

Contents

Acknowledgments	xi
Introduction	xxi

Part I: Overview of Excel Services **1**

Chapter 1: Introduction to Excel Services **3**

Who Hasn't Heard of Excel?	4
Why Excel on the Server?	5
The Problems with Distributing Spreadsheets	5
Controlling Spreadsheet Distribution	6
Incorporating Spreadsheets in Dashboards	7
Leveraging Spreadsheet Models in Custom Solutions	7
Offloading Spreadsheet Calculations to Servers	8
What Is Excel Services?	8
Microsoft Office SharePoint Server	9
Security	10
Web Part Pages	11
Content Storage and Management	11
Collaboration	14
Search	15
Forms Services	15
Business Intelligence	16
Administration	20
Five Key Ways to Use Excel Services	20
Distributing Workbooks Through the Browser	20
Controlling and Managing Workbook Distribution	23
Building Business Intelligence Portals and Dashboards	25
Leveraging Workbook Calculation in Custom Solutions	25
Offloading Workbook Calculation to Excel Services	26
Who Is Excel Services For?	26
What Excel Services Is Not	27
Summary	28

Chapter 2: Getting Started with Excel Services	29
Installation Types	29
Platform Requirements	30
Hardware	30
Software	31
Excel 2007 Client	32
Installing an Evaluation Copy	32
Setup Wizard	33
Configuration Wizard	37
After Setup Completes	38
Excel Web Access	39
Excel Web Services	42
Summary	42
Chapter 3: Architecture	45
Getting to Know Excel Services	45
Understanding the Architecture	47
Office SharePoint Server Architecture	48
The Excel Calculation Server (ECS)	50
The Excel Web Access (EWA) Web Part	51
The Excel Web Services API	52
Understanding Operational Concepts	53
Sessions	53
Workbook Operations	55
Publishing and Loading Workbooks	56
Querying Data from External Databases	58
Caching and Memory Utilization	58
Scaling to Multiple Machines	61
ECS Thread Management	63
Charting	63
Optimizing for Performance	64
Load Balancing	64
Network	65
Memory	67
CPU	69
I/O	70
Charting	70
Client Machine and Browser Speed	71
Summary	71

Part II: Working with Excel Services	73
Chapter 4: Workbook Support	75
Supported File Formats	75
Unsupported Features	76
Workbook Security	78
External Data Queries	82
Graphics Objects	84
Code, Macros, and Solutions	85
Other Features	86
Partially Supported Features	86
Sheet Rendering	87
Charts	88
Calculation Extensibility	89
Summary	90
Chapter 5: External Data	91
Connecting to Data	92
Data Connection Libraries	93
Data Connections in Excel Services	95
Trusted Data Providers	96
Supported Data Objects	99
Using UDFs to Query External Data	99
Security	99
Security Threats	100
Security Mitigations	101
Credentials Delegation	103
Performance	109
Caching and Sharing	109
Connection Pooling	111
Parallel and Asynchronous Queries	111
OLAP Formulas	111
Excel Web Access	112
Refresh on Open	112
Interactivity	113
Periodic Refresh	114
Common Configuration	116
Line of Business Data	116

Contents

Reporting on Restricted Data	116
Business Intelligence Portal	117
Summary	117
Chapter 6: Capacity and Deployment Planning	119
Choosing a Deployment Topology	119
Single-Server Topology	120
Small Farm Topology	121
Medium Farm Topology	122
Large Farm Topology	123
Single-Server and Farm Topology Comparison	124
Intranet and Extranet	124
High-Performance Computing	124
Capacity Planning	126
Considerations	127
Affecting Capacity	128
Mitigation	135
Summary	138
Chapter 7: Administration of Excel Services	139
Configuring	139
Using Central Administration	140
Monitoring	169
Unified Logging Service (ULS)	170
Windows Events	177
Making Configuration Changes to Event Logging	179
Performance Counters	179
Microsoft Operations Management Pack	182
International Deployments	184
Setup	184
Language Packs	184
Cultures and Workbooks	186
Summary	190
Chapter 8: Security	191
Protecting the Workbook	191
Authentication	192

