Index

A
absolute addresses, 309
access to service-enabled workflows, controlling, 454
declarative access control, 455
programmatic access control, 455-457
ACID transactions, 208
activities, 378
activity ID, 378
Activity View (Service Trace Viewer), 393
Add Web Reference, 19-22
adjusting TCP connection lifetime, 550
advanced Web services
DualHttpBinding binding, 143-151
ws2007HttpBinding binding, 140-143
wsHttpBinding binding, 137-139
advanced Web services, 135-136
AJAX Web programming, ASP.NET integration, 516-523
app-domains, 127
application blocks, 421
ASMX
enabling features in IIS-hosted services, 294-301
WCF clients, implementing, 27-31
ASP.NET integration, 360-361
AJAX integration, 516-523
authentication
Forms Authentication, 366-371
membership provider, 362-364
membership services, 361-362
authorization using role providers, 364-366
ASR (Add Service Reference), 19-22
asynchronous request-response operations, 41-44
ATOM, content syndication, 531-533
auditing configuration, 372-373
authentication, 316
mesh authentication, 471
using ASP.NET Forms Authentication, 366-371
using Windows credentials, 343-346
authorization, 316
using ASP.NET role providers, 364-366
using AzMan, 348-353
AzMan, authentication, 346-348
auto flushing, 385
AzMan, authorization, 348-353
Index

B
cross-matching communication, 123
client behaviors, 181
custom behaviors implementing, 224-232
service behavior, exposing through configuration, 233-236
metadata, exporting and publishing, 204-207
runtime initialization, 182-184
security behaviors, 237
server-side functions, 183
service behaviors concurrency, controlling, 184-186
concurrent calls, controlling, 199-201
concurrent instances, controlling, 195-199
concurrent sessions, controlling, 201-204
session-level instances, 193-195
single instances, multithreading, 189-190
singleton, implementing, 190-192
transaction service behaviors, 223-224

bidirectional communication, 46-47
duplex service contracts client portion, implementing, 53-54
server portion, implementing, 48-52

binary encoding
MTOM encoding, 283
versus text encoding, 282-283
binding elements, 4, 92, 114, 171
encoders, 173-174
security protocols, 174
shape change, 176
transports, 172-173
upgrades/helpers, 175

