

Free Pascal Resource support (FCL-res):
Reference guide.

Reference guide for FCL-res units.
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Giulio Bernardi

Contents

0.1	Introduction	20
0.2	Basic Usage	20
0.3	How to implement a new resource class	26
0.4	How to implement a new resource reader	30
0.5	How to implement a new resource writer	36
0.6	Format of resources in object files	39
1	Reference for unit 'acceleratorsresource'	42
1.1	Used units	42
1.2	Overview	42
1.3	Constants, types and variables	42
1.3.1	Constants	42
1.3.2	Types	43
1.4	TAcceleratorsResource	43
1.4.1	Description	43
1.4.2	Method overview	44
1.4.3	Property overview	44
1.4.4	TAcceleratorsResource.GetType	44
1.4.5	TAcceleratorsResource.GetName	44
1.4.6	TAcceleratorsResource.ChangeDescTypeAllowed	44
1.4.7	TAcceleratorsResource.ChangeDescValueAllowed	44
1.4.8	TAcceleratorsResource.NotifyResourcesLoaded	44
1.4.9	TAcceleratorsResource.Create	45
1.4.10	TAcceleratorsResource.Destroy	45
1.4.11	TAcceleratorsResource.UpdateRawData	45
1.4.12	TAcceleratorsResource.Add	45
1.4.13	TAcceleratorsResource.Clear	45
1.4.14	TAcceleratorsResource.Delete	45
1.4.15	TAcceleratorsResource.Count	46
1.4.16	TAcceleratorsResource.Items	46
2	Reference for unit 'bitmapresource'	47

2.1	Used units	47
2.2	Overview	47
2.3	TBitmapResource	47
2.3.1	Description	47
2.3.2	Method overview	48
2.3.3	Property overview	48
2.3.4	TBitmapResource.GetType	48
2.3.5	TBitmapResource.GetName	48
2.3.6	TBitmapResource.ChangeDescTypeAllowed	48
2.3.7	TBitmapResource.ChangeDescValueAllowed	48
2.3.8	TBitmapResource.NotifyResourcesLoaded	48
2.3.9	TBitmapResource.Create	49
2.3.10	TBitmapResource.Destroy	49
2.3.11	TBitmapResource.UpdateRawData	49
2.3.12	TBitmapResource.SetCustomBitmapDataStream	49
2.3.13	TBitmapResource.BitmapData	50
3	Reference for unit 'coffreader'	51
3.1	Used units	51
3.2	Overview	51
3.3	TCoffResourceReader	51
3.3.1	Description	51
3.3.2	Method overview	52
3.3.3	Property overview	52
3.3.4	TCoffResourceReader.GetExtensions	52
3.3.5	TCoffResourceReader.GetDescription	52
3.3.6	TCoffResourceReader.Load	52
3.3.7	TCoffResourceReader.CheckMagic	52
3.3.8	TCoffResourceReader.Create	52
3.3.9	TCoffResourceReader.Destroy	52
3.3.10	TCoffResourceReader.MachineType	53
4	Reference for unit 'cofftypes'	54
4.1	Overview	54
4.2	Constants, types and variables	54
4.2.1	Constants	54
4.2.2	Types	54
5	Reference for unit 'coffwriter'	57
5.1	Used units	57
5.2	Overview	57

5.3	Constants, types and variables	57
5.3.1	Types	57
5.4	TCoffRelocations	58
5.4.1	Description	58
5.4.2	Method overview	58
5.4.3	Property overview	58
5.4.4	TCoffRelocations.GetCount	58
5.4.5	TCoffRelocations.GetRelocation	58
5.4.6	TCoffRelocations.Create	58
5.4.7	TCoffRelocations.Destroy	58
5.4.8	TCoffRelocations.Add	59
5.4.9	TCoffRelocations.AddRelativeToSection	59
5.4.10	TCoffRelocations.Clear	59
5.4.11	TCoffRelocations.Count	59
5.4.12	TCoffRelocations.Items	59
5.4.13	TCoffRelocations.StartAddress	59
5.4.14	TCoffRelocations.MachineType	59
5.5	TCoffResourceWriter	60
5.5.1	Description	60
5.5.2	Method overview	60
5.5.3	Property overview	60
5.5.4	TCoffResourceWriter.WriteEmptyCoffHeader	60
5.5.5	TCoffResourceWriter.WriteEmptySectionHeader	60
5.5.6	TCoffResourceWriter.WriteResStringTable	61
5.5.7	TCoffResourceWriter.WriteRawData	61
5.5.8	TCoffResourceWriter.WriteRelocations	61
5.5.9	TCoffResourceWriter.WriteCoffStringTable	61
5.5.10	TCoffResourceWriter.GetFixedCoffHeader	61
5.5.11	TCoffResourceWriter.FixCoffHeader	61
5.5.12	TCoffResourceWriter.FixSectionHeader	61
5.5.13	TCoffResourceWriter.GetExtensions	61
5.5.14	TCoffResourceWriter.GetDescription	61
5.5.15	TCoffResourceWriter.PrescanNode	62
5.5.16	TCoffResourceWriter.PrescanResourceTree	62
5.5.17	TCoffResourceWriter.Write	62
5.5.18	TCoffResourceWriter.WriteSymbolTable	62
5.5.19	TCoffResourceWriter.Create	62
5.5.20	TCoffResourceWriter.Destroy	62
5.5.21	TCoffResourceWriter.MachineType	62
5.5.22	TCoffResourceWriter.OppositeEndianess	63

5.6	TCoffStringTable	63
5.6.1	Method overview	63
5.6.2	Property overview	63
5.6.3	TCoffStringTable.Create	63
5.6.4	TCoffStringTable.Add	63
5.6.5	TCoffStringTable.Delete	63
5.6.6	TCoffStringTable.Size	63
5.7	TResourceStringTable	63
5.7.1	Description	63
5.7.2	Method overview	64
5.7.3	Property overview	64
5.7.4	TResourceStringTable.Create	64
5.7.5	TResourceStringTable.Destroy	64
5.7.6	TResourceStringTable.Add	64
5.7.7	TResourceStringTable.Clear	64
5.7.8	TResourceStringTable.Count	64
5.7.9	TResourceStringTable.Items	65
5.7.10	TResourceStringTable.StartRVA	65
5.7.11	TResourceStringTable.CurrRVA	65
5.7.12	TResourceStringTable.EndRVA	65
6	Reference for unit 'dfmreader'	66
6.1	Used units	66
6.2	Overview	66
6.3	TDfmResourceReader	66
6.3.1	Description	66
6.3.2	Method overview	67
6.3.3	TDfmResourceReader.GetExtensions	67
6.3.4	TDfmResourceReader.GetDescription	67
6.3.5	TDfmResourceReader.Load	67
6.3.6	TDfmResourceReader.CheckMagic	67
6.3.7	TDfmResourceReader.Create	67
6.3.8	TDfmResourceReader.Destroy	67
7	Reference for unit 'elfconsts'	68
7.1	Overview	68
7.2	Constants, types and variables	68
7.2.1	Constants	68
7.2.2	Types	73
8	Reference for unit 'elfreader'	74

8.1	Used units	74
8.2	Overview	74
8.3	EElfResourceReaderException	74
8.3.1	Description	74
8.4	EElfResourceReaderNoSectionsException	74
8.4.1	Description	74
8.5	EElfResourceReaderNoStringTableException	75
8.5.1	Description	75
8.6	EElfResourceReaderUnknownClassException	75
8.6.1	Description	75
8.7	EElfResourceReaderUnknownVersionException	75
8.7.1	Description	75
8.8	TElfResourceReader	75
8.8.1	Description	75
8.8.2	Method overview	75
8.8.3	Property overview	76
8.8.4	TElfResourceReader.GetExtensions	76
8.8.5	TElfResourceReader.GetDescription	76
8.8.6	TElfResourceReader.Load	76
8.8.7	TElfResourceReader.CheckMagic	76
8.8.8	TElfResourceReader.Create	76
8.8.9	TElfResourceReader.Destroy	76
8.8.10	TElfResourceReader.MachineType	76
9	Reference for unit 'elfwriter'	77
9.1	Used units	77
9.2	Overview	77
9.3	EElfResourceWriterException	77
9.3.1	Description	77
9.4	EElfResourceWriterUnknownClassException	77
9.4.1	Description	77
9.5	EElfResourceWriterUnknownMachineException	78
9.5.1	Description	78
9.6	EElfResourceWriterUnknownSectionException	78
9.6.1	Description	78
9.7	TElfResourceWriter	78
9.7.1	Description	78
9.7.2	Method overview	78
9.7.3	Property overview	78
9.7.4	TElfResourceWriter.GetExtensions	78

9.7.5	TElfResourceWriter.GetDescription	79
9.7.6	TElfResourceWriter.Write	79
9.7.7	TElfResourceWriter.Create	79
9.7.8	TElfResourceWriter.Destroy	79
9.7.9	TElfResourceWriter.MachineType	79
10	Reference for unit 'externalreader'	80
10.1	Used units	80
10.2	Overview	80
10.3	TExternalResourceReader	80
10.3.1	Description	80
10.3.2	Method overview	81
10.3.3	Property overview	81
10.3.4	TExternalResourceReader.GetExtensions	81
10.3.5	TExternalResourceReader.GetDescription	81
10.3.6	TExternalResourceReader.Load	81
10.3.7	TExternalResourceReader.CheckMagic	81
10.3.8	TExternalResourceReader.Create	81
10.3.9	TExternalResourceReader.Destroy	81
10.3.10	TExternalResourceReader.Endianess	82
11	Reference for unit 'externaltypes'	83
11.1	Overview	83
11.2	Description of external resource file format	83
11.3	Constants, types and variables	85
11.3.1	Constants	85
11.3.2	Types	86
12	Reference for unit 'externalwriter'	87
12.1	Used units	87
12.2	Overview	87
12.3	EExternalResInvalidEndianessException	87
12.3.1	Description	87
12.4	EExternalResourceWriterException	88
12.4.1	Description	88
12.5	TExternalResourceWriter	88
12.5.1	Description	88
12.5.2	Method overview	88
12.5.3	Property overview	88
12.5.4	TExternalResourceWriter.GetExtensions	88
12.5.5	TExternalResourceWriter.GetDescription	88

12.5.6	TExternalResourceWriter.Write	88
12.5.7	TExternalResourceWriter.Create	89
12.5.8	TExternalResourceWriter.Destroy	89
12.5.9	TExternalResourceWriter.Endianess	89
13	Reference for unit 'groupcursorresource'	90
13.1	Used units	90
13.2	Overview	90
13.3	TGroupCursorResource	90
13.3.1	Description	90
13.3.2	Method overview	91
13.3.3	TGroupCursorResource.ReadResourceItemHeader	91
13.3.4	TGroupCursorResource.WriteHeader	91
13.3.5	TGroupCursorResource.CreateSubItem	91
13.3.6	TGroupCursorResource.UpdateItemOwner	91
13.3.7	TGroupCursorResource.ClearItemList	92
13.3.8	TGroupCursorResource.DeleteSubItems	92
13.3.9	TGroupCursorResource.GetSubStream	92
13.3.10	TGroupCursorResource.GetType	92
13.3.11	TGroupCursorResource.GetName	92
13.3.12	TGroupCursorResource.ChangeDescTypeAllowed	92
13.3.13	TGroupCursorResource.ChangeDescValueAllowed	92
13.3.14	TGroupCursorResource.Create	92
14	Reference for unit 'groupiconresource'	94
14.1	Used units	94
14.2	Overview	94
14.3	TGroupIconResource	94
14.3.1	Description	94
14.3.2	Method overview	95
14.3.3	TGroupIconResource.ReadResourceItemHeader	95
14.3.4	TGroupIconResource.WriteHeader	95
14.3.5	TGroupIconResource.CreateSubItem	95
14.3.6	TGroupIconResource.UpdateItemOwner	95
14.3.7	TGroupIconResource.ClearItemList	96
14.3.8	TGroupIconResource.DeleteSubItems	96
14.3.9	TGroupIconResource.GetSubStream	96
14.3.10	TGroupIconResource.GetType	96
14.3.11	TGroupIconResource.GetName	96
14.3.12	TGroupIconResource.ChangeDescTypeAllowed	96
14.3.13	TGroupIconResource.ChangeDescValueAllowed	96

14.3.14 TGroupIconResource.Create	96
15 Reference for unit 'groupresource'	98
15.1 Used units	98
15.2 Overview	98
15.3 TGroupCachedDataStream	98
15.3.1 Description	98
15.3.2 Method overview	99
15.3.3 TGroupCachedDataStream.Create	99
15.3.4 TGroupCachedDataStream.Destroy	99
15.3.5 TGroupCachedDataStream.Read	99
15.4 TGroupResource	99
15.4.1 Description	99
15.4.2 Method overview	100
15.4.3 Property overview	100
15.4.4 TGroupResource.FindSubResources	100
15.4.5 TGroupResource.ReadResourceItemHeader	100
15.4.6 TGroupResource.CheckBuildItemStream	100
15.4.7 TGroupResource.GetItemData	100
15.4.8 TGroupResource.WriteHeader	101
15.4.9 TGroupResource.WriteResHeader	101
15.4.10 TGroupResource.CreateSubItems	101
15.4.11 TGroupResource.CreateSubItem	101
15.4.12 TGroupResource.UpdateItemOwner	101
15.4.13 TGroupResource.ClearItemList	101
15.4.14 TGroupResource.DeleteSubItems	101
15.4.15 TGroupResource.GetSubStreamCount	101
15.4.16 TGroupResource.GetSubStream	101
15.4.17 TGroupResource.SetOwnerList	102
15.4.18 TGroupResource.NotifyResourcesLoaded	102
15.4.19 TGroupResource.Destroy	102
15.4.20 TGroupResource.CompareContents	102
15.4.21 TGroupResource.SetCustomItemDataStream	102
15.4.22 TGroupResource.UpdateRawData	103
15.4.23 TGroupResource.ItemData	103
16 Reference for unit 'machoreader'	104
16.1 Used units	104
16.2 Overview	104
16.3 TMachOResourceReader	104
16.3.1 Description	104

16.3.2	Method overview	105
16.3.3	Property overview	105
16.3.4	TMachOResourceReader.GetExtensions	105
16.3.5	TMachOResourceReader.GetDescription	105
16.3.6	TMachOResourceReader.Load	105
16.3.7	TMachOResourceReader.CheckMagic	105
16.3.8	TMachOResourceReader.Create	105
16.3.9	TMachOResourceReader.Destroy	105
16.3.10	TMachOResourceReader.MachineType	106
17	Reference for unit 'machotypes'	107
17.1	Overview	107
17.2	Constants, types and variables	107
17.2.1	Types	107
18	Reference for unit 'machowriter'	112
18.1	Used units	112
18.2	Overview	112
18.3	Constants, types and variables	112
18.3.1	Types	112
18.4	EMachOResourceWriterException	113
18.4.1	Description	113
18.5	EMachOResourceWriterUnknownBitSizeException	113
18.5.1	Description	113
18.6	TMachOResourceWriter	113
18.6.1	Description	113
18.6.2	Method overview	113
18.6.3	Property overview	113
18.6.4	TMachOResourceWriter.GetExtensions	114
18.6.5	TMachOResourceWriter.GetDescription	114
18.6.6	TMachOResourceWriter.Write	114
18.6.7	TMachOResourceWriter.Create	114
18.6.8	TMachOResourceWriter.Destroy	114
18.6.9	TMachOResourceWriter.MachineType	114
18.6.10	TMachOResourceWriter.SubMachineType	114
19	Reference for unit 'resdatastream'	115
19.1	Used units	115
19.2	Overview	115
19.3	Constants, types and variables	115
19.3.1	Types	115

19.4	TCachedDataStream	116
19.4.1	Description	116
19.4.2	Method overview	116
19.4.3	TCachedDataStream.GetPosition	116
19.4.4	TCachedDataStream.SetPosition	116
19.4.5	TCachedDataStream.GetSize	117
19.4.6	TCachedDataStream.SetSize64	117
19.4.7	TCachedDataStream.Create	117
19.4.8	TCachedDataStream.Write	117
19.4.9	TCachedDataStream.Seek	117
19.5	TCachedResourceDataStream	117
19.5.1	Description	117
19.5.2	Method overview	117
19.5.3	TCachedResourceDataStream.Create	118
19.5.4	TCachedResourceDataStream.Read	118
19.6	TResourceDataStream	118
19.6.1	Description	118
19.6.2	Method overview	119
19.6.3	Property overview	119
19.6.4	TResourceDataStream.GetPosition	119
19.6.5	TResourceDataStream.SetPosition	119
19.6.6	TResourceDataStream.GetSize	119
19.6.7	TResourceDataStream.SetSize64	119
19.6.8	TResourceDataStream.Create	119
19.6.9	TResourceDataStream.Destroy	120
19.6.10	TResourceDataStream.Compare	120
19.6.11	TResourceDataStream.SetCustomStream	120
19.6.12	TResourceDataStream.Read	120
19.6.13	TResourceDataStream.Write	120
19.6.14	TResourceDataStream.Seek	121
19.6.15	TResourceDataStream.Cached	121
20	Reference for unit 'resfactory'	122
20.1	Used units	122
20.2	Overview	122
20.3	Constants, types and variables	122
20.3.1	Resource strings	122
20.4	EResourceClassAlreadyRegisteredException	122
20.4.1	Description	122
20.5	EResourceFactoryException	123

20.5.1 Description	123
20.6 TResourceFactory	123
20.6.1 Description	123
20.6.2 Method overview	123
20.6.3 TResourceFactory.RegisterResourceClass	123
20.6.4 TResourceFactory.CreateResource	123
21 Reference for unit 'resource'	125
21.1 Used units	125
21.2 Overview	125
21.3 Constants, types and variables	125
21.3.1 Resource strings	125
21.3.2 Constants	126
21.3.3 Types	128
21.4 ENoMoreFreeIDsException	129
21.4.1 Description	129
21.5 EResourceDescChangeNotAllowedException	129
21.5.1 Description	129
21.6 EResourceDescTypeException	129
21.6.1 Description	129
21.7 EResourceDuplicateException	130
21.7.1 Description	130
21.8 EResourceException	130
21.8.1 Description	130
21.9 EResourceLangIDChangeNotAllowedException	130
21.9.1 Description	130
21.10 EResourceNotFoundException	130
21.10.1 Description	130
21.11 EResourceReaderException	130
21.11.1 Description	130
21.12 EResourceReaderNotFoundException	130
21.12.1 Description	130
21.13 EResourceReaderUnexpectedEndOfStreamException	131
21.13.1 Description	131
21.14 EResourceReaderWrongFormatException	131
21.14.1 Description	131
21.15 EResourceWriterException	131
21.15.1 Description	131
21.16 EResourceWriterNotFoundException	131
21.16.1 Description	131

21.17	TAbstractResource	131
21.17.1	Description	131
21.17.2	Method overview	132
21.17.3	Property overview	133
21.17.4	TAbstractResource.SetDescOwner	133
21.17.5	TAbstractResource.SetOwnerList	133
21.17.6	TAbstractResource.SetChildOwner	133
21.17.7	TAbstractResource.GetType	133
21.17.8	TAbstractResource.GetName	134
21.17.9	TAbstractResource.ChangeDescTypeAllowed	134
21.17.10	TAbstractResource.ChangeDescValueAllowed	134
21.17.11	TAbstractResource.NotifyResourcesLoaded	135
21.17.12	TAbstractResource.Create	135
21.17.13	TAbstractResource.Destroy	135
21.17.14	TAbstractResource.CompareContents	135
21.17.15	TAbstractResource.UpdateRawData	136
21.17.16	TAbstractResource.SetCustomRawDataStream	136
21.17.17	TAbstractResource._Type	137
21.17.18	TAbstractResource.Name	137
21.17.19	TAbstractResource.LangID	137
21.17.20	TAbstractResource.DataSize	137
21.17.21	TAbstractResource.HeaderSize	138
21.17.22	TAbstractResource.DataVersion	138
21.17.23	TAbstractResource.MemoryFlags	138
21.17.24	TAbstractResource.Version	139
21.17.25	TAbstractResource.Characteristics	139
21.17.26	TAbstractResource.DataOffset	139
21.17.27	TAbstractResource.CodePage	139
21.17.28	TAbstractResource.RawData	140
21.17.29	TAbstractResource.CacheData	140
21.17.30	TAbstractResource.OwnerList	140
21.17.31	TAbstractResource.Owner	141
21.18	TAbstractResourceReader	141
21.18.1	Description	141
21.18.2	Method overview	142
21.18.3	Property overview	142
21.18.4	TAbstractResourceReader.SetDataSize	142
21.18.5	TAbstractResourceReader.SetHeaderSize	142
21.18.6	TAbstractResourceReader.SetDataOffset	143
21.18.7	TAbstractResourceReader.SetRawData	143

21.18.8 TAbstractResourceReader.CallSubReaderLoad	143
21.18.9 TAbstractResourceReader.AddNoTree	143
21.18.10 TAbstractResourceReader.GetTree	144
21.18.11 TAbstractResourceReader.GetExtensions	144
21.18.12 TAbstractResourceReader.GetDescription	144
21.18.13 TAbstractResourceReader.Load	144
21.18.14 TAbstractResourceReader.CheckMagic	145
21.18.15 TAbstractResourceReader.Create	145
21.18.16 TAbstractResourceReader.Extensions	145
21.18.17 TAbstractResourceReader.Description	146
21.19 TAbstractResourceWriter	146
21.19.1 Description	146
21.19.2 Method overview	146
21.19.3 Property overview	146
21.19.4 TAbstractResourceWriter.GetTree	147
21.19.5 TAbstractResourceWriter.GetExtensions	147
21.19.6 TAbstractResourceWriter.GetDescription	147
21.19.7 TAbstractResourceWriter.Write	147
21.19.8 TAbstractResourceWriter.Create	148
21.19.9 TAbstractResourceWriter.Extensions	148
21.19.10 TAbstractResourceWriter.Description	148
21.20 TGenericResource	148
21.20.1 Description	148
21.20.2 Method overview	149
21.20.3 TGenericResource.GetType	149
21.20.4 TGenericResource.GetName	149
21.20.5 TGenericResource.ChangeDescTypeAllowed	149
21.20.6 TGenericResource.ChangeDescValueAllowed	149
21.20.7 TGenericResource.NotifyResourcesLoaded	149
21.20.8 TGenericResource.Create	149
21.20.9 TGenericResource.Destroy	150
21.20.10 TGenericResource.UpdateRawData	150
21.21 TResourceDesc	150
21.21.1 Description	150
21.21.2 Method overview	150
21.21.3 Property overview	150
21.21.4 TResourceDesc.SetOwner	150
21.21.5 TResourceDesc.Create	151
21.21.6 TResourceDesc.Assign	151
21.21.7 TResourceDesc.Equals	151

21.21.8 TResourceDesc.Name	151
21.21.9 TResourceDesc.ID	152
21.21.10 TResourceDesc.DescType	152
21.22 TResources	152
21.22.1 Description	152
21.22.2 Method overview	153
21.22.3 Property overview	153
21.22.4 TResources.Create	153
21.22.5 TResources.Destroy	153
21.22.6 TResources.Add	153
21.22.7 TResources.AddAutoID	154
21.22.8 TResources.Clear	154
21.22.9 TResources.Find	154
21.22.10 TResources.FindReader	155
21.22.11 TResources.MoveFrom	155
21.22.12 TResources.Remove	155
21.22.13 TResources.LoadFromStream	156
21.22.14 TResources.LoadFromFile	156
21.22.15 TResources.RegisterReader	157
21.22.16 TResources.RegisterWriter	157
21.22.17 TResources.WriteToStream	158
21.22.18 TResources.WriteToFile	158
21.22.19 TResources.Count	158
21.22.20 TResources.Items	159
21.22.21 TResources.CacheData	159
22 Reference for unit 'resourcetree'	160
22.1 Used units	160
22.2 Overview	160
22.3 TResourceTreeNode	161
22.3.1 Description	161
22.3.2 Method overview	161
22.3.3 Property overview	161
22.3.4 TResourceTreeNode.GetNamedCount	161
22.3.5 TResourceTreeNode.GetNamedEntry	161
22.3.6 TResourceTreeNode.GetIDCount	162
22.3.7 TResourceTreeNode.GetIDEntry	162
22.3.8 TResourceTreeNode.GetData	162
22.3.9 TResourceTreeNode.InternalFind	162
22.3.10 TResourceTreeNode.Create	162

22.3.11 TResourceTreeNode.Destroy	162
22.3.12 TResourceTreeNode.Add	163
22.3.13 TResourceTreeNode.CreateSubNode	163
22.3.14 TResourceTreeNode.CreateResource	163
22.3.15 TResourceTreeNode.Clear	163
22.3.16 TResourceTreeNode.Remove	164
22.3.17 TResourceTreeNode.Find	164
22.3.18 TResourceTreeNode.FindFreeID	164
22.3.19 TResourceTreeNode.IsLeaf	164
22.3.20 TResourceTreeNode.Parent	165
22.3.21 TResourceTreeNode.Desc	165
22.3.22 TResourceTreeNode.NamedCount	165
22.3.23 TResourceTreeNode.NamedEntries	165
22.3.24 TResourceTreeNode.IDCount	165
22.3.25 TResourceTreeNode.IDEntries	166
22.3.26 TResourceTreeNode.NameRVA	166
22.3.27 TResourceTreeNode.SubDirRVA	166
22.3.28 TResourceTreeNode.DataRVA	167
22.3.29 TResourceTreeNode.Data	167
22.4 TRootResTreeNode	167
22.4.1 Description	167
22.4.2 Method overview	167
22.4.3 TRootResTreeNode.InternalFind	168
22.4.4 TRootResTreeNode.Create	168
22.4.5 TRootResTreeNode.CreateSubNode	168
22.4.6 TRootResTreeNode.Add	168
22.4.7 TRootResTreeNode.FindFreeID	168
23 Reference for unit 'resreader'	169
23.1 Used units	169
23.2 Overview	169
23.3 TResResourceReader	169
23.3.1 Description	169
23.3.2 Method overview	170
23.3.3 TResResourceReader.GetExtensions	170
23.3.4 TResResourceReader.GetDescription	170
23.3.5 TResResourceReader.Load	170
23.3.6 TResResourceReader.CheckMagic	170
23.3.7 TResResourceReader.Create	170
23.3.8 TResResourceReader.Destroy	170

