Specifik Software

Domain Analysis - Euro

The Euro problem is an example of a project type, (like the Y2K problem) involving nearly all the application components (programs, data bases etc.). Everybody, participating in the Y2K projects, knows how complex, this task was. The projects were expensive, took a long time and were not especially interesting for the project participants. Most big installations used tools for mapping and analyzing the problem, and some also used tools to solve the problem.

In spite of a very big investment and in spite of use of tools, the result was not perfect.
Specifik Software also developed a tool Specifik/2000, aimed for these projects.

The purpose with this tool was not to analyze or solve the problem, but to verify that the problem was solved correctly.

I 1998/1999 230.000.000 lines of code were verified with this tool. The systems had been corrected, tested and made ready for production. Non the less Specifik/2000 found in average an error per 10.000 lines of code!
This illustrates clearly how difficult it is to perform 'mass changes' on big and complex systems, which often has been developed over a long period (up to 40 years).
Specifik Software has now developed a general tool for domain analysis (like EURO).

The Euro task is also a 'mass change' project. But there are considerable differences compared to the Y2K task.

The Y2K problem was technically simple. One program usually could be changed independent of other programs and without knowledge of the programs/systems functionality. The correlation between subsystems was minimal (the bridge problem). And one could put the total system into service as a sequence of 'mini bangs'.

The Euro problem is also technically simple. But a program normally can not be changed without knowledge of the programs/systems functionality. The correlation between subsystems is big. And one could be forced to put the total system into service as a 'big bang'. Many changes demands a business decision.
The correlation to the outside world can be big (ex. political decisions regarding taxes etc.).

European experiences shows that the Euro project both could cost considerable more (factor 10) than the Y2K project, but also less.
Specifically the interface (bridge) problems were underestimated.
(ref. Svenska Statskontoret publ 2002:9, page 61, Øvergången til euro. Erfarenheter från den offentlige sektorn i eurolænderna.
www.Statskontoret.se).

Problem areas

The following is a list of examples of problems, and is in no way complete,

Bank tellers
Banks (others)
Big money
Bonds
Card systems
Central Bank
Code values
Commissions
Data conversion
Decimals
Edifact
EMU
Encrypted values
Exchange of rates
External interfaces
Factors
Interests
Post
Premiums
Prices
Print
Properties
Risks
Roundings
Scales
Screens
Small money
Special values
Stocks
SWIFT
Taxes
Texts
Threshold values
Validation
Vat

The Analysis

The prerequisite to solve the Euro problem as efficiently as possible (read cheap), is a precise mapping and documentation of constructions, which are Euro relevant.

- interfaces,
  model analysis (bridges)

- algorithms,
  X = Y * 1,30 + Z * 0,25 / 100
  …

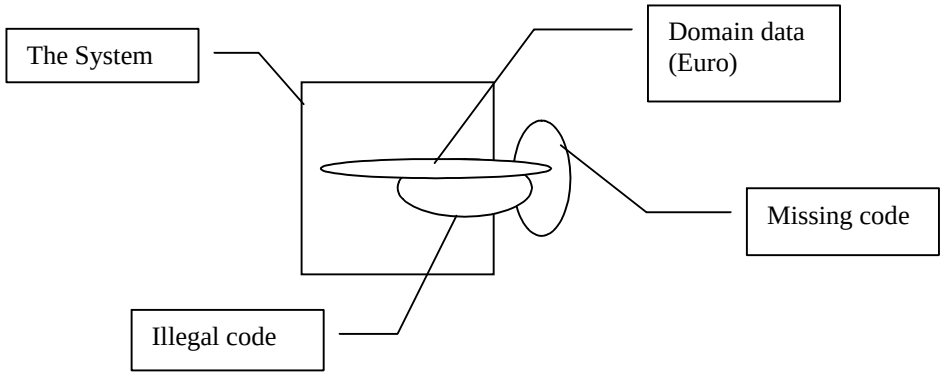
- variable and constants,

Currency:	BELOPP-0 PIC S9(13)V99.
Scale:	BELOPP-1 = BELOPP-0 / 1000
Factor:	BELOPP-2 = BELOPP-0 * 100
Exchange:	BELOPP-3 = BELOPP-0 * KURS
Number:	ANTAL = BELOPP-3 / BELOPP-2
Threshold:	BELOPP-3 > 1200,00
Text:	'SEK'

Consistence

The Euro analysis naturally must be performed on a system. But what is the system?. In the real world parts of the system might be wrong or even missing. Experience shows it can take a long time (many months) to establish a complete and consistent system.

