

# Index

- Absa Bank Ltd., 94, 95, 299
- Access control, 111, 143, 146, 257–258
- ActiveX controls, 252, 253
- Ad hoc reporting, 13, 38, 70, 77, 78, 151, 155, 193, 194, 226, 259, 263, 297
- Adobe Flash, 16, 251, 253–256, 258
- Adoption, ensuring. *See* Project adoption, ensuring
- Agile development techniques, 69, 71, 88, 126, 127, 130
- AJAX, 253–255
- Alerts
  - complex event processing, 268, 269
  - drill down, 244
  - intelligent alerts, 31, 205
  - monitoring function, 5, 10–12, 14, 17
  - operational dashboards, 105–109, 132, 137
  - performance dashboards, 5, 10–12, 14, 17, 31
  - predictions, 128
  - setting, 205
  - strategic dashboards, 157, 171
  - tactical dashboards, 105, 106, 149, 151, 155
- Alignment of business and IT. *See* Business-IT alignment
- Analytical dashboards, 111, 113
- Annotation, 11, 236, 259, 266
- Applications (functionality) of performance dashboards
  - analysis, 10, 11, 13
  - management, 10, 11, 13
  - monitoring, 10–12
- Architectural standards, 276, 277
- Architecture of performance dashboards
  - data architectures, 256–259
  - display architectures, 251–256
  - overview, 251, 271
  - types of, 260–271
- Arizona State University (ASU)
  - dashboard design, 229
  - dashboard usage, tracking, 299
  - operational dashboards, 109
  - tactical dashboards, 111, 139–147, 156
- Assumptions, testing, 301, 302
- Balanced Scorecard Step by Step: Maximizing Performance and Maintaining Results* (Niven), 43, 285
- Balanced scorecards. *See also* Strategic dashboards
  - about, 5
  - Balanced Scorecard Step by Step: Maximizing Performance and Maintaining Results* (Niven), 43, 285
  - challenges, 176
  - Cisco functional balanced scorecard example, 160, 167
  - cost savings, 185
  - dashboards compared, 11, 12
  - delay in implementation of, 53, 54
  - deployment, 273, 285
  - development of, 43, 184
  - metrics, 118, 119, 205, 206, 212, 213, 216
  - Ministry of Works (Kingdom of Bahrain). *See* Strategic dashboards and performance dashboards, 5
  - readiness assessment, 44, 45

- Barberg, Bill, 21, 53, 54, 118, 119, 213
- Barr, Stacey, 200
- Basel Accord, 47
- Baseline Consulting, 85
- Beautiful Evidence* (Tufte), 227
- Benchmarks
- and business intelligence, 53, 54, 73
  - peer groups, 290
  - and performance metrics, 118, 149, 203, 214
  - published data, 184
  - and tactical dashboards, 17
- BI. *See* Business intelligence (BI)
- BI Competency Center (BICC), 193
- BI platforms, 32, 39, 111, 112, 156, 262, 264, 273, 274, 276, 280, 285, 292
- BI tools architecture, 261, 262
- BNSF Railway, 111
- Bodla, Ranga, 204
- Bootstrapping, 37, 62, 187, 188
- Bottom-up approach, 273, 284, 287–289
- Bread crumbs, 14, 234–236, 259
- British Airways, 201, 202
- Brown & Root, 21
- Build versus buy, 18, 19, 104
- Bullet graphs, 206, 245
- Buried scores, 206
- Business architecture, 18–20, 170
- Business intelligence (BI)
- about, 6, 31, 32
  - adolescent phase, 59
  - conceptual framework, 32–34
  - data integration environment, 34–36
  - data warehousing environment, 36, 37
  - evolution of, 15
  - governance committees, 93, 94
  - infrastructure, need for, 37
  - Maturity Model. *See* Maturity Model for BI
  - and performance dashboards, 6, 22, 39
  - platforms. *See* BI platforms
  - reporting and analysis environment, 38, 39
  - technical framework, 34–39
  - user fitting, 39–41
- Business performance management (BPM)
- architecture, 18–21
  - background, 6
  - benefits of, 26, 27
  - challenges and obstacles, 25, 26
  - defined, 23–25
  - framework for, 28–31
  - and performance dashboards, 4, 6, 22
- Business process management (BPM), 24, 25
- Business requirements
- analysts, 67, 93, 94, 183
  - and business/IT alignment, 85, 86, 93, 94
  - changes in, adapting to, 71, 88
  - communicating, 49, 93, 189
  - forms, 215
  - requirements gathering, 212–217
  - responding to, 50
- Business-IT alignment
- business issues, 84, 85
  - business requirements, 85, 86
  - communication, 93–96
  - incremental delivery, 86–88
  - IT issues, 83, 84
  - overview, 97
  - portfolio planning, 88–91
  - readiness assessment, 51, 52, 55
  - standardization, 91, 92
  - trust, lack of, 81–83
- Business-IT partnership, 21
- Cascading filters, 155
- Cascading scorecards, 119, 273, 285, 286, 289, 290
- Cause-effect linkages, 115–117, 172
- Centers of Excellence, 71, 74–76, 94
- Change agents, 197
- Charts and graphs, designing, 240–249
- Chasm, 58–61, 68–70, 74, 76
- Cisco
- balanced scorecards, 160, 167
  - distributed approach, 274, 285

