Egger, Fiechter, Kramer, Sawicki, Straub, Weber

SAP Business Intelligence
# Contents at a Glance

1. Business Intelligence Concepts—Innovations .............. 27  
2. New Features of SAP NetWeaver 2004s—An Overview ................................................................. 67  
3. Data Modeling in the Data Warehousing Workbench of SAP NetWeaver 2004s BI ............... 155  
4. Data Retrieval ................................................................. 213  
5. Performance Optimization with Aggregates and BI Accelerator ......................................................... 263  
6. Redesign Functions: Repartitioning and Remodeling ............................................................. 297  
7. BEx Query Designer ......................................................... 325  
8. Business Explorer Analyzer ................................................ 365  
9. BEx Web Application Designer ....................................... 387  
10. Report Designer ...................................................... 425  
11. BI-Integrated Planning .................................................. 451  
12. SAP NetWeaver Visual Composer ......................... 535  
A. Abbreviations .......................................................... 631  
B. New Terminology ........................................................ 633  
C. Transaction Codes ..................................................... 635  
D. Literature ................................................................. 641  
E. Authors ................................................................. 643
Contents

Preface ........................................................................................................... 15
Foreword ......................................................................................................... 19

Introductory Notes .................................................................................... 21

1 Business Intelligence Concepts—Innovations ............................... 27
  1.1 The Closed-Loop Business Analytics Process .................. 27
  1.2 Implementation in Modern Data-Warehousing Systems .......................................................... 32
  1.3 New Features in SAP NetWeaver 2004s ......................... 36
     1.3.1 Enterprise Services Architecture (ESA) .......... 37
     1.3.2 The Enterprise Data Warehouse (EDW) .......... 42
     1.3.3 Real-Time Data Warehousing ..................... 45
     1.3.4 Information Lifecycle Management and the Use of Nearline Storage .................. 47
     1.3.5 Clustering (Reclustering), Partitioning (Repartitioning), and Remodeling Functions ... 49
     1.3.6 The New ETL Process, Including Transformation Rules and Data Transfer ........ 53
     1.3.7 The Business Intelligence Accelerator and Its Search and Classification Functions (TREX) ... 54
     1.3.8 Advanced Analytics Applications .................. 58
     1.3.9 BI-Integrated Planning ................................ 59
     1.3.10 The Composite Application Framework and Barrier-Free Applications ................ 61

2 New Features of SAP NetWeaver 2004s—An Overview .................. 67
  2.1 SAP NetWeaver 2004s ......................................................... 67
  2.2 Software Components and User Interfaces ......................... 68
     2.2.1 Data Warehousing Workbench ........................ 68
     2.2.2 BEx Query Designer ........................................ 74
     2.2.3 Report Designer .............................................. 76
     2.2.4 Web Application Designer ............................... 77
     2.2.5 BEx Analyzer and Workbook Design .......... 78
     2.2.6 BEx Web Analyzer ........................................... 79
Contents

2.2.7 Planning Modeler and Planning Wizard ........ 80
2.2.8 Visual Composer ....................................... 82

2.3 Enterprise Data Warehousing: Data Modeling .......... 85
2.3.1 InfoObjects .............................................. 85
2.3.2 DataStore Objects ...................................... 87
2.3.3 InfoCubes, VirtualProviders, and MultiProviders .......... 93
2.3.4 InfoSets ................................................... 95
2.3.5 Modeling Aspects: Remodeling and Partitioning ........ 97

2.4 Enterprise Data Warehousing: ETL and Administration .... 101
2.4.1 Data Flow Concept in SAP NetWeaver 2004s ............. 101
2.4.2 Source Systems and DataSources ...................... 102
2.4.3 Transformation .......................................... 105
2.4.4 Controlling the Data Flow with InfoPackages and DTP ... 111
2.4.5 Process Chains ........................................... 118

2.5 Enterprise Reporting, Query, and Analysis ........... 122
2.5.1 Query Design ............................................. 123
2.5.2 MS Excel Integration and Workbook Design ............. 126
2.5.3 BEx Web Analyzer ...................................... 128
2.5.4 Formatted Reports ..................................... 129
2.5.5 Web Applications and Web Printing ................... 132
2.5.6 Information Broadcasting ................................ 141

2.6 Business Planning and Analytical Services ............ 142
2.6.1 BI-Integrated Planning .................................. 142
2.6.2 Planning Modeler ....................................... 145

2.7 Performance Optimization ................................ 147
2.7.1 BI Accelerator .......................................... 148
2.7.2 Delta Caching ........................................... 150

2.8 User Management and Analysis Authorizations ....... 151
2.9 Conclusion ..................................................... 153

3 Data Modeling in the Data Warehousing Workbench of SAP NetWeaver 2004s BI ............... 155
3.1 Introduction .................................................. 155
3.2 Sample Scenario ............................................ 155
3.3 Creating an InfoObject ................................... 156
Contents

3.4 “Sales Order Header” Data Model ...................................... 160
  3.4.1 “Sales Order Header” DataStore Object ............ 160
  3.4.2 “Sales Order Header” InfoCube ..................... 173
3.5 “Sales Order Items” Data Model .................................. 189
  3.5.1 “Sales Order Items” DataStore Object .......... 189
  3.5.2 “Sales Order Items” InfoCube ................... 197
3.6 “Sales Order Header and Item” MultiProvider ............... 203

4 Data Retrieval .......................................................... 213
  4.1 Sample Scenario .............................................. 213
  4.2 DataSources .................................................. 213
  4.3 Emulating the 3.x Data Retrieval Process in
    SAP NetWeaver 2004s ........................................ 217
    4.3.1 Direct Update ........................................ 217
    4.3.2 Flexible Updating ................................ 221
  4.4 Data Retrieval Processes in SAP NetWeaver 2004s ....... 230
    4.4.1 Migrating 3.x DataSources ....................... 230
    4.4.2 ETL Process for Master Data Under
      SAP NetWeaver 2004s .................................. 232
    4.4.3 ETL Process for Transaction Data Under
      SAP NetWeaver 2004s .................................. 238

5 Performance Optimization with Aggregates and
  BI Accelerator .................................................... 263
  5.1 Introduction ................................................ 263
  5.2 Reporting without Performance Optimization
    Measures ......................................................... 264
      5.2.1 Sample Query for Performance
            Optimization ....................................... 264
      5.2.2 Response Time Behavior without
            Performance Optimization ....................... 268
  5.3 Performance Optimization Using Aggregates .......... 270
      5.3.1 The Concept of Aggregates .................... 270
      5.3.2 Defining Aggregates ............................ 272
      5.3.3 Functionality of Aggregates ................... 277
  5.4 Performance Optimization Using BI Accelerator ...... 279
      5.4.1 The Concept of the BI Accelerator .......... 279
      5.4.2 BI Accelerator: Technical Background .......... 281
      5.4.3 Definition of BI Accelerator Indices .......... 284
      5.4.4 The Functionality of BI Accelerator Indices .... 292
Contents

5.5 Comparison and Evaluation of Performance  Optimization Tools .................................................... 294

