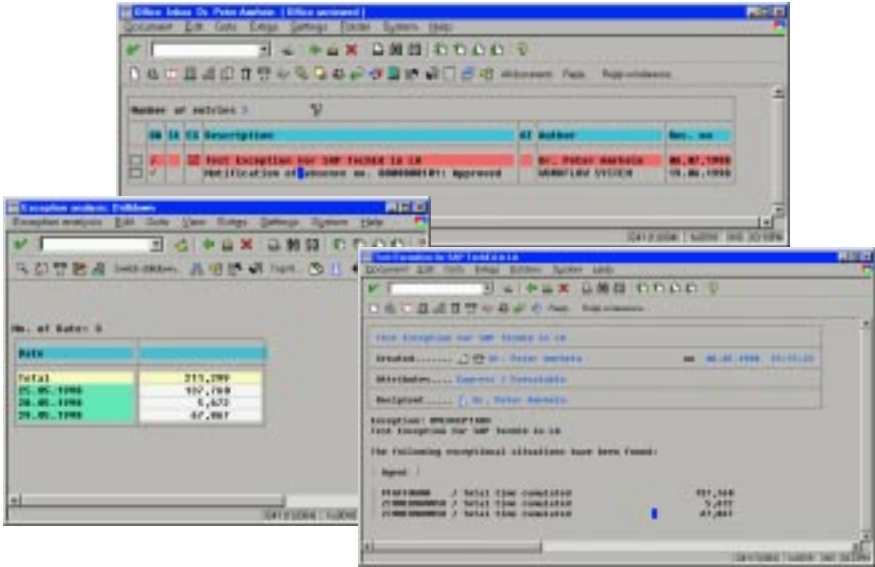


WIS: Early Warning System Basic Concepts

- Active monitoring
- System driven week point identification
- Definition and scheduling of exceptions
 - selection of info structure, characteristic and key figure
 - requirements
 - ◆ threshold value analysis
 - ◆ trend analysis
 - ◆ planned / actual comparison
 - follow-up processing
 - ◆ send executable mail
 - ◆ create workflow event



WIS: Early Warning System An Example

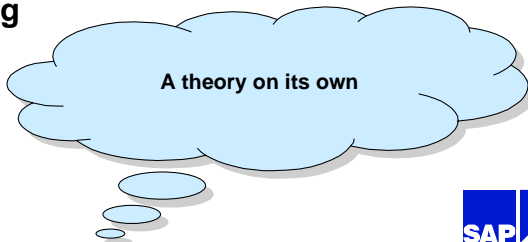


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WIS: Early Warning System... ... and further features

- **Flexible Analysis**
 - additional reporting based on the “Report Writer”
 - more than one characteristic per list
- **Info Library**
 - classification of key figures
 - customer defined info-sets
- **Planning**



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WIS: Scenario Specific Customer Defined Analyses

KEY QUESTIONS

- What are the relevant tasks ?
- What are the data of interest ?
- Which of them is characteristic, which key figure ?
- Which of the key figures need a unit ?
- How can the data be read from the container ?
- What are the appropriate references ?



WIS: Scenario Specific Customer Defined Analyses

SAMPLE SCENARIO: VACATION APPROVAL

- Task
 - workflow template WS20000011
- Additional data of interest
 - status: approved/rejected (characteristic)
 - applicant (characteristic)
 - total days of vacation (key figure)



WIS: Scenario Specific Customer Defined Analyses

TECHNICAL DETAILS: HOW TO ACCESS THE DATA

- Status: approved/rejected
 - container element: *PROCSTATE*
 - data element: *SWX_PRO CST*
- Applicant
 - container element: *ABSENCEFORM*
 - object attribute: *CREATEDBY*
 - data element: *SWX_ORDBY*