- governance, 170
  - metadata, 161, 167
  - operational dashboards, 109
  - strategic dashboards, 116, 159–172
- Closed loop, 28, 146
- Cloud-based dashboards, 69, 258, 259, 269–271
- Collaboration, 11, 13, 16, 17, 30, 64, 92, 111, 119, 170, 174, 190, 266, 293
- Compensation
  - aligned with strategic objectives, 30
  - bonuses, 170
  - performance metrics, 8, 294, 304, 307
- Complex event processing (CEP), 108, 109, 205, 268, 269
- Corda, 140, 142, 143, 201, 214
- Correlation
  - business sponsor commitment and project success, 46, 295
  - metrics, 291
  - between variables, scatter plots, 248
- Crow, Michael M., 139
- Culture of measurement, 50, 51, 55
- Dashboard displays
  - data, 225, 228
  - guidelines for creating, 229–240
  - iterative design, 229
  - overview, 223, 224, 249
  - planning, 224–229
  - prototypes, 225, 227, 228, 249
  - requirements gathering, 224, 225
  - resources on design techniques, 227
  - usability labs, use of, 228, 229, 249
  - user feedback, 227, 228, 249
  - users, 225, 226
  - visual designers, use of, 226, 227
- Dashboards. *See also* Performance dashboards, overview
  - build versus buy, 18, 19, 104
  - cascading, 290
  - cloud-based, 69, 258, 259, 269–271
  - deployment and integration. *See* Deployment and integration
  - displays, designing. *See* Dashboard displays
  - enterprise dashboards, 111, 112, 160, 166, 189, 280, 282, 285, 287, 290
  - executive. *See* Executive dashboard
  - operational. *See* Operational dashboards
  - project launch. *See* Project launch project management
  - project management. *See* Project management
  - scorecards compared, 11, 12
  - strategic. *See* Strategic dashboards
  - tactical. *See* Tactical dashboards
  - themes, 117, 118, 121, 158, 173, 174, 176, 213, 239, 240
  - training on use of, 298, 299
  - usage, tracking, 299, 300
- Data architectures, 256–259
- Data availability and reliability, 52, 53, 55, 297
- Data bars, 248
- Data cleaning, 35
- Data constellation, 248
- Data federation, 87, 265, 266
- Data governance, 93, 95, 161, 279–280
- Data integration, 8, 9, 31, 32, 34–36, 43, 134, 221
- Data marts, 36, 266–268
- Data mining, 38–40, 95. *See also* Predictive analytics
- Data modeling, 35, 277, 278
- Data profiling, 35
- Data quality, 110
- Data roll-ups, 290, 291
- Data standards, 277–280
- Data stewardship, 94, 143, 215, 279
- Data warehousing (DW)
  - data integration tools, 35, 36
  - operational dashboards, 109
  - and tactical dashboards, 111, 114
- Decision making, 13
- Decomposition view, 151, 152, 155
- Departmental scope, 106
- Deployment and integration
  - cascading metrics, 289–291
  - centralized approach, 274–284
  - distributed approach, 284–289, 2747
  - overview, 273–275, 291, 292