6 Redesign Functions: Repartitioning and Remodeling .............................................................. 297
6.1 Redesign Requirements in SAP BW Applications ........ 297
6.2 Repartitioning InfoProviders .............................................................. 297
6.2.1 An Overview of the Functionality .................. 297
6.2.2 Sample Scenario for Repartitioning ............ 299
6.3 Remodeling InfoProviders .............................................................. 308
6.3.1 An Overview of the Functionality .................. 308
6.3.2 Sample Scenario for Remodeling ................... 310
6.4 The First Redesign Functions: An Interim Result ........ 323

7 BEx Query Designer ................................................. 325
7.1 Reporting and Analysis—An Overview ............... 325
7.2 BEx Query Designer in Detail .............................................................. 327
7.2.1 Sample Scenario .............................................................. 328
7.2.2 Getting Started with BEx Query Designer ....... 328
7.2.3 Filters in a Query .............................................................. 332
7.2.4 Rows and Columns .............................................................. 335
7.2.5 Free Characteristics .............................................................. 338
7.2.6 Formulas .............................................................. 339
7.2.7 Properties of the Components ............................. 344
7.2.8 Selections .............................................................. 346
7.2.9 Variables .............................................................. 358
7.2.10 Conditions and Exceptions ............................ 363
7.2.11 Exception Cells .............................................................. 363
7.2.12 Table Display .............................................................. 364

8 Business Explorer Analyzer ...................................... 365
8.1 Introduction .............................................................. 365
8.2 Running a Query in BEx Analyzer ....................... 366
8.2.1 Starting BEx Analyzer .............................................................. 366
8.2.2 Using Filters in BEx Analyzer ............................. 369
8.2.3 Drag-and-Drop in BEx Analyzer ....................... 372
8.3 The Design Mode in BEx Analyzer ....................... 374
8.3.1 General Remarks .............................................................. 374
8.3.2 Creating an Application in the BEx Analyzer Design Mode .... 375
9 BEx Web Application Designer .......................... 387
  9.1 Getting Started .............................................. 387
  9.2 Simple Web Reporting ..................................... 389
    9.2.1 Creating a Simple Web Template for Time Series Reporting ........................................ 390
    9.2.2 Design of the Web Template ......................... 391
    9.2.3 Design Based on CSS and MIME Objects .......... 397
    9.2.4 Integrating Charts .................................... 399
    9.2.5 Other Web Items ....................................... 401
  9.3 Complex Web Reporting .................................... 405
    9.3.1 Basic Template ......................................... 406
    9.3.2 Menu Structure .......................................... 407
    9.3.3 Export Function ........................................ 411
    9.3.4 Multiple Languages .................................... 414
    9.3.5 Links ..................................................... 417
    9.3.6 Preliminary Result ..................................... 417
  9.4 Structure of Web Templates .............................. 418
  9.5 Portal Integration .......................................... 419
  9.6 Migrating 3.x Web Templates ............................. 419
  9.7 BEx Broadcaster ............................................. 421

10 Report Designer ............................................. 425
  10.1 Introduction .................................................. 425
  10.2 Enterprise Reporting—Sample Application ............. 426
  10.3 Installing and Executing BEx Report Designer .......... 428
    10.3.1 Starting and Creating a Report in the Report Designer ............................................. 428
    10.3.2 Setting Up a Page in the Report Designer ........ 432
    10.3.3 Forcing a Variable Selection at Report Runtime ............................................. 433
  10.4 Formatting in BEx Report Designer ....................... 435
    10.4.1 Report Designer General Settings via Portal Theme ............................................. 435
    10.4.2 Formatting Columns ................................... 435
    10.4.3 Formatting Rows with Different Font Styles ... 437
    10.4.4 Formatting Cells with Different Font Styles .... 437
    10.4.5 Changing the Background Color ..................... 441
    10.4.6 Adjusting the Column Width and Row Height ........ 444
Contents

10.4.7 Inserting Spacing Columns and Rows .......... 445
10.4.8 Inserting the Report Title as Page Header ...... 449

11 BI-Integrated Planning ............................................ 451

11.1 Introduction .............................................................. 451
11.2 Sample Scenario ......................................................... 454
11.2.1 Planning Application Requirements ............... 456
11.3 The Planning Environment ......................................... 458
11.3.1 Introduction .................................................. 458
11.3.2 Planning Environment Objects ...................... 461
11.3.3 Business Planning with the SAP Enterprise Portal .................................................. 463
11.3.4 Lock Concept ................................................ 464
11.3.5 Modeling Aspects .......................................... 466
11.3.6 InfoProviders ................................................. 468
11.3.7 Characteristic Derivations .............................. 472
11.3.8 Data Slices .................................................... 475
11.3.9 The Variable Wizard ...................................... 478
11.4 Planning Functions ..................................................... 480
11.4.1 Creating a Delete Function Using the Planning Wizard ............................................ 480
11.4.2 Creating a Copy Function Using the Planning Modeler ............................................ 492
11.4.3 Delete and Copy Functions in the Planning Cockpit .................................................. 499
11.4.4 Copying with the FOX Formula Function ...... 501
11.5 Manual Planning ........................................................ 507
11.6 Planning on the Web ................................................. 514
11.7 Planning in Microsoft Excel ........................................ 525
11.8 Conclusion ................................................................. 534

12 SAP NetWeaver Visual Composer ....................... 535

12.1 Sample Scenario ......................................................... 535
12.2 Basis Components ...................................................... 536
12.2.1 SAP BW ........................................................ 536
12.2.2 SAP R/3 (ERP) ............................................... 538
12.2.3 Customer Data Sheet ..................................... 540
12.3 Creating a Model in Visual Composer ................. 540
12.3.1 Creating a Model .......................................... 540
12.3.2 Creating an iView ........................................... 543
12.4 The “Accounts Receivables by Customer” Overview .... 544
  12.4.1 Underlying SAP BW Components ....................... 544
  12.4.2 Creating Selections for the Top N Overview
          in Visual Composer ........................................ 546
  12.4.3 Creating the Top N Overview in Visual
          Composer ................................................................ 559
12.5 Development of the Payment History of a Selected
     Customer ..................................................................... 569
  12.5.1 Underlying SAP BW Components ....................... 569
  12.5.2 Creating the Table “Payment History” in
          Visual Composer .................................................. 570
  12.5.3 Creating the “Payment History” Chart in
          Visual Composer .................................................. 577
12.6 The Customer Data Sheet ........................................... 581
  12.6.1 Underlying Documents ................................. 581
  12.6.2 Creating an HTML View for Customer
          Data Sheets in Visual Composer ............................ 582
12.7 Changing Customer Credit Management Data in
     the OLTP System .......................................................... 586
  12.7.1 Underlying Components in the OLTP System
          SAP R/3 for Updating the Customer Credit
          Management Data ............................................... 586
  12.7.2 Components for Updating the Customer
          Credit Management Data in Visual
          Composer ................................................................ 590
12.8 Creating a Header Field .............................................. 615
12.9 Integrating the Composite Application in the
     SAP Enterprise Portal ................................................ 620
12.10 Running the Application ............................................. 622
12.11 An Interim Result ....................................................... 627

Appendix .............................................................................. 629
A Abbreviations ................................................................ 631
B New Terminology ............................................................. 633
C Transaction Codes ............................................................ 635
  C.1 Transactions in the SAP BW System ......................... 635
  C.2 SAP R/3 Transactions Relevant to SAP BW .............. 639
D Literature ......................................................................... 641
E Authors ........................................................................... 643

Index .................................................................................. 647
Preface

I am very pleased to take the opportunity to address the readers of this book with a few words from SAP product development, especially since after SAP BW 3.5, SAP NetWeaver 2004s BI is a release whose functional width and depth marks the greatest step forward since SAP entered the business intelligence and data warehousing markets.