bindings, 92-93, 111-114. See also channel stacks
cross-matching communication, 123
custom bindings, creating, 168-171
DualHttpBinding, 143-151
HttpBinding, Web services communication, 132-135
mexHttpBinding, 538
mexHttpsBinding, 539
mexNamedPipeBinding, 538
mexTcpBinding, 538
msmqIntegrationBinding, communication using queued services, 165-168
netMsmqBinding, communication using queued services, 155-164
netNamedPipeBinding, 128-131
netPeerTcpBinding, P2P applications, creating, 465-467
netTcpBinding, 123-126
performance of, comparing, 152-153
scalability of, comparing, 152-153
selecting, 116, 119
service contracts, exposing, 177-179
sessionless, controlling concurrency, 187-188
stock quote service example, 119-123
WebHttpBinding, 511
service hosting, 512-514
WebGet attribute, 514
WebInvoke attribute, 514-515
WebOperationcontext class, 523-529
ws2007HttpBinding, 140-143
wsHttpBinding, 115, 137-139
message security, 335
blank relative addresses, 310
breaking changes, 73
buffered mode, 276-277
building URIs, 509
callback behaviors, 181
calling WCF services from WF, 426
with custom activity, 430-433
with Send activity, 427-429
calls, controlling concurrency, 199-201
certificates, 319-320
  authentication, 337-340
  key installation, 321
channel factories, 102-105
channel listeners, 101
channel shapes, 94
  session-aware, 99
  shape changing, 98
channel stacks, 91-93. See also bindings
channels, 92, 100
  transport channels, 93
class hierarchies, defining, 65-67
client fault handlers, implementing, 419-421
client/server applications, 460
client/service communication, 4-5
clients
  authenticating with transport security, 327-329
digital certificates, 330-332
Windows credentials, 329
creating from metadata, 539
Silverlight clients, 541-542
implementing, 17-22
  for ASMX service, 27-31
collections, 76-77
communicating exception details, 409-411
communication
  using advanced Web services, 135-136
  DualHttpBinding binding, 143-151
  ws2007HttpBinding binding, 140-143
  wsHttpBinding binding, 137-139
using queued services, 154
  msmqIntegrationBinding binding, 165-168
  netMmqBinding binding, 155-164
using Web services, 131
  basicHttpBinding binding, 132-135
comparing
  approaches to building distributed applications, 462
  binding performance and scalability, 152-153
  serialization and encoding, 241-243
concurrency, controlling, 184-186
  concurrent calls, 199-201
  concurrent instances, 195-199
  concurrent sessions, 201-204
  default concurrency, 187-188
confidentiality, 317
configuration files, writing services, 10-16
Configuration Free Hosting, 530
configuring
  HTTP connections, 545-549
  service quota settings, 543-544
  TCP connections, 549-550
content syndication, 531-533
Context, handling in workflows, 450-451
contracts, 33
  data contracts, 60-61
  class hierarchies, defining, 65-67
  collections, 76-77
  equivalence, 75-76
  KnownTypes, 67-72
  versioning, 72-74
  XML schema, defining for .NET class, 62-65
message contracts, 78
  typed messages, 79-82
  untyped messages, 82-87
multiple contracts in services, 54-57
service contracts, 37
  asynchronous request-response operations, 41-44
duplex operations, 46-54
one-way operations, 44-45
  synchronous request-response operations, 38-41
WSDL, 34-36
controlling
  access to service-enabled workflows, 454-455
declarative access control, 455
  programmatic access control, 455-457
concurrency, 184-186
  concurrent calls, 199-201
  concurrent instances, 195-199
  concurrent sessions, 201-204
default concurrency, 187-188
  WSDL terms, 58-60
correlation, 378, 444-445
creating
custom bindings, 168-169
  user-defined, 171
data contracts, 416-417
P2P applications
  netPeerTcpBinding, 465-467
  PNRP, 468-473
SVC files, 24-25
credentials
  client authentication, 328-329
  impersonation, 353-358
cross-machine communication, 123
CRUD (Create Read Update Delete), 2
custom activities, writing, 430-433
custom behaviors
  implementing, 224-227
  message inspectors, implementing, 227-232
  service behavior, exposing through configuration, 233-236
custom bindings, 26
  creating, 168-169
directional messaging, 492-501
user-defined, creating, 171
custom serialization, XmlSerializer, 277-281
cyclical references, preserving, 254
XmlSerializable interface, 255-259
D
data contracts, 34, 60-61
class hierarchies, defining, 65-67
collections, 76-77
  creating, 416-417
equivalence, 75-76
  KnownTypes, 67-72
  versioning, 72-74
XML schema, defining for .NET class, 62-65
DataContractJsonSerializer option, 252-253
DataContractSerializer option, 243-247
declarative access control, 455
default concurrency mode, 187-188
defining
class hierarchies, 65-67
fault contracts, 417-419
detecting faulted channels, 408-409
diagnostics
  activities, 378
correlation, 378
  message logging
    auto flushing, 385
    enabling, 381-383
    filters, 384-385
message logging, 381
performance counters, enabling, 386-387
Service Configuration Editor
listeners, configuring, 391
logging options, 389-390
sources, configuring, 391
tracing options, 389
Service Trace Viewer, 376, 387-388
Activity View, 393
Graph View, 395-397
logs, analyzing from multiple
sources, 397-399
Message View, 395
Project View, 395
results, filtering, 400-402
shared listeners, 384
tracing
E2E, 377-378
enabling, 378-381
verbosity, 381
tracing, 376-377
WMI, 387
diagnostics, 375-376
digital certificates, client
authentication, 330-332
digital signatures, 320
directional messaging, 465, 492-501
disabling HTTP Keep-Alives, 547-549
disconnected applications, 155
distributed applications
building approaches to, 459
client/server applications, 460
comparing, 462
N-Tier applications, 460
P2P applications, 461
P2P applications, 459
collaboration using Windows Vista,
480-491
creating, 465-467
directional messaging, 465, 492-501
mesh networks, 462-464
message flooding, 464
message hops, limiting, 478-480
PNRP, 468-473
DTC (Distributed Transaction
Coordinator), 222
DualHttpBinding binding,
communication using advanced
Web services, 143-151
duplex communication, 95
duplex service contracts, 46-47
client portion, implementing, 53-54
server portion, implementing, 48-52
durability, 444-445