This is the reality and a tool must be able to cope with this. Re2Spec/Euro always documents the system, no matter its quality. Ex.. *ghost variables are used*, if copy/include files are missing. This means, that there always is a progress in the project.



Analysis principle

The best analysis tools simulates the execution if the systems components. Ex. If B is a currency, and A = B, then A is also a currency. This simulation can create two problems, false positive and false negative (also known from Y2K projects).

False positive means, that there are variables/constants marked as Euro related, but which are not.

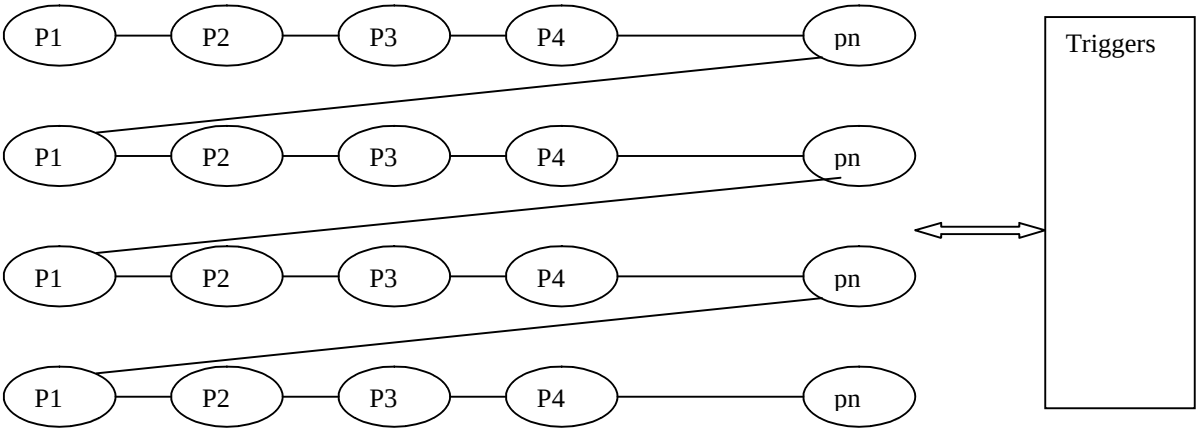
False negative means, that there are variables/constants, which are Euro related, but are not marked.

By using a perfect tool the number of false positive and false negative both should be 0. But this tool does not exist. Therefore there is a need for a calibration function, which makes it possible to fulfill this ideal demand.

Specifik Concept

Re2Spec/Euro analyses through simulation, both on program level and on system level.
The analysis/simulation uses ’pattern matching’ algorithms, to find domain (Euro) related constructions (variables, constants, statements etc.).
The analysis/simulation iterates n times, and stops when no new data are detected.

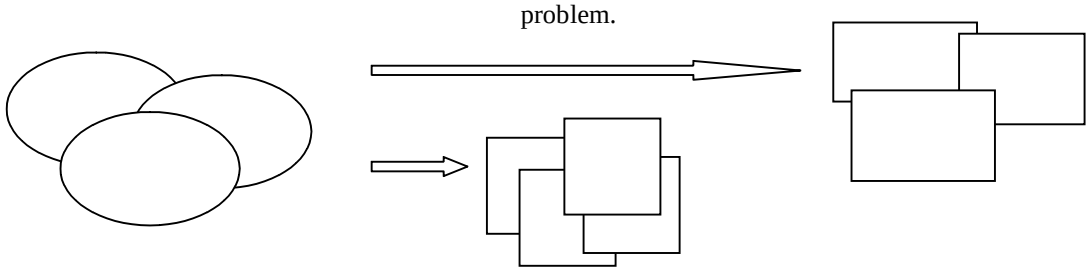
Interface related data (copy, call etc.) are stored in a repository (Triggers), and are used to propagate domain data between components.
This repository can be updated with calibration data, so the ideal goal can be achieved. (0 false positive and 0 false negative).



Modeling (interfaces/bridges)

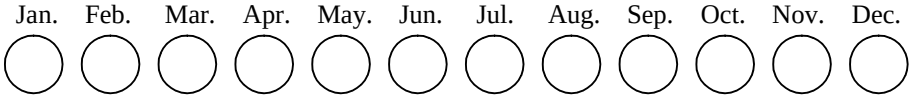
Big systems consists of many subsystems. This means, there will be problems between 2 subsystems, if one system is changed, and the other one is not, and the subsystems has a common interface (ex. a database). These interfaces, ’bridges’, are numerous and difficult to revise.