The most significant change is doubtlessly the new name—SAP NetWeaver Business Intelligence. The SAP BW 3.5 Release was already part of SAP NetWeaver 2004 and achieved significant synergies with other NetWeaver components, in particular, with SAP Enterprise Portal. Just think of the information broadcasting function that enables you to distribute reports via email or the portal.

With SAP NetWeaver 2004s, SAP has now managed to comprehensively integrate business intelligence into an integration platform for business processes. The resulting benefits are reflected in numerous areas. All applications that are based on SAP NetWeaver—whether they are SAP-proprietary applications, partner solutions, or customer-specific solutions—can now build on a standard portfolio of BI functions and tools. The coherence of user interfaces, interaction options, metadata, master data, and the general request processing is therefore guaranteed.

But, even as a standalone solution, BI benefits from the integration into SAP NetWeaver. Today, business intelligence can no longer be considered an isolated task. On the contrary, increasingly more, sometimes almost existential, interdependencies are being created with other software components. Consequently, no web-browser-based BI solution can exist today if it isn’t integrated into a portal or intranet. The same holds true for document management: context-specific comments, descriptions, remarks, and so on, are critical if you want to communicate insights based on reports or analyses between different users. Other areas of integration include data qual-
ity (master data management), the tracking of tasks (collaboration), and business process management.

All those interdependencies are mapped in the NetWeaver platform; the BI component in SAP NetWeaver 2004s is virtually able to delegate the relevant tasks to the responsible special components. This ensures that BI-specific solutions (e.g., for the portal) don’t make the system landscape more complex than it already is.

In the planning phase of BI in SAP NetWeaver 2004s, we had four strategic goals. You can determine how far we managed to set the right priorities and to attain the planned goals as outlined below. In any case, this book should prove invaluable to you.

1st Objective: Extending the Range of BI to Masses of End Users
In this age of the so-called information democracy, each employee of a company has the right to an appropriate supply of information. This alone (and there are many other reasons) turns the entire company staff into a potential business intelligence user base. SAP NetWeaver 2004s meets this requirement because of massive investments in two key areas: user friendliness and query performance. The new Business Explorer (web, Excel, and design tools), the integration into SAP NetWeaver Visual Composer, and the BI Accelerator as a performance turbo engine are the outstanding technology innovations in this respect.

2nd Objective: Real Integration of Planning and BI
Today, planning and budgeting are regarded as natural extensions to business intelligence. From the user departments’ viewpoint, that is certainly not a new outlook as there is no strict separation between these areas that closely interact with each other in daily business processes. But, on the software side, reality looks different. BI and planning tasks are usually carried out using different tools, even though the same vendor provides these tools. With NetWeaver BI, we want to provide a realistic combination of BI and planning: identical user interfaces, the same design tools, identical master and metadata, common hierarchies, authorizations, processors, and so on. Therefore, each report has the potential to become a planning template.
3rd Objective: Assuming the Role of a Companywide Data Warehouse

A modern data warehouse must ensure that the stored information is as up-to-date, consistent, and complete as possible. A companywide view of the entire organization should ensure that correct strategic decisions can be made in real time and based on a consistent data basis. SAP NetWeaver 2004s addresses the requirements with a strategic implementation as a corporate data warehouse: simplified administration, reduced efforts during operation, improved data transfer processes, fewer implications of changes to the modeling, increased loading throughput, management of very large data quantities, and so on.

4th Objective: Service-Oriented Basis for All Kinds of Analytical Applications

The Enterprise Services Architecture (ESA) is the prerequisite for increased flexibility and agility in times of constantly changing requirements to IT and to the user departments. ESA is also the basis for a closer interaction of strategic and operational decision-making processes. The focus of service orientation in SAP NetWeaver 2004s BI is based on an improved support of operational reporting and embedded analytics. In other words, the BI functions are exposed as services and integrated into a model-driven application development using the Visual Composer.

Once again, Norbert Egger and his team of authors have found the right point in time to capture their rich project experience and excellent knowledge of the product in a book that reconciles theoretical concepts and practical use in a highly useful manner.

I hope that you enjoy reading this book and will have great success with your SAP NetWeaver 2004s Business Intelligence projects.

Walldorf, December 2006
Stefan Sigg
Vice President SAP NetWeaver BI
SAP AG
In recent years, technological innovations have catapulted the concept of a companywide, consistent information landscape from its academic ivory tower into the coarse reality of everyday work. This chapter provides an overview of the basic concepts and technologies required for a companywide information landscape.

1 Business Intelligence Concepts—Innovations

1.1 The Closed-Loop Business Analytics Process

“For many years, the computer profession and business have formed a partnership that has operated under what can be termed an open-loop architecture. But with recent advances in data-warehouse technology and the possibilities of the Internet, there is the prospect of what can be termed a closed-loop architecture for the marriage of business and computers. With a closed-loop business/computer architecture, new business opportunities and possibilities arise that were never before imaginable.”

When Bill Inmon, president of Inmon Data Systems, introduced his vision of a closed-loop analytical process under the name of Corporate Information Factory (CIF) in 1998, people sneered at him. Today, things have substantially changed. The “screwballs” of the past are the innovative pioneers of today, and those who haven’t yet implemented such a landscape run the risk of sooner or later losing their competitiveness.

The term Corporate Information Factory describes an information landscape that collects, transforms, standardizes, and stores data from the most disparate operational applications in a company in order to provide this information for analysis and reporting purposes. During this process, the data runs through different layers,

---

1 Inmon, 1998.
after which this meaningful information can be used to influence the operational systems.

You can easily recognize those layers by taking a close look at Figure 1.1. The different layers are: the staging area, extract-transform-load (ETL), enterprise data warehouse, data marts (respectively data mining), and the decision-support system (DSS) applications. Each of these layers fulfills a specific purpose (standardization of data in the ETL, "Corporate Memory" in the EDW, user-friendly data staging in the data marts, and so on) so that all the individual parts of the jigsaw puzzle fit together to form a single picture.

But what you can clearly see already is that building up such an information landscape can be a very complex undertaking, which is often doomed to failure without the support of appropriate software tools.

Figure 1.1 The Corporate Information Factory According to Bill Inmon
Let us now return to the closed-loop business analytics process. The primary goal of the closed-loop business analytics process is to enable you to convert operational data into analyzable information from which you can then generate actionable knowledge, to be used to influence the operational systems.