- Detect and respond dashboard, 107–109
- Detemple, Klaus, 96
- Deutsche Börse, 96
- DHTML (Dynamic HTML), 253, 254
- Direct Energy Essential Home Services, 198, 217, 302, 304, 305
- Direct query architecture, 260, 261, 266, 267
- Distributed approach, 284–289
- Donkin, Dave, 94, 95, 299
- Double MAD, 16, 17
- Dow Chemical. *See* Rohm and Haas
- Drill through, 259
- Drill to detail, 13, 14, 111, 148, 156, 168, 169, 256, 280. *See also* MAD (monitor, analyze, drill to detail) framework
- Driver metrics, 20, 198–202
- Dyche, Jill, 85
  
- End-user query and reporting, 39
- Enterprise, defined, 196
- Enterprise dashboards, 111, 112, 160, 166, 189, 280, 282, 285, 287, 290
- Enterprise data warehouse, 36, 58, 68, 93, 112, 114, 124, 142, 156, 174, 274
- Envisioning Information* (Tufté), 227
- ETL tools. *See* Extraction, transformation, and loading (ETL) tools
- Executive dashboard
  - at 1–800-CONTACTS, 123, 127, 128, 130
  - background, 5
  - controls, 130
  - and dashboard cascading, 290
  - deployment and integration of dashboards, 273, 290, 291
  - display, 127, 128, 149, 150, 156
  - and enterprise dashboards, 112
  - at Rohm and Haas, 149, 150, 156, 207
- Executive information systems (EISs), 5
  
- Extraction, transformation, and loading (ETL) tools, 36, 69, 74, 91, 96, 126, 127, 190
  
- Federated approach, 287
- Few, Stephen, 223, 226, 227
- “Five Whys,” 200, 214
- Flash. *See* Adobe Flash
- Flash charts, 123, 127, 128, 246
- Flash visualizations, 155
- Focus, 3–5, 78, 302, 303, 305
- Frost, Bob, 300, 306
  
- Goals, 45, 46, 115
- Governance
  - BI, 70, 71, 75, 93
  - Cisco example, 170
  - committees, 295, 296
  - corporate, 193
  - dashboard, 194
  - data governance, 93, 95, 161, 279, 280
  - KPI governance team, 193
  - reports, 70
  - and Sarbanes-Oxley Act, 26
- Grassroots initiatives, 284
- Gulf, 58, 60–65, 70, 74, 85
  
- Help desk, 94, 296, 299
- Hewlett Packard (HP), 44, 45, 48, 182, 284, 300
- Hill, Jim, 125–128, 130
- Hsiao, David, 157, 159, 164, 171
- Hub-and-spoke architecture, 36
  
- Incent and motivate dashboards, 107, 108, 124
- Information consumers, 39–41
- Information Dashboard Design* (Few), 227
- Information producers, 39, 40
- Information sandbox, 14
- Information technology (IT), alignment with business. *See* Business-IT alignment
- In-memory
  - analytics, 69
  - dashboards, 264, 265, 267