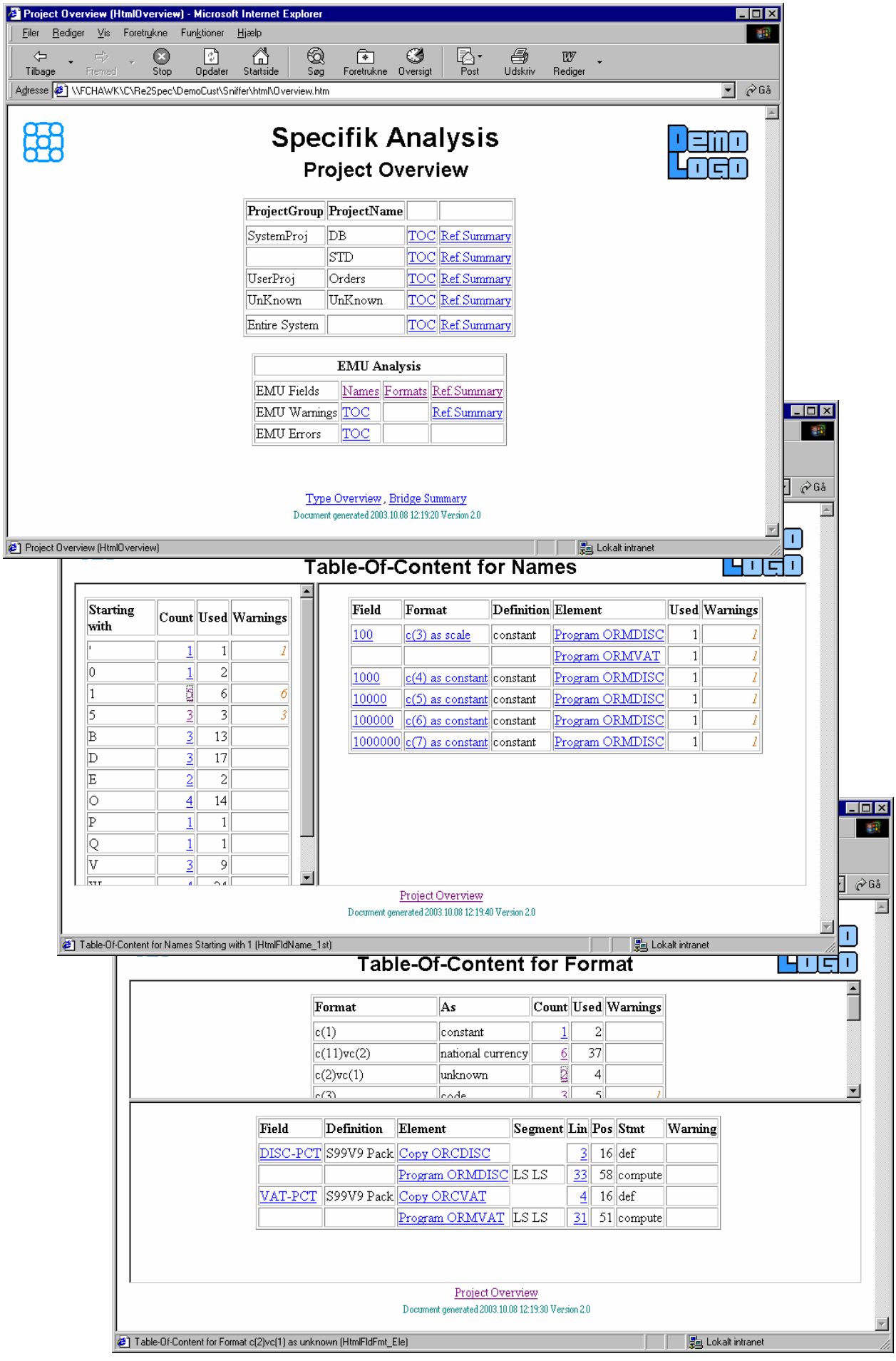
Re2Spec maps all interfaces between all subsystems and all component types.
Additionally Re2Spec has functions for defining virtual subsystems (by using set mathematics), so it is easy and quick to experiment with different subsystem boundaries, ex.. to minimize the interface problem.