Opening Workbooks	193
Protecting the Workbook Content	195
Configuring and Delegating Credentials	196
Protecting Against Attacks	198
Threats	198
Spoofing	199
Tampering with Data	200
Repudiation	202
Information Disclosure	202
Denial of Service	204
Elevation of Privilege	207
Extensibility	207
Summary	209
Part III: How-To Scenarios	211
Chapter 9: Sharing Workbooks with the Browser	213
Publishing a Workbook to the Server	213
The Simple Case	213
Controlling What's Visible in the Browser	217
Other Ways to Save Your Workbook to the Server	220
Common Issues with Publishing Workbooks	221
Viewing Workbooks in the Browser	225
Viewing a Workbook from a Document Library	225
Changing the Default Click to View in Browser	226
The Excel Viewer Page	227
Sending a Link to View a Workbook in the Browser	227
Summary	229
Chapter 10: Interacting with Workbooks in the Browser	231
Navigating Workbooks and Hyperlinks	232
Scrolling Within a Worksheet	232
Navigating Between Worksheets in a Workbook	234
Switching Between Items in a Workbook	234
Working with Hyperlinks	237
Working with Grouped Rows and Columns	238
Using Tables to Sort and Filter Data	240
Using PivotTables	243

Contents

Working with Workbook Parameters	246
Defining Workbook Parameters	246
Changing Workbook Parameters in the Browser	248
Interactivity and Charting	251
The Excel Web Access Toolbar	251
Using the Toolbar to Open a Workbook in Excel	251
Using the Toolbar to Calculate a Workbook	252
Reloading the Workbook File	254
Finding Data in a Workbook	255
Excel Web Access Interactivity Settings	256
Summary	257
Chapter 11: Controlling Workbook Distribution	259
Controlling Workbook Authoring	259
Controlling Who Can Publish Workbooks	260
Using Content Approval to Review Workbooks	262
Using Workflows to Review Workbooks	266
Using Check-In, Check-Out, and Versioning	273
Controlling Workbook Viewing	278
The View Only Permission	278
Workbook Snapshots	281
Alerts and RSS Feeds	283
Auditing Workbook Usage	286
The End-to-End Scenario	290
Summary	292
Chapter 12: Business Intelligence Solutions	293
Report Centers	293
Report Libraries	296
Key Performance Indicators	300
Building Business Intelligence Dashboards	305
Business Intelligence Everywhere	317
Working with SQL Server Analysis Services	318
Connecting to Analysis Services from Excel	319
Building a Data-Bound Dashboard	324
Summary	329

Chapter 13: Offloading Workbook Calculation to the Server	331
The Benefits	331
Setup and Configuration Considerations	332
Excel Services Settings	332
Deployment Topology Considerations	333
Sample Solution Designs	334
Integrating with Windows Compute Cluster Server 2003	335
Summary	335
Chapter 14: Building Custom Solutions	337
Excel Services Web Service	337
First-Use Information	338
Creating a Custom API Application	340
Local Linking	343
Web Service API Methods	343
GetApiVersion	344
OpenWorkbook	344
GetSessionInformation	345
CloseWorkbook	346
CancelRequest	347
Refresh	348
CalculateA1	349
Calculate	350
CalculateWorkbook	352
GetRangeA1	353
GetRange	354
GetCellA1	356
GetCell	357
SetRangeA1	358
SetRange	360
SetCellA1	362
SetCell	363
GetWorkbook	364
API Sample	365
User-Defined Functions (UDFs)	367
UdfMethodAttribute Class	367
Argument Data Types	368

Contents

Ranges as Arguments	369
Parameter Arrays as Arguments	370
Return Data Types	370
Returning a Range	371
Creating a UDF	372
ECS XLL UDF	375
Xlviewer Customizations	376
Setting New Defaults and URL Parameters	376
Configurable Properties	378
EWA and API Working Together	379
JavaScript Approach	380
Managed-Code Approach	383
Summary	389
Appendix: Troubleshooting	391
Index	393