As you can easily see in Figure 1.1, this is only possible on the basis of a companywide, consistent information landscape.

For this reason, we’d first like to describe the five steps that form the closed-loop business analytics process and discuss their meaning for implementing a companywide, consistent information landscape (see Figure 1.2). This will make it much easier for you to understand SAP’s priorities for the new SAP NetWeaver 2004s BI release.

**Figure 1.2** Closed-Loop Business Analytics Process (Source: IDC, 2003)

1. **Track**
   The first step of the closed-loop business analytics process focuses on data acquisition and data storage.

---

First, the data is extracted from all relevant operational systems. Depending on the requirements, this happens either at set times (recurring regularly: daily, weekly, monthly, and so on) or almost in real time.

The data must then be cleansed, transformed, enriched, and standardized.

After that, the cleansed data can be imported and stored in the “basic layer: the enterprise data-warehouse layer of the data warehouse.

This layer serves as the basis for filling the upstream data marts with data as well as for forwarding the data to the DSS applications. Once the data has been staged sufficiently, the process enters the data-retrieval phase.

The following quote by Dan Vesset, Research Director for IDC’s Analytics and Data Warehousing Software service, also emphasizes the importance of creating a clean foundation for the data warehouse, particularly regarding data retrieval:

While the end user’s needs and tools that support these needs differ, foundational components of business analytics software must be able to provide a unified architecture that supports all the user groups. End users should be able to view summary information and then drill down into detail that is specific to their business process. The underlying measures that enable this analysis must be consistent across the enterprise.3

2. Analyze

Data retrieval, which consists of analyzing and modeling (as the primary activities) as well as presenting and distributing information (as secondary activities), represents the second and third steps in the closed-loop business analytics process.

Once the data has been stored in the data warehouse, it is finally available for analysis using business intelligence tools, for query, reporting, and multidimensional analysis.

Traditional business intelligence tools enable decision-makers and information users to answer the following questions. What hap-

The Closed-Loop Business Analytics Process

1.1

pened? How did it happen? When did it happen? And if one additional aspect could be added, it might be: Why did it happen?

On the other hand, the following questions are not taken into account: Which alternate decisions are available? Which one is the ideal decision? What are the implications and possible consequences of this decision? What is going to happen?

To run a company with just those traditional BI tools would be like driving a car and looking only into the rear-view mirror. Although you can see everything that happens, you don’t see it until it has happened, which might be too late.

3. Model

At this stage, the advanced analytics tools come into play. These tools are used to create rules, classifications, and additional models to support the decision-making process. In this context, the following methods are used: decision modeling, forecasting, simulation, optimization, and risk analysis.

Even though the diagram in Figure 1.2 gives you the impression that analyzing and modeling are sequential steps, real life is different. It often happens that the results of an Online Analytical Processing (OLAP) analysis serve as the basis for the creation of a model. Conversely, forecasts and simulations often result in profound analyses, or the modeling results must be presented and distributed. For that reason, it is clear that both steps are closely interrelated.

4. Decide

The fourth step of the closed-loop process involves making decisions based on solid information that has been presented in a user-friendly manner. The results obtained in the Analyze and Model steps represent the basis for those decisions.

The ability to access all types of information consistently and in an integrated way lays the foundation for making solid decisions.

5. Act

When the decisions have been made, the corresponding actions must be taken in the fifth step. This step can involve, for instance, the start of a new marketing campaign based on the results of previous campaigns. In another scenario, it may be necessary to automatically lock a credit card based on a transaction analysis and in
order to prevent a fraudulent use. Still, another action might consist of granting or refusing a loan on the basis of specific customer profiles.

This step represents the necessary feedback to the operational processes in companies.

In some cases, the feedback occurs automatically. If that happens, we speak of a retraction. In other cases, a decision-maker (or end user) obtains actionable knowledge, and then we speak of a manual feedback.

To benefit significantly from the use of a data warehouse, the closed-loop process must in no way end with the modeling step. It is vital that this step is followed by the additional steps, decide and act.

It is the objective of each organization to accelerate the process of “track, analyze, model, decide, and act” to attain a competitive advantage. Speed without understanding, however, can also result in faster but wrong decisions. Therefore speed and precision must merge with understanding in order to produce a real competitive advantage.

1.2 Implementation in Modern Data-Warehousing Systems

When it comes to a comprehensive utilization of the closed-loop process, modern data-warehousing systems come into play. Only this kind of business intelligence, which has been made possible with the introduction of today’s data-warehousing tools, can maximize the business value and improve the competitive advantage for the company.

But those who consider the integration of such heterogeneous system landscapes to be a mere technological challenge are completely mistaken. Companies are experiencing a significantly higher need for flexibility, mobility, and innovation, especially in the area of business processes. Consequently, a competitive advantage can be attained only if the companies focus on their core business processes and tasks. On the other hand, IT departments must provide a high degree of flexibility and mobility to master these challenges quickly and efficiently.
The closed-loop technologies used should help you perform the following tasks:

- Make the complexity of systems and applications invisible to the user and reduce this complexity via standardization and integration, wherever possible.
- Optimize the interoperability between applications and systems, based on application and process integration.
- Provide consistent, intuitive access to all relevant information and to the actionable knowledge at any time and anywhere, using any frontend device.
- Achieve an increase in the productivity of end users by standardizing the user interfaces of all relevant applications.
- Ensure optimal system stability and data security as well as access control for sensitive information.

To master all those tasks successfully, the motto "think big; start small" should be observed more than ever before. In this context, an approach that is based on a service-oriented architecture (SOA) can help to build a landscape that’s made up of reusable application components with the objective of saving time and money.

Please allow us now a slight digression in order to demonstrate the importance—or rather the inevitability—of such an approach.

Today, companies have to face numerous challenges:

- Markets and consumer behavior change ever more rapidly and require a high degree of flexibility and reactivity from successful companies.
- Companies are forced to implement new strategies faster and to shorten the development cycles for products and services. Only in this way can they attain a long-term advantage over their competitors.
- In order to cope with those increasingly tight innovation cycles, existing business processes must be constantly optimized, transformed, or even replaced by more efficient processes.
- To meet such challenges quickly and efficiently in terms of costs and resources, companies need dynamic and business-oriented IT ...
departments that can react rapidly and flexibly to changing conditions and requirements.

- In recent years, IT has become a strategic tool that businesses need to secure competitive advantage and even to survive.

### Future-oriented IT landscape

To meet all those demands, the following requirements, which must be regarded as indispensable for a future-oriented IT landscape, have emerged in recent years:

- Technological openness
- Functional modularity
- Integrated technologies and components
- Reusable technologies and components
- Powerful development tools

The approach of a service-oriented architecture (SOA) aims to meet just those requirements. Openness, modularity, and integrated and reusable components form the basis for application development.

### Service-oriented architecture

A service-oriented architecture is based on an application platform that provides business functions as reusable, self-contained components. Working from that platform, different services are combined to map entire business processes, such as an ordering transaction. These services are managed centrally and “published” in directories where they can be found and used. Analysis functions are directly integrated in those operational services and no longer treated as separate processes. Finally, the whole structure is rounded off by lifecycle-management services. The objective of all those efforts is to increase the user productivity.