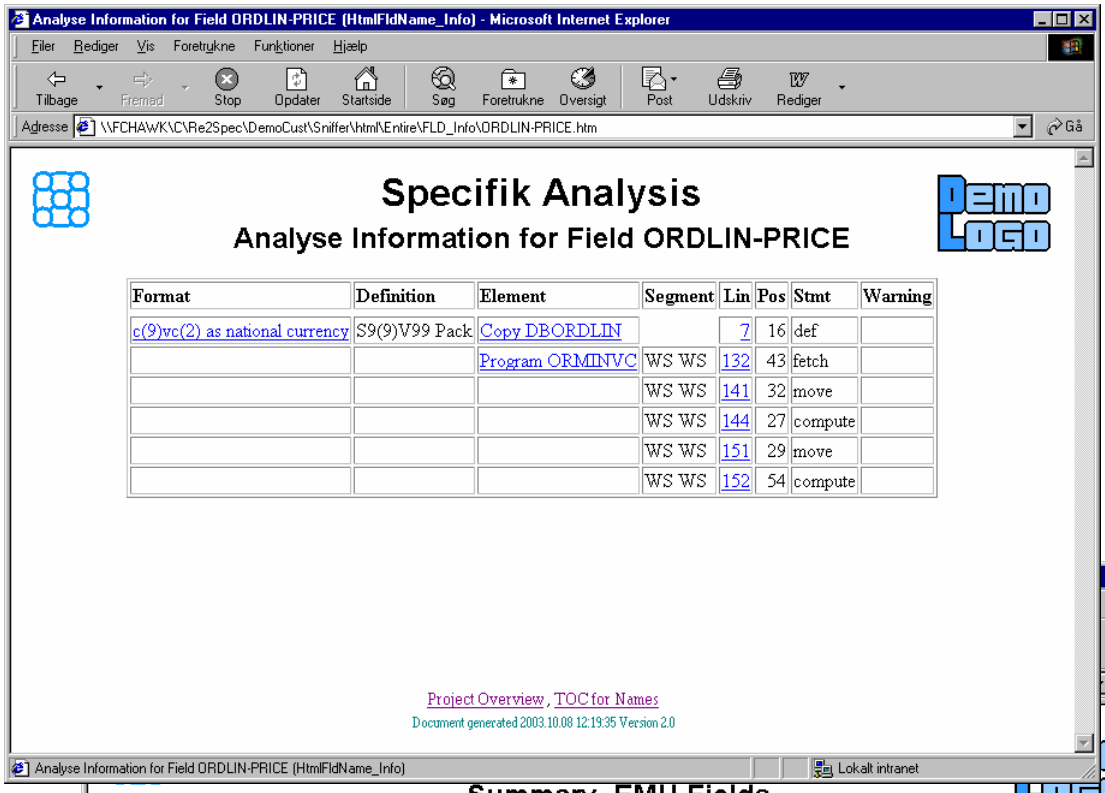


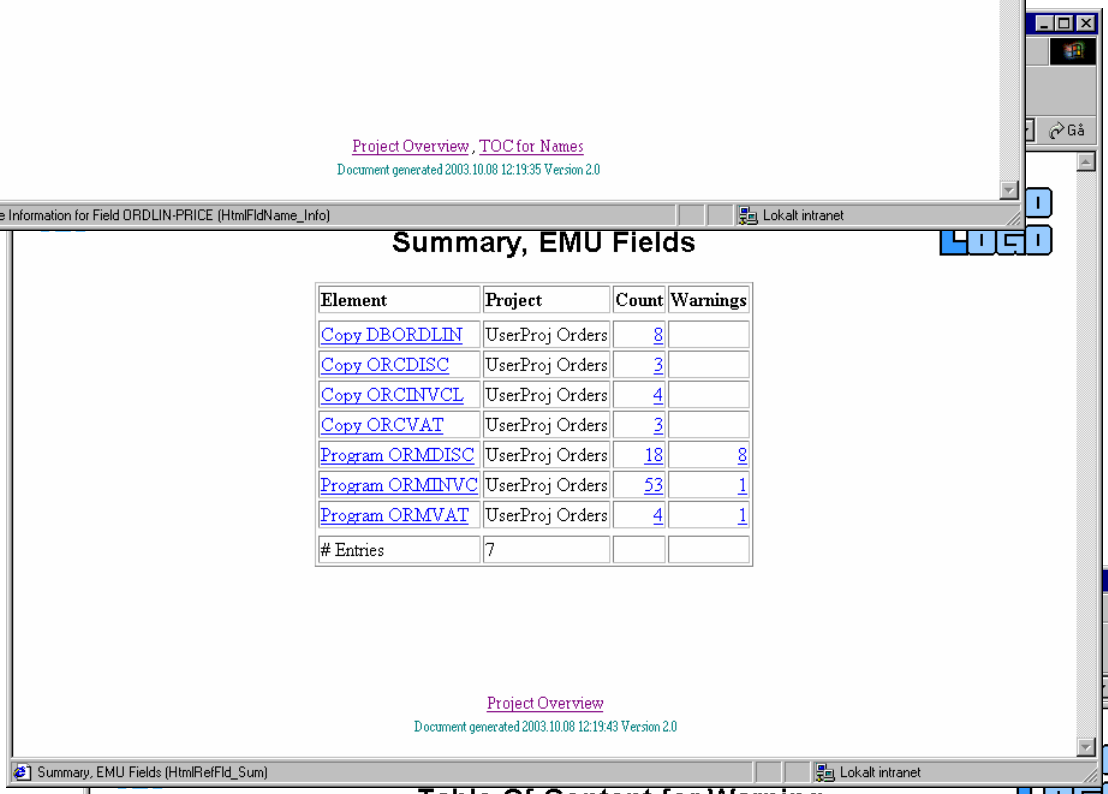
Documentation

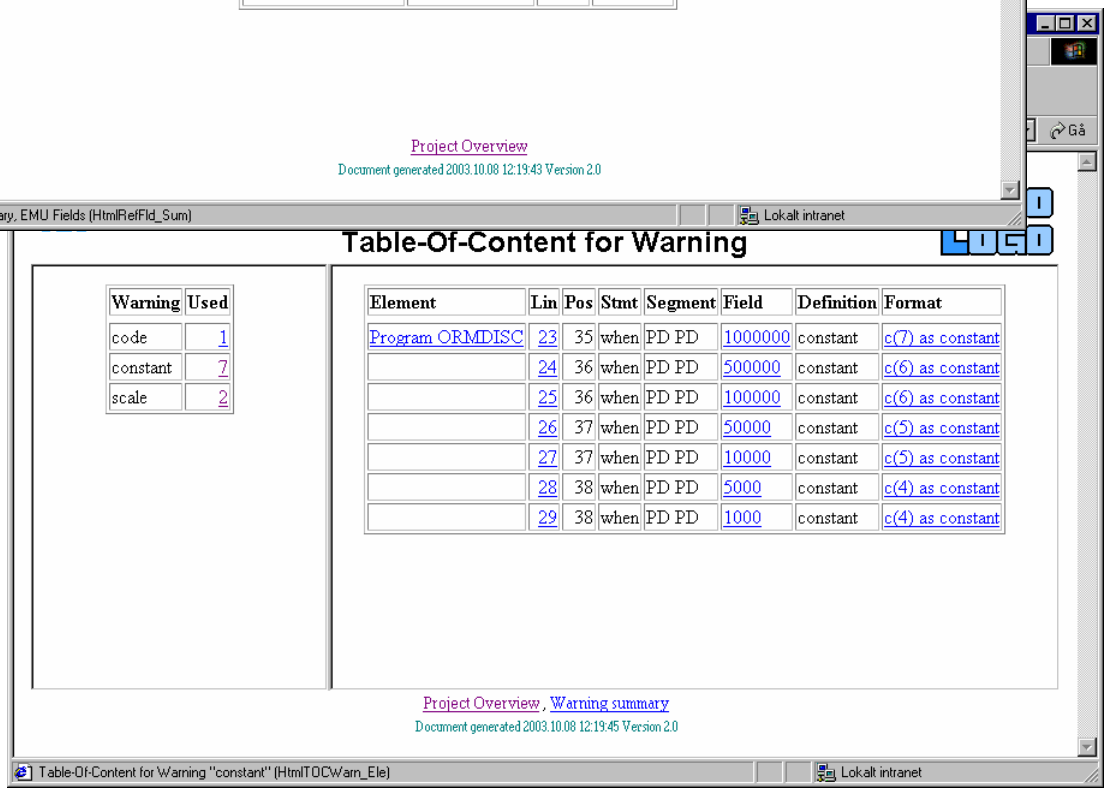
All documentation is done either statically via Html documents or dynamically via Re2Spec/Desktop.
Big projects can last 2 – 3 calendar years. If one throughout the project creates CD’s or other backups with the generated Html documentation, a documentation archive can be established, which makes it possible to browse in the total system documentation as it looked at various times.