24 Reference for unit 'reswriter'	171
24.1 Used units	171
24.2 Overview	171
24.3 TResResourceWriter	171
24.3.1 Description	171
24.3.2 Method overview	172
24.3.3 TResResourceWriter.GetExtensions	172
24.3.4 TResResourceWriter.GetDescription	172
24.3.5 TResResourceWriter.Write	172
24.3.6 TResResourceWriter.Create	172
25 Reference for unit 'stringtableresource'	173
25.1 Used units	173
25.2 Overview	173
25.3 Constants, types and variables	173
25.3.1 Resource strings	173
25.4 EStringTableIndexOutOfBoundsException	174
25.4.1 Description	174
25.5 EStringTableNameNotAllowedException	174
25.5.1 Description	174
25.6 EStringTableResourceException	174
25.6.1 Description	174
25.7 TStringTableResource	174
25.7.1 Description	174
25.7.2 Method overview	175
25.7.3 Property overview	175
25.7.4 TStringTableResource.GetType	175
25.7.5 TStringTableResource.GetName	175
25.7.6 TStringTableResource.ChangeDescTypeAllowed	175
25.7.7 TStringTableResource.ChangeDescValueAllowed	175
25.7.8 TStringTableResource.NotifyResourcesLoaded	175
25.7.9 TStringTableResource.Create	176
25.7.10 TStringTableResource.Destroy	176
25.7.11 TStringTableResource.UpdateRawData	176
25.7.12 TStringTableResource.FirstID	176
25.7.13 TStringTableResource.LastID	177
25.7.14 TStringTableResource.Count	177
25.7.15 TStringTableResource.Strings	177
26 Reference for unit 'versionconsts'	178
26.1 Overview	178

26.2	Constants, types and variables	179
26.2.1	Constants	179
27	Reference for unit 'versionresource'	184
27.1	Used units	184
27.2	Overview	184
27.3	Constants, types and variables	184
27.3.1	Types	184
27.4	TVersionResource	185
27.4.1	Description	185
27.4.2	Method overview	186
27.4.3	Property overview	186
27.4.4	TVersionResource.GetType	186
27.4.5	TVersionResource.GetName	186
27.4.6	TVersionResource.ChangeDescTypeAllowed	186
27.4.7	TVersionResource.ChangeDescValueAllowed	186
27.4.8	TVersionResource.NotifyResourcesLoaded	187
27.4.9	TVersionResource.Create	187
27.4.10	TVersionResource.Destroy	187
27.4.11	TVersionResource.UpdateRawData	187
27.4.12	TVersionResource.FixedInfo	187
27.4.13	TVersionResource.StringFileInfo	187
27.4.14	TVersionResource.VarFileInfo	188
28	Reference for unit 'versiontypes'	189
28.1	Used units	189
28.2	Overview	189
28.3	Constants, types and variables	189
28.3.1	Resource strings	189
28.3.2	Types	189
28.4	EDuplicateKeyException	190
28.4.1	Description	190
28.5	EKeyNotFoundException	190
28.5.1	Description	190
28.6	ENameNotAllowedException	190
28.6.1	Description	190
28.7	EVersionStringTableException	190
28.7.1	Description	190
28.8	TVersionFixedInfo	191
28.8.1	Description	191
28.8.2	Method overview	191

28.8.3	Property overview	191
28.8.4	TVersionFixedInfo.Create	191
28.8.5	TVersionFixedInfo.FileVersion	191
28.8.6	TVersionFixedInfo.ProductVersion	191
28.8.7	TVersionFixedInfo.FileFlagsMask	192
28.8.8	TVersionFixedInfo.FileFlags	192
28.8.9	TVersionFixedInfo.FileOS	192
28.8.10	TVersionFixedInfo.FileType	193
28.8.11	TVersionFixedInfo.FileSubType	193
28.8.12	TVersionFixedInfo.FileDate	194
28.9	TVersionStringFileInfo	194
28.9.1	Description	194
28.9.2	Method overview	194
28.9.3	Property overview	195
28.9.4	TVersionStringFileInfo.GetCount	195
28.9.5	TVersionStringFileInfo.GetItem	195
28.9.6	TVersionStringFileInfo.SetItem	195
28.9.7	TVersionStringFileInfo.Create	195
28.9.8	TVersionStringFileInfo.Destroy	195
28.9.9	TVersionStringFileInfo.Add	195
28.9.10	TVersionStringFileInfo.Clear	196
28.9.11	TVersionStringFileInfo.Delete	196
28.9.12	TVersionStringFileInfo.Count	196
28.9.13	TVersionStringFileInfo.Items	196
28.10	TVersionStringTable	197
28.10.1	Description	197
28.10.2	Method overview	197
28.10.3	Property overview	197
28.10.4	TVersionStringTable.Create	198
28.10.5	TVersionStringTable.Destroy	198
28.10.6	TVersionStringTable.Add	198
28.10.7	TVersionStringTable.Clear	199
28.10.8	TVersionStringTable.Delete	199
28.10.9	TVersionStringTable.Name	199
28.10.10	TVersionStringTable.Count	199
28.10.11	TVersionStringTable.Keys	200
28.10.12	TVersionStringTable.ValuesByIndex	200
28.10.13	TVersionStringTable.Values	200
28.11	TVersionVarFileInfo	201
28.11.1	Description	201

28.11.2 Method overview	201
28.11.3 Property overview	201
28.11.4 TVersionVarFileInfo.GetCount	201
28.11.5 TVersionVarFileInfo.GetItem	201
28.11.6 TVersionVarFileInfo.SetItem	201
28.11.7 TVersionVarFileInfo.Create	201
28.11.8 TVersionVarFileInfo.Destroy	202
28.11.9 TVersionVarFileInfo.Add	202
28.11.10 TVersionVarFileInfo.Clear	202
28.11.11 TVersionVarFileInfo.Delete	202
28.11.12 TVersionVarFileInfo.Count	202
28.11.13 TVersionVarFileInfo.Items	203
29 Reference for unit 'winpeimagereader'	204
29.1 Used units	204
29.2 Overview	204
29.3 TWinPEImageResourceReader	204
29.3.1 Description	204
29.3.2 Method overview	205
29.3.3 TWinPEImageResourceReader.CheckDosStub	205
29.3.4 TWinPEImageResourceReader.CheckPESignature	205
29.3.5 TWinPEImageResourceReader.GetExtensions	205
29.3.6 TWinPEImageResourceReader.GetDescription	205
29.3.7 TWinPEImageResourceReader.Load	205
29.3.8 TWinPEImageResourceReader.CheckMagic	205
29.3.9 TWinPEImageResourceReader.Create	205
29.3.10 TWinPEImageResourceReader.Destroy	206

About this guide

This document describes all constants, types, variables, functions and procedures as they are declared in the units that come standard with the FCL-res (Free Pascal Resource support).

Throughout this document, we will refer to functions, types and variables with `typewriter` font. Functions and procedures have their own subsections, and for each function or procedure we have the following topics:

Declaration The exact declaration of the function.

Description What does the procedure exactly do ?

Errors What errors can occur.

See Also Cross references to other related functions/commands.

0.1 Introduction

This package contains a library to easily work with Microsoft Windows resources in a cross-platform way.

Classes are provided to create, load and write resources from/to different file formats in a transparent way, and to handle most common resource types without having to deal with their internal format.

Whenever possible data caching is performed, helped by a copy-on-write mechanism. This improves performance especially when converting big resources from a file format to another.

Since `fcl-res` architecture is extensible, it's always possible to extend the library with custom resource types or new file readers/writers.

Please note that resources aren't limited to Windows platform: Free Pascal can use them also on ELF and Mach-O targets. Moreover, this library can be useful for cross-compilation purposes even on other targets.

It is highly recommended to read Basic Usage (??) topic if you are approaching this library for the first time.

0.2 Basic Usage

Resource files and TResources class

One of the most important classes is `TResources` (??) class, contained in `resource` (??) unit, which represents a format-independent view of a resource file. In fact, while single resources are important, they are of little use alone, since they can't be read or written to file directly: they need to be contained in a `TResources` (??) object.

`TResources` (??) provides methods to read itself from a file or stream, using specific objects that are able to read resource data from such a stream: these are the so called *resource readers*, that descend from `TAbstractResourceReader` (??).

There are also *resource writers* that do the opposite, and that descend from `TAbstractResourceWriter` (??).

Usually readers and writers register themselves with `TResources` (??) in the `initialization` section of the unit they are implemented in, so you only need to add a certain unit to your program `uses` clause to let `TResources` (??) "know" about a particular file format.

Let's see a very simple example: a program that converts a `.res` file to an object file in COFF format (the object file format used by Microsoft Windows).

```

program res1;

{$mode objfpc}

uses
    Classes, SysUtils, resource, resreader, coffwriter;

var
    resources : TResources;
begin
    resources:=TResources.Create;
    resources.LoadFromFile('myresource.res');
    resources.WriteToFile('myobject.o');
    resources.Free;
end.

```

As you can see, the code is trivial. Note that `resreader` and `coffwriter` units were added to the `uses` clause of the program: this way, the resource reader for `.res` files and the resource writer for COFF files have been registered, letting the `resources` object know how to handle these file types.

There are cases where one doesn't want to let the `TResources` (??) object to choose readers and writers by itself. In fact, while generally it is a good idea to let `TResources` (??) probe all readers it knows to find one able to read the input file, this isn't true when it comes to write files: writers are selected based on the file extension, so if you are trying to write a file with `.o` extension you can't be sure about which writer will be selected: it could be the COFF or the ELF writer (it depends on which writer gets registered first). Moreover, writers generally make an object file for the host architecture, so if you are running the program on a i386 machine it will produce a COFF or ELF file for i386.

The solution is to provide `TResources` (??) with a specific writer. In the following example the reader is automatically chosen among various readers, and we use a specific writer to produce an ELF file for SPARC.

```

program res2;

{$mode objfpc}

uses
    Classes, SysUtils, resource,
    resreader, coffreader, elfreader, winpeimagereader, //readers
    elfwriter, elfconsts;

var
    resources : TResources;
    writer : TElfResourceWriter;
begin
    resources:=TResources.Create;
    resources.LoadFromFile(paramstr(1));
    writer:=TElfResourceWriter.Create;
    writer.MachineType:=emtsparc;
    resources.WriteToFile(ChangeFileExt(paramstr(1),'.o'),writer);
    resources.Free;
    writer.Free;
end.

```

Note that the file to convert is taken from the command line. Its format is automatically detected among res (resreader (??)), coff (coffreader (??)), elf (elfreader (??)), PE (winpeimagereader (??), e.g. a Windows exe or dll), and is written as an ELF file for SPARC. Note that we had to use elfconsts (??) unit since we used emtsparc (??) constant to specify the machine type of the object file to generate.

With a small change to the above program we can let the user know which reader was selected to read the input file: we can use TResources.FindReader (??) class method to obtain the appropriate reader for a given stream.

```
program res3;

{$mode objfpc}

uses
  Classes, SysUtils, resource,
  resreader, coffreader, elfreader, winpeimagereader, //readers
  elfwriter, elfconsts;

var
  resources : TResources;
  writer : TElfResourceWriter;
  reader : TAbstractResourceReader;
  inFile : TFileStream;
begin
  resources:=TResources.Create;
  inFile:=TFileStream.Create(paramstr(1), fmOpenRead or fmShareDenyNone);
  reader:=TResources.FindReader(inFile);
  writeln('Selected reader: ', reader.Description);
  resources.LoadFromStream(inFile, reader);
  writer:=TElfResourceWriter.Create;
  writer.MachineType:=emtsparc;
  resources.WriteToFile(ChangeFileExt(paramstr(1), '.o'), writer);
  resources.Free;
  reader.Free;
  writer.Free;
  inFile.Free;
end.
```

Output example:

```
user@localhost:~$ ./res3 myresource.res
Selected reader: .res resource reader
user@localhost:~$
```

Single resources

You can do more with resources than simply converting between file formats.

TResources.Items (??) property provides a simple way to access all resources contained in the TResources (??) object.

In the following example we read a resource file and then dump each resource data in a file whose name is built from type and name of the dumped resource.

```
program res4;
```

```
{ $mode objfpc }

uses
  Classes, SysUtils, resource, resreader;

var
  resources : TResources;
  dumpFile : TFileStream;
  i : integer;
  fname : string;
begin
  resources:=TResources.Create;
  resources.LoadFromFile('myresource.res');
  for i:=0 to resources.Count-1 do
    begin
      fname:=resources[i]._Type.Name+'_'+resources[i].Name.Name;
      dumpFile:=TFileStream.Create(fname, fmCreate or fmShareDenyWrite);
      dumpFile.CopyFrom(resources[i].RawData, resources[i].RawData.Size);
      dumpFile.Free;
    end;
  resources.Free;
end.
```

This code simply copies the content of each resource's `RawData` (??) stream to a file stream, whose name is *resourcetype_resourcename*.

Resource raw data isn't always what one expected, however. While some resource types simply contain a copy of a file in their raw data, other types do some processing, so that dumping raw data doesn't result in a file in the format one expected.

E.g. a resource of type `RT_MANIFEST` (??) is of the former type: its raw data is like an XML manifest file. On the other hand, in a resource of type `RT_BITMAP` (??) the `RawData` (??) stream isn't like a BMP file.

For this reason, several classes (descendants of `TAbstractResource` (??)) are provided to handle the peculiarities of this or that resource type. Much like it's done with readers and writers, resource classes can be registered: adding the unit that contains a resource class to the `uses` clause of your program registers that class. This way, when resources are read from a file, they are created with the class that is registered for their type (the class responsible to do this is `TResourceFactory` (??), but probably you won't need to use it unless you're implementing a new resource reader or resource class).

In the following example, we read a resource file and then dump data of each resource of type `RT_BITMAP` (??) as a BMP file.

```
program res5;

{ $mode objfpc }

uses
  Classes, SysUtils, resource, resreader, bitmapresource;

var
  resources : TResources;
  dumpFile : TFileStream;
```

```

    i : integer;
    fname : string;
begin
    resources:=TResources.Create;
    resources.LoadFromFile('myresource.res');
    for i:=0 to resources.Count-1 do
        if resources[i] is TBitmapResource then
            with resources[i] as TBitmapResource do
                begin
                    fname:=Name.Name+'.bmp';
                    dumpFile:=TFileStream.Create(fname, fmCreate or fmShareDenyWrite);
                    dumpFile.CopyFrom(BitmapData, BitmapData.Size);
                    dumpFile.Free;
                end;
            end;
        resources.Free;
    end.

```

Note that we included `bitmapresource (??)` in the `uses` clause of our program. This way, resources of type `RT_BITMAP (??)` are created from `TBitmapResource (??)` class. This class provides a stream, `BitmapData (??)` that allows resource raw data to be accessed as if it was a bmp file.

We can of course do the opposite. In the following code we are creating a manifest resource from `manifest.xml` file.

```

program res6;

{$mode objfpc}

uses
    Classes, SysUtils, resource, reswriter;

var
    resources : TResources;
    inFile : TFileStream;
    res : TGenericResource;
    rname, rtype : TResourceDesc;
begin
    inFile:=TFileStream.Create('manifest.xml', fmOpenRead or fmShareDenyNone);
    rtype:=TResourceDesc.Create(RT_MANIFEST);
    rname:=TResourceDesc.Create(1);
    res:=TGenericResource.Create(rtype, rname);
    rtype.Free; //no longer needed
    rname.Free;
    res.SetCustomRawDataStream(inFile);
    resources:=TResources.Create;
    resources.Add(res);
    resources.WriteToFile('myresource.res');
    resources.Free; //frees res as well
    inFile.Free;
end.

```

Note that resources of type `RT_MANIFEST (??)` contain a straight copy of a xml file, so `TGenericResource (??)` class fits our needs. `TGenericResource (??)` is a basic implementation of `TAbstractResource (??)`. It is the default class used by `TResourceFactory (??)` when it must create a resource whose type wasn't registered with any resource class.

Please note that instead of copying `inFile` contents to `RawData` (??) we used `SetCustomRawDataStream` (??) method: it sets a stream as the underlying stream for `RawData` (??), so that when final resource file is written, data is read directly from the original file.

Let's see a similar example, in which we use a specific class instead of `TGenericResource` (??). In the following code we are creating a resource containing the main program icon, which is read from `mainicon.ico` file.

```
program res7;

{$mode objfpc}

uses
  Classes, SysUtils, resource, reswriter, groupiconresource;

var
  resources : TResources;
  inFile : TFileStream;
  iconres : TGroupIconResource;
  name : TResourceDesc;
begin
  inFile:=TFileStream.Create('mainicon.ico',fmOpenRead or fmShareDenyNone);
  name:=TResourceDesc.Create('MAINICON');
  //type is always RT_GROUP_ICON for this resource class
  iconres:=TGroupIconResource.Create(nil,name);
  iconres.SetCustomItemDataStream(inFile);
  resources:=TResources.Create;
  resources.Add(iconres);
  resources.WriteToFile('myicon.res');
  resources.Free; //frees iconres as well
  inFile.Free;
  name.Free;
end.
```

In this program we created a new `TGroupIconResource` (??) with 'MAINICON' as name, and we loaded its contents from file 'mainicon.ico'. Please note that `RT_GROUP_ICON` (??) resource raw data doesn't contain a .ico file, so we have to write to `ItemData` (??) which is a ico-like stream. As we did for `res6` program, we tell the resource to use our stream as the underlying stream for resource data: the only difference is that we are using `TGroupResource.SetCustomItemDataStream` (??) instead of `TAbstractResource.SetCustomRawDataStream` (??) method, for obvious reasons.

Other resource types

There are other resource types that allow to easily deal with resource data. E.g. `TVersionResource` (??) makes it easy to create and read version information for Windows executables and dlls, `TStringTableResource` (??) deals with string tables, and so on.

Data caching

Whenever possible, `fcl-res` tries to avoid to duplicate data. Generally a reader doesn't copy resource data from the original stream to `RawData` (??) stream: instead, it only informs the resource about where its raw data is in the original stream. `RawData` (??) uses a caching system so that it appears as a stream while it only redirects operations to its underlying stream, with a copy-on-write mechanism. Of course this behaviour can be controlled by the user. For further information, see `TAbstractResource` (??) and `TAbstractResource.RawData` (??).

0.3 How to implement a new resource class

Remark: This chapter assumes you have some experience in using this library.

Some considerations

Usually, a specific resource class is needed when resource data is encoded in a specific binary format that makes working with `RawData` (??) uncomfortable.

However, there aren't many reasons to design a new binary format requiring a specific resource class: the classes provided with this package exist for compatibility with Microsoft Windows, but in the general case one should avoid such approach.

In Microsoft Windows, some resource types have a specific format, and the operating system supports them at runtime making it easy to access that kind of data: e.g. icons and bitmaps are stored in resources in a format that is slightly different from the one found in regular files, but the operating system allows the user to easily load them using `LoadImage` function, without having to deal with their internal format. Other resource types are used to obtain information about the executable: `RT_VERSION` (??) resource type and `RT_GROUP_ICON` (??) contain version information and program icon that can be displayed in Windows Explorer, respectively.

Using this kind of resources in a cross-platform perspective doesn't make much sense however, since there is no support by other operating systems for these types of resources (and for resources in general), and this means that it's up to you to provide support at runtime for these binary formats. So if you need to store images as resources it's better to use `TGenericResource` (??) and store an image in PNG format (for instance), which can be read by existing libraries at runtime, instead of creating a `RT_BITMAP` (??) resource with `TBitmapResource` (??), since libraries that read BMP files can't handle that resource contents.

New resource classes thus make sense when you want to add support for existing Windows-specific resources, e.g. because you are writing a resource compiler or editor, but in the general case they should be avoided.

Now that you've been warned, let's start with the topic of this chapter.

How to implement a new resource class

A resource class is a descendant of `TAbstractResource` (??), and it's usually implemented in a unit named `typeresource`, where *type* is resource type.

If you are implementing a new resource class, you are doing it to provide additional methods or properties to utilize resource data. Your resource class must thus be able to read its `RawData` (??) stream format and write data back to it when it is requested to do so.

Generally, your class shouldn't create private objects, records or memory buffers to provide these specific means of accessing data until it's requested to do so (lazy loading), and it should free these things when it is requested to write back data to the `RawData` (??) stream.

We'll see these points in more detail, using `TAcceleratorsResource` (??) as an example.

`TAcceleratorsResource` (??) holds a collection of accelerators. An accelerator is a record defined as follows:

```
type
  TAccelerator = packed record
    Flags : word;
    Ansi : word;
    Id : word;
    padding : word;
  end;
```

The resource simply contains accelerators, one immediately following the other. Last accelerator

must have \$80 in its flags.

To provide easy access to the elements it contains, our accelerator resource class exposes these methods and properties in its public section:

```
procedure Add(aItem : TAccelerator);
procedure Clear;
procedure Delete(aIndex : integer);
property Count : integer read GetCount;
property Items[index : integer] : TAccelerator read GetItem write SetItem; default;
```

We must also implement abstract methods (and an abstract constructor) of TAbstractResource (??):

```
protected
    function GetType : TResourceDesc; override;
    function GetName : TResourceDesc; override;
    function ChangeDescTypeAllowed(aDesc : TResourceDesc) : boolean; override;
    function ChangeDescValueAllowed(aDesc : TResourceDesc) : boolean; override;
    procedure NotifyResourcesLoaded; override;
public
    constructor Create(aType, aName : TResourceDesc); override;
    procedure UpdateRawData; override;
```

The protected methods are very easy to implement, so let's start from them. For GetType (??) and GetName (??), we need to add two private fields, fType and fName, of type TResourceDesc (??). We create them in the constructor and destroy them in the destructor. Type will always be RT_ACCELERATOR (??). We make the parameterless constructor of TAbstractResource (??) public, using 1 as the resource name, while in the other constructor we use the name passed as parameter, ignoring the type (since it must always be RT_ACCELERATOR (??)).

So, GetType (??), GetName (??), the constructors and the destructor are implemented as follows:

```
function TAcceleratorsResource.GetType: TResourceDesc;
begin
    Result:=fType;
end;

function TAcceleratorsResource.GetName: TResourceDesc;
begin
    Result:=fName;
end;

constructor TAcceleratorsResource.Create;
begin
    inherited Create;
    fType:=TResourceDesc.Create(RT_ACCELERATOR);
    fName:=TResourceDesc.Create(1);
    SetDescOwner(fType);
    SetDescOwner(fName);
end;

constructor TAcceleratorsResource.Create(aType, aName: TResourceDesc);
begin
    Create;
    fName.Assign(aName);
```

```
end;

destructor TAcceleratorsResource.Destroy;
begin
    fType.Free;
    fName.Free;
    inherited Destroy;
end;
```

Note that we used `SetDescOwner` (??) to let type and name know the resource that owns them.

Now `ChangeDescTypeAllowed` (??) and `ChangeDescValueAllowed` (??) come. As we said, resource type must be `RT_ACCELERATOR` (??), always. Thus, we only allow name to change value or type:

```
function TAcceleratorsResource.ChangeDescTypeAllowed(aDesc: TResourceDesc) : boolean;
begin
    Result:=aDesc=fName;
end;

function TAcceleratorsResource.ChangeDescValueAllowed(aDesc: TResourceDesc) : boolean;
begin
    Result:=aDesc=fName;
end;
```

`NotifyResourcesLoaded` (??) is called by `TResources` (??) when it finishes loading all resources. Since we are not interested in this fact, we simply leave this method empty. This method is useful for resources that "own" other resources, like `TGroupIconResource` (??) and `TGroupCursorResource` (??) (note: you should **not** implement resource types that depend on other resources: it complicates things a lot and gives you a lot of headaches).

Now, let's see the more interesting - and more difficult - part: providing an easy way to deal with accelerators.

As we said earlier, we must implement some methods and properties to do so. Surely we'll need a list to hold pointers to accelerator records, but we must think a little bit about how this list is created, populated, written to `RawData` (??) and so on.

When the object is created, we don't have to create (yet) single accelerator records, as said before; but if the user tries to access them we must do it. If the object is created and its `RawData` (??) contains data (e.g. because a reader has created the resource when loading a resource file) and the user tries to access an accelerator, we must create accelerators from `RawData` (??) contents. So, until a user tries to access accelerators our class doesn't do anything, while when the user does so it "lazy-loads" data, or creates empty structures if `RawData` (??) is empty.

When data is loaded, `RawData` (??) contents aren't considered anymore. When, however, our resource is requested to update `RawData` (??) (that is, when `UpdateRawData` (??) method is invoked), our "lazy-loaded" data must be freed. In fact, a user could ask our resource to update raw data, then he/she could modify it directly and then could use our resource's specialized methods and properties to do further processing: for this reason, when `RawData` (??) is written, other buffered things must be freed, so that they'll be created again from `RawData` (??) if needed.