Thus, a companywide vision can grow via projects that are well managed in terms of time and resources.

Each subproject runs through a complete development cycle that consists of specifying and prioritizing the requirements, modeling, and implementation, as well as introduction and review (see Figure 1.3). The reuse of existing services and components therefore helps to consistently create a service-oriented IT landscape step by step.

### Advantages

This brings us back to our data-warehousing systems. The consistent integration of data-warehousing systems into a service-oriented architecture has two main advantages. First, projects can be run
much faster and more cost-efficiently. Second, the data-warehousing systems allow for faster, more precise, and more accurate decisions because they base the closed-loop process on a solid, uniform, consistent service-oriented architecture and thereby ensure competitive advantage for the organization.

Figure 1.3 Iterative Implementation of Projects in a Service-Oriented Architecture

Figure 1.4 SAP NetWeaver Architecture Components Relevant to SAP BI
Figure 1.4 shows such a structure by depicting SAP NetWeaver 2004s Business Intelligence. Not only does SAP NetWeaver 2004s BI contain all aspects of a service-oriented architecture—including an application platform, processes and services, the integration of operational and analytical functions, component lifecycle management, and the focus on the integration and standardization of user functions—but it also provides the benefits of a closed-loop process by integrating the BI results into the operational processes.

1.3 New Features in SAP NetWeaver 2004s

With the new NetWeaver 2004s release, SAP pursued the goal of consistently implementing a closed-loop process architecture in its software application. Figure 1.5 shows that this goal has been impressively attained. As you can see, the most important new features of SAP NetWeaver 2004s have been smoothly integrated into the five steps of the closed-loop process:

![Diagram of SAP NetWeaver 2004s Business Intelligence](image)

Figure 1.5 Most Important New Features of SAP NetWeaver 2004s Business Intelligence
The most important new features in SAP NetWeaver 2004s BI are as follows:

- The Enterprise Services Architecture (ESA)
- The Enterprise Data Warehouse (EDW)
- Real-time data warehousing (DWH)
- Information lifecycle management and the use of nearline storage
- Clustering, partitioning (repartitioning), and remodeling functions
- The new extraction, transformation, and loading (ETL) process including transformation rules and data-transfer process (DTP)
- The Business Intelligence Accelerator (BIA) including its search and classification functions (TREX)
- Advanced analytics applications
- BI-integrated planning
- Composite Application Framework (CAF) and barrier-free applications including
  - Visual Composer
  - Data Warehousing Workbench (DWB)

The following sections of this chapter provide a brief description of these new features and position them both within the SAP NetWeaver architecture and within the closed-loop process.

**1.3.1 Enterprise Services Architecture (ESA)**

By enhancing the approach of a service-oriented architecture, SAP has developed its Enterprise Services Architecture (ESA). For SAP, ESA is the future-oriented, modular architecture that builds completely on service-based, reusable application components (enterprise services). In this context, SAP NetWeaver 2004s provides the technological platform for implementing this SOA.

The greatest benefit of SAP ESA is the consistent support of the innovation and standardization cycle within a single environment.

Another fundamental advantage of ESA is that it focuses primarily on individual business processes such as purchasing, production, marketing, sales, accounting, and so on, instead of the technology. This
Index

3.x Data retrieval process 217
3.x DataSource 215, 221, 230
3.x Emulation 218
3.x InfoSource 222

A

ABAP routines 106
ABC Analysis 136
Accelerator index 285
Actionable knowledge 29
ActionScript 84
Activating aggregates 275
Activation 162, 177
Actual data 143, 457
Actual data InfoProvider 492
Actual profitability analysis data 457
Ad-hoc query 128
Ad-hoc Query Designer 136
Administration 71, 73, 101
Administrator Workbench 68, 155, 178, 212, 214, 218, 643
Advanced 78, 133
Advanced analytics applications 37, 58
Advanced analytics tools 31
Agent group 611
Aggregate sizes 277
Aggregate synchronization 279
Aggregate technology 294
Aggregates 149, 295
Aggregation 270
Aggregation hierarchies 43
Aggregation level 43, 146, 459, 461, 467, 480, 483, 493
Alert Monitor 136
Alerts 508
Analysis 137, 460
Analysis authorizations 151
Analysis engine 451
Analysis table 375, 376, 392
Analyzing business content InfoCube 173
Appearance 78
Appearance, configure 612
Application building 127
Application logs 287
Application Server 465
Attribute 87, 321, 388
Attribute derivation 316
Attribute values 388
Authorization 360
Authorization-relevant attributes 86

B

Background color 441
Bar chart 400
Barrier-free applications 61
Basic functions 340
Basic InfoCubes 270, 272
Basic template 406
Behavior 78, 134
BEx Analysis Tool Box 367
BEx Analyzer 78, 127, 366
BEx Analyzer design mode 375
BEx Analyzer functionality 525
BEx Analyzer Workbook 369
BEx Analyzer workbook 374
BEx Broadcaster 421
BEx Design Box 532
BEx Query Designer 74, 325
BEx Web 387
BEx Web Analyzer 79, 128, 463
BEx Web Application Designer 387, 425
BEx workbook 378, 385, 386
BI Accelerator 54, 148, 149, 263, 279, 294
BI Accelerator Architecture 149
BI Accelerator index 280, 284
BI Accelerator Monitor 289
BI Accelerator sizing 283
BI Analytic Engine 149
BI applications 43
BI implementation 42
BI system 458
BI tags 388
BIA index 287
BIA index filling job 285
BIA index properties 291
BIA Monitor 289
Index

BI-integrated planning 37, 59, 80, 142, 451, 453
BI-integrated planning environment 458
BI-integrated planning transactions 462
Blade technology 281
Blank column 446
Bookmarking 412
Boolean functions 340
BPS0 80
Broadcaster 136
Business analytics market 54
Business content 156, 173, 178, 455
Business content DataStore object 165, 189
Business content InfoCube 176, 313
Business content object 161, 166, 176
Business content transfer rules 310
Business content update rules 311
Business Explorer Analyzer 326, 365, 456
Business Explorer Broadcaster 326
Business Explorer query 326
Business Explorer Suite 122, 325, 365, 426
Business Explorer Web Application 326, 456
Business Explorer Web Application Designer 326
Business Information Warehouse 263
Business Intelligence Accelerator 37, 54
Business Intelligence concepts 27, 644
Business Intelligence solution 535
Business Intelligence tools 30
Business Planning and Analytical Services 459
Business planning and analytical services 68, 142
Business Planning and Simulation 452
Button group 135, 402, 516
BW Administrator Workbench 313