E
E2E tracing, 377-378
enabling
message logging, 381-383
performance counters, 386-387
tracing, 378-381
encoding, 173-174
encoders, selecting, 282-283
MTOM encoding, 283
versus serialization, 241-243
WebMessageEncoder, 284-285
encryption
certificates, 319-320
key installation, 321
SSL
over HTTP, 323-325
over TCP, 326-327
endpoint address, defining, 308-311
endpoints, 3
client/service communication, 4-5
metadata endpoints, publishing, 537-539
MEX, 5-6, 204
exposing, 15-16
multiple endpoints in services, 54-57
service endpoints, implementing, 10-22
Enterprise Library, 421

equivalent data contracts, 75-76
examples
  of bindings, stock quote service example, 119-123
  of Windows Integrated Security, 341-343
exception handling, 404-405
fault contracts, defining, 417-419
FaultException class, limitations of, 415
service exceptions, managing with FaultException, 411-414
unhandled exceptions, 405-408
Exception Handling Application Block, 421
exception shielding, 421
exceptions, 403
  details, communicating, 409-411
execution time, 184
exporting metadata, 204-207
exposing
  MEX endpoints, 15-16
  service contracts over multiple bindings, 177-179
  services from WF, 433-443
extending FaultException constructor, 412-414

faults, 408. See also exception handling
SOAP, 405
filtering
  message logging, 384-385
  results in Service Trace Viewer, 400-402
flowing transactions across operations, 215-220
Forms Authentication (ASP.NET), 366-371
fully connected mesh, 462

G–H
GET, 506-507
Graph View (Service Trace Viewer), 395-397

handling context in workflow, 450-451
hosting services, 14-16
  base address, defining, 308-311
  endpoint address, defining, 308-311
  hosting service-enabled workflow self-hosting, 442
    service-enabled workflow, 441-442
    using IIS, 443
  IIS, 7, 23-26, 292-294
  ASMX features, enabling, 294-301
  self-hosting
    hosting multiple services in one process, 305-308
    in managed Windows service, 302-305
    self-hosting, 301-302
    WAS, 288-291
Web services
  WebScriptServiceHost class, 530
  WebScriptServiceHost Factory class, 530-531
WebHttpBinding binding, 512-514
WebGet attribute, 514-515
WebOperationContext class, 523-529
HTTP
connections, configuring, 545-549
GET, 506
keep-aliases, disabling, 547-549
HttpBinding binding, Web services
communication, 132-135
ICloneable interface, 105-109
idle HTTP connections,
recycling, 546
IExtensibleDataObject, roundtrip
serialization, 264
roundtrip serialization, 265-270
IIS, 7
service-enabled workflow,
hosting, 443
services, hosting, 23-26, 292-294
ASMX features, enabling, 294-301
impersonation, 353-358
implementing
client fault handlers, 419-421
custom behaviors, 224-227
message inspectors, 227-230
parameter inspectors, 230-232
service behavior, exposing through
configuration, 233-236
peer resolvers, 474-478
services, 8-12
clients, 17-22
configuration files, 13-16
singletons, 190-192
WCF clients for ASMX service, 27-31
installing keys, 321
instances
concurrent, controlling, 195-199
session-level, 193-195
integrity, 317
Internet services security, ASP.NET
integration, 358-371
interprocess communication, 127
intraprocess communication, 127
invitations, P2P application
collaboration, 483-491
IXmlSerializable interface, reference
preservation, 255-259
JSON, 507
Web programming, 516
keep-aliases (HTTP), disabling, 547-549
keys, installing, 321
known types, defining, 70-72
layered channels, 91
libraries, Enterprise Library, 421
limitations of FaultException class,
414-415
limiting message hops, 478-480
LINQ (Language Integrated
Query), 550
LINQ-to-SQL entities, 550-551
listener adapter architecture
(WAS), 289
listeners, configuring in Service
Configuration Editor, 391
Live Service Trace Viewer, 397
local-machine communication, 127
logging. See message logging
long-running workflows, 445-450
managing service exceptions, 411-414
membership provider (ASP.NET),
362-364
mesh authentication, 471
mesh networks, 462-463
message contracts, 34, 78
typed messages, 79-82
untyped messages, 82-84
SOAP headers, 85-87
message flooding, 464
message hops, limiting, 478-480
message inspectors, implementing, 227-230
message logging
auto flushing, 385
enabling, 381-383
filters, 384-385
shared listeners, 384
message security, authentication, 318, 334
certificate authentication, 337-340
Windows authentication, 335
with wsHttpBinding, 335
Message View (Service Trace Viewer), 395
messages, streaming, 276-277
metadata
clients, creating, 539
Silverlight clients, 541-542
endpoints, publishing, 537-539
exporting and publishing, 204-207
MetadataResolver, 539
MEX (Metadata Exchange) endpoints, 5-6, 204
exposing, 15-16
mexHttpBinding binding, 538
mexHttpsBinding binding, 539
mexNamedPipeBinding binding, 538
mexTcpBinding binding, 538
MSMQ (Microsoft Message Queue), 154
msmqIntegrationBinding binding, communication using queued services, 165-168
MTOM encoding, binary data, sending, 283
multiple concurrency mode, 185-186
multiple contracts in a service, 54-57
multiple endpoints in a service, 54-57
multistep business processes, 207
multithreading single instances, 189-190
N
N-Tier applications, 460
named pipes, 127
naming conventions, controlling
WSDL terms, 58-60
Net.Tcp Port Sharing Service, 542-543
NetDataContractSerializer option, 247-248
sharing type with, 260-264
netMsmqBinding binding, communication using queued services, 155-164
netNamedPipeBinding binding, 128-131
netPeerTcpBinding, creating P2P applications, 465-467
netTcpBinding binding, 123-126
nonblank relative addresses, 310
nonbreaking changes, 73
O
Object Relational Designer, 551
OleTx protocol, selecting, 221-222
one-way communication patterns, 94
one-way message exchange, 44-45
one-way operations, 408, 417
operation behaviors, 181
ORM (object-relational mapping), 550
P