Note that other resource classes could behave differently: e.g. `TBitmapResource` (??) uses a copy-on-write mechanism on top of `RawData` (??) to insert a BMP file header at the beginning of the stream, but it doesn't copy `RawData` (??) contents whenever possible.

Coming back to our `TAcceleratorsResource` (??) example, let's see how to implement this behaviour.

Let's add a `fList` field in the `private` section of our class:

```
fList : TFPList;
```

In the constructor, we set this field to `nil`: we use it to check if data has been loaded from `RawData` (??) or not. Consequently in the destructor we'll free the list only if it's not `nil`:

```
destructor TAcceleratorsResource.Destroy;
begin
  fType.Free;
  fName.Free;
  if fList<>nil then
    begin
      Clear;
      fList.Free;
    end;
  inherited Destroy;
end;
```

(we did not implement `Clear` method yet: we'll see it later).

We said that our resource must load data only when needed; to do this we add a private method, `CheckDataLoaded` that ensures that data is loaded. This method is called by whatever method needs to operate on the list: if data has already been loaded it will quickly return, otherwise it will load data.

```
procedure TAcceleratorsResource.CheckDataLoaded;
var acc : TAccelerator;
    tot, i : integer;
    p : PAccelerator;
begin
  if fList<>nil then exit;
  fList:=TFPList.Create;
  if RawData.Size=0 then exit;
  RawData.Position:=0;
  tot:=RawData.Size div 8;
  for i:=1 to tot do
    begin
      RawData.ReadBuffer(acc, sizeof(acc));
      GetMem(p, sizeof(TAccelerator));
      p^:=acc;
      fList.Add(p);
    end;
  end;
```

If `fList` is not `nil` data is already loaded, so exit. Otherwise, create the list. If `RawData` (??) is empty we don't need to load anything, so exit. Otherwise allocate room for accelerators, read them from the stream, and add them to the list.

Note that if we are running on a big endian system we should swap the bytes we read, e.g. calling `SwapEndian` function, but for simplicity this is omitted.

The counterpart of `CheckDataLoaded` is `UpdateRawData` (??). When it is called, data from the list must be written back to `RawData` (??), and the list and its contents must be freed:

```
procedure TAcceleratorsResource.UpdateRawData;
var acc : TAccelerator;
```

```

        i : integer;
begin
    if fList=nil then exit;
    RawData.Size:=0;
    RawData.Position:=0;

    for i:=0 to fList.Count-1 do
    begin
        acc:=PAccelerator(fList[i])^;
        // $80 means 'this is the last entry', so be sure only the last one has this bit
        if i=Count-1 then acc.Flags:=acc.Flags or $80
        else acc.Flags:=acc.Flags and $7F;
        RawData.WriteBuffer(acc,sizeof(acc));
    end;
    Clear;
    FreeAndNil(fList);
end;
```

If `fList` is `nil` data hasn't been loaded, so `RawData` (??) is up to date, so exit. Otherwise, write each accelerator (ensuring that only last one has \$80 flag set), clear the list, free it and set it to `nil`. Again, if we are on a big endian system we should swap each accelerator contents before writing it, but for simplicity this is omitted.

Other methods we named earlier (`Add`, `Delete`, `Clear`) are trivial to implement: remember only to call `CheckDataLoaded` before doing anything. The same is true for accessor methods of relevant properties (`Count`, `Items`).

If you are curious, you can check the full implementation of `TAcceleratorsResource` (??) looking at source code.

0.4 How to implement a new resource reader

Remark: This chapter assumes you have some experience in using this library.

We'll see how to implement a reader for a new resource file format. A resource reader is a descendant of `TAbstractResourceReader` (??), and it's usually implemented in a unit named `namereader`, where *name* is file format name.

Suppose we must write a reader for file format *foo*; we could start with a unit like this:

```

unit fooreader;

{$MODE OBJFPC} {$H+}

interface

uses
    Classes, SysUtils, resource;

type
    TFooResourceReader = class(TAbstractResourceReader)
    protected
        function GetExtensions : string; override;
        function GetDescription : string; override;
        procedure Load(aResources : TResources; aStream : TStream); override;
```

```

    function CheckMagic(aStream : TStream) : boolean; override;
public
    constructor Create; override;
end;

implementation

function TFooResourceReader.GetExtensions: string;
begin

end;

function TFooResourceReader.GetDescription: string;
begin

end;

procedure TFooResourceReader.Load(aResources: TResources; aStream: TStream);
begin

end;

function TFooResourceReader.CheckMagic(aStream: TStream): boolean;
begin

end;

constructor TFooResourceReader.Create;
begin

end;

initialization
    TResources.RegisterReader('.foo', TFooResourceReader);

end.
```

Note that in the initialization section, TFooResourceReader is registered for extension .foo.

We must implement abstract methods of TAbstractResourceReader (??). Let's start with the simpler ones, GetExtensions (??) and GetDescription (??).

```

function TFooResourceReader.GetExtensions: string;
begin
    Result:='.foo';
end;

function TFooResourceReader.GetDescription: string;
begin
    Result:='FOO resource reader';
end;
```

Now let's see CheckMagic (??) method. This method is called with a stream as a parameter, and

the reader must return `true` if it recognizes the stream as a valid one. Usually this means checking some magic number or header.

```
function TFooResourceReader.CheckMagic(aStream: TStream): boolean;
var signature : array[0..3] of char;
begin
    Result:=false;
    try
        aStream.ReadBuffer(signature[0], 4);
    except
        on e : EReadError do exit;
    end;
    Result:=signature='FOO*';
end;
```

Suppose our foo files start with a 4-byte signature 'FOO*'. This method checks the signature and returns `true` if it is verified. Note that it catches `EReadError` exception raised by `TStream`: this way, if the stream is too short it returns `false` (as it should, since magic is not valid) instead of letting the exception to propagate.

Now let's see `Load` (??). This method must read the stream and create resources in the `TResources` (??) object, with information about their name, type, position and size of their raw data, and so on.

```
procedure TFooResourceReader.Load(aResources: TResources; aStream: TStream);
begin
    if not CheckMagic(aStream) then
        raise EResourceReaderWrongFormatException.Create('');
    try
        ReadResources(aResources, aStream);
    except
        on e : EReadError do
            raise EResourceReaderUnexpectedEndOfStreamException.Create('');
        end;
    end;
end;
```

First of all, this method checks file magic number, calling `CheckMagic` (??) method we already implemented. This is necessary since `CheckMagic` (??) is not called before `Load` (??): `CheckMagic` (??) is invoked by `TResources` (??) when probing a stream, while `Load` (??) is invoked when loading resources (so if the user passed a reader object to a `TResources` (??) object, `CheckMagic` (??) is never called). Note also that the stream is always at its starting position when these methods are called.

If magic number is ok, our method invokes another method to do the actual loading. If during this process the stream can't be read, an `EResourceReaderUnexpectedEndOfStreamException` (??) exception is raised.

So, let's implement the private method which will load resources.

Suppose that our foo format is very simple:

- the header is made by the 4-byte signature we already saw, a longword holding the number of resources in the file, and other 8 bytes of padding.
- each resource has a 16-byte header containing:
 - a longword for the resource type (only IDs are allowed for types)
 - a longword for the resource name (only IDs are allowed for names)

- a longword for the language ID
- a longword for the size of the resource data
- after the resource header immediately comes the resource data, possibly padded so that it ends on a 4 byte boundary.
- file format is little-endian

To start with, our method will be:

```

procedure TFooResourceReader.ReadResources(aResources: TResources; aStream: TStream)
var Count, i: longword;
    aType, aName, aLangID : longword;
    aDataSize : longword;
begin
    //read remaining file header
    aStream.ReadBuffer(Count, sizeof(Count));
    aStream.Seek(8, soFromCurrent);

    for i:=1 to Count do
    begin
        //read resource header
        aStream.ReadBuffer(aType, sizeof(aType));
        aStream.ReadBuffer(aName, sizeof(aName));
        aStream.ReadBuffer(aLangID, sizeof(aLangID));
        aStream.ReadBuffer(aDataSize, sizeof(aDataSize));

    end;
end;

```

Since in Load (??) we called CheckMagic (??), which read the first 4 bytes of the header, we must read the remaining 12: we read the number of resources, and we skip the other 8 bytes of padding.

Then, for each resource, we read the resource header. Note that if we are running on a big endian system we should swap the bytes we read, e.g. calling SwapEndian function, but for simplicity this is omitted.

Now, we should create a resource. Of which class? Well, we must use resfactory (??) unit. In fact it contains TResourceFactory (??) class, which is an expert in creating resources of the right class: when the user adds a unit containing a resource class to the uses clause of its program, the resource class registers itself with TResourceFactory (??). This way it knows how to map resource types to resource classes.

We need to have type and name of the resource to create as TResourceDesc (??) objects: instead of creating and destroying these objects for each resource, we'll create a couple in the creator of our reader and we'll destroy them in the destructor, so that they will live for the whole life of our reader. Let's name them workType and workName.

Our code becomes:

```

uses
    resfactory;

procedure TFooResourceReader.ReadResources(aResources: TResources; aStream: TStream)
var Count, i: longword;
    aType, aName, aLangID : longword;

```

```

        aDataSize : longword;
        aRes : TAbstractResource;
begin
    //read remaining file header
    aStream.ReadBuffer(Count, sizeof(Count));
    aStream.Seek(8, soFromCurrent);

    for i:=1 to Count do
    begin
        //read resource header
        aStream.ReadBuffer(aType, sizeof(aType));
        aStream.ReadBuffer(aName, sizeof(aName));
        aStream.ReadBuffer(aLangID, sizeof(aLangID));
        aStream.ReadBuffer(aDataSize, sizeof(aDataSize));

        //create the resource
        workType.ID:=aType;
        workName.ID:=aName;
        aRes:=TResourceFactory.CreateResource(workType, workName);
        SetDataSize(aRes, aDataSize);
        SetDataOffset(aRes, aStream.Position);
        aRes.LangID:=aLangID;

    end;
end;

```

Note that after the resource has been created we set its data size and data offset. Data offset is the current position in the stream, since in our FOO file format resource data immediately follows resource header.

What else do we need to do? Of course we must create RawData (??) stream for our resource, so that raw data can be accessed with the caching mechanism. We will create a TResourceDataStream (??) object, telling it which resource and stream it is associated to, which its size will be and which class its underlying cached stream must be created from.

So we add resdatastream (??) to the uses clause, declare another local variable

```
aRawData : TResourceDataStream;
```

and add these lines in the for loop

```

aRawData:=TResourceDataStream.Create(aStream, aRes, aRes.DataSize, TCachedResourceDataS
SetRawData(aRes, aRawData);

```

That is, aRawData will create its underlying stream as a TCachedResourceDataStream (??) over the portion of aStream that starts at current position and ends after aRes.DataSize bytes.

We almost finished: now we must add the newly created resource to the TResources (??) object and move stream position to the next resource header. Complete code for ReadResources method is:

```

procedure TFooResourceReader.ReadResources(aResources: TResources; aStream: TStream)
var Count, i: longword;
    aType, aName, aLangID : longword;
    aDataSize : longword;
    aRes : TAbstractResource;

```

```

        aRawData : TResourceDataStream;
begin
    //read remaining file header
    aStream.ReadBuffer(Count,sizeof(Count));
    aStream.Seek(8,soFromCurrent);

    for i:=1 to Count do
    begin
        //read resource header
        aStream.ReadBuffer(aType,sizeof(aType));
        aStream.ReadBuffer(aName,sizeof(aName));
        aStream.ReadBuffer(aLangID,sizeof(aLangID));
        aStream.ReadBuffer(aDataSize,sizeof(aDataSize));

        //create the resource
        workType.ID:=aType;
        workName.ID:=aName;
        aRes:=TResourceFactory.CreateResource(workType,workName);
        SetDataSize(aRes,aDataSize);
        SetDataOffset(aRes,aStream.Position);
        aRes.LangID:=aLangID;

        //set raw data
        aRawData:=TResourceDataStream.Create(aStream,aRes,aRes.DataSize,TCachedResourceD
        SetRawData(aRes,aRawData);

        //add to aResources
        try
            aResources.Add(aRes);
        except
            on e : EResourceDuplicateException do
            begin
                aRes.Free;
                raise;
            end;
        end;

        //go to next resource header
        aStream.Seek(aDataSize,soFromCurrent);
        Align4Bytes(aStream);
    end;
end;

```

Align4Bytes is a private method (not shown for simplicity) that sets stream position to the next multiple of 4 if needed, since FOO file format specifies that resource data must be padded to end on a 4 byte boundary.

Note: We have used Add (??) method to populate the TResources (??) object. More complex file formats store resources in a tree hierarchy; since TResources (??) internally stores resources in this way too, a reader can choose to acquire a reference to the internal tree used by the TResources (??) object (see TAbstractResourceReader.GetTree (??)), populate it and notify the TResources (??) object about the added resources (see TAbstractResourceReader.AddNoTree (??)). For these file formats resources can be loaded faster, since there is no overhead involved in keeping a separate resource tree in the reader.

That's all. Now you should be able to create a real resource reader.

0.5 How to implement a new resource writer

Remark: This chapter assumes you have some experience in using this library.

We'll see how to implement a writer for a new resource file format. A resource writer is a descendant of `TAbstractResourceWriter` (??), and it's usually implemented in a unit named `namewriter`, where *name* is file format name.

Suppose we must write a writer for file format *foo*; we could start with a unit like this:

```
unit foowriter;

{$MODE OBJFPC} {$H+}

interface

uses
  Classes, SysUtils, resource;

type
  TFooResourceWriter = class (TAbstractResourceWriter)
  protected
    function GetExtensions : string; override;
    function GetDescription : string; override;
    procedure Write(aResources : TResources; aStream : TStream); override;
  public
    constructor Create; override;
  end;

implementation

function TFooResourceWriter.GetExtensions: string;
begin

end;

function TFooResourceWriter.GetDescription: string;
begin

end;

procedure TFooResourceWriter.Write(aResources: TResources; aStream: TStream);
begin

end;

constructor TFooResourceWriter.Create;
begin

end;

initialization
```

```
TResources.RegisterWriter(' .foo', TFooResourceWriter);

end.
```

Note that in the initialization section, `TFooResourceWriter` is registered for extension `.foo`.

We must implement abstract methods of `TAbstractResourceWriter` (??). Let's start with the simpler ones, `GetExtensions` (??) and `GetDescription` (??).

```
function TFooResourceWriter.GetExtensions: string;
begin
    Result:=' .foo';
end;

function TFooResourceWriter.GetDescription: string;
begin
    Result:='FOO resource writer';
end;
```

Now let's see `Write` (??). This method must write all resources in the `TResources` (??) object to the stream.

Suppose that our foo format is very simple:

- the header is made by a 4-byte signature (FOO*), a longword holding the number of resources in the file, and other 8 bytes of padding.
- each resource has a 16-byte header containing:
 - a longword for the resource type (only IDs are allowed for types)
 - a longword for the resource name (only IDs are allowed for names)
 - a longword for the language ID
 - a longword for the size of the resource data
- after the resource header immediately comes the resource data, possibly padded so that it ends on a 4 byte boundary.
- file format is little-endian

Our `Write` (??) method could be something like this:

```
procedure TFooResourceWriter.Write(aResources: TResources; aStream: TStream);
var i : integer;
begin
    WriteFileHeader(aStream, aResources);
    for i:=0 to aResources.Count-1 do
        WriteResource(aStream, aResources[i]);
    end;
```

So we must implement `WriteFileHeader`, which writes the 16-byte file header, and `WriteResource`, which writes a single resource with its header.

Let's start from the first one:

```
procedure TFooResourceWriter.WriteFileHeader(aStream: TStream; aResources: TResource
var signature : array[0..3] of char;
    rescount : longword;
    padding : qword;
begin
    signature:='FOO*';
    rescount:=aResources.Count;
    padding:=0;

    aStream.WriteBuffer(signature[0],4);
    aStream.WriteBuffer(rescount,sizeof(rescount));
    aStream.WriteBuffer(padding,sizeof(padding));
end;
```

This code simply writes the file header as defined in foo format. Note that if we are running on a big endian system we should swap bytes before writing, e.g. calling `SwapEndian` function, but for simplicity this is omitted.

Now `WriteResource` comes. This method could be like this:

```
procedure TFooResourceWriter.WriteResource(aStream: TStream; aResource: TAbstractRes
var aType : longword;
    aName : longword;
    aLangID : longword;
    aDataSize : longword;
begin
    aType:=aResource._Type.ID;
    aName:=aResource.Name.ID;
    aLangID:=aResource.LangID;
    aDataSize:=aResource.RawData.Size;

    //write resource header
    aStream.WriteBuffer(aType,sizeof(aType));
    aStream.WriteBuffer(aName,sizeof(aName));
    aStream.WriteBuffer(aLangID,sizeof(aLangID));
    aStream.WriteBuffer(aDataSize,sizeof(aDataSize));

    //write resource data
    aResource.RawData.Position:=0;
    aStream.CopyFrom(aResource.RawData,aResource.RawData.Size);

    //align data so that it ends on a 4-byte boundary
    Align4Bytes(aStream);
end;
```

We write the 16-byte resource header, and then resource data. Note that if resources have been loaded from a stream and the user didn't modify resource data, we are copying data directly from the original stream.

`Align4Bytes` is a private method (not shown for simplicity) that writes some padding bytes to the stream if needed, since FOO file format specifies that resource data must be padded to end on a 4 byte boundary. Again, we didn't consider endianness for simplicity. And finally, note that foo format only supports IDs for types and names, so if one of them is a name (that is, a string) this code might cause exceptions to be raised.

Note: More complex file formats store resources in a tree hierarchy; since `TResources` (??) internally stores resources in this way too, a writer can choose to acquire a reference to the internal tree used by the `TResources` (??) object (see `TAbstractResourceWriter.GetTree` (??)) and use it directly. For these file formats resources can be written faster, since there is no overhead involved in building a separate resource tree in the writer.

That's all. Now you should be able to create a real resource writer.

0.6 Format of resources in object files

Introduction

This appendix describes the format in which resources are stored in object files. This doesn't apply to PECOFF file format, where a format already exists and is well described in documentation from Microsoft.

On Microsoft Windows, resources are natively supported by the operating system. On other systems, Free Pascal RTL provides access to resources, which are embedded in the executable file in the format that is here described.

This appendix doesn't describe a particular object file format implementation (e.g. ELF or Mach-O), but the layout of the sections involved in supporting resources: the way these sections are actually laid out on a file are subject to the rules of the hosting object file format.

For external resource file details, see [Description of external resource file format](#) (??)

Conventions

In this document, data sizes are specified with pascal-style data types. They are the following:

Table 1:

Name	Meaning
<code>longword</code>	Unsigned 32 bit integer.
<code>ptruint</code>	Unsigned integer of the size of a pointer

Byte order is the one of the target machine.

All data structures in the sections must be aligned on machine boundaries (4 bytes for 32 bit machines, 8 bytes for 64 bit machines).

Note that all pointers must be valid at runtime. This means that relocations must be written to the object file so that the linker can relocate pointers to the addresses they will have at runtime. Note also that pointers to strings are really pointers, and not offsets to the beginning of the string table.

Resource sections

Free Pascal uses two sections to store resource information:

- `fpc.resources`. This is a data section that contains all required structures. It must be writable.
- `fpc.rehandles`. This is a bss section whose size must be equal to $(\text{total number of resources}) * (\text{size of pointer})$. It must be writable.

The rest of this chapter will describe the contents of `fpc.resources` section.

Resource section layout

The `fpc.resources` section consists of these parts:

- The initial header
- The resource tree, in the form of nodes
- The string table, which can be optional
- The resource data

The initial header

The `fpc.resources` section starts with this header:

Table 2:

Name	Offset	Length	Description
rootptr	0	ptruint	Pointer to the root node.
count	4/8	longword	Total number of resources.
usedhandles	8/12	longword	Used at runtime. Set to zero in object files.
handles	12/16	ptruint	Pointer to the first byte of <code>fpc.reshandles</code> section.

The resource tree

Immediately following the initial header, the resource tree comes. It is made up by nodes that represent resource types, names and language ids.

Data is organized so that resource information (type, name and language id) is represented by a tree: root node contains resource types, that in turn contain resource names, which contain language ids, which describe resource data.

Given a node, its sub-nodes are ordered as follows:

- First the "named" nodes (nodes that use a string as identifier) come, then the id ones (nodes that use an integer as identifier).
- Named nodes are alphabetically sorted, in ascending order.
- Id nodes are sorted in ascending order.

In the file, all sub-nodes of a node are written in the order described above. Then, all sub-nodes of the first sub-node are written, and so on.

Example:

There are three resources:

1. a BITMAP resource with name MYBITMAP and language id \$0409
2. a BITMAP resource with name 1 and language id 0
3. a resource with type MYTYPE and name 1 and language id 0

Nodes are laid out this way (note that BITMAP resources have type 2):

```
root | MYTYPE 2 | 1 | 0 | MYBITMAP 1 | $0409 | 0
```

That is, types (MYTYPE is a string, so it comes before 2 which is BITMAP), then names for MYTYPE (1), then language id for resource 3 (0), then names for BITMAP (MYBITMAP and 1), then language id for resource 1 (\$0409), then language id for resource 2 (0).

Node format

Table 3:

Name	Offset	Length	Description
<code>nameid</code>	0	<code>ptruint</code>	name pointer, integer id or language id
<code>ncount</code>	4/8	<code>longword</code>	named sub-nodes count
<code>idcountsize</code>	8/12	<code>longword</code>	id sub-nodes count or resource size
<code>subptr</code>	12/16	<code>ptruint</code>	pointer to first sub-node

If the node is identified by a string, `nameid` is a pointer to the null-terminated string holding the name. If it is identified by an id, `nameid` is that id. Language id nodes are always identified by and ID.

`ncount` is the number of named sub-nodes of this node (nodes that are identified by a string).

`idcountsize` is the number of id sub-nodes of this node (nodes that are identified by an integer id). For language id nodes, this field holds the size of the resource data.

`subptr` is an pointer to the first subnode of this node. Note that it allows to access every subnode of this node, since subnodes of a node always come one after the other. For language id nodes, `subptr` is the pointer to the resource data.

The string table

The string table is used to store strings used for resource types and names. If all resources use integer ids for name and types, it may not be present in the file.

The string table simply contains null-terminated strings, one after the other.

If present, the string table always contains a 0 (zero) at the beginning. This way, the empty string is located at the first byte of the string table.

The resource data

This part of the file contains raw resource data. As written before, all data structures must be aligned on machine boundaries, so if a resource data size is not a multiple of 4 (for 32 bit machines) or 8 (for 64 bit machines), bytes of padding must be inserted after that resource data.

Exported symbols

Object files containing resources must export a pointer to the first byte of `fpc.resources` section. The name of this symbol is `FPC_RESSYMBOL`.

Mach-O specific notes

`fpc.resources` and `fpc.reshandles` sections are to be contained in a `__DATA` segment.

Chapter 1

Reference for unit 'acceleratorsresource'

1.1 Used units

Table 1.1: Used units by unit 'acceleratorsresource'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

1.2 Overview

This unit contains `TAcceleratorsResource` ([43](#)), a `TAbstractResource` ([42](#)) descendant specialized in handling resource of type `RT_ACCELERATOR` ([42](#)).

Adding this unit to a program's `uses` clause registers class `TAcceleratorsResource` ([43](#)) for type `RT_ACCELERATOR` ([42](#)) with `TResourceFactory` ([42](#)).

1.3 Constants, types and variables

1.3.1 Constants

`FAlt` = 16

This flag is valid only if the key is a virtual key.

`FControl` = 8

This flag is valid only if the key is a virtual key.

`FNoInvert` = 2

This flag is obsolete and is provided only for compatibility with 16 bit Windows.

`FShift = 4`

This flag is valid only if the key is a virtual key.

`FVirtKey = 1`

When this flag is set, the accelerator key is a virtual key code. Otherwise, it is a ASCII character

1.3.2 Types

`PAccelerator = ^TAccelerator`

A pointer to a TAccelerator record

```
TAccelerator = packed record
  Flags : Word;
  Ansi  : Word;
  Id    : Word;
  padding : Word;
end
```

A single accelerator entry in the accelerator table resource.

The key associated with the accelerator is represented by `Ansi` field: it can be a character or a virtual-key code (in the latter case, `FVirtKey` (43) flag must be active).

The accelerator is identified by the value of `id` field.

`Flags` is a combination of the following values:

- `FVirtKey` (43)
- `FShift` (43)
- `FNoInvert` (43)
- `FControl` (42)
- `FAlt` (42)

1.4 TAcceleratorsResource

1.4.1 Description

This class represents a resource of type `RT_ACCELERATOR` (42).

An accelerator table resource is a collection of accelerators (represented by `TAccelerator` (43) records).

An accelerator represents a keystroke that can be associated with some action.

This resource type is very Microsoft Windows-specific, so it might not be of interest for many users.

Methods are provided to add, delete and modify single accelerators.

Remark: This class doesn't allow its type to be changed to anything else than `RT_ACCELERATOR` (42). Attempts to do so result in a `EResourceDescChangeNotAllowedException` (42).