C

Calculated key figures 508
Calender day 175
Calendar month 267, 274
Cascading stylesheets 397
Category axis 399
Cell content 438
Cell manipulation 132
Cells 331
Central selection 535
Change log 92, 118
Characteristic 85, 156, 309, 316, 327
Characteristic derivation 472
Characteristic relationship 453, 473
Characteristic selection 383
Characteristic usage 489, 503
Characteristic value variable 358, 562
Characteristic values 347, 351, 373
Characteristics assignments 210
Chart 129, 137, 399, 577
Chart types 135, 399
Chart view 578
Chart, configure 579
Chassis 281
Checkbox Group 137, 402
Client tool 428
Closed-loop business analytics process 27
Closed-loop Process 58
Closed-loop process 37
Clustering 37, 49
Code editing engine 133
Code generation 139
Column header 567, 575
Column headings 438
Column structure 336
Column width 567, 575
Columns 435
Command sequences 413
Commands 408
Company code 22, 316
Compatibility 74, 77
Composite application 82, 535, 592, 620
Composite Application Framework 37, 61
Conditions 404, 508
Consistent time characteristics 298
Constant 309, 317
Constant value 245
Constants 245
Container 403, 515
Container layout 135, 403
Content administration 621
Context menu 136, 394, 405
Control 320
Control area data 536
Control components 112
Control properties 554
Conversion 320
Converting units of measure 111
Copy function 492, 495
Corporate Information Factory 27
Corporate memory 43, 44
Creating a 3.x InfoPackage 228
Credit control area 592
Credit control area parameter 550
Credit limit 565
Credit management 536, 569, 597
CSS properties 398
Currency conversion 508
Currency parameter 548
Currency translation 570
Customer 544, 565, 593
Customer credit management 539
Customer credit management status data 624
Customer data sheet 540, 582
Customer exit 52, 99, 309, 359
Customer master 540

D

Daemon-based control 118
Data abstraction layer 43
Data aging strategy 48
Data basis 451, 540
Data binding 78, 134
Data columns 560, 571
Data entry layouts 457
Data flow 112, 223
Data flow concept 101
Data flow control 111
Data flow objects 70
Data flow tree 227
Data functions 340
Data maintenance 624
Data maintenance table 610
Data marts 28, 43
Data mining 28
Data model 160, 189, 313, 537
Data modeling 85, 155, 643
Data propagation layer 43, 192
Data request 229
Data retrieval 213, 238, 253
Data retrieval level 43
Data retrieval process 217, 230
Data retrieval tree 251
Data slices 453, 475
Data source 425, 429, 559, 570, 571
Data staging process 105
Data storage 282
Data target administration 118
Data targets 456
Data transfer process 37, 53, 113, 118, 236, 261
Data transfer process monitor 116
Data warehouse 263
Data warehouse architecture 213
Data warehouse systems 32
Data Warehousing Workbench 37, 65, 68, 177, 483
Database 307
Database access 270, 277, 278, 293
Database access times 278, 293
Dataflow 178
DataProvider 128, 129, 375, 514, 527
DataProvider information 404
DataSource 54, 102, 105, 213, 221
DataSource tree 103, 214
DataStore 87
DataStore object 87, 93, 97, 105, 114, 156, 160, 164, 183, 189, 473, 537
DB Connect 103
Debugging 114
Decision modeling 31
Default setting, configure 549, 551
Default URL 584
Default value 359, 441
Defining aggregates 272
Delete button 530
Delete function 488
Delta caching 150
Delta determination 91
Delta mechanism 113
Deploy 557
Deployment 84, 620
Description 350
Design adjustments 398
Design environment 451
Design item 374, 386
Design mode 374, 531
Design time components 63
Design Tool 540
Development interface 82
Index

Development status  559
Dimension  94, 181, 186, 198, 205
Direct update  89, 217
Disk subsystem  282
Display  134
Display mode  120
Document List  138
Drag-and-drop  78, 444
Drawing area  399
Drilldown  508
Dropdown box  137, 383, 402, 502, 532
Dropdown list  549
DSO table  91
DSS applications  28
DTP  111, 112
DVD source download  284
DWH integration layer  43
Dynamic document assignment  583
Dynamic reports  131
Dynamic selection  358, 545, 552

Excel  373, 525
Excel workbook  452, 525, 534
Excel-based planning  453
Excel-based planning layout  532
Excel-based solution  500
Excel-in-place functions  525
Exception broadcasting  142
Exception cells  363
Exceptions  363, 404
Exit function  459, 473
Expert routine  109
Export function  411
External system  103
Extraction  213
Extraction methods  455

F

Fact table  279, 298
Favorites  332
Field catalog  130
Filter  264, 331, 461, 480, 484
Filter area  123, 401
Filter pane  135
Filter value  334, 370, 485, 511, 572
Filtering  564
Filters  369
Filters area  333
Fiscal year variant  22, 274
Fixed value selection  271, 274
Flash technology  628
Flex  84
Flexible updating  221
Forecasting  31
Form View  556
Form view  558, 601
Form view components  564
Formatted reporting  425
Formatting  129
Formula  339, 349
Formula function  583
Formula variable  358
FOX formula  505
FOX formula components  504
FOX formula function  459, 501
FOX formula language  501
Frame style  557
Free characteristic  266, 338, 545, 563
Frontend  535
Frontend technology 627
Function module 545, 553, 587, 591
Function pool 588
Functions 340

G
Global data 588
Global filters 123
Global properties 96
Global settings 399
Global structure 354
Goods manufactured 631
Granularity 44, 491
Grid 532
Group 135, 403
Guided procedures 63

H
Hardware 148
Header 174
Header field 615
Help document 555
Hide tree 158
Hierarchical filter 137
Hierarchical filter selection 403
Hierarchical structures 508
Hierarchy display 218
Hierarchy level 271
Hierarchy node variable 358
Hierarchy variable 358
History 332
HTML elements 388
HTML pages 397
HTML technology 435
HTML view 582, 628
HTML view component 585
Hyperlinks 388

I
Identifier 595
Implementation 159
Implementation step 455
Inconsistency ditch 58
Indexing 148, 280, 286
Info field 404
InfoCube 52, 93, 97, 105, 106, 174, 178, 180, 264, 298, 314, 456, 457, 538
InfoCube conversion 320
InfoObject 85, 105, 156, 170, 180, 193, 266, 309, 315, 456
InfoObjectCatalog 156, 170, 184
InfoObjectCatalog template 184
InfoPackage 54, 101, 111, 113, 218, 219, 220, 228
InfoPackageGroups 72
InfoProvider 85, 97, 149, 177, 204, 264, 297, 308, 330, 453, 461, 468, 492
Information broadcasting 60, 129, 141, 454
Information Field 138
Information landscape 27
Information lifecycle management 37, 47, 48
InfoSet 95, 105
InfoSource 101, 105, 217, 222, 238
Initial cockpit 463
Initial view 269
Initialization planning sequence 497
Inmon, Bill 27
Inner Appearance 78
Inner Join 96
Input field 135, 547
Input help 162
Input layout 480
Input variable 431
Insert 91
Inserting a button 384
Integrated planning 125
Internal display 134
Interrupt process 118
Intuitive navigation 126
ISFS 105
IT practices 39
IT scenarios 39
iView 543, 621

J
J2EE engine 460
Job log 305
Job monitoring 286
Join with InfoCubes 95
Index

**K**
- Key figure 86, 93, 174, 187, 193, 309, 318, 327, 505, 511
- Key figure assignments 207
- Key figure calculation 226