P2P applications, 461
  collaboration using
    Windows Vista, 480
  invitations, 483-491
  People Near Me, 481
  Windows Contacts, 482-483
communication
  directional messaging, 465
  mesh networks, 462-463
  message flooding, 464
  peer meshes, resolving, 464
  creating netPeerTcpBinding binding, 465-467
  directional messaging, 492-501
  message hops, limiting, 478-480
  PNRP, 468-469
    bootstrap process, 469
    mesh authentication, 471
  registering names, 471-473
  WICN, 469
parameter inspectors, exposing, 230-232
  parsing URIs, 510
  partially connected meshes, 463
  peer meshes, resolving, 464
Peer Network Resolution Protocol.
  See PNRP
  peer nodes, 462
  peer resolvers, implementing, 474-478
People Near Me, 481
performance of bindings, comparing, 152-153
performance counters, enabling, 386-387
persisted queues, 155
  persisting workflow state on server, 452-454
PNRP (Peer Network Resolution Protocol), 464
  bootstrap process, 469
  mesh authentication, 471
  peer resolution, 468-469
  registering names, 471-473
  WICN, 469
ports, sharing between services, 542-543
POX (Plain Old XML), 507
preserving cyclical references, 254-255
  IXmlSerializable interface, 255-259
Programmable Web, 503
  AJAX, ASP.NET integration, 516-523
  content syndication, 531-533
  JSON, 516
  URIs
    building, 509
    format of, 507
    GET, 506-507
    parameters, 505
    parsing, 510
    URIs, 504, 508
  programmatic access control, 455-457
Project View (Service Trace Viewer), 395
  propagation, 378
  protocol channels, 91
  publishing metadata, 204-207
    endpoints, 537-539
Q–R
queued services communication, 154
  msmqIntegrationBinding binding, 165-168
  netMsmqBinding, 155-164
Receive activity, 435-438
  recovering faulted channels, 408-409
recycling idle connections
HTTP, 546
TCP, 550
reentrant concurrency mode, 185-186
reference preservation, 254
IXmlSerializable interface, 255-259
registering names with PNRP,
471-473
relative addresses, 309
Reliable Sessions, 193
request-reply communication, 97
resolving
peer meshes, 464
peers with PNRP, 468-469
REST (Representational Entity State
Transfer), 2, 504
role provider (ASP.NET), 364-366
round tripping, 74
roundtrip serialization,
ExtensibleDataObject, 264-270
RSS, content syndication, 531-533
runtime initialization, 182