1.4.2 Method overview

Page	Method	Description
45	Add	Adds a new accelerator to the table
44	ChangeDescTypeAllowed	
44	ChangeDescValueAllowed	
45	Clear	Empties the accelerator table
45	Create	Creates a new accelerator table resource
45	Delete	Deletes an accelerator from the table
45	Destroy	
44	GetName	
44	GetType	
44	NotifyResourcesLoaded	
45	UpdateRawData	

1.4.3 Property overview

Page	Properties	Access	Description
46	Count	r	The number of accelerators in the table
46	Items	rw	Indexed array of accelerators in the table

1.4.4 TAcceleratorsResource.GetType

Declaration: `function GetType : TResourceDesc; Override`

Visibility: protected

1.4.5 TAcceleratorsResource.GetName

Declaration: `function GetName : TResourceDesc; Override`

Visibility: protected

1.4.6 TAcceleratorsResource.ChangeDescTypeAllowed

Declaration: `function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: protected

1.4.7 TAcceleratorsResource.ChangeDescValueAllowed

Declaration: `function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: protected

1.4.8 TAcceleratorsResource.NotifyResourcesLoaded

Declaration: `procedure NotifyResourcesLoaded; Override`

Visibility: protected

1.4.9 TAcceleratorsResource.Create

Synopsis: Creates a new accelerator table resource

Declaration: `constructor Create; Override`
`constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override`

Visibility: public

Description: Please note that `aType` parameter is not used, since this class always uses `RT_ACCELERATOR` (42) as type.

1.4.10 TAcceleratorsResource.Destroy

Declaration: `destructor Destroy; Override`

Visibility: public

1.4.11 TAcceleratorsResource.UpdateRawData

Declaration: `procedure UpdateRawData; Override`

Visibility: public

1.4.12 TAcceleratorsResource.Add

Synopsis: Adds a new accelerator to the table

Declaration: `procedure Add(aItem: TAccelerator)`

Visibility: public

See also: `TAcceleratorsResource.Items` (46)

1.4.13 TAcceleratorsResource.Clear

Synopsis: Empties the accelerator table

Declaration: `procedure Clear`

Visibility: public

See also: `TAcceleratorsResource.Items` (46), `TAcceleratorsResource.Delete` (45)

1.4.14 TAcceleratorsResource.Delete

Synopsis: Deletes an accelerator from the table

Declaration: `procedure Delete(aIndex: Integer)`

Visibility: public

See also: `TAcceleratorsResource.Items` (46), `TAcceleratorsResource.Clear` (45)

1.4.15 TAcceleratorsResource.Count

Synopsis: The number of accelerators in the table

Declaration: `Property Count : Integer`

Visibility: public

Access: Read

See also: TAcceleratorsResource.Items ([46](#))

1.4.16 TAcceleratorsResource.Items

Synopsis: Indexed array of accelerators in the table

Declaration: `Property Items[index: Integer]: TAccelerator; default`

Visibility: public

Access: Read,Write

Description: This property can be used to access all accelerators in the object.

Remark: This array is 0-based: valid elements range from 0 to Count ([46](#))-1.

Remark: If you need to access RawData ([42](#)) after you added, deleted or modified accelerators, be sure to call UpdateRawData ([42](#)) first. This isn't needed however when resource is written to a stream, since TResources ([42](#)) takes care of it.

See also: TAcceleratorsResource.Count ([46](#)), TAccelerator ([43](#))

Chapter 2

Reference for unit 'bitmapresource'

2.1 Used units

Table 2.1: Used units by unit 'bitmapresource'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

2.2 Overview

This unit contains [TBitmapResource \(47\)](#), a [TAbstractResource \(47\)](#) descendant specialized in handling resource of type [RT_BITMAP \(47\)](#).

Adding this unit to a program's `uses` clause registers class [TBitmapResource \(47\)](#) for type [RT_BITMAP \(47\)](#) with [TResourceFactory \(47\)](#).

2.3 TBitmapResource

2.3.1 Description

This class represents a resource of type [RT_BITMAP \(47\)](#).

A bitmap resource contents is very similar to a BMP file. However some differences exists, so [RawData \(47\)](#) is not appropriate if you need to read and write BMP data. Instead, [BitmapData \(50\)](#) property gives access to a BMP file-like stream.

Remark: This class doesn't allow its type to be changed to anything else than [RT_BITMAP \(47\)](#). Attempts to do so result in a [EResourceDescChangeNotAllowedException \(47\)](#).

See also: [BitmapData \(50\)](#), [TAbstractResource.RawData \(47\)](#)

2.3.2 Method overview

Page	Method	Description
48	ChangeDescTypeAllowed	
48	ChangeDescValueAllowed	
49	Create	Creates a new bitmap resource
49	Destroy	
48	GetName	
48	GetType	
48	NotifyResourcesLoaded	
49	SetCustomBitmapDataStream	Sets a custom stream as the underlying stream for BitmapData
49	UpdateRawData	

2.3.3 Property overview

Page	Properties	Access	Description
50	BitmapData	r	Resource data as a BMP stream

2.3.4 TBitmapResource.GetType

Declaration: function GetType : TResourceDesc; Override

Visibility: protected

2.3.5 TBitmapResource.GetName

Declaration: function GetName : TResourceDesc; Override

Visibility: protected

2.3.6 TBitmapResource.ChangeDescTypeAllowed

Declaration: function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override

Visibility: protected

2.3.7 TBitmapResource.ChangeDescValueAllowed

Declaration: function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override

Visibility: protected

2.3.8 TBitmapResource.NotifyResourcesLoaded

Declaration: procedure NotifyResourcesLoaded; Override

Visibility: protected

2.3.9 TBitmapResource.Create

Synopsis: Creates a new bitmap resource

Declaration: constructor Create; Override
 constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override

Visibility: public

Description: Please note that aType parameter is not used, since this class always uses RT_BITMAP (47) as type.

2.3.10 TBitmapResource.Destroy

Declaration: destructor Destroy; Override

Visibility: public

2.3.11 TBitmapResource.UpdateRawData

Declaration: procedure UpdateRawData; Override

Visibility: public

2.3.12 TBitmapResource.SetCustomBitmapDataStream

Synopsis: Sets a custom stream as the underlying stream for BitmapData

Declaration: procedure SetCustomBitmapDataStream(aStream: TStream)

Visibility: public

Description: This method allows the user to use a custom stream as the underlying stream for BitmapData (50). This is useful when you want a TBitmapResource (47) to be created from a bmp file for which you have a stream.

Sample code

This code creates a resource containing a bitmap

```
var
  aName : TResourceDesc;
  aRes : TBitmapResource;
  aFile : TFileStream;
  Resources : TResources;
begin
  Resources:=TResources.Create;
  aName:=TResourceDesc.Create('MYBITMAP');
  aRes:=TBitmapResource.Create(nil,aName); //type is always RT_BITMAP
  aName.Free; //not needed anymore
  aFile:=TFileStream.Create('mybitmap.bmp',fmOpenRead or fmShareDenyNone);
  aRes.SetCustomBitmapDataStream(aFile);
  Resources.Add(aRes);
  Resources.WriteToFile('myresource.res');

  Resources.Free; //it destroys aRes as well.
  aFile.Free;
end;
```

See also: [TBitmapResource.BitmapData \(50\)](#), [TAbstractResource.UpdateRawData \(47\)](#)

2.3.13 TBitmapResource.BitmapData

Synopsis: Resource data as a BMP stream

Declaration: `Property BitmapData : TStream`

Visibility: `public`

Access: `Read`

Description: [BitmapData \(50\)](#) property gives access to resource data in a BMP file-like stream, unlike [RawData \(47\)](#).

[BitmapData \(50\)](#) does not create a copy of [RawData \(47\)](#) so memory usage is generally kept limited.

You can also set a custom stream as the underlying stream for [BitmapData \(50\)](#) via [SetCustomBitmapDataStream \(49\)](#), much like [SetCustomRawDataStream \(47\)](#) does for [RawData \(47\)](#). This is useful when you want a [TBitmapResource \(47\)](#) to be created from a bmp file for which you have a stream.

Remark: If you need to access [RawData \(47\)](#) after you modified [BitmapData \(50\)](#), be sure to call [UpdateRawData \(47\)](#) first. This isn't needed however when resource is written to a stream, since [TResources \(47\)](#) takes care of it.

See also: [TBitmapResource.SetCustomBitmapDataStream \(49\)](#), [TAbstractResource.RawData \(47\)](#), [TAbstractResource.UpdateRawData \(47\)](#)

Chapter 3

Reference for unit 'coffreader'

3.1 Used units

Table 3.1: Used units by unit 'coffreader'

Name	Page
Classes	??
cofftypes	54
resource	125
resourcetree	160
System	??
sysutils	??

3.2 Overview

This unit contains `TCoffResourceReader` ([51](#)), a `TAbstractResourceReader` ([51](#)) descendant that is able to read COFF object files containing resources.

Adding this unit to a program's `uses` clause registers class `TCoffResourceReader` ([51](#)) with `TResources` ([51](#)).

3.3 TCoffResourceReader

3.3.1 Description

This class provides a reader for COFF object files containing resources.

COFF is the file format used by Microsoft Windows object files. Usually resources get stored in a object file that can be given to a linker to produce an executable.

After an object file has been read, `MachineType` ([53](#)) property holds the machine type the object file was built for.

Remark: This reader is not able to read full PE images. Use `TWinPEImageResourceReader` ([51](#)) instead.

See also: `TCoffResourceReader.MachineType` ([53](#)), `TAbstractResourceReader` ([51](#)), `TWinPEImageResourceReader` ([51](#)), `TCoffResourceWriter` ([51](#))

3.3.2 Method overview

Page	Method	Description
52	CheckMagic	
52	Create	
52	Destroy	
52	GetDescription	
52	GetExtensions	
52	Load	

3.3.3 Property overview

Page	Properties	Access	Description
53	MachineType	r	The machine type of the object file

3.3.4 TCoffResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

3.3.5 TCoffResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

3.3.6 TCoffResourceReader.Load

Declaration: `procedure Load(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

3.3.7 TCoffResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: `protected`

3.3.8 TCoffResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: `public`

3.3.9 TCoffResourceReader.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

3.3.10 TCoffResourceReader.MachineType

Synopsis: The machine type of the object file

Declaration: `Property MachineType : TCoffMachineType`

Visibility: `public`

Access: `Read`

Description: This property holds the machine type of the object file that has been read.

Remark: Obviously, this property is meaningful only after an object file has been read.

See also: `TCoffMachineType` ([51](#))

Chapter 4

Reference for unit 'cofftypes'

4.1 Overview

These types are used internally by TCoffResourceWriter ([54](#)) and TCoffResourceReader ([54](#)).
The only type of interest for the user is TCoffMachineType ([54](#)).

4.2 Constants, types and variables

4.2.1 Constants

```
RSRC SectName : TSectionName = '.rsrc' + #0 + #0 + #0
```

4.2.2 Types

```
TCoffHeader = packed record
  Machine : Word;
  NumSects : Word;
  TimeStamp : LongWord;
  SymTablePtr : LongWord;
  SymNum : LongWord;
  OptHdrSize : Word;
  Characteristics : Word;
end
```

```
TCoffMachineType = (cmti386, cmtarm, cmtx8664, cmtppc32aix, cmtppc64aix)
```

Table 4.1: Enumeration values for type TCoffMachineType

Value	Explanation
cmtarm	ARM
cmti386	Intel i386
cmtppc32aix	
cmtppc64aix	
cmtx8664	AMD x86_64

This enumeration specifies the COFF machine type.

It is used by TCoffResourceWriter (54) to specify the machine type of the generated object file and by TCoffResourceReader (54) to read the machine type of the object file that has been read.

```
TCoffSectionHeader = packed record
  Name : TSectionName;
  VirtualSize : LongWord;
  VirtualAddress : LongWord;
  SizeOfRawData : LongWord;
  PointerToRawData : LongWord;
  PointerToRelocations : LongWord;
  PointerToLineNumbers : LongWord;
  NumberOfRelocations : Word;
  NumberOfLineNumbers : Word;
  Characteristics : LongWord;
end
```

```
TCoffSectionTable = TCoffSymtableEntry
```

```
TCoffSymtableEntry = packed record
case Byte of
1: (
  Name : TSectionName;
  Value : LongWord;
  SectionNumber : Word;
  _type : Word;
  StorageClass : Byte;
  NumAuxSymbol : Byte;
);
2: (
  n_name : TSectionName;
  n_value : LongWord;
  n_scnum : Word;
  n_type : Word;
  n_sclass : Byte;
  n_numaux : Byte;
);
end
```

```
TResDataEntry = packed record
  DataRVA : LongWord;
  Size : LongWord;
  Codepage : LongWord;
  Reserved : LongWord;
end
```

```
TResDirEntry = packed record
  NameID : LongWord;
  DataSubDirRVA : LongWord;
end
```

```
TResDirTable = packed record
  Characteristics : LongWord;
  TimeStamp : LongWord;
  VerMajor : Word;
  VerMinor : Word;
  NamedEntriesCount : Word;
  IDEntriesCount : Word;
end
```

```
TSectionName = Array[0..7] of Char
```

```
TXCoff32SectionHeader = packed record
  s_name : TSectionName;
  s_paddr : LongWord;
  s_vaddr : LongWord;
  s_size : LongWord;
  s_scnptr : LongWord;
  s_relptr : LongWord;
  s_lnnoptr : LongWord;
  s_nreloc : Word;
  s_nlnno : Word;
  s_flags : LongWord;
end
```

```
TXCoffAuxSymbol32 = packed record
  x_scnlen : LongWord;
  x_parmhash : LongWord;
  x_snhash : Word;
  x_smtyp : Byte;
  x_smclas : Byte;
  x_stab : LongWord;
  x_snstab : Word;
end
```

Chapter 5

Reference for unit 'coffwriter'

5.1 Used units

Table 5.1: Used units by unit 'coffwriter'

Name	Page
Classes	??
cofftypes	54
resource	125
resourcetree	160
System	??
sysutils	??

5.2 Overview

This unit contains `TCoffResourceWriter` ([60](#)), a `TAbstractResourceWriter` ([57](#)) descendant that is able to write COFF object files containing resources.

Adding this unit to a program's `uses` clause registers class `TCoffResourceWriter` ([60](#)) with `TResources` ([57](#)).

5.3 Constants, types and variables

5.3.1 Types

```
PCoffRelocation = ^TCoffRelocation
```

This type is used internally by `TCoffResourceWriter` ([60](#)).

```
TCoffRelocation = packed record
  VirtualAddress : LongWord;
  SymTableIndex : LongWord;
  _type : Word;
end
```

This record is used internally by TCoffResourceWriter (60).

5.4 TCoffRelocations

5.4.1 Description

This class is used internally by TCoffResourceWriter (60).

5.4.2 Method overview

Page	Method	Description
59	Add	
59	AddRelativeToSection	
59	Clear	
58	Create	
58	Destroy	
58	GetCount	
58	GetRelocation	

5.4.3 Property overview

Page	Properties	Access	Description
59	Count	r	
59	Items	r	
59	MachineType	rw	
59	StartAddress	rw	

5.4.4 TCoffRelocations.GetCount

Declaration: `function GetCount : Integer`

Visibility: `protected`

5.4.5 TCoffRelocations.GetRelocation

Declaration: `function GetRelocation(index: Integer) : PCoffRelocation`

Visibility: `protected`

5.4.6 TCoffRelocations.Create

Declaration: `constructor Create(aMachineType: TCoffMachineType)`

Visibility: `public`

5.4.7 TCoffRelocations.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

5.4.8 TCoffRelocations.Add

Declaration: procedure Add(aAddress: LongWord; aType: Word; aSymTableIndex: LongWord)

Visibility: public

5.4.9 TCoffRelocations.AddRelativeToSection

Declaration: procedure AddRelativeToSection(aAddress: LongWord;
aSectSymTableIndex: LongWord)

Visibility: public

5.4.10 TCoffRelocations.Clear

Declaration: procedure Clear

Visibility: public

5.4.11 TCoffRelocations.Count

Declaration: Property Count : Integer

Visibility: public

Access: Read

5.4.12 TCoffRelocations.Items

Declaration: Property Items[index: Integer]: PCoffRelocation; default

Visibility: public

Access: Read

5.4.13 TCoffRelocations.StartAddress

Declaration: Property StartAddress : LongWord

Visibility: public

Access: Read, Write

5.4.14 TCoffRelocations.MachineType

Declaration: Property MachineType : TCoffMachineType

Visibility: public

Access: Read, Write

5.5 TCoffResourceWriter

5.5.1 Description

This class provides a writer for COFF object files containing resources.

COFF is the file format used by Microsoft Windows object files. Usually resources get stored in a object file that can be given to a linker to produce an executable.

MachineType (62) property can be used to set the machine type of the object file to generate.

See also: TCoffResourceWriter.MachineType (62), TAbstractResourceWriter (57), TCoffResourceWriter (57)

5.5.2 Method overview

Page	Method	Description
62	Create	
62	Destroy	
61	FixCoffHeader	
61	FixSectionHeader	
61	GetDescription	
61	GetExtensions	
61	GetFixedCoffHeader	
62	PrescanNode	
62	PrescanResourceTree	
62	Write	
61	WriteCoffStringTable	
60	WriteEmptyCoffHeader	
60	WriteEmptySectionHeader	
61	WriteRawData	
61	WriteRelocations	
61	WriteResStringTable	
62	WriteSymbolTable	

5.5.3 Property overview

Page	Properties	Access	Description
62	MachineType	rw	The machine type of the object file
63	OppositeEndianness	rw	

5.5.4 TCoffResourceWriter.WriteEmptyCoffHeader

Declaration: `procedure WriteEmptyCoffHeader(aStream: TStream)`

Visibility: protected

5.5.5 TCoffResourceWriter.WriteEmptySectionHeader

Declaration: `procedure WriteEmptySectionHeader(aStream: TStream); Virtual`

Visibility: protected

5.5.6 TCoffResourceWriter.WriteResStringTable

Declaration: procedure WriteResStringTable(aStream: TStream); Virtual

Visibility: protected

5.5.7 TCoffResourceWriter.WriteRawData

Declaration: procedure WriteRawData(aStream: TStream)

Visibility: protected

5.5.8 TCoffResourceWriter.WriteRelocations

Declaration: procedure WriteRelocations(aStream: TStream)

Visibility: protected

5.5.9 TCoffResourceWriter.WriteCoffStringTable

Declaration: procedure WriteCoffStringTable(aStream: TStream)

Visibility: protected

5.5.10 TCoffResourceWriter.GetFixedCoffHeader

Declaration: function GetFixedCoffHeader : TCoffHeader; Virtual

Visibility: protected

5.5.11 TCoffResourceWriter.FixCoffHeader

Declaration: procedure FixCoffHeader(aStream: TStream)

Visibility: protected

5.5.12 TCoffResourceWriter.FixSectionHeader

Declaration: procedure FixSectionHeader(aStream: TStream; aResources: TResources)
; Virtual

Visibility: protected

5.5.13 TCoffResourceWriter.GetExtensions

Declaration: function GetExtensions : string; Override

Visibility: protected

5.5.14 TCoffResourceWriter.GetDescription

Declaration: function GetDescription : string; Override

Visibility: protected

5.5.15 TCoffResourceWriter.PrescanNode

Declaration: `function PrescanNode(aNode: TResourceTreeNode; aNodeSize: LongWord)
: LongWord; Virtual`

Visibility: protected

5.5.16 TCoffResourceWriter.PrescanResourceTree

Declaration: `procedure PrescanResourceTree; Virtual`

Visibility: protected

5.5.17 TCoffResourceWriter.Write

Declaration: `procedure Write(aResources: TResources; aStream: TStream); Override`

Visibility: protected

5.5.18 TCoffResourceWriter.WriteSymbolTable

Declaration: `procedure WriteSymbolTable(aStream: TStream; aResources: TResources)
; Virtual`

Visibility: protected

5.5.19 TCoffResourceWriter.Create

Declaration: `constructor Create; Override`

Visibility: public

5.5.20 TCoffResourceWriter.Destroy

Declaration: `destructor Destroy; Override`

Visibility: public

5.5.21 TCoffResourceWriter.MachineType

Synopsis: The machine type of the object file

Declaration: `Property MachineType : TCoffMachineType`

Visibility: public

Access: Read, Write

Description: This property can be used to set the machine type of the object file to write.

See also: `TCoffMachineType` ([57](#))

5.5.2 TCoffResourceWriter.OppositeEndianess

Declaration: Property OppositeEndianess : Boolean

Visibility: public

Access: Read,Write

5.6 TCoffStringTable

5.6.1 Method overview

Page	Method	Description
63	Add	
63	Create	
63	Delete	

5.6.2 Property overview

Page	Properties	Access	Description
63	Size	r	

5.6.3 TCoffStringTable.Create

Declaration: constructor Create

Visibility: public

5.6.4 TCoffStringTable.Add

Declaration: function Add(const S: string) : Integer; Override

Visibility: public

5.6.5 TCoffStringTable.Delete

Declaration: procedure Delete(Index: Integer); Override

Visibility: public

5.6.6 TCoffStringTable.Size

Declaration: Property Size : ptruint

Visibility: public

Access: Read

5.7 TResourceStringTable

5.7.1 Description

This class is used internally by TCoffResourceWriter ([60](#)).

5.7.2 Method overview

Page	Method	Description
64	Add	
64	Clear	
64	Create	
64	Destroy	

5.7.3 Property overview

Page	Properties	Access	Description
64	Count	r	
65	CurrRVA	r	
65	EndRVA	r	
65	Items	r	
65	StartRVA	rw	

5.7.4 TResourceStringTable.Create

Declaration: `constructor Create`

Visibility: `public`

5.7.5 TResourceStringTable.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

5.7.6 TResourceStringTable.Add

Declaration: `procedure Add(s: string)`

Visibility: `public`

5.7.7 TResourceStringTable.Clear

Declaration: `procedure Clear`

Visibility: `public`

5.7.8 TResourceStringTable.Count

Declaration: `Property Count : Integer`

Visibility: `public`

Access: `Read`

5.7.9 TResourceStringTable.Items

Declaration: Property Items[index: Integer]: string; default

Visibility: public

Access: Read

5.7.10 TResourceStringTable.StartRVA

Declaration: Property StartRVA : LongWord

Visibility: public

Access: Read,Write

5.7.11 TResourceStringTable.CurrRVA

Declaration: Property CurrRVA : LongWord

Visibility: public

Access: Read

5.7.12 TResourceStringTable.EndRVA

Declaration: Property EndRVA : LongWord

Visibility: public

Access: Read

Chapter 6

Reference for unit 'dfmreader'

6.1 Used units

Table 6.1: Used units by unit 'dfmreader'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

6.2 Overview

This unit contains TDfmResourceReader ([66](#)), a TAbstractResourceReader ([66](#)) descendant used to compile DFM files to resources.

Adding this unit to a program's `uses` clause registers class TDfmResourceReader ([66](#)) with TResources ([66](#)).

6.3 TDfmResourceReader

6.3.1 Description

This class isn't a proper resource reader. It provides a quick way to create a resource file from a DFM/XFM/LFM file, similar to what Delphi does with constructs like `{ $R *.dfm }`.

This class reads a DFM, XFM or LFM file, compiles it to binary format if it isn't, and stores it in a resource of type RT_RCDATA ([66](#)) with the name of the form specified in the DFM file.

6.3.2 Method overview

Page	Method	Description
67	CheckMagic	
67	Create	
67	Destroy	
67	GetDescription	
67	GetExtensions	
67	Load	

6.3.3 TDfmResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

6.3.4 TDfmResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

6.3.5 TDfmResourceReader.Load

Declaration: `procedure Load(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

6.3.6 TDfmResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: `protected`

6.3.7 TDfmResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: `public`

6.3.8 TDfmResourceReader.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

Chapter 7

Reference for unit 'elfconsts'

7.1 Overview

These constants are used internally by `TElfResourceWriter` ([68](#)) and `TElfResourceReader` ([68](#)).
The only type of interest for the user is `TElfMachineType` ([73](#)).