**L**
- Large T-shirt size 283
- Last customer contact update 119
- Layer 156, 213
- Layout 399, 514, 556, 558, 575
- Layout editing engine 133
- Layout mode 388
- Layout, edit 565
- Lead column 428
- Legend 399
- Lifecycle 36
- Line item dimension 186
- Link 135
- List of documents 403
- Listbox 136, 402
- Lock concept 464
- Lock server 465
- Logistics extract structure customizing cockpit 456
- Look & feel 104

**M**
- Maintaining aggregates 273
- Maintenance 286
- Maintenance table 595
- Manage models 541
- Manual feedback 32
- Manual input layout 480
- Map 138, 404
- Mapping 255
- Mass changes 125
- Master data 158, 160, 213, 232
- Master data access 85, 159
- Master data/texts 86
- Mathematical functions 340
- Medium T-shirt size 283
- Menu bar 135
- Menu structure 407
- Message box 531
- Message table 607, 613
- Messages 123
- Metadata 162, 216
- Migration 105, 216, 230, 419
- Migration project 455
- Migration scenario 467
- MIME objects 397
- MiniCubes 270
- Miscellaneous 78, 133
- Model 540
- Modeling 69, 93, 177, 264
- Modeling area 331, 387
- Modeling aspects 97, 466
- Model-oriented architecture 62
- Monitor 270
- Monitoring 220, 229, 237, 253, 304, 320
- MS Excel 373
- MS Excel integration 126
- Multi-Channel Broadcasting 141
- Multidimensional clustering 51
- Multiple editing 125
- Multiple languages 414
- MultiProvider 93, 97, 143, 203, 208, 272, 456, 467
- MXML 84

**N**
- Navigation 126, 128, 338, 493
- Navigation area 393
- Navigation attributes 93, 174, 188, 201, 202, 208
- Navigation block 500
- Navigation pane 137
- Navigation window 111
- Nearline 48
- Nearline storage 37, 47
- Near-real-time scenario 116
- NetWeaver 2004s DataSources 215
- NetWeaver Portal 419

**O**
- Object access layer 62
- Object maintenance 158
- ODS layer 91
- OLAP 31
- OLAP analysis 31
- OLAP cache 50, 149, 150
OLAP functions 452
OLTP 538
OLTP data basis 540
OLTP system 586
OLTP transaction 538
Operating system 281
Operation 315
Optimization 31
Output medium 425
Output table 566, 573
Own implementation 85

P
Page elements 129, 130
Page header 449
Page layout 129
Parallelization 53
Parallelized deletions 88
Parameter 592
Parameter group 502
Parameter transfer 592, 606
Partitioning 37, 49, 97, 100
Partitioning condition 302
Partitioning setting 306
Payment history 537, 569, 570, 577, 624
PDF generation 140
Percentage function 340, 342
Performance management 264
Performance optimization 147, 268
Performance optimization measures 147, 264
Persistent staging area 101
Planned data 457
Planned InfoCube 489
Planned InfoProvider 489
Planned profitability analysis data 457
Planning 451
Planning application 451, 452, 453, 456
Planning architecture 470
Planning areas 457
Planning basis 457, 497
Planning cockpit 499, 514, 520, 531
Planning data 143
Planning environment 457, 458, 461
Planning function 146, 461, 480
Planning integration 127
Planning interface 456
Planning layout 507, 521, 533
Planning model 146
Planning Modeler 80, 145, 451, 460, 471, 492, 509
Planning point 486
Planning process 508
Planning query 491, 509
Planning sequence 461, 496
Planning transactions 462
Planning Wizard 80, 146, 451, 460, 480
Planning-compatible queries 147
Populating the aggregate 279
Portal 65, 557, 620
Portal content 621
Portal integration 419
Prerequisites 309
Print version 141
Process chain 120
Process chain maintenance 120, 460
Process chains 118, 146
Process types 118
Properties 327
Properties pane 135
Property area 405
Proposed transformation rules 256, 257
PSA 101
PSA table 54

Q
Query 149, 331, 425, 460, 508, 544, 559, 571
Query and analysis 68
Query description 428, 449
Query design 123
Query Designer 74, 329, 451, 509
Query Monitor 150, 270
Query runtime 270

R
Radio button group 137, 402
Ranking list 363
Real-time cube 143
Real-time data acquisition 46, 116
Real-time data warehousing 37, 45
Real-time InfoCube 93, 118, 146
Real-time InfoProvider 453, 467
Real-time-enabled InfoCube 468
Index

Receivables 565
Reclustering 49
Redesign components 297
Redesign functionality 323
Redesign functions 100, 297, 323, 643
Redesign requirements 297, 310, 323
Redundant functions 143
Remodeling 37, 49, 52, 72, 97, 297, 308, 313, 320, 323
Remodeling function 320
Remodeling monitor 321
Remodeling rule 98, 312, 314
Remodeling Toolbox 98
Remote 85, 159
Remote-capable module 588
Repartitioning 37, 49, 72, 100, 297, 304, 323, 643
Repartitioning Monitor 304
Repartitioning request 303
Replacement path 358
Replication 215
Report 136, 401, 430, 450
Report call 266
Report Designer 76, 130, 425, 435
Report title 428
Reporting 425
Reporting Agent 72
Reporting tools 456
Request ID 91
Request processing 92
Response times 263
Retraction 32
RFC connections 282
Risk analysis 31
Risk class 597
Routine 108, 245, 249
Row characteristic 337
Row content 336
Row height 444
Row-pattern concept 131
Rows and columns 265
RSAI 68
RSDS 105
RSPLAN 81, 145
Rule details 244, 257
Runtime components 63
Runtime parameter 89
Runtime version 628