- data, 13
- processing, 269
- Insightformation, Inc., 21, 53, 118, 213
- International Truck and Engine Corporation, 87, 185, 186, 299, 300
- Java, 96, 104, 252, 253, 255
- JavaScript, 253, 254
- Kaplan, Robert, 115, 116, 158, 172, 174, 184, 213
- Key performance indicators (KPIs)
  - data collection, 220, 221
  - governance team, 193
  - and metrics, 198, 200–202
  - requirements, gathering, 212–217
  - standardizing terms, 219, 220
  - steering committee, 193
  - strategic dashboards, 116, 118
  - tactical dashboards, 111
  - targets, setting, 221
  - validating, 217–219
- King, Lord, 201, 202
- Knowledge discovery. *See* Data mining
- Lagging indicators, 20, 44, 198
- Law of diminishing returns, 303
- Layers of functionality, 252
- Layers of information, 13. *See also* MAD (monitor, analyze, drill to detail) framework
- Leading indicators, 20, 199
- Lochrie, John, 198, 302, 303, 306
- MAD (monitor, analyze, drill to detail) framework
  - analyze, 13, 14
  - and BI platform, 111
  - described, 13, 14
  - double MAD, 16, 17
  - drill to detail, 13, 14, 111, 148, 156, 168, 169, 256, 280
  - and evolution of BI, 15
  - Flash, use of, 256
  - monitoring, 13, 14
  - and NetApp dashboard design, 280, 281, 283
  - and three-tier delivery framework of Rohm and Haas, 148
- Management scorecards, 115, 116, 158
- Marketing, and project sustainment, 192
- Masciandaro, Michael, 147–149, 154, 155
- Masdea, Deb, 296–297
- Mashboards, 111–113, 262–264, 288
- Mashups, 111, 140, 287–289, 292
- Maturity Model for BI
  - Adult stage, 58, 70–72, 75–79
  - business value, 77, 78
  - Chasm sticking point, 58–61, 68–70, 74, 76
  - Child stage, 58, 65, 66, 75–79
  - Gulf sticking point, 58, 60–65, 70, 74, 85
  - insights to action, 78, 79
  - maturity dynamics, 74–79
  - overview, 57, 58, 80
  - Prenatal/Infant stage, 58, 61–65, 75–79
  - return on investment (ROI), 78
  - Sage stage, 58, 72–79
  - stages, 58
  - stages, regressing, 60
  - stages, skipping, 60
  - sticking points, 58, 60, 61
  - Teenager stage, 58, 66, 67, 75–77, 79
  - users and usage, 76, 77
- Metadata
  - and application development, 87
  - and BI tools, 39
  - Cisco example, 161, 167
  - management, 96
  - properties of, viewing on dashboard, 141, 210, 259
  - repository, 277
  - updating, 69
- Metrics
  - accuracy, 210, 211
  - actionable, 199, 210
  - activity metrics, 200
  - attributes, 202–205

Metrics (*Continued*)

- balancing, 208, 209
- benchmarks, 203
- calculating, 221, 222
- cause-effect relationships, 201
- characteristics of effective metrics, 209–212
- creating, 197–222
- data collection, 220, 221
- described, 20
- designing, 212–218
- displaying, 205–208
- driver metrics, 20, 198–202
- ecosystems, 208, 209
- effectiveness, 197, 209–212
- goals, 45, 46
- graphical view of data, 14
- indicators compared, 198
- key performance indicators (KPIs), 200–202. *See also* Key performance indicators (KPIs)
- number of, 206–208
- objectives, 45, 46
- operational dashboards, 109
- outcome, 20, 44, 198, 199, 202
- overview, 197–198, 222
- ownership, 210
- performance dashboards, 103
- and performance management architecture, 20
- predictive, 199
- ranges, 203, 204
- relevance, 212
- requirements gathering, 212–217. *See also* Business requirements
- revising, 192, 193
- risk indicators, 200
- standardization, 211
- stoplights, 204. *See also* Stoplights
- strategic, 209
- strategic dashboards, 116, 118
- tactical dashboards, 115
- targets, 203–205, 221
- terms, standardizing, 219, 220
- time frame, 202, 203, 210
- types of, 198–202
- understandable, 209, 210
- validating, 217, 219
- value, 202, 203
- Mid-level management support, 47, 48, 55
- Ministry of Works (Kingdom of Bahrain), strategic dashboards, 158, 172–178
- Mission, 45, 115
- Mobile use of dashboards, 137, 155, 259
- Monitor, analyze, drill to detail framework. *See* MAD (monitor, analyze, drill to detail) framework
- Mouse-overs, 126, 154, 253, 255
- Mozilla Scalar Vector Graphics (SVG), 253
- NetApp, 280–284
- Niven, Paul, 43, 48, 285
- Norton, David, 115, 158, 172, 174
- Now You See It (Few)*, 227
- Objectives, 45, 46, 115
- Office of Strategy Management, 119
- 1-800-CONTACTS
  - executive dashboard, 123, 127, 128, 130
  - operational dashboards, 107, 123, 124–131, 137
  - personal data on dashboards, 297
- Online analytical processing (OLAP), 1, 13, 38–40, 77, 111, 113, 259–262
- Open source products, 69, 124, 126, 155
- Operational dashboards
  - 1-800-CONTACTS example, 107, 123, 124–131, 137
  - action oriented, 107
  - alerts, 105–109
  - appearance, 105
  - Arizona State University example, 109
  - Cisco example, 109
  - data quality, 110
  - detect-and-respond dashboards, 107–109