S
sample stock quote service
application, 119-123
scalability of bindings, comparing,
152-153
security
ASP.NET integration, 360-371
auditing, 372-373
authentication, 316
Windows credentials, 343-346
authorization
AzMan, 348-353
Windows credentials, 346-348
authorization, 316
certificate-based encryption, 319-320
key installation, 321
confidentiality, 317
credentials, impersonation, 353-358
integrity, 317
Internet services, securing, 358
message security, 318, 334-335
authentication, 335-340
transport security, 322
client authentication, 317-318,
327-332
service identity, 332-334
SSL, 323-327
Windows Integrated Security, 340
examples, 341-343
security behaviors, 237
selecting
bindings, 116-119
encoders, 282-283
transaction protocols, 221-222
self-hosting, 14-16, 301
hosting multiple services in one
process, 305-308
in managed Windows service,
302-305
self-hosting service-enabled
workflow, 442
SelfHost sample application, 376
Send activity, calling WCF services
from WF, 427-429
serialization
custom serialization, XmlSerializer,
277-281
DataContractJsonSerializer option,
252-253
DataContractSerializer option,
243-247
NetDataContractSerializer option,
247-248
sharing type with, 260-264
reference preservation, 254-255
XmlSerializable interface, 255-259
roundtrip serialization,
ExtensibleDataObject, 264-270
serializers, selecting, 254
using surrogates, 270-275
versus encoding, 241-243
XmlSerializer option, 249-251
**service behavior**, exposing through configuration, 233-236
**service behaviors**, 181
concurrency, controlling, 184-186
concurrent calls, 199-201
concurrent instances, 195-199
concurrent sessions, 201-204
default concurrency, 187-188
exposing through configuration, 233-236
metadata, exporting and publishing, 204-207
session-level instances, 193-195
single instances, multithreading, 189-190
singletons, implementing, 190-192
transaction service behaviors, 223-224
**Service Configuration Editor**, 380, 387-388
listeners, configuring, 391
logging options, 389-390
sources, configuring, 391
tracing options, 389
**service contracts**, 34, 37
asynchronous request-response operations, 41-44
duplex operations, 46-52
client portion, implementing, 53-54
exposing over multiple bindings, 177-179
one-way operations, 44-45
synchronous request-response operations, 38-41
**service endpoint behaviors**, implementing message inspectors, 227-230
**service exceptions**, managing, 411-414
**service hosting**, 287
IIS, 292-294
ASMX features, enabling, 294-301
self-hosting, 301
hosting multiple services in one process, 305-308
in managed Windows service, 302-305
WAS, 288-291
WCF service
base address, defining, 308-311
endpoint address, defining, 308-311
**service hosts**, 287
**service identity**, 332-334
**service quota settings**, configuring, 543-544
**Service Trace Viewer**, 36, 376
Activity View, 393
Graph View, 395-397
logs, analyzing from multiple sources, 397-399
Message View, 395-396
Project View, 395
results, filtering, 400-402
**service-enabled workflows**
controlling access to, 454
declarative access control, 455
programmatic access control, 455-457
hosting, 441
in IIS, 443
self-hosting, 442
**service-oriented architecture**, 503
**services**
ASMX, implementing WCF clients, 27-31
calling from WF, 426
with custom activity, 430-433
with Send activity, 427-429
clients, implementing, 17-22
configuration files, 13-16
exposing from WF, 433-443
hosting, 14-16
in IIS, 23-26
WebHttpBinding binding, 512-529
implementing, 8-12
multiple contracts and endpoints, 54-57
Web services, hosting, 530-531
session-aware channel shapes, 99
session-level instances, 193-195
sessionless bindings, controlling concurrency, 187-188
sessions, controlling concurrency, 201-204
shape change binding elements, 176
shape changing, 98
shared listeners, 384
sharing
ports between services, 542-543
type with NetDataContractSerializer, 260-264
short-running transactions, 207
Silverlight clients, creating from metadata, 541-542
single concurrency mode, 185-186
single instances, multithreading, 189-190
singletons, implementing, 190-192
SOAP (Simple Object Access Protocol), 2, 404
faults, 405
message contracts, 78
typed messages, 79-82
untyped messages, 82-87
sources, configuring in Service Configuration Editor, 391
SSL
over HTTP, 323-324
over TCP, 326-327
state of workflow, persisting on server, 452-454
stock quote service binding example, 119-123
streamed mode, 276-277
streaming messages, 276-277
surrogates, type serialization, 270-275
SVC files, creating, 24-25
SvcUtil.exe, 36
synchronous request-response operations, 38-41
System.UriBuilder class, 508-509
TCP connections, configuring, 549-550
TcpBinding binding, client authentication, 330-332
terms (WSDL), controlling, 58-60
text encoding, versus binary encoding, 282-283
throughput, 184
tracing, 376-377
E2E, 377-378
enabling, 378-381
shared listeners, 384
verbosity, 381
transaction flow, 215-220
transaction managers, 221
transaction protocols, selecting, 221-222
transaction service behaviors, 223-224
transactions, 207
ACID, 208
flowing across operations, 215-220
within a service, 208-215
transfers, 378
transport channels, 91-93, 172-173
transport security, 317-318, 322
client authentication
digital certificates, 330-332
Windows credentials, 329
client authentication, 327-329
service identity, 332-334
SSL
  over HTTP, 323-325
  over TCP, 326-327
trust, 320
two-way communication,
  request-reply, 97
typed messages, 79-82