S

Sales document 175
Sales order header 160, 173, 174
Sales order header and item 203
Sales order item 189, 197
Sales order reporting 155, 203
SAP Alert Framework 142
SAP Analytics 65, 535
SAP Analytics application 535
SAP Business Content 455
SAP Business Explorer 425
SAP Business Information Warehouse 263
SAP BW 456, 536
SAP BW 3.5 452
SAP BW components 544, 569
SAP BW data model 456
SAP BW installations 297
SAP BW-BPS 144
SAP Delta Queue 47
SAP Enterprise Portal 65, 463, 557, 620
SAP Exit 359
SAP GUI 460
SAP liveCache 465
SAP NetWeaver 2004s Business Intelligence 153, 428
SAP NetWeaver architecture 36, 37
SAP Query Designer 509
SAP R/3 455, 592
SAP R/3 (ERP) 538
SAP R/3 upstream systems 456
SAP Visual Composer 535
Save button 528
Scheduling 303
Search and classification 37, 54
sel_Currency 556
sel_TopN 556
Selection 346, 351, 545, 546
Selection form view 558
Selection screen 301
Selection values 549, 551
Selection, configure 550
Semantic groups 114
Semantic key 184
Server blade 281
<table>
<thead>
<tr>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server slot 281</td>
</tr>
<tr>
<td>Service-oriented architecture 33</td>
</tr>
<tr>
<td>Setup 148</td>
</tr>
<tr>
<td>Shared Object Memory 465</td>
</tr>
<tr>
<td>Shockwave 84</td>
</tr>
<tr>
<td>Show tree 158</td>
</tr>
<tr>
<td>Simulation 31</td>
</tr>
<tr>
<td>Simulation Prediction 136</td>
</tr>
<tr>
<td>Single Document 138</td>
</tr>
<tr>
<td>Single document 403</td>
</tr>
<tr>
<td>Single version of the truth 44</td>
</tr>
<tr>
<td>Small T-shirt size 283</td>
</tr>
<tr>
<td>Sold-to country 267</td>
</tr>
<tr>
<td>Sold-to party 174</td>
</tr>
<tr>
<td>Source code 389</td>
</tr>
<tr>
<td>Source InfoCube 207</td>
</tr>
<tr>
<td>Source system 102, 214, 253, 317</td>
</tr>
<tr>
<td>Source system ID 317</td>
</tr>
<tr>
<td>Source system type 103</td>
</tr>
<tr>
<td>Spacing row 450</td>
</tr>
<tr>
<td>Staging area 28</td>
</tr>
<tr>
<td>Standard 78, 85, 88, 133</td>
</tr>
<tr>
<td>Standard InfoCube 468</td>
</tr>
<tr>
<td>Standard web template 433</td>
</tr>
<tr>
<td>Standard workbook 78</td>
</tr>
<tr>
<td>Start option 320</td>
</tr>
<tr>
<td>Start point 561</td>
</tr>
<tr>
<td>Start routine 107, 108</td>
</tr>
<tr>
<td>Static and dynamic sections 131</td>
</tr>
<tr>
<td>Static filter 380</td>
</tr>
<tr>
<td>Static reports 131</td>
</tr>
<tr>
<td>Statistics data 270</td>
</tr>
<tr>
<td>Status and tracking system 60, 454</td>
</tr>
<tr>
<td>Status data 624</td>
</tr>
<tr>
<td>Structure 335, 350, 400, 508</td>
</tr>
<tr>
<td>Structure elements 348, 373</td>
</tr>
<tr>
<td>Structured data 148</td>
</tr>
<tr>
<td>Stylesheet 397, 435</td>
</tr>
<tr>
<td>System messages 136, 404</td>
</tr>
</tbody>
</table>

**T**

<table>
<thead>
<tr>
<th>Tab pages</th>
<th>135, 522</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>129, 137, 526</td>
</tr>
<tr>
<td>Table display</td>
<td>364</td>
</tr>
<tr>
<td>Table functions</td>
<td>625</td>
</tr>
<tr>
<td>Tables and indices</td>
<td>307</td>
</tr>
<tr>
<td>Tabs</td>
<td>403</td>
</tr>
<tr>
<td>Target InfoObjects</td>
<td>106</td>
</tr>
<tr>
<td>TCO</td>
<td>153</td>
</tr>
<tr>
<td>Technical name</td>
<td>315</td>
</tr>
<tr>
<td>Template</td>
<td>520</td>
</tr>
<tr>
<td>Template enhancement</td>
<td>522</td>
</tr>
<tr>
<td>Template object</td>
<td>200</td>
</tr>
<tr>
<td>Test Frame</td>
<td>491</td>
</tr>
<tr>
<td>Text</td>
<td>138</td>
</tr>
<tr>
<td>Text element</td>
<td>378</td>
</tr>
<tr>
<td>Text variables</td>
<td>358</td>
</tr>
<tr>
<td>Third-party frontends</td>
<td>425</td>
</tr>
<tr>
<td>Thresholds</td>
<td>363</td>
</tr>
<tr>
<td>Ticker</td>
<td>405</td>
</tr>
<tr>
<td>Time characteristics</td>
<td>185, 186, 298</td>
</tr>
<tr>
<td>Time dimension</td>
<td>173</td>
</tr>
<tr>
<td>Time series</td>
<td>624</td>
</tr>
<tr>
<td>Time series reporting</td>
<td>390</td>
</tr>
<tr>
<td>Top n condition</td>
<td>545</td>
</tr>
<tr>
<td>Top n customers</td>
<td>548</td>
</tr>
<tr>
<td>Top n overview</td>
<td>544, 546, 559</td>
</tr>
<tr>
<td>Top node</td>
<td>275</td>
</tr>
<tr>
<td>Total cost of ownership</td>
<td>153</td>
</tr>
<tr>
<td>Trace evaluation</td>
<td>499</td>
</tr>
<tr>
<td>Transaction</td>
<td>538</td>
</tr>
<tr>
<td>Transaction data</td>
<td>213, 238, 262</td>
</tr>
<tr>
<td>Transaction data retrieval</td>
<td>262</td>
</tr>
<tr>
<td>Transaction type</td>
<td>274</td>
</tr>
<tr>
<td>Transactional InfoCubes</td>
<td>456</td>
</tr>
<tr>
<td>Transfer rules</td>
<td>106, 218, 222, 310</td>
</tr>
<tr>
<td>Transformation</td>
<td>102, 105, 232</td>
</tr>
<tr>
<td>transaction data</td>
<td>238, 239</td>
</tr>
<tr>
<td>Transformation blocks</td>
<td>109</td>
</tr>
<tr>
<td>Transformation routine</td>
<td>246, 250</td>
</tr>
<tr>
<td>Transformation rules</td>
<td>37, 53, 242, 244, 250</td>
</tr>
<tr>
<td>Transformation types</td>
<td>109</td>
</tr>
<tr>
<td>Trigonometric functions</td>
<td>340</td>
</tr>
<tr>
<td>T-shirt size</td>
<td>283</td>
</tr>
</tbody>
</table>

**U**

| UD Connect          | 103      |
| Unstructured data   | 148      |
| Update              | 217      |
| Update button       | 529      |
| Update components   | 609      |
| Update function module | 605  |
| Update rules        | 106, 224, 311 |
| Upstream systems    | 456      |
Index

User interface   63, 68, 111, 133, 157, 180, 369, 453
User management  151
User-specific code   309
User-specific coding   52

V

Value axis   399
Value range   302
Variable definition   479
Variable selection   487
Variable types   358
Variable use   360
Variable value   381
Variable Wizard   478
Variables   123, 332, 358, 368, 457, 561
VC-iView   621
Version   174
VirtualProvider   93
Visual Composer   37, 64, 82, 535, 546, 559, 570, 582
Visual Composer applications   628
Visual Composer design tool   540, 627
Visual Composer model   620

W

Warning area   388
Web application   132, 141, 147, 387, 425, 433, 644
Web Application Designer   77, 132, 387, 425, 451, 499, 514
Web Design API   405
Web interface   456, 457
Web item   133, 401, 515
Web item pool   388
Web printing   132, 140
Web reporting   389
Web service   103, 105
Web template   390, 403, 433, 515
Web-based reporting   387
Wizard   139
Work areas   123
Workbench   68
Workbook   147
Workbook design   78, 126
Write-optimized   89, 90
Write-optimized DataStore object   169

X

XHTML mode   388
XHTML source code   139