WIS: Scenario Specific Customer Defined Analyses

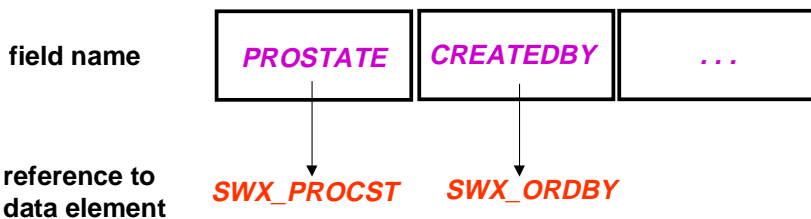
STEPS TO AN OWN ANALYSIS

- **STEP 1**
 - Extend the communication structure by a customer include containing the new fields (append structure).
- **STEP 2**
 - Write ABAP coding to fill the new fields (customer exit).
- **STEP 3**
 - Assign the new fields to a new field catalogue.
 - Create a info structure containing the new fields.
 - Define the update rules by accepting the proposal.
 - Generate the standard analysis.



WIS: Scenario Specific Customer Defined Analyses

APPEND STRUCTURE



WIS: Scenario Specific Customer Defined Analyses

FRAMEWORK OF THE CUSTOMER EXIT

```
function EXIT_SAPLMCWF_001
*-----
*   tables XMCWF_TRANS structure MCWF_TRANS
*-----

    loop at xmcwf_trans.

        case xmcwf_trans-wi_rh_task.

            when 'WS20000011'.

                read work item container

            when others.

        endcase.

    endloop.
Endfunction.
```

WIS: Scenario Specific Customer Defined Analyses

READING A CONTAINER ELEMENT

```
data: PROCSTATE like mcfw_trans- PROCSTATE.

call function 'SWI_READ_CONTAINER_ELEMENT'
    exporting
        wi_id      = xmcwf_trans-wi_id
        element    = 'PROCSTATE'
    importing
        value      = PROCSTATE
    exceptions
        others    = 1.

if sy-subrc = 0.

    xmcwf_trans- PROCSTATE = PROCSTATE.
    modify xmcwf_trans.

endif.
```

WIS: Scenario Specific Customer Defined Analyses

READING AN OBJECT ATTRIBUTE

```
data: CREATEDBY like mcwf_trans-CREATEDBY.

call function 'SWI_READ_OBJECT_ATTRIBUTE'
  exporting
    wi_id      = xmcwf_trans-wi_id
    element    = 'ABSENCEFORM'
    attribute  = 'CREATEDBY'
  importing
    value      = CREATEDBY
  exceptions
    others     = 1.

if sy-subrc = 0.

  xmcwf_trans-CREATEDBY = CREATEDBY.
  modify xmcwf_trans.

endif.
```

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WIS: Summary and Outlook Benefits

- **WIS combines data warehousing with workflow management, both technologies of high strategic importance.**
- **WIS consists of pre-configured standard analyses, which cover the scenario independent key issues and provide rich statistical evaluation facilities.**
- **WIS can easily be extended in order to integrate customer specific workflow definitions.**
- **WIS is part of the SAP Data Warehouse (LIS) and will automatically gain from all future enhancements.**



WIS: Summary and Outlook Evolution

- **R/3 Release 3.0A**
 - **Workitem Analysis**
 - ◆ frequency, duration, deadline
- **R/3 Release 3.0C**
 - **Object Links**
 - ◆ workflow context of a business object
- **R/3 Release 3.1G**
 - **Workload Analysis**
 - ◆ workitems completed by an organizational unit with an interface to excel
- **R/3 Release 4.0A**
 - **WIS**



WIS: Summary and Outlook

What's Next

- **Migration Into Business Information Warehouse (BW)**
 - SAP's warehouse solution for the "next millenium"
 - own product, own physical system
 - high volume, high performance staging engine
 - administrator's workbench
 - business explorer with appealing user interface
- **Integration With Workflow Definition Tools**
 - specify the reporting when designing the process
 - generate the info system from these specification
- **Simulation**



The End

Thank You Very Much