7.2 Constants, types and variables

7.2.1 Constants

```
EF_IA_64_ABI64 = $10
```

```
ELFCLASS32 = 1
```

```
ELFCLASS64 = 2
```

```
ELFCLASSNONE = 0
```

```
ELFDATA2LSB = 1
```

```
ELFDATA2MSB = 2
```

```
ELFDATANONE = 0
```

```
ELFMAGIC = ($7f) + 'ELF'
```

```
ELFOSABI_ARM = 97
```

```
ELFOSABI_FREEBSD = 9
```

ELFOSABI_LINUX = 3

ELFOSABI_NONE = 0

EM_386 = 3

EM_68K = 4

EM_ALPHA = 9026

EM_ARM = 40

EM_IA_64 = 50

EM_MIPS = 8

EM_MIPS_RS3_LE = 10

EM_MIPS_X = 51

EM_NONE = 0

EM_PPC = 20

EM_PPC64 = 21

EM_SPARC = 2

EM_X86_64 = 62

ET_CORE = 4

ET_DYN = 3

ET_EXEC = 2

ET_HIOS = \$feff

ET_HIPROC = \$ffff

ET_LOOS = \$fe00

ET_LOPROC = \$ff00

ET_NONE = 0

ET_REL = 1

EV_CURRENT = 1

EV_NONE = 0

HANDLESECT_IDX = 2

HandlesSectName = 'fpc.reshandles'

RsrcSectName = 'fpc.resources'

RSRCSECT_IDX = 1

R_386_32 = 1

R_68K_32 = 1

R_ALPHA_REFQUAD = 2

R_ARM_ABS32 = 2

R_IA64_DIR64LSB = \$27

R_MIPS_32 = 2

R_PPC64_ADDR64 = 38

R_PPC_ADDR32 = 1

R_SPARC_32 = 3

R_x86_64_64 = 1

SHF_ALLOC = 2

SHF_EXECINSTR = 4

SHF_MASKOS = \$0f000000

SHF_MASKPROC = \$f0000000

SHF_WRITE = 1

SHT_DYNAMIC = 6

SHT_DYNSYM = 11

SHT_HASH = 5

SHT_HIOS = \$ffffffff

SHT_HIPROC = \$7ffffffff

SHT_LOOS = \$80000000

SHT_LOPROC = \$70000000

SHT_NOBITS = 8

SHT_NOTE = 7

SHT_NULL = 0

SHT_PROGBITS = 1

SHT_REL = 9

SHT_RELA = 4

SHT_SHLIB = 10

SHT_STRTAB = 3

SHT_SYMTAB = 2

STB_GLOBAL = 1

STB_HIOS = 12

STB_HIPROC = 15

STB_LOCAL = 0

STB_LOOS = 10

STB_LOPROC = 13

STB_WEAK = 2

STT_COMMON = 5

STT_FILE = 4

STT_FUNC = 2

STT_HIOS = 12

STT_HIPROC = 15

STT_LOOS = 10

STT_LOPROC = 13

STT_NOTYPE = 0

STT_OBJECT = 1

STT_SECTION = 3

STT_SPARC_REGISTER = 13

STT_TLS = 6

7.2.2 Types

```
TElfMachineType = (emtnone, emtsparc, emti386, emtm68k, emtppc, emtppc64,
    emtarm, emtarmeb, emtia64, emtx86_64, emtalpha, emtmips,
    emtmipsel)
```

Table 7.1: Enumeration values for type TElfMachineType

Value	Explanation
emtalpha	DEC Alpha machine type
emtarm	ARM machine type
emtarmeb	ARM Big Endian machine type
emti386	Intel 386 machine type
emtia64	Intel IA-64 machine type
emtm68k	Motorola 68000 machine type
emtmips	
emtmipsel	
emtnone	Invalid machine type
emtppc	PowerPC machine type
emtppc64	PowerPC 64 machine type
emtsparc	Sparc machine type
emtx86_64	AMD x86_64 machine type

This enumeration specifies the ELF machine type.

It is used by TElfResourceWriter (68) to specify the machine type of the generated object file and by TElfResourceReader (68) to read the machine type of the object file that has been read.

Chapter 8

Reference for unit 'elfreader'

8.1 Used units

Table 8.1: Used units by unit 'elfreader'

Name	Page
Classes	??
elfconsts	68
elftypes	??
resource	125
System	??
sysutils	??

8.2 Overview

This unit contains `TElfResourceReader` ([75](#)), a `TAbstractResourceReader` ([74](#)) descendant that is able to read ELF object files containing resources.

Adding this unit to a program's `uses` clause registers class `TElfResourceReader` ([75](#)) with `TResources` ([74](#)).

8.3 `EElfResourceReaderException`

8.3.1 Description

Base class for elf resource reader-related exceptions

8.4 `EElfResourceReaderNoSectionsException`

8.4.1 Description

This exception is raised by `Load` ([74](#)) method of `TElfResourceReader` ([75](#)) when no section headers are found.

8.5 EElfResourceReaderNoStringTableException

8.5.1 Description

This exception is raised by Load (74) method of TElfResourceReader (75) when no ELF string table is found.

8.6 EElfResourceReaderUnknownClassException

8.6.1 Description

This exception is raised by Load (74) method of TElfResourceReader (75) when class field of ELF header is neither ELFCLASS32 (74) nor ELFCLASS64 (74).

8.7 EElfResourceReaderUnknownVersionException

8.7.1 Description

This exception is raised by Load (74) method of TElfResourceReader (75) when version field of ELF header is not 1.

8.8 TElfResourceReader

8.8.1 Description

This class provides a reader for ELF object files and images containing resources.

ELF is the file format used by unices and other operating systems for object files and image files (executables, dynamic libraries and so on). Free Pascal can store resources in ELF files in its own format.

After an object file has been read, MachineType (76) property holds the machine type the object file was built for.

Remark: This reader can't read ELF files without section headers. These are however very rare.

See also: TElfResourceReader.MachineType (76), TAbstractResourceReader (74), TElfResourceWriter (74), Format of resources in object files (74)

8.8.2 Method overview

Page	Method	Description
76	CheckMagic	
76	Create	
76	Destroy	
76	GetDescription	
76	GetExtensions	
76	Load	

8.8.3 Property overview

Page	Properties	Access	Description
76	MachineType	r	The machine type of the object file

8.8.4 TElfResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

8.8.5 TElfResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

8.8.6 TElfResourceReader.Load

Declaration: `procedure Load(aResources: TResources; aStream: TStream); Override`

Visibility: `protected`

8.8.7 TElfResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: `protected`

8.8.8 TElfResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: `public`

8.8.9 TElfResourceReader.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

8.8.10 TElfResourceReader.MachineType

Synopsis: The machine type of the object file

Declaration: `Property MachineType : TElfMachineType`

Visibility: `public`

Access: `Read`

Description: This property holds the machine type of the object file that has been read.

Remark: Obviously, this property is meaningful only after an object file has been read.

See also: `TElfMachineType` ([74](#))

Chapter 9

Reference for unit 'elfwriter'

9.1 Used units

Table 9.1: Used units by unit 'elfwriter'

Name	Page
Classes	??
elfconsts	68
elftypes	??
resource	125
System	??
sysutils	??

9.2 Overview

This unit contains `TElfResourceWriter` ([78](#)), a `TAbstractResourceWriter` ([77](#)) descendant that is able to write ELF object files containing resources.

Adding this unit to a program's `uses` clause registers class `TElfResourceWriter` ([78](#)) with `TResources` ([77](#)).

9.3 EElfResourceWriterException

9.3.1 Description

Base class for elf resource writer-related exceptions

9.4 EElfResourceWriterUnknownClassException

9.4.1 Description

If this exception is raised, an internal error occurred.

9.5 EElfResourceWriterUnknownMachineException

9.5.1 Description

This exception is raised when an attempt is made to set `TElfResourceWriter.MachineType` (79) to an unknown machine type.

See also: `TElfResourceWriter.MachineType` (79)

9.6 EElfResourceWriterUnknownSectionException

9.6.1 Description

If this exception is raised, an internal error occurred.

9.7 TElfResourceWriter

9.7.1 Description

This class provides a writer for ELF object files and images containing resources.

ELF is the file format used by unices and other operating systems for object files and image files (executables, dynamic libraries and so on). Free Pascal can store resources in ELF files in its own format.

`MachineType` (79) property can be used to set the machine type of the object file to generate.

See also: `TElfResourceWriter.MachineType` (79), `TAbstractResourceWriter` (77), `TElfResourceReader` (77), `Format of resources in object files` (77)

9.7.2 Method overview

Page	Method	Description
79	Create	
79	Destroy	
79	GetDescription	
78	GetExtensions	
79	Write	

9.7.3 Property overview

Page	Properties	Access	Description
79	MachineType	rw	The machine type of the object file

9.7.4 TElfResourceWriter.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

9.7.5 TElfResourceWriter.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

9.7.6 TElfResourceWriter.Write

Declaration: `procedure Write(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

9.7.7 TElfResourceWriter.Create

Declaration: `constructor Create; Override`

Visibility: `public`

9.7.8 TElfResourceWriter.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

9.7.9 TElfResourceWriter.MachineType

Synopsis: The machine type of the object file

Declaration: `Property MachineType : TElfMachineType`

Visibility: `public`

Access: `Read,Write`

Description: This property can be used to set the machine type of the object file to write.

If an attempt is made to set `MachineType` to an unsupported value, an `EElfResourceWriterUnknownMachineException` (78) exception is raised.

See also: `TElfMachineType` (77), `EElfResourceWriterUnknownMachineException` (78)

Chapter 10

Reference for unit 'externalreader'

10.1 Used units

Table 10.1: Used units by unit 'externalreader'

Name	Page
Classes	??
externaltypes	83
resource	125
resourcetree	160
System	??
sysutils	??

10.2 Overview

This unit contains TExternalResourceReader ([80](#)), a TAbstractResourceReader ([80](#)) descendant that is able to read standalone resource files in a Free Pascal-specific format.

Adding this unit to a program's `uses` clause registers class TExternalResourceReader ([80](#)) with TResources ([80](#)).

See also

Free Pascal external resource file format description ([80](#))

10.3 TExternalResourceReader

10.3.1 Description

This class provides a reader for .fpcres files: they are standalone files containing resources.

Standalone files are files that don't get linked with the final executable. They are used as a fallback solution on all those platforms for which an internal resource format is not available.

At runtime the resource file is read by Free Pascal RTL to provide resource support to the application.

After an external file has been read, Endianness ([82](#)) property holds the byte order used in the file.

See also: TExternalResourceReader.Endianess ([82](#)), TAbstractResourceReader ([80](#)), TExternalResourceWriter ([80](#))

10.3.2 Method overview

Page	Method	Description
81	CheckMagic	
81	Create	
81	Destroy	
81	GetDescription	
81	GetExtensions	
81	Load	

10.3.3 Property overview

Page	Properties	Access	Description
82	Endianess	r	The byte order used in the file

10.3.4 TExternalResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

10.3.5 TExternalResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

10.3.6 TExternalResourceReader.Load

Declaration: `procedure Load(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

10.3.7 TExternalResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: `protected`

10.3.8 TExternalResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: `public`

10.3.9 TExternalResourceReader.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

10.3.10 TExternalResourceReader.Endianess

Synopsis: The byte order used in the file

Declaration: `Property Endianess : Byte`

Visibility: `public`

Access: `Read`

Description: This property holds the byte order (endianess) of the file that has been read.

Remark: Obviously, this property is meaningful only after a file has been read.

See also: `EXT_ENDIAN_BIG` ([80](#)), `EXT_ENDIAN_LITTLE` ([80](#))

Chapter 11

Reference for unit 'externaltypes'

11.1 Overview

These types are used internally by TExternalResourceReader (83) and TExternalResourceWriter (83).

Two constants are of interest: EXT_ENDIAN_BIG (86) and EXT_ENDIAN_LITTLE (86).

11.2 Description of external resource file format

Introduction

An external resource file (.fpcres extension) provides resource support for those systems where a resource format suitable to be embedded in an object file isn't available.

The file format is designed in a way similar to other internal resource formats. The file is opened at program startup and is mapped in the program address space. Offsets in the file are easily converted to pointers at runtime since those offsets represent a displacement from a base address (the starting address where the file is mapped). Differences from an internal file format hence lie in the fact that resources aren't mapped in the program address space by the program loader but by Free Pascal RTL, and data must be accessed with a displacement mechanism instead of absolute pointers.

For internal resources details, see Format of resources in object files (83)

File layout

An external resource file consists of these parts:

- The initial header, containing various file information
- The resource tree, in the form of nodes
- The string table, which can be optional
- The resource data

The header is made up by initial header, resource tree and string table (if present).

Conventions

In this document, data sizes are specified with pascal-style data types. They are the following:

Table 11.1:

Name	Meaning
byte	Unsigned 8 bit integer.
longword	Unsigned 32 bit integer.
qword	Unsigned 64 bit integer.

Byte order used in the file is specified in the initial header.

All data structures in the file must be aligned on qword boundaries.

The initial header

An external resource file starts with this header:

Table 11.2:

Name	Offset	Length	Description
magic	0	6	Six ASCII characters that form the string FPCRES
version	6	byte	File format version. Currently it is 1.
endianess	7	byte	Byte order. 1 for big endian, 2 for little endian
count	8	longword	Number of resources in the file
nodesize	12	longword	Size of header up to the string table, excluded
hdrsize	16	longword	Full size of header (up to the string table, included)
reserved	20	12	Must be zero

Note that byte order of the file can be read in the `endianess` field of the header. All data fields longer than a byte are written with the byte order specified in `endianess`.

If no resource name or type is identified by strings, string table is optional. When this is the case, `nodesize` and `hdrsize` have the same value.

The resource tree

Immediately following the initial header, the resource tree comes. It is made up by nodes that represent resource types, names and language ids.

Data is organized so that resource information (type, name and language id) is represented by a tree: root node contains resource types, that in turn contain resource names, which contain language ids, which describe resource data.

Given a node, its sub-nodes are ordered as follows:

- First the "named" nodes (nodes that use a string as identifier) come, then the id ones (nodes that use an integer as identifier).
- Named nodes are alphabetically sorted, in ascending order.
- Id nodes are sorted in ascending order.

In the file, all sub-nodes of a node are written in the order described above. Then, all sub-nodes of the first sub-node are written, and so on.

Example:

There are three resources:

1. a BITMAP resource with name MYBITMAP and language id \$0409

2. a BITMAP resource with name 1 and language id 0
3. a resource with type MYTYPE and name 1 and language id 0

Nodes are laid out this way (note that BITMAP resources have type 2):

```
root | MYTYPE 2 | 1 | 0 | MYBITMAP 1 | $0409 | 0
```

That is, types (MYTYPE is a string, so it comes before 2 which is BITMAP), then names for MYTYPE (1), then language id for resource 3 (0), then names for BITMAP (MYBITMAP and 1), then language id for resource 1 (\$0409), then language id for resource 2 (0).

Node format

Table 11.3:

Name	Offset	Length	Description
nameid	0	longword	name offset, integer id or language id
ncount	4	longword	named sub-nodes count
idcountsize	8	longword	id sub-nodes count or resource size
subptr	12	longword	offset to first sub-node

Note that all offset are always relative to the beginning of the file.

If the node is identified by a string, `nameid` is an offset to the null-terminated string holding the name. If it is identified by an id, `nameid` is that id. Language id nodes are always identified by and ID.

`ncount` is the number of named sub-nodes of this node (nodes that are identified by a string).

`idcountsize` is the number of id sub-nodes of this node (nodes that are identified by an integer id). For language id nodes, this field holds the size of the resource data.

`subptr` is an offset to the first subnode of this node. Note that it allows to access every subnode of this node, since subnodes of a node always come one after the other. For language id nodes, `subptr` is the offset to the resource data.

The string table

The string table is used to store strings used for resource types and names. If all resources use integer ids for name and types, it may not be present in the file.

The string table simply contains null-terminated strings, one after the other.

If present, the string table always contains a 0 (zero) at the beginning. This way, the empty string is located at the offset of the string table (whose value is held in `nodesize` field of the initial header).

The resource data

This part of the file contains raw resource data. As written before, all data structures must be aligned on qword boundaries, so if a resource data size is not a multiple of 8, bytes of padding must be inserted after that resource data.

11.3 Constants, types and variables

11.3.1 Constants

```
EXTERNAL_RESMAGIC : TExternalResMagic = 'FPCRES'
```

This value is used for TExtHeader.magic (86).

```
EXT_CURRENT_VERSION = 1
```

This value is used for TExtHeader.version (86).

```
EXT_ENDIAN_BIG = 1
```

This value is used for TExtHeader.endianess (86).

```
EXT_ENDIAN_LITTLE = 2
```

This value is used for TExtHeader.endianess (86).

11.3.2 Types

```
TExternalResMagic = Array[1..6] of Char
```

Type used for the magic identifier in external resource files

```
TExtHeader = packed record
  magic : TExternalResMagic;
  version : Byte;
  endianess : Byte;
  count : LongWord;
  nodesize : LongWord;
  hdrsize : LongWord;
  reserved1 : LongWord;
  reserved2 : LongWord;
  reserved3 : LongWord;
end
```

This header describes the data structure present at the beginning of an external resource file.

```
TResInfoNode = packed record
  nameid : LongWord;
  ncount : LongWord;
  idcountsize : LongWord;
  subptr : LongWord;
end
```

This record represents a node used in a resource tree. A node contains information about a certain resource type, name or language id.

Chapter 12

Reference for unit 'externalwriter'

12.1 Used units

Table 12.1: Used units by unit 'externalwriter'

Name	Page
Classes	??
externaltypes	83
resource	125
resourcetree	160
strtable	??
System	??
sysutils	??

12.2 Overview

This unit contains TExternalResourceWriter ([88](#)), a TAbstractResourceWriter ([87](#)) descendant that is able to write standalone resource files in a Free Pascal-specific format.

Adding this unit to a program's `uses` clause registers class TExternalResourceWriter ([88](#)) with TResources ([87](#)).

See also

Free Pascal external resource file format description ([87](#))

12.3 EExternalResInvalidEndiannessException

12.3.1 Description

This exception is raised when an attempt is made to set Endianness ([89](#)) property of a TExternalResourceWriter ([88](#)) object to a value other than EXT_ENDIAN_BIG ([87](#)) or EXT_ENDIAN_LITTLE ([87](#)).

See also: TExternalResourceWriter.Endianness ([89](#))

12.4 EExternalResourceWriterException

12.4.1 Description

Base class for external resource writer-related exceptions

12.5 TExternalResourceWriter

12.5.1 Description

This class provides a writer for .fpcres files: they are standalone files containing resources.

Standalone files are files that don't get linked with the final executable. They are used as a fallback solution on all those platforms for which an internal resource format is not available.

At runtime the resource file is read by Free Pascal RTL to provide resource support to the application.

Endianness (89) property can be used to set the byte order to use in the file to generate.

See also: TExternalResourceWriter.Endianness (89), TAbstractResourceWriter (87), TExternalResourceReader (87)

12.5.2 Method overview

Page	Method	Description
89	Create	
89	Destroy	
88	GetDescription	
88	GetExtensions	
88	Write	

12.5.3 Property overview

Page	Properties	Access	Description
89	Endianness	rw	The byte order to use in the file

12.5.4 TExternalResourceWriter.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: protected

12.5.5 TExternalResourceWriter.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: protected

12.5.6 TExternalResourceWriter.Write

Declaration: `procedure Write(aResources: TResources;aStream: TStream); Override`

Visibility: protected

12.5.7 TExternalResourceWriter.Create

Declaration: constructor Create; Override

Visibility: public

12.5.8 TExternalResourceWriter.Destroy

Declaration: destructor Destroy; Override

Visibility: public

12.5.9 TExternalResourceWriter.Endianess

Synopsis: The byte order to use in the file

Declaration: Property Endianess : Byte

Visibility: public

Access: Read,Write

Description: This property can be used to set the byte order (endianess) of the file to write.

Remark: If a value other than EXT_ENDIAN_BIG (87) or EXT_ENDIAN_LITTLE (87) is used, an EExternalResInvalidEndianessException (87) exception is raised.

See also: EXT_ENDIAN_BIG (87), EXT_ENDIAN_LITTLE (87)

Chapter 13

Reference for unit 'groupcursorresource'

13.1 Used units

Table 13.1: Used units by unit 'groupcursorresource'

Name	Page
Classes	??
groupresource	98
resource	125
System	??
sysutils	??

13.2 Overview

This unit contains `TGroupCursorResource` ([90](#)), a `TAbstractResource` ([90](#)) descendant specialized in handling resource of type `RT_GROUP_CURSOR` ([90](#)).

Adding this unit to a program's `uses` clause registers class `TGroupCursorResource` ([90](#)) for type `RT_GROUP_CURSOR` ([90](#)) with `TResourceFactory` ([90](#)).

13.3 TGroupCursorResource

13.3.1 Description

This class represents a resource of type `RT_GROUP_CURSOR` ([90](#)).

Resources of this type are strictly related to `.cur` files: typically a resource compiler creates resources of this type when it is instructed to insert a cursor from a `.cur` file.

There is although a big difference between `.cur` files and cursor resources: a `.cur` file contains a cursor, which is made of several different images (for different sizes and color depth), but while a file of this type is self-contained, when it comes to resources data is scattered over several different resources: an `RT_GROUP_CURSOR` ([90](#)) resource only contains information about the single images, which are contained each in a different resource of type `RT_CURSOR` ([90](#)). The single resources are pretty

unuseful alone, since they only consist of raw image data: they must be accessed in the contest of the `RT_GROUP_CURSOR` (90) resource, which provides information about them.

`TGroupCursorResource` (90) provides a way to handle a cursor as if it was a .cur file, via `ItemData` (90) property. Single cursor resources are automatically created or destroyed as needed.

Remark: This class doesn't allow its type to be changed to anything else than `RT_GROUP_CURSOR` (90). Attempts to do so result in a `EResourceDescChangeNotAllowedException` (90).

See also: `TGroupResource.ItemData` (90), `TGroupIconResource` (90)

13.3.2 Method overview

Page	Method	Description
92	<code>ChangeDescTypeAllowed</code>	
92	<code>ChangeDescValueAllowed</code>	
92	<code>ClearItemList</code>	
92	<code>Create</code>	Creates a new group cursor resource
91	<code>CreateSubItem</code>	
92	<code>DeleteSubItems</code>	
92	<code>GetName</code>	
92	<code>GetSubStream</code>	
92	<code>GetType</code>	
91	<code>ReadResourceItemHeader</code>	
91	<code>UpdateItemOwner</code>	
91	<code>WriteHeader</code>	

13.3.3 TGroupCursorResource.ReadResourceItemHeader

Declaration: `procedure ReadResourceItemHeader; Override`

Visibility: `protected`

13.3.4 TGroupCursorResource.WriteHeader

Declaration: `procedure WriteHeader(aStream: TStream); Override`

Visibility: `protected`

13.3.5 TGroupCursorResource.CreateSubItem

Declaration: `procedure CreateSubItem; Override`

Visibility: `protected`

13.3.6 TGroupCursorResource.UpdateItemOwner

Declaration: `procedure UpdateItemOwner(index: Integer); Override`

Visibility: `protected`

13.3.7 TGroupCursorResource.ClearItemList

Declaration: procedure ClearItemList; Override

Visibility: protected

13.3.8 TGroupCursorResource.DeleteSubItems

Declaration: procedure DeleteSubItems; Override

Visibility: protected

13.3.9 TGroupCursorResource.GetSubStream

Declaration: function GetSubStream(const index: Integer; out aSize: Int64) : TStream
; Override

Visibility: protected

13.3.10 TGroupCursorResource.GetType

Declaration: function GetType : TResourceDesc; Override

Visibility: protected

13.3.11 TGroupCursorResource.GetName

Declaration: function GetName : TResourceDesc; Override

Visibility: protected

13.3.12 TGroupCursorResource.ChangeDescTypeAllowed

Declaration: function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override

Visibility: protected

13.3.13 TGroupCursorResource.ChangeDescValueAllowed

Declaration: function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override

Visibility: protected

13.3.14 TGroupCursorResource.Create

Synopsis: Creates a new group cursor resource

Declaration: constructor Create; Override

constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override

Visibility: public

Description: Please note that a `Type` parameter is not used, since this class always uses `RT_GROUP_CURSOR` (90) as type.

Chapter 14

Reference for unit 'groupiconresource'

14.1 Used units

Table 14.1: Used units by unit 'groupiconresource'

Name	Page
Classes	??
groupresource	98
resource	125
System	??
sysutils	??

14.2 Overview

This unit contains `TGroupIconResource` ([94](#)), a `TAbstractResource` ([94](#)) descendant specialized in handling resource of type `RT_GROUP_ICON` ([94](#)).

Adding this unit to a program's `uses` clause registers class `TGroupIconResource` ([94](#)) for type `RT_GROUP_ICON` ([94](#)) with `TResourceFactory` ([94](#)).

14.3 TGroupIconResource

14.3.1 Description

This class represents a resource of type `RT_GROUP_ICON` ([94](#)).

Resources of this type are strictly related to `.ico` files: typically a resource compiler creates resources of this type when it is instructed to insert an icon from an `.ico` file.

There is although a big difference between `.ico` files and icon resources: an `.ico` file contains an icon, which is made of several different images (for different sizes and color depth), but while a file of this type is self-contained, when it comes to resources data is scattered over several different resources: an `RT_GROUP_ICON` ([94](#)) resource only contains information about the single images, which are contained each in a different resource of type `RT_ICON` ([94](#)). The single resources are

pretty useless alone, since they only consist of raw image data: they must be accessed in the context of the RT_GROUP_ICON (94) resource, which provides information about them.

TGroupIconResource (94) provides a way to handle an icon as if it was a .ico file, via ItemData (94) property. Single icon resources are automatically created or destroyed as needed.

Remark: This class doesn't allow its type to be changed to anything else than RT_GROUP_ICON (94). Attempts to do so result in a EResourceDescChangeNotAllowedException (94).

See also: TGroupResource.ItemData (94), TGroupCursorResource (94)

14.3.2 Method overview

Page	Method	Description
96	ChangeDescTypeAllowed	Creates a new group icon resource
96	ChangeDescValueAllowed	
96	ClearItemList	
96	Create	
95	CreateSubItem	
96	DeleteSubItems	
96	GetName	
96	GetSubStream	
96	GetType	
95	ReadResourceItemHeader	
95	UpdateItemOwner	
95	WriteHeader	

14.3.3 TGroupIconResource.ReadResourceItemHeader

Declaration: procedure ReadResourceItemHeader; Override

Visibility: protected

14.3.4 TGroupIconResource.WriteHeader

Declaration: procedure WriteHeader(aStream: TStream); Override

Visibility: protected

14.3.5 TGroupIconResource.CreateSubItem

Declaration: procedure CreateSubItem; Override

Visibility: protected

14.3.6 TGroupIconResource.UpdateItemOwner

Declaration: procedure UpdateItemOwner(index: Integer); Override

Visibility: protected

14.3.7 TGroupIconResource.ClearItemList

Declaration: procedure ClearItemList; Override

Visibility: protected

14.3.8 TGroupIconResource.DeleteSubItems

Declaration: procedure DeleteSubItems; Override

Visibility: protected

14.3.9 TGroupIconResource.GetSubStream

Declaration: function GetSubStream(const index: Integer; out aSize: Int64) : TStream
; Override

Visibility: protected

14.3.10 TGroupIconResource.GetType

Declaration: function GetType : TResourceDesc; Override

Visibility: protected

14.3.11 TGroupIconResource.GetName

Declaration: function GetName : TResourceDesc; Override

Visibility: protected

14.3.12 TGroupIconResource.ChangeDescTypeAllowed

Declaration: function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override

Visibility: protected

14.3.13 TGroupIconResource.ChangeDescValueAllowed

Declaration: function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override

Visibility: protected

14.3.14 TGroupIconResource.Create

Synopsis: Creates a new group icon resource

Declaration: constructor Create; Override

constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override

Visibility: public

Description: Please note that `aType` parameter is not used, since this class always uses `RT_GROUP_ICON` (94) as type.