- incent-and-motivate dashboards, 107, 108
- information, 109
- metrics, 109
- overview, 17, 101, 107, 123, 124
- prevalence of, 102
- real time versus right time, 107, 109, 110
- refresh rates, 109, 110
- Richmond Police Department
  - example, 106, 107, 124, 131–137
- tactical and strategic dashboards
  - compared, 105, 106
- updating, 107
- use of, 103
- users of, 107
- Oracle, 142, 159, 160, 285
- Organizational change, 5–8
- Organizational culture, 50, 51, 55, 300
- Organizational readiness. *See* Readiness assessment
- Organizational restructuring, 47
- Outcome metrics, 20, 44, 198, 199, 202
- Ownership, 210, 295, 296
  
- Parallel coordinate charts, 248
- Pareto charts, 168, 169, 247
- Pareto drill-downs, 160
- Parmenter, David, 200, 201
- Performance dashboards, overview
  - applications, 10–13, 22
  - architecture, 251–271
  - balanced scorecards, 5. *See also* Balanced scorecards
  - benefits of, 6–8
  - build versus buy, 18, 19, 104
  - and business intelligence (BI), 6, 22, 39
  - characteristics of, 105, 106
  - composition of, 10–18
  - dashboard displays. *See* Dashboard displays
  - defined, 10
  - described, 4, 5
  - historical background, 5
  - integrating, 18
  - as layered delivery system, 10
  - layers, 10, 13–17, 22
  - metrics, 103
  - and organizational change, 5
  - overview, 22
  - and performance management, 4, 6, 10, 22. *See also* Business performance management (BPM)
  - performance management
    - architecture, 18–21
  - prevalence of, 6
  - project failures, reasons for, 9, 10
  - scorecards compared, 11, 12
  - success factors, 10, 21, 22
  - three threes, 5, 10–18, 22
  - types of, 10, 17, 18, 22, 101, 121. *See also* Operational dashboards; Strategic dashboards; Tactical dashboards
  - users of, 103
- Performance management. *See* Business performance management (BPM)
- Performance management system, 10
- Performance metrics. *See* Metrics
- Performance reviews, 306, 307
- Preattentive processing, 242–249
- Predictive analytics, 13, 38, 72, 113, 259. *See also* Data mining
- Principle of proximity, 237, 239
- Project adoption, ensuring
  - failure, reasons for, 294
  - overview, 293, 294, 307, 308
  - performance optimization, 293, 294, 300–308
  - strategies for, 294–299
  - success factors, 192–195
- Project launch
  - funding, 187, 188
  - mid-level management support, 185, 186
  - overview, 181, 195
  - sponsorship, 182–185
  - staff buy-in, 186, 187
- Project management
  - dashboard development, 191, 192
  - KPI team, 189, 190
  - overview, 195