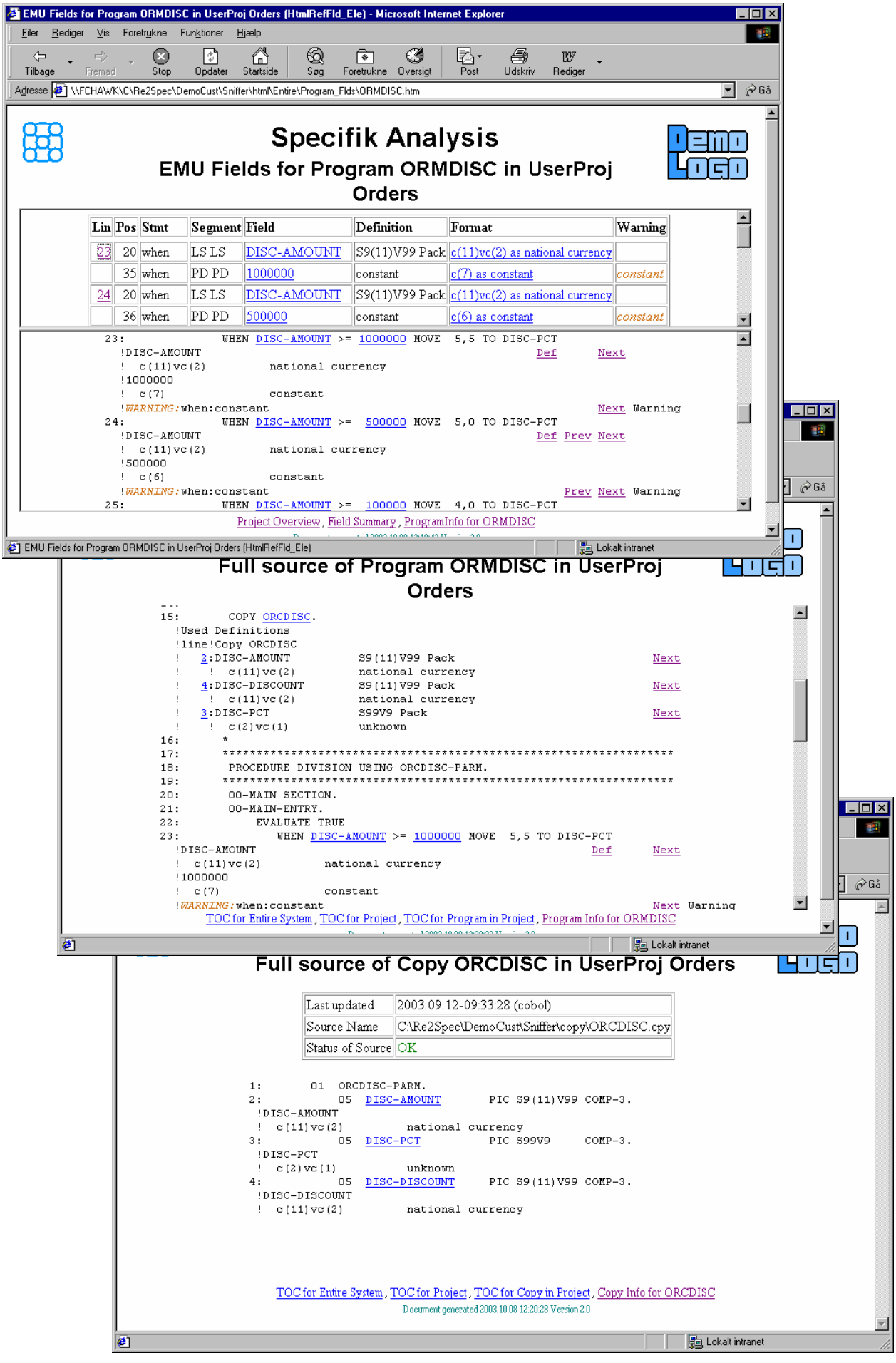



Project Overview (HtmlOverview) - Microsoft Internet Explorer
Filer Rediger Vis Foretrukne Funktioner Hjælp
Tilbage Fremad Stop Opdater Startside Søg Foretrukne Oversigt Post Udskriv Rediger
Adresse \\FCHAWK\C\Re2Spec\DemoCust\Sniffer\html\Overview.htm
Gå
Specifik Analysis
Project Overview
DemoLogo
ProjectGroup ProjectName
SystemProj DB TOC Ref.Summary
STD TOC Ref.Summary
UserProj Orders TOC Ref.Summary
UnKnown UnKnown TOC Ref.Summary
Entire System TOC Ref.Summary
EMU Analysis
EMU Fields Names Formats Ref.Summary
EMU Warnings TOC Ref.Summary
EMU Errors TOC
Type Overview , Bridge Summary
Document generated 2003.10.08 12:19:20 Version 2.0
Project Overview (HtmlOverview)
Lokalt intranet
Table-Of-Content for Names
Starting with Count Used Warnings
' 1 1 1
0 1 2
1 6 6
5 3 3
B 3 13
D 3 17
E 2 2
O 4 14
P 1 1
Q 1 1
V 3 9
Field Format Definition Element Used Warnings
100 c(3) as scale constant Program ORMDISC 1 1
Program ORMVAT 1 1
1000 c(4) as constant constant Program ORMDISC 1 1
10000 c(5) as constant constant Program ORMDISC 1 1
100000 c(6) as constant constant Program ORMDISC 1 1
1000000 c(7) as constant constant Program ORMDISC 1 1
Project Overview
Document generated 2003.10.08 12:19:40 Version 2.0
Table-Of-Content for Names Starting with 1 (HtmlFldName_1st)
Lokalt intranet
Table-Of-Content for Format
Format As Count Used Warnings
c(1) constant 1 2
c(11)vc(2) national currency 6 37
c(2)vc(1) unknown 2 4
c(3) code 3 5 1
Field Definition Element Segment Lin Pos Stmt Warning
DISC-PCT S99V9 Pack Copy ORCDISC 3 16 def
Program ORMDISC LS LS 33 58 compute
VAT-PCT S99V9 Pack Copy ORCVAT 4 16 def
Program ORMVAT LS LS 31 51 compute
Project Overview
Document generated 2003.10.08 12:19:30 Version 2.0
Table-Of-Content for Format c(2)vc(1) as unknown (HtmlFldFmt_Ele)
Lokalt intranet