Chapter 15

Reference for unit 'groupresource'

15.1 Used units

Table 15.1: Used units by unit 'groupresource'

Name	Page
Classes	??
resdatastream	115
resource	125
System	??
sysutils	??

15.2 Overview

This unit contains [TGroupResource \(99\)](#) and [TGroupCachedDataStream \(98\)](#), two classes used for resources of type [RT_GROUP_ICON \(98\)](#) and [RT_GROUP_CURSOR \(98\)](#).

The former is an abstract resource class which is implemented by [TGroupIconResource \(98\)](#) and [TGroupCursorResource \(98\)](#), and the latter is a [TCachedDataStream \(98\)](#) descendant used to provide .ico/.cur like streams for resource classes mentioned earlier.

This unit shouldn't be of interest for the user, who should look at documentation for [groupiconresource \(98\)](#) and [groupcursorresource \(98\)](#) units instead.

15.3 TGroupCachedDataStream

15.3.1 Description

This class is used by [TGroupResource \(99\)](#) descendants to provide an .ico/.cur like stream.

Unlike [TCachedResourceDataStream \(98\)](#), which provides a stream-like interface over a portion of another stream, this class lets multiple stream to be seen as one: this way, several [RT_ICON \(98\)](#) or [RT_CURSOR \(98\)](#) resources can appear like a single .ico or .cur file.

See also: [TGroupResource \(99\)](#), [TGroupIconResource \(98\)](#), [TGroupCursorResource \(98\)](#), [TCachedDataStream \(98\)](#), [TCachedResourceDataStream \(98\)](#)

15.3.2 Method overview

Page	Method	Description
99	Create	
99	Destroy	
99	Read	

15.3.3 TGroupCachedDataStream.Create

Declaration: `constructor Create(aStream: TStream; aResource: TAbstractResource; aSize: Int64); Override`

Visibility: public

15.3.4 TGroupCachedDataStream.Destroy

Declaration: `destructor Destroy; Override`

Visibility: public

15.3.5 TGroupCachedDataStream.Read

Declaration: `function Read(var Buffer; Count: LongInt) : LongInt; Override`

Visibility: public

15.4 TGroupResource

15.4.1 Description

This class provides common functionalities that are extended by [TGroupIconResource \(98\)](#) and [TGroupCursorResource \(98\)](#).

Resources of type [RT_GROUP_ICON \(98\)](#) and [RT_GROUP_CURSOR \(98\)](#) represent a .ico or .cur file, respectively. However, data isn't contained in a single resource, but it's scattered over several different resources. That is, a .ico file contains an icon, which is made of several different images (for different sizes and color depth); when it is represented as a resource, however, the [RT_GROUP_ICON \(98\)](#) resource only contains information about the single images, which are contained each in a different resource of type [RT_ICON \(98\)](#). The single resources are pretty unuseful alone, since they only consist of raw image data: they must be accessed in the context of the [RT_GROUP_ICON \(98\)](#) resource, which provides information about them.

[TGroupIconResource \(98\)](#) and [TGroupCursorResource \(98\)](#) provide a way to handle resources of these types as if they were .ico or .cur files. This class implements common functionalities, since icons and cursors are very similar.

Remark: An object of this class should never be directly instantiated: use a descendant class instead.

See also: [TGroupIconResource \(98\)](#), [TGroupCursorResource \(98\)](#)

15.4.2 Method overview

Page	Method	Description
100	CheckBuildItemStream	
101	ClearItemList	
102	CompareContents	
101	CreateSubItem	
101	CreateSubItems	
101	DeleteSubItems	
102	Destroy	
100	FindSubResources	
100	GetItemData	
101	GetSubStream	
101	GetSubStreamCount	
102	NotifyResourcesLoaded	
100	ReadResourceItemHeader	
102	SetCustomItemDataStream	Sets a custom stream as the underlying stream for ItemData
102	SetOwnerList	
101	UpdateItemOwner	
103	UpdateRawData	
101	WriteHeader	
101	WriteResHeader	

15.4.3 Property overview

Page	Properties	Access	Description
103	ItemData	r	Resource data as an ICO/CUR stream

15.4.4 TGroupResource.FindSubResources

Declaration: `procedure FindSubResources`

Visibility: `protected`

15.4.5 TGroupResource.ReadResourceItemHeader

Declaration: `procedure ReadResourceItemHeader; Virtual; Abstract`

Visibility: `protected`

15.4.6 TGroupResource.CheckBuildItemStream

Declaration: `procedure CheckBuildItemStream`

Visibility: `protected`

15.4.7 TGroupResource.GetItemData

Declaration: `function GetItemData : TStream`

Visibility: `protected`

15.4.8 TGroupResource.WriteHeader

Declaration: `procedure WriteHeader(aStream: TStream); Virtual; Abstract`

Visibility: `protected`

15.4.9 TGroupResource.WriteResHeader

Declaration: `function WriteResHeader : Word`

Visibility: `protected`

15.4.10 TGroupResource.CreateSubItems

Declaration: `procedure CreateSubItems`

Visibility: `protected`

15.4.11 TGroupResource.CreateSubItem

Declaration: `procedure CreateSubItem; Virtual; Abstract`

Visibility: `protected`

15.4.12 TGroupResource.UpdateItemOwner

Declaration: `procedure UpdateItemOwner(index: Integer); Virtual; Abstract`

Visibility: `protected`

15.4.13 TGroupResource.ClearItemList

Declaration: `procedure ClearItemList; Virtual; Abstract`

Visibility: `protected`

15.4.14 TGroupResource.DeleteSubItems

Declaration: `procedure DeleteSubItems; Virtual; Abstract`

Visibility: `protected`

15.4.15 TGroupResource.GetSubStreamCount

Declaration: `function GetSubStreamCount : Integer`

Visibility: `protected`

15.4.16 TGroupResource.GetSubStream

Declaration: `function GetSubStream(const index: Integer; out aSize: Int64) : TStream
; Virtual; Abstract`

Visibility: `protected`

15.4.17 TGroupResource.SetOwnerList

Declaration: `procedure SetOwnerList(aResources: TResources); Override`

Visibility: `protected`

15.4.18 TGroupResource.NotifyResourcesLoaded

Declaration: `procedure NotifyResourcesLoaded; Override`

Visibility: `protected`

15.4.19 TGroupResource.Destroy

Synopsis:

Declaration: `destructor Destroy; Override`

Visibility: `public`

Description:

15.4.20 TGroupResource.CompareContents

Declaration: `function CompareContents(aResource: TAbstractResource) : Boolean
; Override`

Visibility: `public`

15.4.21 TGroupResource.SetCustomItemDataStream

Synopsis: Sets a custom stream as the underlying stream for ItemData

Declaration: `procedure SetCustomItemDataStream(aStream: TStream)`

Visibility: `public`

Description: This method allows the user to use a custom stream as the underlying stream for ItemData (103). This is useful when you want a TGroupIconResource (98) or TGroupCursorResource (98) to be created from a ico or cur file for which you have a stream.

Sample code

This code creates a resource containing an icon

```
var
  aName : TResourceDesc;
  aRes : TGroupIconResource;
  aFile : TFileStream;
  Resources : TResources;
begin
  Resources:=TResources.Create;
  aName:=TResourceDesc.Create('MAINICON');
  aRes:=TGroupIconResource.Create(nil,aName); //type is always RT_GROUP_ICON
  aName.Free; //not needed anymore
  aFile:=TFileStream.Create('mainicon.ico',fmOpenRead or fmShareDenyNone);
```

```

aRes.SetCustomItemDataStream(aFile);
Resources.Add(aRes);
Resources.WriteToFile('myresource.res');

Resources.Free; //it destroys aRes as well.
aFile.Free;
end;

```

See also: [TGroupResource.ItemData \(103\)](#), [TGroupIconResource \(98\)](#), [TGroupCursorResource \(98\)](#), [TAbstractResource.UpdateRawData \(98\)](#)

15.4.22 TGroupResource.UpdateRawData

Declaration: `procedure UpdateRawData; Override`

Visibility: `public`

15.4.23 TGroupResource.ItemData

Synopsis: Resource data as an ICO/CUR stream

Declaration: `Property ItemData : TStream`

Visibility: `public`

Access: `Read`

Description: This property gives access to resource data in a (ICO or CUR) file-like stream, unlike [RawData \(98\)](#).

The exact format of the stream (ico or cur) is determined by the descendant class of [TGroupResource \(99\)](#) that is used.

[ItemData](#) does not create a copy of [RawData \(98\)](#) so memory usage is generally kept limited.

You can also set a custom stream as the underlying stream for [ItemData](#) via [SetCustomItemDataStream \(102\)](#), much like [SetCustomRawDataStream \(98\)](#) does for [RawData \(98\)](#). This is useful when you want a [TGroupIconResource \(98\)](#) or [TGroupCursorResource \(98\)](#) to be created from a ico or cur file for which you have a stream.

Remark: If you need to access [RawData \(98\)](#) after you modified [ItemData](#), be sure to call [UpdateRawData \(98\)](#) first. This isn't needed however when resource is written to a stream, since [TResources \(98\)](#) takes care of it.

See also: [TGroupResource.SetCustomItemDataStream \(102\)](#), [TGroupIconResource \(98\)](#), [TGroupCursorResource \(98\)](#), [TAbstractResource.RawData \(98\)](#), [TAbstractResource.UpdateRawData \(98\)](#)

Chapter 16

Reference for unit 'machoreader'

16.1 Used units

Table 16.1: Used units by unit 'machoreader'

Name	Page
Classes	??
machotypes	107
resource	125
System	??
sysutils	??

16.2 Overview

This unit contains `TMachOResourceReader` ([104](#)), a `TAbstractResourceReader` ([104](#)) descendant that is able to read Mach-O object files containing resources.

Adding this unit to a program's `uses` clause registers class `TMachOResourceReader` ([104](#)) with `TResources` ([104](#)).

16.3 TMachOResourceReader

16.3.1 Description

This class provides a reader for Mach-O object files and images containing resources.

Mach-O is the file format used by Darwin and Mac OS X for object files and image files (executables, dynamic libraries and so on). Free Pascal can store resources in Mach-O files in its own format.

After an object file has been read, `MachineType` ([106](#)) property holds the machine type the object file was built for.

Remark: This reader can't read multiple-architecture Mach-O files (like universal binary). To read a particular Mach-O file in a multiple-architecture file, extract it with `lipo` command.

See also: `TMachOResourceReader.MachineType` ([106](#)), `TAbstractResourceReader` ([104](#)), `TMachOResourceWriter` ([104](#)), `Format of resources in object files` ([104](#))

16.3.2 Method overview

Page	Method	Description
105	CheckMagic	
105	Create	
105	Destroy	
105	GetDescription	
105	GetExtensions	
105	Load	

16.3.3 Property overview

Page	Properties	Access	Description
106	MachineType	r	The machine type of the object file

16.3.4 TMachOResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

16.3.5 TMachOResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

16.3.6 TMachOResourceReader.Load

Declaration: `procedure Load(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

16.3.7 TMachOResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: `protected`

16.3.8 TMachOResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: `public`

16.3.9 TMachOResourceReader.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

16.3.10 **TMachOResourceReader.MachineType**

Synopsis: The machine type of the object file

Declaration: `Property MachineType : TMachOMachineType`

Visibility: `public`

Access: `Read`

Description: This property holds the machine type of the object file that has been read.

Remark: Obviously, this property is meaningful only after an object file has been read.

See also: `TMachOMachineType` ([104](#))

Chapter 17

Reference for unit 'machotypes'

17.1 Overview

These constants are used internally by TMachOResourceWriter ([107](#)) and TMachOResourceReader ([107](#)).

The only type of interest for the user is TMachOMachineType ([108](#)).

17.2 Constants, types and variables

17.2.1 Types

```
PNList32 = ^TNList32
```

```
PNList64 = ^TNList64
```

```
PRelocationInfo = ^TRelocationInfo
```

```
TDySymtabCommand = packed record
```

```
    ilocalsym : LongWord;  
    nlocalsym : LongWord;  
    iextdefsym : LongWord;  
    nextdefsym : LongWord;  
    iundefsym : LongWord;  
    nundefsym : LongWord;  
    tocoff : LongWord;  
    ntoc : LongWord;  
    modtaboff : LongWord;  
    nmodtab : LongWord;  
    extrefsymoff : LongWord;  
    nextrefsyms : LongWord;  
    indirectsymoff : LongWord;  
    nindirectsyms : LongWord;  
    extreloff : LongWord;  
    nextrel : LongWord;
```

```

    locreloff : LongWord;
    nlocrel : LongWord;
end

```

```

TLoadCommand = packed record
    cmd : LongWord;
    cmdsize : LongWord;
end

```

```

TMachHdr = packed record
    magic : LongWord;
    cputype : LongInt;
    cpusubtype : LongInt;
    filetype : LongWord;
    ncmds : LongWord;
    sizeofcmds : LongWord;
    flags : LongWord;
end

```

```

TMachOMachineType = (mmtpowerpc, mmtpowerpc64, mmti386, mmtx86_64, mmtarm)

```

Table 17.1: Enumeration values for type TMachOMachineType

Value	Explanation
mmtarm	
mmti386	Intel 386 machine type
mmtpowerpc	PowerPC machine type
mmtpowerpc64	PowerPC 64 machine type
mmtx86_64	AMD x86_64 machine type

This enumeration specifies the Mach-O machine type.

It is used by TMachOResourceWriter (107) to specify the machine type of the generated object file and by TMachOResourceReader (107) to read the machine type of the object file that has been read.

```

TMachOSubMachineType386 = (msm386_all)

```

Table 17.2: Enumeration values for type TMachOSubMachineType386

Value	Explanation
msm386_all	

```

TMachOSubMachineTypeArm = (msmarm_all, msmarm_v4t, msmarm_v6, msmarm_v5tej,
    msmarm_xscale, msmarm_v7)

```

Table 17.3: Enumeration values for type TMachOSubMachineTypeArm

Value	Explanation
msmarm_all	
msmarm_v4t	
msmarm_v5tej	
msmarm_v6	
msmarm_v7	
msmarm_xscale	

TMachOSubMachineTypePowerPC = (msmppc_all)

Table 17.4: Enumeration values for type TMachOSubMachineTypePowerPC

Value	Explanation
msmppc_all	

TMachOSubMachineTypePowerPC64 = (msmppc64_all)

Table 17.5: Enumeration values for type TMachOSubMachineTypePowerPC64

Value	Explanation
msmppc64_all	

TMachOSubMachineTypepex64 = (msmx64_all)

Table 17.6: Enumeration values for type TMachOSubMachineTypepex64

Value	Explanation
msmx64_all	

```
TNList32 = packed record
  strx : LongWord;
  _type : Byte;
  sect : Byte;
  desc : Word;
  value : LongWord;
end
```

```
TNList64 = packed record
  strx : LongWord;
  _type : Byte;
  sect : Byte;
```

```

    desc : Word;
    value : QWord;
end

```

```

TRelocationInfo = packed record
    address : LongWord;
    flags : LongWord;
end

```

```

TSection32 = packed record
    sectname : TSegSectName;
    segname : TSegSectName;
    addr : LongWord;
    size : LongWord;
    offset : LongWord;
    align : LongWord;
    reloff : LongWord;
    nreloc : LongWord;
    flags : LongWord;
    reserved1 : LongWord;
    reserved2 : LongWord;
end

```

```

TSection64 = packed record
    sectname : TSegSectName;
    segname : TSegSectName;
    addr : QWord;
    size : QWord;
    offset : LongWord;
    align : LongWord;
    reloff : LongWord;
    nreloc : LongWord;
    flags : LongWord;
    reserved1 : LongWord;
    reserved2 : LongWord;
    reserved3 : LongWord;
end

```

```

TSegmentCommand32 = packed record
    name : TSegSectName;
    vmaddr : LongWord;
    vmsize : LongWord;
    fileoff : LongWord;
    filesize : LongWord;
    maxprot : LongInt;
    initprot : LongInt;

```

```
    nsects : LongWord;  
    flags : LongWord;  
end
```

```
TSegmentCommand64 = packed record  
    name : TSegSectName;  
    vmaddr : QWord;  
    vmsize : QWord;  
    fileoff : QWord;  
    filesize : QWord;  
    maxprot : LongInt;  
    initprot : LongInt;  
    nsects : LongWord;  
    flags : LongWord;  
end
```

```
TSegSectName = Array[0..15] of Char
```

```
TSymtabCommand = packed record  
    symoff : LongWord;  
    nsyms : LongWord;  
    stroff : LongWord;  
    strsize : LongWord;  
end
```

Chapter 18

Reference for unit 'machowriter'

18.1 Used units

Table 18.1: Used units by unit 'machowriter'

Name	Page
Classes	??
machotypes	107
resource	125
System	??
sysutils	??

18.2 Overview

This unit contains `TMachOResourceWriter` ([113](#)), a `TAbstractResourceWriter` ([112](#)) descendant that is able to write Mach-O object files containing resources.

Adding this unit to a program's `uses` clause registers class `TMachOResourceWriter` ([113](#)) with `TResources` ([112](#)).

18.3 Constants, types and variables

18.3.1 Types

```
TMachoSubMachineType = record
case TMachOMachineType of
msmppc_all: (
  fPpcSubType : TMachOSubMachineTypePowerPC;
);
msmppc64_all: (
  fPpc64SubType : TMachOSubMachineTypePowerPC64;
);
msm386_all: (
  f386SubType : TMachOSubMachineType386;
);
```

```

msmx64_all: (
    fX64SubType : TMachOSubMachineTypex64;
);
mmtarm: (
    fArmSubType : TMachOSubMachineTypeArm;
);
end

```

18.4 EMachOResourceWriterException

18.4.1 Description

Base class for Mach-O resource writer-related exceptions

18.5 EMachOResourceWriterUnknownBitSizeException

18.5.1 Description

If this exception is raised, an internal error occurred.

18.6 TMachOResourceWriter

18.6.1 Description

This class provides a writer for Mach-O object files and images containing resources.

Mach-O is the file format used by Darwin and Mac OS X for object files and image files (executables, dynamic libraries and so on). Free Pascal can store resources in Mach-O files in its own format.

MachineType (114) property can be used to set the machine type of the object file to generate.

See also: TMachOResourceWriter.MachineType (114), TAbstractResourceWriter (112), TMachOResourceReader (112), Format of resources in object files (112)

18.6.2 Method overview

Page	Method	Description
114	Create	
114	Destroy	
114	GetDescription	
114	GetExtensions	
114	Write	

18.6.3 Property overview

Page	Properties	Access	Description
114	MachineType	rw	The machine type of the object file
114	SubMachineType	rw	

18.6.4 TMachOResourceWriter.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

18.6.5 TMachOResourceWriter.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

18.6.6 TMachOResourceWriter.Write

Declaration: `procedure Write(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

18.6.7 TMachOResourceWriter.Create

Declaration: `constructor Create; Override`

Visibility: `public`

18.6.8 TMachOResourceWriter.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

18.6.9 TMachOResourceWriter.MachineType

Synopsis: The machine type of the object file

Declaration: `Property MachineType : TMachOMachineType`

Visibility: `public`

Access: `Read,Write`

Description: This property can be used to set the machine type of the object file to write.

See also: `TMachOMachineType` ([112](#))

18.6.10 TMachOResourceWriter.SubMachineType

Declaration: `Property SubMachineType : TMachOSubMachineType`

Visibility: `public`

Access: `Read,Write`

Chapter 19

Reference for unit 'resdatastream'

19.1 Used units

Table 19.1: Used units by unit 'resdatastream'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

19.2 Overview

This unit contains various streams that are used to provide copy-on-write mechanism for TAbstractResource.RawData ([115](#)), via more levels of indirection.

Main class is TResourceDataStream ([118](#)), which is the stream used for TAbstractResource.RawData ([115](#)). This class uses an underlying stream, to which it redirects operations.

At a lower level, a TCachedDataStream ([116](#)) descendant provides a layer between the original stream and the TResourceDataStream ([118](#)).

19.3 Constants, types and variables

19.3.1 Types

```
TCachedStreamClass = Class of TCachedDataStream
```

Cached stream metaclass

```
TUnderlyingStreamType = (usCached, usMemory, usCustom)
```

Table 19.2: Enumeration values for type TUnderlyingStreamType

Value	Explanation
usCached	The underlying stream is a TCachedResourceDataStream descendant
usCustom	The underlying stream is a custom stream
usMemory	The underlying stream is a memory stream

The type of the underlying stream of TResourceDataStream

19.4 TCachedDataStream

19.4.1 Description

This abstract class provides basic cached stream functionalities.

A cached stream is a read-only stream that operates on a portion of another stream. That is, it creates a "window" on the original stream from which to read data. Since it is a read-only stream, trying to write to the stream or to set its size cause an EInvalidOperation exception to be raised.

This class is used by TResourceDataStream (118) to access the raw data of a resource. When an attempt to write to the stream is detected, TResourceDataStream (118) replaces it with a memory stream and copies the contents of the cached stream to the memory one, thus providing a copy-on-write mechanism.

Remark: An object of this class should never be directly instantiated: use a descendant class instead.

See also: TResourceDataStream (118), TCachedResourceDataStream (117)

19.4.2 Method overview

Page	Method	Description
117	Create	Creates a new object
116	GetPosition	
117	GetSize	
117	Seek	
116	SetPosition	
117	SetSize64	
117	Write	

19.4.3 TCachedDataStream.GetPosition

Declaration: `function GetPosition : Int64; Override`

Visibility: protected

19.4.4 TCachedDataStream.SetPosition

Declaration: `procedure SetPosition(const Pos: Int64); Override`

Visibility: protected

19.4.5 TCachedDataStream.GetSize

Declaration: `function GetSize : Int64; Override`

Visibility: `protected`

19.4.6 TCachedDataStream.SetSize64

Declaration: `procedure SetSize64(const NewSize: Int64); Override`

Visibility: `protected`

19.4.7 TCachedDataStream.Create

Synopsis: Creates a new object

Declaration: `constructor Create(aStream: TStream; aResource: TAbstractResource;
aSize: Int64); Virtual`

Visibility: `public`

Description: A new cached stream is created on top of the `aStream` stream.

See also: [TCachedDataStream \(116\)](#), [TResourceDataStream \(118\)](#), [TResourceDataStream.Create \(119\)](#)

19.4.8 TCachedDataStream.Write

Declaration: `function Write(const Buffer; Count: LongInt) : LongInt; Override`

Visibility: `public`

19.4.9 TCachedDataStream.Seek

Declaration: `function Seek(const Offset: Int64; Origin: TSeekOrigin) : Int64
; Override`

Visibility: `public`

19.5 TCachedResourceDataStream

19.5.1 Description

This class provides an implementation of [TCachedDataStream \(116\)](#).

Usually resource readers create a [TResourceDataStream \(118\)](#) with a [TCachedResourceDataStream](#) as the underlying stream.

See also: [TCachedDataStream \(116\)](#), [TResourceDataStream \(118\)](#)

19.5.2 Method overview

Page	Method	Description
118	Create	
118	Read	

19.5.3 TCachedResourceDataStream.Create

Declaration: constructor Create(aStream: TStream; aResource: TAbstractResource;
aSize: Int64); Override

Visibility: public

19.5.4 TCachedResourceDataStream.Read

Declaration: function Read(var Buffer; Count: LongInt) : LongInt; Override

Visibility: public

19.6 TResourceDataStream

19.6.1 Description

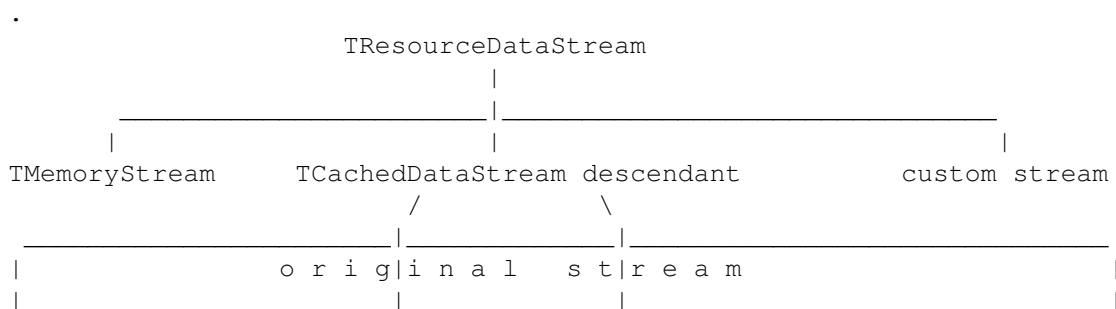
This class provides the copy-on-write mechanism of TAbstractResource.RawData (115), via more levels of indirection.