- Project management (*Continued*)
- project champion, 189
  - starting point, 188
  - steering committee, 189
  - sustainment, 192–195. *See also*
    - Project adoption, ensuring
    - teams, creation of, 189–191
    - technical team, 190, 191
- Prototypes
- creating, 227, 228
  - data federation, use of, 266
  - and KPI design, 214
  - metrics, 170, 171
  - performance dashboard, 184, 225, 227–229, 249
  - testing, 229, 249
  - use of, 184, 185
- Purple people, 96
- Ranges, 203, 204
- Rappé, Jim, 87, 186, 299
- Readiness assessment
- balanced scorecards, 44, 45
  - business and IT alignment, 51, 52, 55
  - criteria for, 43, 55
  - culture of measurement, 50, 51, 55
  - data availability and reliability, 52, 53, 55
  - mid-level management support, 47, 48, 55
  - need, 46, 47, 55
  - overview, 54, 55
  - scale and scope, 48, 55
  - sponsorship, 46, 55
  - strategy, 44–46, 55
  - team and resources, 49, 50, 55
  - technical infrastructure, 52–55
  - technical readiness, 57–80
- Real-time
- and complex event processing, 268, 269
  - and data marts, 268
  - and detect-and-respond dashboards, 108
  - and forecasting, 107, 136
  - intraday updates, 72
  - material events, 27
  - near-real-time, 72, 108–110, 125, 126, 129, 130, 137, 268
  - operational dashboards, 109, 110, 124, 126, 129–131, 136, 137
  - and readiness assessment, 72, 73, 79
  - right time compared, 107, 109, 110
  - strategic dashboards, 164
- Refresh rates, operational dashboards, 109, 110
- Regulatory compliance, 26, 27, 47
- Reporting
- ad hoc, 13, 38, 70, 77, 78, 151, 155, 193, 194, 226, 259, 263, 297
  - tools, 32, 38, 73, 78, 185, 226, 263, 277
- Rich Internet applications (RIAs), 251–255
- Richmond Police Department, operational dashboards, 106, 107, 124, 131–137
- “Right time” data, 8, 11, 12, 63, 67, 72, 109, 110, 131
- Risk indicators, 200
- Risk metrics, 175
- Road maps, 60, 67, 71, 74, 88–89, 155
- Rohm and Haas
- centralized approach, 274, 276
  - executive dashboard, 149, 150, 156, 207
  - tactical dashboards, 106, 111, 140, 147–156
  - three-tier delivery framework, 148
- Rome, John, 141, 143, 146, 229, 299
- SAP, 147, 148, 151, 154–156, 204, 274
- Sarbanes-Oxley Act of 2002, 26, 27, 47
- Scale and scope of project, 48, 55
- Scatter plots (bubble charts), 113, 248
- Scorecards
- cascading, 119, 273, 285, 286, 289, 290
  - dashboards compared, 11, 12
  - strategic dashboards, 115. *See also* Strategic dashboards
- Self-service BI, 8, 13, 32, 59, 70, 131, 136, 140