Analyse Information for Field ORDLIN-PRICE (HtmlFldName_Info) - Microsoft Internet Explorer
Filer Rediger Vis Foretrukne Funktioner Hjælp
Tilbage Fremad Stop Opdater Startside Søg Foretrukne Oversigt Post Udskriv Rediger
Adresse \\FCHAWK\C\Re2Spec\DemoCust\Sniffer\html\Entire\FLD_Info\ORDLIN-PRICE.htm
Gå
Specifik Analysis
Analyse Information for Field ORDLIN-PRICE
Format Definition Element Segment Lin Pos Stmt Warning
c(9)vc(2) as national currency S9(9)V99 Pack Copy DBORDLIN 7 16 def
Program ORMINVC WS WS 132 43 fetch
WS WS 141 32 move
WS WS 144 27 compute
WS WS 151 29 move
WS WS 152 54 compute
Project Overview , TOC for Names
Document generated 2003.10.08 12:19:35 Version 2.0
Analyse Information for Field ORDLIN-PRICE (HtmlFldName_Info)
Lokalt intranet


Gå
Summary, EMU Fields
Element Project Count Warnings
Copy DBORDLIN UserProj Orders 8
Copy ORCDISC UserProj Orders 3
Copy ORCINVCL UserProj Orders 4
Copy ORCVAT UserProj Orders 3
Program ORMDISC UserProj Orders 18 8
Program ORMINVC UserProj Orders 53 1
Program ORMVAT UserProj Orders 4 1
Entries 7
Project Overview
Document generated 2003.10.08 12:19:43 Version 2.0
Summary, EMU Fields (HtmlRefFld_Sum)
Lokalt intranet


Gå
Table-Of-Content for Warning
Warning Used
code 1
constant 7
scale 2
Element Lin Pos Stmt Segment Field Definition Format
Program ORMDISC 23 35 when PD PD 1000000 constant c(7) as constant
24 36 when PD PD 500000 constant c(6) as constant
25 36 when PD PD 100000 constant c(6) as constant
26 37 when PD PD 50000 constant c(5) as constant
27 37 when PD PD 10000 constant c(5) as constant
28 38 when PD PD 5000 constant c(4) as constant
29 38 when PD PD 1000 constant c(4) as constant
Project Overview , Warning summary
Document generated 2003.10.08 12:19:45 Version 2.0
Table-Of-Content for Warning "constant" (HtmlTOCWarn_Ele)
Lokalt intranet