It uses an underlying stream, to which it redirects operations.

The underlying stream can be a TCachedDataStream (116) descendant, a memory stream or a custom stream. Usually when a resource is loaded from a stream, the underlying stream is a TCachedDataStream (116) descendant, which provides a read-only stream-like interface over a portion of the original stream (that is, the part of the original stream where resource data resides). When TResourceDataStream (118) is requested to write data, it replaces the underlying stream with a memory stream, whose contents are copied from the previous underlying stream: this way, copy-on-write functionality can be achieved.

As said before, third possibility is to have a custom stream as the underlying stream: a user can set this stream via TAbstractResource.SetCustomRawDataStream (115) method, which in turn calls TResourceDataStream.SetCustomStream (120)

Figure: Levels of indirection



See also: TCachedDataStream (116), TResourceDataStream.Create (119), TResourceDataStream.SetCustomStream (120)

19.6.2 Method overview

Page	Method	Description
120	Compare	Compares the stream to another one
119	Create	Creates a new object
120	Destroy	
119	GetPosition	
119	GetSize	
120	Read	
121	Seek	
120	SetCustomStream	Sets a custom stream as the underlying stream
119	SetPosition	
119	SetSize64	
120	Write	

19.6.3 Property overview

Page	Properties	Access	Description
121	Cached	rw	Controls the copy-on-write behaviour of the stream

19.6.4 TResourceDataStream.GetPosition

Declaration: `function GetPosition : Int64; Override`

Visibility: `protected`

19.6.5 TResourceDataStream.SetPosition

Declaration: `procedure SetPosition(const Pos: Int64); Override`

Visibility: `protected`

19.6.6 TResourceDataStream.GetSize

Declaration: `function GetSize : Int64; Override`

Visibility: `protected`

19.6.7 TResourceDataStream.SetSize64

Declaration: `procedure SetSize64(const NewSize: Int64); Override`

Visibility: `protected`

19.6.8 TResourceDataStream.Create

Synopsis: Creates a new object

Declaration: `constructor Create(aStream: TStream; aResource: TAbstractResource;
aSize: Int64; aClass: TCachedStreamClass)`

Visibility: `public`

Description: A new `TResourceDataStream` ([118](#)) object is created.

If `aStream` is `nil`, the underlying stream is a memory stream. Otherwise, a cached stream of the class specified in `aClass` is created and set as the underlying stream.

See also: `TResourceDataStream` ([118](#)), `TCachedDataStream` ([116](#)), `TResourceDataStream.SetCustomStream` ([120](#))

19.6.9 TResourceDataStream.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

19.6.10 TResourceDataStream.Compare

Synopsis: Compares the stream to another one

Declaration: `function Compare(aStream: TStream) : Boolean`

Visibility: `public`

Description: This methods compares the stream with `aStream`. If they are of the same length and their contents are the same, `true` is returned, `false` otherwise.

See also: `TAbstractResource.CompareContents` ([115](#))

19.6.11 TResourceDataStream.SetCustomStream

Synopsis: Sets a custom stream as the underlying stream

Declaration: `procedure SetCustomStream(aStream: TStream)`

Visibility: `public`

Description: This method sets a custom stream as the underlying stream.

If `aStream` is `nil`, a new memory stream is used as the underlying stream. This can be used to remove a previously set custom stream as the underlying stream.

Usually it is called by `TAbstractResource.SetCustomRawDataStream` ([115](#)).

See also: `TResourceDataStream` ([118](#)), `TAbstractResource.SetCustomRawDataStream` ([115](#))

19.6.12 TResourceDataStream.Read

Declaration: `function Read(var Buffer;Count: LongInt) : LongInt; Override`

Visibility: `public`

19.6.13 TResourceDataStream.Write

Declaration: `function Write(const Buffer;Count: LongInt) : LongInt; Override`

Visibility: `public`

19.6.14 TResourceDataStream.Seek

Declaration: `function Seek(const Offset: Int64; Origin: TSeekOrigin) : Int64
; Override`

Visibility: public

19.6.15 TResourceDataStream.Cached

Synopsis: Controls the copy-on-write behaviour of the stream

Declaration: `Property Cached : Boolean`

Visibility: public

Access: Read, Write

Description: When this property is set to `true`, a cached stream is used as the underlying stream for read operations. If it is set to `false`, no caching is performed and data is always copied to a memory stream.

Note that this property does nothing if the underlying stream is a custom stream.

By default this property is `true`.

See also: [TResourceDataStream \(118\)](#), [TAbstractResource.CacheData \(115\)](#)

Chapter 20

Reference for unit 'resfactory'

20.1 Used units

Table 20.1: Used units by unit 'resfactory'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

20.2 Overview

This unit contains a factory class that provides an easy way to create resources of the right class.

Resource classes can be registered with `TResourceFactory` ([123](#)) so that the class knows how to create a resource of a specific type.

20.3 Constants, types and variables

20.3.1 Resource strings

```
SAlreadyRegistered = 'A resource class for the type %s is already registered.'
```

20.4 `EResourceClassAlreadyRegisteredException`

20.4.1 Description

This exception is raised by class method `RegisterResourceClass` ([123](#)) of `TResourceFactory` ([123](#)) when an attempt is made to register a class for an already registered type.

See also: `TResourceFactory.RegisterResourceClass` ([123](#))

20.5 EResourceFactoryException

20.5.1 Description

Base class for resource factory-related exceptions

20.6 TResourceFactory

20.6.1 Description

Resources are represented by descendants of TAbstractResource (122). Some applications don't need specialized resource classes, and a TGenericResource (122) can be enough. On the other hand, sometimes it is required that a resource of a specific type is created with a more specialized class. This class provides a centralized point for the creation of resources.

TResourceFactory (123) holds a list of registered classes with an associated resource type. When it is requested to create a resource for a given type, it creates a resource of the class associated with that type. If no class matching that type is found, TGenericResource (122) is used.

Usually each resource class registers itself in the `initialization` section of the unit in which it is implemented.

See also: TResourceFactory.RegisterResourceClass (123), TResourceFactory.CreateResource (123), TAbstractResource (122), TGenericResource (122)

20.6.2 Method overview

Page	Method	Description
123	CreateResource	Creates a new resource
123	RegisterResourceClass	Registers a resource class

20.6.3 TResourceFactory.RegisterResourceClass

Synopsis: Registers a resource class

Declaration:

```
class procedure RegisterResourceClass(aType: TResID;
                                     aClass: TResourceClass); Overload
class procedure RegisterResourceClass(aType: TResName;
                                     aClass: TResourceClass); Overload
class procedure RegisterResourceClass(aType: TResourceDesc;
                                     aClass: TResourceClass); Overload
```

Visibility: public

Description: This class method registers a resource class for the given resource type.

Errors: If a class has already been registered for the given resource type, an EResourceClassAlreadyRegisteredException (122) exception is raised.

See also: TResourceFactory (123)

20.6.4 TResourceFactory.CreateResource

Synopsis: Creates a new resource

Declaration: `class function CreateResource(aType: TResourceDesc; aName: TResourceDesc)`

Visibility: `public`

Description: This class method creates a new resource of the class associated with the given type, and sets its name and type based on the values passed as parameters.

If no class matching the given type is found, the resource is created with `TGenericResource` ([122](#)) class.

See also: `TResourceFactory` ([123](#)), `TResourceFactory.RegisterResourceClass` ([123](#)), `TGenericResource` ([122](#))

Chapter 21

Reference for unit 'resource'

21.1 Used units

Table 21.1: Used units by unit 'resource'

Name	Page
Classes	??
System	??
sysutils	??

21.2 Overview

This unit contains base classes needed to work with resources.

Single resources are represented by an instance of a `TAbstractResource` (131) descendant. They are grouped in a `TResources` (152) instance which can be read (written) to (from) a stream via a `TAbstractResourceReader` (141) (`TAbstractResourceWriter` (146)) descendant.

`TGenericResource` (148) provides a basic implementation of `TAbstractResource` (131).

21.3 Constants, types and variables

21.3.1 Resource strings

```
SDescChangeNotAllowed = 'Cannot modify %s resource description'
```

```
SLangIDChangeNotAllowed = 'Cannot modify %s resource language ID'
```

```
SReaderNotFoundExt = 'Cannot find resource reader for extension ''%s'''
```

```
SReaderNotFoundProbe = 'Cannot find a resource reader: unknown format.'
```

SResDuplicate = 'Duplicate resource: Type = %s, Name = %s, Lang ID = %.4x'

SResourceNotFound = 'Cannot find resource: Type = %s, Name = %s'

SResourceNotFoundLang = 'Cannot find resource: Type = %s, Name = %s, Lang ID = %.4x'

SWriterNotFoundExt = 'Cannot find resource writer for extension ''%s'''

21.3.2 Constants

CREATEPROCESS_MANIFEST_RESOURCE_ID = 1

ISOLATIONAWARE_MANIFEST_RESOURCE_ID = 2

ISOLATIONAWARE_NOSTATICIMPORT_MANIFEST_RESOURCE_ID = 3

MAXIMUM_RESERVED_MANIFEST_RESOURCE_ID = 16

MF_DISCARDABLE = \$1000

This flag is ignored by Windows and Free Pascal RTL. It's provided for compatibility with 16-bit Windows.

MF_MOVEABLE = \$0010

This flag is ignored by Windows and Free Pascal RTL. It's provided for compatibility with 16-bit Windows.

MF_PRELOAD = \$0040

This flag is ignored by Windows and Free Pascal RTL. It's provided for compatibility with 16-bit Windows.

MF_PURE = \$0020

This flag is ignored by Windows and Free Pascal RTL. It's provided for compatibility with 16-bit Windows.

MINIMUM_RESERVED_MANIFEST_RESOURCE_ID = 1

RT_ACCELERATOR = 9

Accelerator table resource

RT_ANICURSOR = 21

This resource type contains raw binary data taken from a .ani file

RT_ANIICON = 22

This resource type contains raw binary data taken from a .ani file

RT_BITMAP = 2

Bitmap resource

RT_CURSOR = 1

A single image in a cursor. Don't use it directly.

RT_DIALOG = 5

Dialog resource

RT_DLGINCLUDE = 17

This resource is used internally by resource compilers but will never appear in compiled form

RT_FONT = 8

This resource type is obsolete and never appears in 32 bit resources.

RT_FONTDIR = 7

This resource type is obsolete and never appears in 32 bit resources.

RT_GROUP_CURSOR = 12

This resource type contains a cursor and it's the equivalent of a .cur file

Remark: Please note that is is made up of several RT_CURSOR (127) resources (the single cursor images) that shouldn't be accessed singularly.

RT_GROUP_ICON = 14

This resource type contains an icon and it's the equivalent of a .ico file

Remark: Please note that is is made up of several RT_ICON (128) resources (the single icon images) that shouldn't be accessed singularly.

RT_HTML = 23

This resource type contains an HTML file.

RT_ICON = 3

A single image in a icon. Don't use it directly.

RT_MANIFEST = 24

This resource contains data taken from a .manifest file

Remark: Resource name must be one of CREATEPROCESS_MANIFEST_RESOURCE_ID (126) (mainly used for executables), ISOLATIONAWARE_MANIFEST_RESOURCE_ID (126) or ISOLATION-AWARE_NOSTATICIMPORT_MANIFEST_RESOURCE_ID (126) (mainly used for DLLs)

RT_MENU = 4

Menu resource

RT_MESSAGE_TABLE = 11

Message table resource

RT_PLUGPLAY = 19

Plug and Play resource

RT_RCDATA = 10

This resource type contains arbitrary binary data

Note that Delphi dfm files are stored in compiled form as a RCDATA resource

RT_STRING = 6

String table resource

RT_VERSION = 16

This resource defines version information which is visible when viewing properties of a Windows executable or DLL.

RT_VXD = 20

VXD resource

21.3.3 Types

TDescType = (dtName, dtID)

Table 21.2: Enumeration values for type TDescType

Value	Explanation
dtID	The resource type or name is an ID
dtName	The resource type or name is a string

The type of a resource type or name

`TLangID = Word`

A resource language ID

`TResID = LongWord`

A resource type or name in ID form

`TResName = String`

A resource type or name in string form

`TResourceClass = Class of TAbstractResource`

Resource metaclass

`TResourceReaderClass = Class of TAbstractResourceReader`

Resource reader metaclass

`TResourceWriterClass = Class of TAbstractResourceWriter`

Resource writer metaclass

21.4 ENoMoreFreeIDsException

21.4.1 Description

This exception is raised by `TResources.AddAutoID` ([154](#)) method when it is not possible to generate an ID to use as a name for the given resource, because all possible 65536 IDs are already assigned to resources of the same type as the given one.

See also: `TResources.AddAutoID` ([154](#))

21.5 EResourceDescChangeNotAllowedException

21.5.1 Description

This exception is raised when a resource description (either type or name) is tried to be changed, but the resource class doesn't allow it.

See also: `TAbstractResource._Type` ([137](#)), `TAbstractResource.Name` ([137](#))

21.6 EResourceDescTypeException

21.6.1 Description

This exception is raised when a resource description is of type `dtName` ([128](#)) and `TResourceDesc.ID` ([152](#)) property is read.

See also: `TResourceDesc.ID` ([152](#))

21.7 EResourceDuplicateException

21.7.1 Description

This exception is raised when a resource is being added to a TResources (152) object, but another resource with the same type, name and language ID already exists.

See also: TResources.Add (153), TResources.MoveFrom (155)

21.8 EResourceException

21.8.1 Description

Base class for resource-related exceptions

21.9 EResourceLangIDChangeNotAllowedException

21.9.1 Description

This exception is raised when the resource language ID is tried to be changed, but the resource is contained in a TResources (152) object.

See also: TAbstractResource.LangID (137)

21.10 EResourceNotFoundException

21.10.1 Description

This exception is raised when searching for a resource in a TResources (152) object fails.

See also: TResources.Find (154), TResources.Remove (155)

21.11 EResourceReaderException

21.11.1 Description

Base class for resource reader-related exceptions

21.12 EResourceReaderNotFoundException

21.12.1 Description

This exception is raised when no TAbstractResourceReader (141) descendant able to read a stream was found.

See also: TResources.FindReader (155), TResources.LoadFromStream (156), TResources.LoadFromFile (156)

21.13 EResourceReaderUnexpectedEndOfStreamException

21.13.1 Description

This exception is raised by Load (144) method of a TAbstractResourceReader (141) descendant when the stream it was asked to read resources from ended prematurely.

See also: TAbstractResourceReader.Load (144)

21.14 EResourceReaderWrongFormatException

21.14.1 Description

This exception is raised by Load (144) method of a TAbstractResourceReader (141) descendant when the stream it was asked to read resources from is not in the format it supports.

See also: TAbstractResourceReader.Load (144)

21.15 EResourceWriterException

21.15.1 Description

Base class for resource writer-related exceptions

21.16 EResourceWriterNotFoundException

21.16.1 Description

This exception is raised by WriteToFile (158) method of TResources (152) when no TAbstractResourceWriter (146) descendant matching filename extension was found.

See also: TResources.WriteToFile (158)

21.17 TAbstractResource

21.17.1 Description

This is the base class that represents a resource.

A resource is identified by its type (137), name (137) and language ID (137) even if some file formats or operating systems don't consider the latter.

There are also additional properties that aren't always present in all file formats, so their values aren't always meaningful: however, they can be used to display detailed information when possible.

Every resource has a RawData (140) stream that holds resource data. This stream uses a copy-on-write mechanism: if the resource has been read from a stream or file, RawData (140) redirects read operations to the original stream. This is particularly useful when a resource file must be converted from a format to another, or when more resource files must be merged, since (potentially large) resource data is directly copied from the original to the destination stream without the need of allocating a lot of memory.

When resource data is encoded in a resource-specific format, `RawData` (140) can be uncomfortable: it's often better to use a more specialized descendant class that provides additional properties and methods.

Resources cannot be read or written alone from/to a stream: they need to be contained in a `TResources` (152) object, which represents an abstract view of a resource file.

Usually each descendant registers itself with `TResourceFactory` (125) class in the `initialization` section of the unit in which it is implemented: this way `TResourceFactory` (125) class can know which class to use to instantiate a resource of a given type.

Remark: An object of this class should never be directly instantiated: use a descendant class instead.

See also: `TGenericResource` (148), `TAcceleratorsResource` (125), `TBitmapResource` (125), `TGroupCursorResource` (125), `TGroupIconResource` (125), `TStringTableResource` (125), `TVersionResource` (125), `TResources` (152), `TResourceFactory` (125)

21.17.2 Method overview

Page	Method	Description
134	<code>ChangeDescTypeAllowed</code>	Reports whether changing the type of resource type or name is allowed
134	<code>ChangeDescValueAllowed</code>	Reports whether changing the value of resource type or name is allowed
135	<code>CompareContents</code>	Compares the contents of the resource to the contents of another one
135	<code>Create</code>	Creates a new resource
135	<code>Destroy</code>	Destroys the object
134	<code>GetName</code>	Returns the name of the resource
133	<code>GetType</code>	Returns the type of the resource
135	<code>NotifyResourcesLoaded</code>	Tells the resource that all resources have been loaded
133	<code>SetChildOwner</code>	Protected method to let a resource set itself as the owner of a sub-resource
136	<code>SetCustomRawDataStream</code>	Sets a custom stream as the underlying stream for <code>RawData</code>
133	<code>SetDescOwner</code>	Sets this resource as the owner of the given <code>TResourceDesc</code>
133	<code>SetOwnerList</code>	Protected method to let a resource list set itself as the owner of the resource
136	<code>UpdateRawData</code>	Updates <code>RawData</code> stream.

21.17.3 Property overview

Page	Properties	Access	Description
140	CacheData	rw	Controls the copy-on-write behaviour of the resource
139	Characteristics	rw	A user defined piece of data
139	CodePage	rw	The code page of the resource
139	DataOffset	r	The offset of resource data from the beginning of the stream
137	DataSize	r	The size of resource raw data
138	DataVersion	rw	The version of the resource data
138	HeaderSize	r	The size of resource header
137	LangID	rw	The language ID of the resource
138	MemoryFlags	rw	The memory flags of the resource
137	Name	r	The name of the resource
141	Owner	r	The owner of this resource
140	OwnerList	r	The resource list that owns this resource
140	RawData	r	The raw resource data stream
139	Version	rw	A user defined version number
137	_Type	r	The type of the resource

21.17.4 TAbstractResource.SetDescOwner

Synopsis: Sets this resource as the owner of the given TResourceDesc

Declaration: `procedure SetDescOwner(aDesc: TResourceDesc)`

Visibility: protected

Description: This method is provided so that descendants of TAbstractResource ([131](#)) can set themselves as the owners of the given TResourceDesc

21.17.5 TAbstractResource.SetOwnerList

Synopsis: Protected method to let a resource list set itself as the owner of the resource

Declaration: `procedure SetOwnerList(aResources: TResources); Virtual`

Visibility: protected

21.17.6 TAbstractResource.SetChildOwner

Synopsis: Protected method to let a resource set itself as the owner of a sub-resource

Declaration: `procedure SetChildOwner(aChild: TAbstractResource)`

Visibility: protected

21.17.7 TAbstractResource.GetType

Synopsis: Returns the type of the resource

Declaration: `function GetType : TResourceDesc; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to provide access to the resource type.

21.17.8 TAbstractResource.GetName

Synopsis: Returns the name of the resource

Declaration: `function GetName : TResourceDesc; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to provide access to the resource name.

21.17.9 TAbstractResource.ChangeDescTypeAllowed

Synopsis: Reports whether changing the type of resource type or name is allowed

Declaration: `function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean; Virtual
; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to declare if the resource allows changing the type of one of its resource description (type or name): that is, if it allows one of its descriptions type to change from dtName (128) to dtID (128) or vice versa.

Example:

A certain resource class allows its name only to be changed: e.g. a TBitmapResource (125) doesn't want its type to be anything else than RT_BITMAP (127). It then allows changing the type of the description only if the description is the resource name:

```
Result:=aDesc=fName;
```

See also: TAbstractResource.ChangDescValueAllowed (131)

21.17.10 TAbstractResource.ChangeDescValueAllowed

Synopsis: Reports whether changing the value of resource type or name is allowed

Declaration: `function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to declare if the resource allows changing the value of one of its resource description (type or name).

Example:

A certain resource class allows its name only to be changed: e.g. a TBitmapResource (125) doesn't want its type to be anything else than RT_BITMAP (127). It then allows changing the value of the description only if the description is the resource name:

```
Result:=aDesc=fName;
```

See also: TAbstractResource.ChangDescTypeAllowed (131)

21.17.11 TAbstractResource.NotifyResourcesLoaded

Synopsis: Tells the resource that all resources have been loaded

Declaration: `procedure NotifyResourcesLoaded; Virtual; Abstract`

Visibility: `protected`

Description: This method is called by a TResources (152) object when the loading of all resources from a stream has completed.

Example:

A Group resource (e.g. TGroupIconResource (125)) can use this method to find all its sub-resources, since all resources have been loaded from a stream.

21.17.12 TAbstractResource.Create

Synopsis: Creates a new resource

Declaration: `constructor Create; Virtual; Overload
constructor Create(aType: TResourceDesc; aName: TResourceDesc); Virtual
; Abstract; Overload`

Visibility: `protected`

Description: A new resource is created with the given type and name.

Remark: Please note that the resource doesn't take ownership of the TResourceDesc (150) objects passed as parameters, it simply copies them: it's user responsibility to free them when no longer needed.

21.17.13 TAbstractResource.Destroy

Synopsis: Destroys the object

Declaration: `destructor Destroy; Override`

Visibility: `public`

21.17.14 TAbstractResource.CompareContents

Synopsis: Compares the contents of the resource to the contents of another one

Declaration: `function CompareContents(aResource: TAbstractResource) : Boolean
; Virtual`

Visibility: `public`

Description: This methods compares the contents of the resource with the ones of aResource. If they are of the same length and their contents are the same, true is returned, false otherwise.

Usually this methods compares the contents of the two RawData (140) streams, calling TResourceDataStream.Compare (125), but descendent classes can implement a different algorithm.

See also: TResourceDataStream.Compare (125)

21.17.15 TAbstractResource.UpdateRawData

Synopsis: Updates RawData stream.

Declaration: `procedure UpdateRawData; Virtual; Abstract`

Visibility: `public`

Description: When operating on resource data with more high-level streams than RawData (140) (e.g. TBitmapResource.BitmapData (125)) RawData contents are no longer valid. This method ensures that RawData (140) stream is properly synchronized with the contents of the higher-level stream.

Remark: Normally a resource writer doesn't need to call this method when it is about to write the resource data to a stream, since TResources (152) class takes care of this before telling the resource writer to write resources to a stream.

See also: TAbstractResource.RawData (140)

21.17.16 TAbstractResource.SetCustomRawDataStream

Synopsis: Sets a custom stream as the underlying stream for RawData

Declaration: `procedure SetCustomRawDataStream(aStream: TStream)`

Visibility: `public`

Description: Normally, RawData (140) uses a memory stream or the original resource stream (e.g. the original file containing the resource) as its underlying stream. This method allows the user to use a custom stream as the underlying stream. This can be useful when a resource must be created from the contents of an original file as-is.

If aStream is nil, a new memory stream is used as the underlying stream. This can be used to remove a previously set custom stream as the underlying stream.

Sample code

This code creates a resource containing an html file

```
var
  aType, aName : TResourceDesc;
  aRes : TGenericResource;
  aFile : TFileStream;
begin
  aType:=TResourceDesc.Create(RT_HTML);
  aName:=TResourceDesc.Create('index');
  aRes:=TGenericResource.Create(aType,aName);
  aFile:=TFileStream.Create('index.html',fmOpenRead or fmShareDenyNone);
  aRes.SetCustomRawDataStream(aFile);

  //do something...

  aRes.Free;
  aFile.Free;
  aType.Free;
  aName.Free;
end;
```

See also: TAbstractResource.RawData (140)

21.17.17 TAbstractResource._Type

Synopsis: The type of the resource

Declaration: `Property _Type : TResourceDesc`

Visibility: public

Access: Read

Description: Please note that some TAbstractResource (131) descendants don't allow resource type to be changed (e.g: it's not possible for a TBitmapResource (125) to have a type other than RT_BITMAP (127)). If it is the case, an EResourceDescChangeNotAllowedException (129) exception is raised.

Moreover, if the resource is contained in a TResources (152) object, type change is not allowed.

See also: TAbstractResource.ChangeDescTypeAllowed (134), TAbstractResource.ChangeDescValueAllowed (134)

21.17.18 TAbstractResource.Name

Synopsis: The name of the resource

Declaration: `Property Name : TResourceDesc`

Visibility: public

Access: Read

Description: Please note that some TAbstractResource (131) descendants don't allow resource name to be changed (e.g: a TStringTableResource (125) name is determined by the range of strings' ID it contains). If it is the case, an EResourceDescChangeNotAllowedException (129) exception is raised.

Moreover, if the resource is contained in a TResources (152) object, name change is not allowed.

See also: TAbstractResource.ChangeDescTypeAllowed (134), TAbstractResource.ChangeDescValueAllowed (134)

21.17.19 TAbstractResource.LangID

Synopsis: The language ID of the resource

Declaration: `Property LangID : TLangID`

Visibility: public

Access: Read,Write

Description: Please note that if the resource is contained in a TResources (152) object, language ID change is not allowed: trying to do so results in an EResourceLangIDChangeNotAllowedException (130) exception being raised.