- Semantics, 19, 20, 58, 63, 68, 69, 74, 193, 222, 260–266
- Service-oriented architecture, 126
- Show Me the Numbers* (Few), 227
- Silverlight, 124, 126, 128, 253–255
- Sparklines, 206, 245
- Spatial maps, 247
- Speed of thought, 38, 113, 124, 264
- Sponsorship
  - readiness assessment, 46, 55
  - role of sponsors, 296
- Stewardship, 58, 94, 143, 161, 162, 171, 215, 279, 308
- Stoplights, 14, 112, 116, 118, 119, 149, 204, 205, 231, 232, 243, 245
- Strategic dashboards
  - alignment, 119
  - appearance, 105
  - balanced scorecards, 18, 115–117, 158. *See also* Balanced scorecards
  - cause-effect linkages, 115, 116, 172
  - Cisco example, 116, 159–172
  - collaboration, 119
  - corporate scorecard example, 120
  - key performance indicators (KPIs), 116, 118
  - management scorecards, 115, 116, 158
  - metrics, 116, 118
  - Ministry of Works example (Kingdom of Bahrain), 158, 172–178
  - navigation, 118, 119
  - operational and tactical dashboards
    - compared, 105, 106
  - overview, 18, 101, 115, 157, 158
  - prevalence of, 102
  - strategic expenditures, 119, 121
  - strategic reviews, 119
  - strategy, 115
  - strategy management, 116–118
  - targets, 118
  - types of, 115, 116
  - updating, 106
  - use of, 102, 103
- Strategy, readiness assessment, 44–46, 55
- Strategy management, 116–118, 158, 172, 176, 178
- Strategy management office, 158, 178, 194
- Strategy maps, 29, 30, 116–119, 158, 172–176, 213, 228, 236, 266–268, 289
- Summerhayes, Martin, 48, 182, 185, 187, 188, 191
- Superusers, 39, 40, 193, 194, 297, 298
- Surveys of users, 300
- Tactical dashboards. *See also* Enterprise dashboards; Mashboards
  - access control, 111
  - alerts, 105, 106, 155
  - analytical dashboards, 111, 113
  - appearance, 105, 111
  - Arizona State University example, 111, 139–147, 156
  - BI platform, 111
  - BNSF Railway, 111
  - data, 114
  - enterprise dashboards, 111, 112
  - key performance indicators (KPIs), 111
  - mashboards, 111–113, 262–264, 288
  - metrics, 115
  - operational and strategic dashboards
    - compared, 105, 106
  - overview, 17, 101, 110, 111, 139, 140
  - portal based, 111
  - prevalence of, 102
  - refreshing, 114
  - Rohm and Haas example, 106, 111, 140, 147–156
  - types of, 111, 112
  - updating, 114
  - use of, 102, 103, 110, 111
  - visual analysis tools, 113, 114
- Targets, 118, 203, 204
- Technical architecture, 20
- Technical readiness assessment, 52–55, 57–80
- Templates, 217, 218, 232–234, 239–241, 259, 285

- Testing
  - and agile development, 88
  - dashboard development, 191, 192
  - dashboard display, 228, 229
  - data, 280
  - and incremental delivery, 87
  - metrics, 211, 213
  - off-the-shelf components, 286
  - test assumptions, 301, 302
- Visual Display of Quantitative Information* (Tufte), 227
- Themes, 117, 118, 121, 158, 173, 174, 176, 213, 239, 240
- Thermometers, 232, 245
- Thin clients, 252
- Three threes, 5, 10–18, 22
- Top 10 lists, 36, 108, 141, 155, 200, 236, 299
- Top-down approach, 273, 275, 276, 285–287
- Training, 298, 299, 306, 307
- Tree maps, 247
- Tufte, Edward R., 227
- Updating
  - operational dashboards, 107
  - strategic dashboards, 106
  - tactical dashboards, 114
- Usability labs, 228, 229, 249
- Usage monitoring, 11, 13, 147, 192
- User mantra, 15, 40, 41
- Users
  - accountability, 305, 306
  - buy-in, 303–305
  - empowering, 306
  - end-user adoption, 307, 308
  - focus, 305
  - operational dashboards, 107
- Values, 45, 115
- Variance charts, 206, 247
- Virtual mashups, 287–289, 292
- Vision, 45, 115
- Visual analysis, 113, 114, 124, 264
- Visual Explanations* (Tufte), 227
- What-if modeling
  - BI environment, 64
  - dashboard functionality, 137, 257, 259
  - data marts, 266, 267
  - and MAD framework, 15, 16
  - performance dashboard applications, 11
- Whipsawing, 286, 302
- Williams, Neal, 201, 214