U
unhandled exceptions, 405-408
untyped messages, 82-84
SOAP headers, 85-87
upgrades/helpers, 175
URIs, 504, 508
  building, 509
  format of, 507
GET, 506-507
parameters, 505
parsing, 510
user-defined bindings, creating, 171

V–W
verbose tracing options, 381
versioning data contracts, 72-74

W
WAS (Windows Process Activation Service), service hosting, 288-291

Web hosting
  WebScriptServiceHost class, 530
  WebScriptServiceHostFactory class, 530-531

Web services, 131. See also advanced Web services
  communication, basicHttpBinding binding, 132-135

WebHttpBinding binding, 511
  hosting, 512-514
  WebGet attribute, 514
  WebInvoke attribute, 514-515
  WebOperationContract class, 523-529
WebMessageEncoder, 284-285
WebOperationContract class, 523-529
WebScriptServiceHost class, 530
WebScriptServiceHostFactory class, 530-531
WF (Windows Workflow Foundation), 423
  services, exposing, 433-443
  WCF integration, 424-425
  WCF services, calling, 426
  with custom activity, 430-433
  with Send activity, 427-429
WICN (Windows Internet Computer Names), 469
Windows authentication, 335
Windows Contacts, 482-483
Windows credentials
  authentication, 343-346
  authorization, 346-348
  client authentication, 329
Windows Integrated Security, 340
  examples, 341-343
Windows Vista, P2P application collaboration, 480
  invitations, 483-491
  People Near Me, 481
  Windows Contacts, 482-483
WMI (Windows Management Instrumentation), 387
workflows
  context, handling, 450-451
  correlation, 444-445
  durability, 444-445
  long-running, 445-450
  service-enabled, controlling access to, 454-457
  state, persisting on server, 452-454
Index

writing
- custom activities, 430-433
- WCF clients in code, 18-22
- WCF service, 8-12
  - configuration files, 13-16
WS-* specifications, 135
WS-AT (Web Service Atomic Transactions), 215
  - selecting, 221-222
ws2007HttpBinding binding, 135
  - communication using advanced Web services, 140-143
WSDL (Web Service Description Language), 34-36
  - terms, controlling, 58-60
wsHttpBinding binding, 115
  - communication using advanced Web services, 137-139
  - message security, 335

X–Z
XML schema
  - class hierarchies, defining, 66-67
  - defining for .NET class, 62-65
XmlSerializer option, 249-251
  - custom serialization, 277-281