EMU Fields for Program ORMDISC in UserProj Orders (HtmlRefFld_Ele) - Microsoft Internet Explorer

Filer Rediger Vis Foretrukne Funktioner Hjælp

Tilbage Fremad Stop Opdater Startside Søg Foretrukne Oversigt Post Udskriv Rediger

Adresse \\FCHAWK\C\Re2Spec\DemoCust\Sniffer\html\Entire\Program_Flds\ORMDISC.htm

Specifik Analysis

EMU Fields for Program ORMDISC in UserProj Orders

Lin	Pos	Stmt	Segment	Field	Definition	Format	Warning
23	20	when	LS LS	DISC-AMOUNT	S9(11)V99 Pack	c(11)vc(2) as national currency	
	35	when	PD PD	1000000	constant	c(7) as constant	constant
24	20	when	LS LS	DISC-AMOUNT	S9(11)V99 Pack	c(11)vc(2) as national currency	
	36	when	PD PD	500000	constant	c(6) as constant	constant

```
23:              WHEN DISC-AMOUNT >= 1000000 MOVE  5,5 TO DISC-PCT
  !DISC-AMOUNT                                                Def      Next
  !  c(11)vc(2)          national currency
  !1000000
  !  c(7)                constant
  !WARNING:when:constant                                              Next Warning
24:              WHEN DISC-AMOUNT >=  500000 MOVE  5,0 TO DISC-PCT
  !DISC-AMOUNT                                                Def Prev Next
  !  c(11)vc(2)          national currency
  !500000
  !  c(6)                constant
  !WARNING:when:constant                                         Prev Next Warning
25:              WHEN DISC-AMOUNT >=  100000 MOVE  4,0 TO DISC-PCT
```

Project Overview , Field Summary , ProgramInfo for ORMDISC

EMU Fields for Program ORMDISC in UserProj Orders (HtmlRefFld_Ele) — Lokalt intranet

Full source of Program ORMDISC in UserProj Orders

```
---
15:       COPY ORCDISC.
  !Used Definitions
  !line!Copy ORCDISC
  !   2:DISC-AMOUNT          S9(11)V99 Pack                          Next
  !     !  c(11)vc(2)        national currency
  !   4:DISC-DISCOUNT        S9(11)V99 Pack                          Next
  !     !  c(11)vc(2)        national currency
  !   3:DISC-PCT             S99V9 Pack                              Next
  !     !  c(2)vc(1)         unknown
16:       *
17:       ****************************************************************
18:        PROCEDURE DIVISION USING ORCDISC-PARM.
19:       ****************************************************************
20:        00-MAIN SECTION.
21:        00-MAIN-ENTRY.
22:            EVALUATE TRUE
23:               WHEN DISC-AMOUNT >= 1000000 MOVE  5,5 TO DISC-PCT
  !DISC-AMOUNT                                                Def      Next
  !  c(11)vc(2)          national currency
  !1000000
  !  c(7)                constant
  !WARNING:when:constant                                              Next Warning
```

TOC for Entire System , TOC for Project , TOC for Program in Project , Program Info for ORMDISC

Lokalt intranet

Full source of Copy ORCDISC in UserProj Orders

Last updated	2003.09.12-09:33:28 (cobol)
Source Name	C:\Re2Spec\DemoCust\Sniffer\copy\ORCDISC.cpy
Status of Source	OK

```
1:        01  ORCDISC-PARM.
2:            05  DISC-AMOUNT        PIC S9(11)V99 COMP-3.
  !DISC-AMOUNT
  !  c(11)vc(2)          national currency
3:            05  DISC-PCT           PIC S99V9     COMP-3.
  !DISC-PCT
  !  c(2)vc(1)           unknown
4:            05  DISC-DISCOUNT      PIC S9(11)V99 COMP-3.
  !DISC-DISCOUNT
  !  c(11)vc(2)          national currency
```

TOC for Entire System , TOC for Project , TOC for Copy in Project , Copy Info for ORCDISC

Document generated 2003.10.08 12:20:28 Version 2.0

Lokalt intranet

Recommended configuration.

Software:

Java	Sun/JDK 1.3.1
Db	MySql 3.23.51
	MySql Connector 3.0.1

Hardware:

Processor	500 mHz
Memory	256 Mb (server)
	128 Mb (client)
Disk	xGb depending on application size
OS	Windows 95,98,2000 or NT 4.0

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