21.17.20 TAbstractResource.DataSize

Synopsis: The size of resource raw data

Declaration: `Property DataSize : LongWord`

Visibility: public

Access: Read

Description: DataSize is the length, in bytes, of the resource data, accessible via RawData ([140](#)) property.

See also: TAbstractResource.RawData ([140](#)), TAbstractResource.DataOffset ([139](#))

21.17.21 TAbstractResource.HeaderSize

Synopsis: The size of resource header

Declaration: `Property HeaderSize : LongWord`

Visibility: public

Access: Read

Description: This property is not always meaningful, since not all file formats support it.

Its value, when nonzero, can be used for information purposes.

21.17.22 TAbstractResource.DataVersion

Synopsis: The version of the resource data

Declaration: `Property DataVersion : LongWord`

Visibility: public

Access: Read,Write

Description: This property is not always meaningful, since not all file formats support it.

Its value, when nonzero, can be used for information purposes.

21.17.23 TAbstractResource.MemoryFlags

Synopsis: The memory flags of the resource

Declaration: `Property MemoryFlags : Word`

Visibility: public

Access: Read,Write

Description: This field is a combination of the following flags

- MF_MOVEABLE ([126](#))
- MF_PURE ([126](#))
- MF_PRELOAD ([126](#))
- MF_DISCARDABLE ([126](#))

By default, a newly created resource has MF_MOVEABLE ([126](#)) and MF_DISCARDABLE ([126](#)) flags set.

Remark: Please note that memory flags are ignored by Windows and Free Pascal RTL. They are provided only for compatibility with 16-bit Windows.

This property is not always meaningful, since not all file formats support it.

Its value, when nonzero, can be used for information purposes.

21.17.24 TAbstractResource.Version

Synopsis: A user defined version number

Declaration: `Property Version : LongWord`

Visibility: public

Access: Read,Write

Description: A tool that writes resource files can write version information in this field.

This property is not always meaningful, since not all file formats support it.

Its value, when nonzero, can be used for information purposes.

See also: TAbstractResource.Characteristics ([139](#))

21.17.25 TAbstractResource.Characteristics

Synopsis: A user defined piece of data

Declaration: `Property Characteristics : LongWord`

Visibility: public

Access: Read,Write

Description: A tool that writes resource files can write arbitrary data in this field.

This property is not always meaningful, since not all file formats support it.

Its value, when nonzero, can be used for information purposes.

See also: TAbstractResource.Version ([139](#))

21.17.26 TAbstractResource.DataOffset

Synopsis: The offset of resource data from the beginning of the stream

Declaration: `Property DataOffset : LongWord`

Visibility: public

Access: Read

Description: A reader sets this property to let the resource know where its raw data begins in the resource stream.

See also: TAbstractResource.RawData ([140](#)), TAbstractResource.DataSize ([137](#))

21.17.27 TAbstractResource.CodePage

Synopsis: The code page of the resource

Declaration: `Property CodePage : LongWord`

Visibility: public

Access: Read,Write

Description: This property is not always meaningful, since not all file formats support it.

Its value, when nonzero, can be used for information purposes.

21.17.28 TAbstractResource.RawData

Synopsis: The raw resource data stream

Declaration: `Property RawData : TStream`

Visibility: `public`

Access: `Read`

Description: This property provides access to the resource raw data in a stream-like way.

When a resource has been read from a stream, `RawData` redirects read operations to the original stream. When `RawData` is written to, a copy-on-write mechanism copies data from the original stream to a memory stream.

The copy-on-write behaviour can be controlled via `CacheData` (140) property.

Note that for some predefined resource types there are better ways to read and write resource data: some resource types use specific formats, so `RawData` might not always be what one expected. E.g. in a resource of type `RT_BITMAP` (127), `RawData` doesn't contain a valid BMP file: in this case it's better to use `BitmapData` (125) stream of `TBitmapResource` (125) class to work with a BMP-like stream.

Remark: When writing to a "specialized" stream in a descendant class (like the `TBitmapResource.BitmapData` (125) stream mentioned earlier), `RawData` contents might not be valid anymore. If you need to access `RawData` again, be sure to call `UpdateRawData` (136) method first.

Usually there isn't much penalty in using specialized streams in descendant classes, since data isn't duplicated in two or more streams, whenever possible. So, having a very large bitmap resource and reading/writing it via `TBitmapResource.BitmapData` (125) doesn't mean the bitmap is allocated two times.

See also: `TAbstractResource.CacheData` (140), `TAbstractResource.UpdateRawData` (136), `TAbstractResource.SetCustomRawDataStream` (136)

21.17.29 TAbstractResource.CacheData

Synopsis: Controls the copy-on-write behaviour of the resource

Declaration: `Property CacheData : Boolean`

Visibility: `public`

Access: `Read, Write`

Description: When `CacheData` is true, copy-on-write mechanism of `RawData` (140) is enabled.

Setting `CacheData` to false forces the raw resource data to be loaded in memory without performing any caching.

By default, `CacheData` is true.

See also: `TAbstractResource.RawData` (140), `TResources.CacheData` (159)

21.17.30 TAbstractResource.OwnerList

Synopsis: The resource list that owns this resource

Declaration: `Property OwnerList : TResources`

Visibility: `public`

Access: Read

Description: This property identifies the `TResources` (152) object to which this resource belongs to.

This property can be `nil` if the resource isn't part of a resource list.

21.17.31 TAbstractResource.Owner

Synopsis: The owner of this resource

Declaration: `Property Owner : TAbstractResource`

Visibility: public

Access: Read

Description: This property is meaningful only for those sub-resources that are part of a larger *group resource*.

Example: an icon is made by a `RT_GROUP_ICON` (127) resource and many `RT_ICON` (128) resources that hold single-image data. Each `RT_ICON` (128) resource has a pointer to the `RT_GROUP_ICON` (127) resource in its `Owner` property.

21.18 TAbstractResourceReader

21.18.1 Description

This is the base class that represents a resource reader.

A resource reader is an object whose job is to populate a `TResources` (152) object with resources read from a stream in a specific format.

Typically, a `TResources` (152) object invokes `CheckMagic` (145) method of the resource reader when it's searching for a reader able to read a certain stream, and `Load` (144) method when it wants the reader to read data from the stream.

Usually each resource reader registers itself with `TResources` (152) class in the `initialization` section of the unit in which it is implemented: this way a `TResources` (152) object can find it when probing a stream that is to be read.

Remark: An object of this class should never be directly instantiated: use a descendant class instead.

See also: `TResources` (152), `TAbstractResource` (131), `TAbstractResourceWriter` (146), `TResResourceReader` (125), `TCoffResourceReader` (125), `TWinPEResourceReader` (125), `TElfResourceReader` (125), `TExternalResourceReader` (125), `TDfmResourceReader` (125)

21.18.2 Method overview

Page	Method	Description
143	AddNoTree	Adds a resource without updating the internal tree
143	CallSubReaderLoad	Calls another reader's Load (144) method
145	CheckMagic	Checks whether a stream is in a format the reader recognizes
145	Create	Creates a new reader object
144	GetDescription	Returns the description of the reader
144	GetExtensions	Returns the extensions the reader is registered for
144	GetTree	Gets the internal resource tree of a TResources object
144	Load	Loads resources from a stream
143	SetDataOffset	Protected method to let a reader set a resource DataOffset (139) property
142	SetDataSize	Protected method to let a reader set a resource DataSize (137) property
142	SetHeaderSize	Protected method to let a reader set a resource HeaderSize (138) property
143	SetRawData	Protected method to let a reader set a resource RawData (140) property

21.18.3 Property overview

Page	Properties	Access	Description
146	Description	r	The reader description
145	Extensions	r	The extensions of file types the reader is able to read

21.18.4 TAbstractResourceReader.SetDataSize

Synopsis: Protected method to let a reader set a resource DataSize ([137](#)) property

Declaration: `procedure SetDataSize(aResource: TAbstractResource; aValue: LongWord)`

Visibility: protected

Description: This method allows a descendant class to set DataSize ([137](#)) property of a resource that is being loaded.

See also: TAbstractResourceReader.SetHeaderSize ([142](#)), TAbstractResourceReader.SetDataOffset ([143](#)), TAbstractResourceReader.SetRawData ([143](#))

21.18.5 TAbstractResourceReader.SetHeaderSize

Synopsis: Protected method to let a reader set a resource HeaderSize ([138](#)) property

Declaration: `procedure SetHeaderSize(aResource: TAbstractResource; aValue: LongWord)`

Visibility: protected

Description: This method allows a descendant class to set HeaderSize ([138](#)) property of a resource that is being loaded.

See also: TAbstractResourceReader.SetDataSize ([142](#)), TAbstractResourceReader.SetDataOffset ([143](#)), TAbstractResourceReader.SetRawData ([143](#))

21.18.6 TAbstractResourceReader.SetDataOffset

Synopsis: Protected method to let a reader set a resource DataOffset (139) property

Declaration: `procedure SetDataOffset (aResource: TAbstractResource; aValue: LongWord)`

Visibility: protected

Description: This method allows a descendant class to set DataOffset (139) property of a resource that is being loaded.

See also: TAbstractResourceReader.SetDataSize (142), TAbstractResourceReader.SetHeaderSize (142), TAbstractResourceReader.SetRawData (143)

21.18.7 TAbstractResourceReader.SetRawData

Synopsis: Protected method to let a reader set a resource RawData (140) property

Declaration: `procedure SetRawData (aResource: TAbstractResource; aStream: TStream)`

Visibility: protected

Description: This method allows a descendant class to set RawData (140) property of a resource that is being loaded.

See also: TAbstractResourceReader.SetDataSize (142), TAbstractResourceReader.SetHeaderSize (142), TAbstractResourceReader.SetDataOffset (143)

21.18.8 TAbstractResourceReader.CallSubReaderLoad

Synopsis: Calls another reader's Load (144) method

Declaration: `procedure CallSubReaderLoad (aReader: TAbstractResourceReader;
aResources: TResources; aStream: TStream)`

Visibility: protected

Description: This method allows a descendant class to call another reader's Load (144) method. This can be useful when a reader needs to use another one.

21.18.9 TAbstractResourceReader.AddNoTree

Synopsis: Adds a resource without updating the internal tree

Declaration: `procedure AddNoTree (aResources: TResources; aResource: TAbstractResource)`

Visibility: protected

Description: This protected method is used by descendants of TAbstractResourceReader (141) after they add new resources to the internal resource tree used by a TResources (152) object. Calling this method notifies the TResources (152) object about the newly-added resource.

See also: TAbstractResourceReader.GetTree (144), TRootResTreeNode (167)

21.18.10 TAbstractResourceReader.GetTree

Synopsis: Gets the internal resource tree of a TResources object

Declaration: `function GetTree(aResources: TResources) : TObject`

Visibility: protected

Description: This protected method can be used by descendants of TAbstractResourceReader (141) to obtain the internal resource tree used by a TResources (152) object. The internal resource tree is an instance of TRootResTreeNode (167).

Some resource readers can improve their performance if, instead of calling TResources.Add (153), add themselves resources to the internal tree used by a TResources (152) object.

Remark: After adding a resource to a resource tree, a reader must always call AddNoTree (143) method to let the TResources (152) object know about the newly-added resource.

See also: TAbstractResourceReader.AddNoTree (143), TRootResTreeNode (167)

21.18.11 TAbstractResourceReader.GetExtensions

Synopsis: Returns the extensions the reader is registered for

Declaration: `function GetExtensions : string; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to provide access to Extensions (145) property.

See also: TAbstractResourceReader.Extensions (145)

21.18.12 TAbstractResourceReader.GetDescription

Synopsis: Returns the description of the reader

Declaration: `function GetDescription : string; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to provide access to Description (146) property.

See also: TAbstractResourceReader.Description (146)

21.18.13 TAbstractResourceReader.Load

Synopsis: Loads resources from a stream

Declaration: `procedure Load(aResources: TResources; aStream: TStream); Virtual
; Abstract`

Visibility: protected

Description: A TResources (152) object invokes this method when it needs to be loaded from a stream, passing itself as the aResources parameter and the stream as the aStream parameter.

aStream position is already correctly set: the reader must start to read from there.

Descendant classes must ensure that the stream is in a format they recognize, otherwise an EResourceReaderWrongFormatException (131) exception must be raised.

Each resource is then created, read from the stream and added to the TResources (152) object.

When reading a resource, a reader must:

- Create the resource via `TResourceFactory.CreateResource` (125) class method with the correct type and name.
- Set at least the following resource properties:
 - `DataSource` (137), via `SetDataSource` (142) method.
 - `DataOffset` (139), via `SetDataOffset` (143) method. This is the offset of the resource data from the beginning of the stream.
 - `RawData` (140). The reader must create a `TResourceDataStream` (125) object and assign it to the resource via `SetRawData` (143) method.

Errors: If the stream is in a format not recognized by the reader, a `EResourceReaderWrongFormatException` (131) exception must be raised.

If the stream ends prematurely, a `EResourceReaderUnexpectedEndOfStreamException` (131) exception must be raised.

See also: `TResources` (152), `TResources.LoadFromStream` (156), `TResources.LoadFromFile` (156), `TAbstractResource` (131), `TAbstractResource.DataSource` (137), `TAbstractResource.DataOffset` (139), `TAbstractResource.RawData` (140), `TAbstractResourceReader.SetDataSource` (142), `TAbstractResourceReader.SetDataOffset` (143), `TAbstractResourceReader.SetRawData` (143), `TAbstractResourceReader.CheckMagic` (145), `TResourceDataStream` (125)

21.18.14 TAbstractResourceReader.CheckMagic

Synopsis: Checks whether a stream is in a format the reader recognizes

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Virtual; Abstract`

Visibility: protected

Description: A `TResources` (152) object invokes this method when it is searching for a reader able to read a stream, passing that stream as the `aStream` parameter.

`aStream` position is already correctly set: the reader must start to read from there.

This method should read the minimum amount of information needed to recognize the contents of a stream as a valid format: it usually means reading a magic number or a file header.

See also: `TAbstractResourceReader.Load` (144), `TResources.FindReader` (155), `TResources.LoadFromStream` (156), `TResources.LoadFromFile` (156)

21.18.15 TAbstractResourceReader.Create

Synopsis: Creates a new reader object

Declaration: `constructor Create; Virtual; Abstract`

Visibility: public

21.18.16 TAbstractResourceReader.Extensions

Synopsis: The extensions of file types the reader is able to read

Declaration: `Property Extensions : string`

Visibility: public

Access: Read

Description: This property is a string made of space-separated file extensions (each including the leading dot), all lowercase.

This property signals which file types the reader is able to read.

21.18.17 TAbstractResourceReader.Description

Synopsis: The reader description

Declaration: `Property Description : string`

Visibility: public

Access: Read

Description: This property provides a textual description of the reader, e.g. "FOO resource reader"

21.19 TAbstractResourceWriter

21.19.1 Description

This is the base class that represents a resource writer.

A resource writer is an object whose job is to write all resources contained in a TResources (152) object to a stream in a specific format.

Typically, a TResources (152) object invokes Write (147) method of the resource writer when it wants the writer to write data to a stream.

Usually each resource writer registers itself with TResources (152) class in the initialization section of the unit in which it is implemented: this way a TResources (152) object can find it when it is asked to write itself to a file, and no writer was specified (the writer is found based on the extension of the file to write to).

Remark: An object of this class should never be directly instantiated: use a descendant class instead.

See also: TResources (152), TAbstractResource (131), TAbstractResourceReader (141), TResResourceWriter (125), TCoffResourceWriter (125), TElfResourceWriter (125), TExternalResourceWriter (125)

21.19.2 Method overview

Page	Method	Description
148	Create	Creates a new writer object
147	GetDescription	Returns the description of the writer
147	GetExtensions	Returns the extensions the writer is registered for
147	GetTree	Gets the internal resource tree of a TResources object
147	Write	Writes resources to a stream

21.19.3 Property overview

Page	Properties	Access	Description
148	Description	r	The writer description
148	Extensions	r	The extensions of file types the writer is able to write

21.19.4 TAbstractResourceWriter.GetTree

Synopsis: Gets the internal resource tree of a TResources object

Declaration: `function GetTree(aResources: TResources) : TObject`

Visibility: protected

Description: This protected method can be used by descendents of TAbstractResourceWriter (146) to obtain the internal resource tree used by a TResources (152) object. The internal resource tree is an instance of TRootResTreeNode (167).

Some resource writers need to order resources with a tree structure before writing them to a file. Instead of doing this work themselves, they can use the already-ordered internal resource tree of the TResources (152) object they must write.

See also: TRootResTreeNode (167)

21.19.5 TAbstractResourceWriter.GetExtensions

Synopsis: Returns the extensions the writer is registered for

Declaration: `function GetExtensions : string; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to provide access to Extensions (148) property.

See also: TAbstractResourceWriter.Extensions (148)

21.19.6 TAbstractResourceWriter.GetDescription

Synopsis: Returns the description of the writer

Declaration: `function GetDescription : string; Virtual; Abstract`

Visibility: protected

Description: Descendant classes must implement this method to provide access to Description (148) property.

See also: TAbstractResourceWriter.Description (148)

21.19.7 TAbstractResourceWriter.Write

Synopsis: Writes resources to a stream

Declaration: `procedure Write(aResources: TResources; aStream: TStream); Virtual
; Abstract`

Visibility: protected

Description: A TResources (152) object invokes this method when it needs to be written to a stream, passing itself as the aResources parameter and the stream as the aStream parameter.

aStream position is already correctly set: the writer must start to write from there.

A writer must write data in the way specified by the format it supports: usually this means writing a header and all resources contained in the TResources (152) object.

For each resource, a writer should write some information about the resource (like type and name) in a way defined by the format it implements, and the resource data, which is accessible by RawData (140) property of the resource.

See also: [TResources \(152\)](#), [TResources.WriteToStream \(158\)](#), [TResources.WriteToFile \(158\)](#), [TAbstractResource \(131\)](#), [TAbstractResource.DataSize \(137\)](#), [TAbstractResource.RawData \(140\)](#)

21.19.8 TAbstractResourceWriter.Create

Synopsis: Creates a new writer object

Declaration: `constructor Create; Virtual; Abstract`

Visibility: `public`

21.19.9 TAbstractResourceWriter.Extensions

Synopsis: The extensions of file types the writer is able to write

Declaration: `Property Extensions : string`

Visibility: `public`

Access: `Read`

Description: This property is a string made of space-separated file extensions (each including the leading dot), all lowercase.

This property signals which file types the writer is able to write.

21.19.10 TAbstractResourceWriter.Description

Synopsis: The writer description

Declaration: `Property Description : string`

Visibility: `public`

Access: `Read`

Description: This property provides a textual description of the writer, e.g. "FOO resource writer"

21.20 TGenericResource

21.20.1 Description

This class represents a generic resource.

It is suitable to use in all situations where a higher level class is not needed (e.g. the resource raw data is made of arbitrary data) or when total low-level control is desirable.

This class is also the default one that is used by [TResourceFactory \(125\)](#) when it finds no class matching the given type.

See also: [TResourceFactory.CreateResource \(125\)](#)

21.20.2 Method overview

Page	Method	Description
149	ChangeDescTypeAllowed	
149	ChangeDescValueAllowed	
149	Create	
150	Destroy	
149	GetName	
149	GetType	
149	NotifyResourcesLoaded	
150	UpdateRawData	

21.20.3 TGenericResource.GetType

Declaration: `function GetType : TResourceDesc; Override`

Visibility: `protected`

21.20.4 TGenericResource.GetName

Declaration: `function GetName : TResourceDesc; Override`

Visibility: `protected`

21.20.5 TGenericResource.ChangeDescTypeAllowed

Declaration: `function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: `protected`

21.20.6 TGenericResource.ChangeDescValueAllowed

Declaration: `function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: `protected`

21.20.7 TGenericResource.NotifyResourcesLoaded

Declaration: `procedure NotifyResourcesLoaded; Override`

Visibility: `protected`

21.20.8 TGenericResource.Create

Declaration: `constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override`

Visibility: `public`

21.20.9 TGenericResource.Destroy

Declaration: destructor Destroy; Override

Visibility: public

21.20.10 TGenericResource.UpdateRawData

Declaration: procedure UpdateRawData; Override

Visibility: public

21.21 TResourceDesc

21.21.1 Description

This class represent a resource description (type or name).

Resources are identified by a type, name and (optionally) a language ID.

Type and name can be either a **name** (a string identifier) or an **ID** (an integer identifier in the range 0..65535).

Remark: Unfortunately, *name* is used both to refer to a the name of the resource and both to the format of a resource description

Example:

Typically, a Windows executable has a main icon, which is a resource of type RT_GROUP_ICON (127) (type is an ID) and name MAINICON (name is a name).

See also: TAbstractResource (131)

21.21.2 Method overview

Page	Method	Description
151	Assign	Assigns the contents of another TResourceDesc object to this one
151	Create	Creates a new TResourceDesc object
151	Equals	Compares the contents of another TResourceDesc object to this one
150	SetOwner	Protected method to let a resource set itself as owner of the TResourceDesc

21.21.3 Property overview

Page	Properties	Access	Description
152	DescType	r	The type of the resource description
152	ID	rw	The value of the resource description as an ID
151	Name	rw	The value of the resource description as a name

21.21.4 TResourceDesc.SetOwner

Synopsis: Protected method to let a resource set itself as owner of the TResourceDesc

Declaration: procedure SetOwner(aOwner: TAbstractResource)

Visibility: protected

21.21.5 TResourceDesc.Create

Synopsis: Creates a new TResourceDesc object

Declaration: `constructor Create; Overload`
`constructor Create(const aID: TResID); Overload`
`constructor Create(const aName: TResName); Overload`

Visibility: public

Description: Creates a new TResourceDesc object.

Without arguments, resource description is of type `dtName` (128) and its name is empty.

If an argument is specified, resource description and name/id are set accordingly to the value passed as parameter.

21.21.6 TResourceDesc.Assign

Synopsis: Assigns the contents of another TResourceDesc object to this one

Declaration: `procedure Assign(aResourceDesc: TResourceDesc)`

Visibility: public

Description: Assigns the contents of another TResourceDesc object to this one

Errors: If changing values is not permitted because owner resource doesn't allow it (e.g. because owner resource is a `TBitmapResource` (125) and values other than `RT_BITMAP` (127) are not permitted for the resource type) an `EResourceDescChangeNotAllowedException` (129) exception is raised.

21.21.7 TResourceDesc.Equals

Synopsis: Compares the contents of another TResourceDesc object to this one

Declaration: `function Equals(aResDesc: TResourceDesc) : Boolean`

Visibility: public

21.21.8 TResourceDesc.Name

Synopsis: The value of the resource description as a name

Declaration: `Property Name : TResName`

Visibility: public

Access: Read,Write

Description: Setting this property causes `DescType` (152) to be `dtName` (128)

When reading, if `DescType` (152) is `dtID` (128), the ID is returned as a string value.

See also: `TResourceDesc.ID` (152), `TResourceDesc.DescType` (152)

21.21.9 TResourceDesc.ID

Synopsis: The value of the resource description as an ID

Declaration: `Property ID : TResID`

Visibility: public

Access: Read, Write

Description: Setting this property causes DescType (152) to be dtID (128)

Remark: When reading, if DescType (152) is dtName (128), an EResourceDescTypeException (129) exception is raised.

See also: TResourceDesc.Name (151), TResourceDesc.DescType (152)

21.21.10 TResourceDesc.DescType

Synopsis: The type of the resource description

Declaration: `Property DescType : TDescType`

Visibility: public

Access: Read

Description: When DescType is dtName (128), resource description value is a name and can be accessed via Name (151) property

When DescType is dtID (128), resource description value is an ID and can be accessed via ID (152) property

See also: TResourceDesc.Name (151), TResourceDesc.ID (152), TDescType (128)

21.22 TResources

21.22.1 Description

This class represents a format-independent view of a resource file. It holds a collection of resources (TAbstractResource (131) descendants).

Typically, a TResource object is loaded from and written to a stream via format-dependent readers and writers, which are descendants of TAbstractResourceReader (141) and TAbstractResourceWriter (146), respectively.

Single resources can be added, removed, searched and modified: a resource compiler or editor probably will create resources, set their data, and add them to a TResources object which can then be written to file in the desired format.

This class also provides some class methods to register and find resource readers and writers: these classes, once registered, will be used by a TResources object when it is asked to load or save itself to a stream and the user didn't specify a reader or writer.

Remark: Because of the copy-on-write mechanism of TAbstractResource (131), care should be taken when loading resources, since by default resource data isn't immediately read from the stream: resources hold a reference to the original stream because they need it when their data is requested. For further information, see TResources.LoadFromStream (156) and TResources.LoadFromFile (156).

See also: TAbstractResource (131), TAbstractResourceReader (141), TAbstractResourceWriter (146)

21.22.2 Method overview

Page	Method	Description
153	Add	Adds a resource
154	AddAutoID	Adds a resource and gives it a new autogenerated name
154	Clear	Deletes all resources
153	Create	Creates a new TResources object
153	Destroy	Destroys the object
154	Find	Searches for a resource
155	FindReader	Searches for a suitable resource reader
156	LoadFromFile	Loads the contents of the object from a file
156	LoadFromStream	Loads the contents of the object from a stream
155	MoveFrom	Moves all resources of another TResources object to itself
157	RegisterReader	Registers a resource reader class
157	RegisterWriter	Registers a resource writer class
155	Remove	Removes a resource
158	WriteToFile	Writes the contents of the object to a file
158	WriteToStream	Writes the contents of the object to a stream

21.22.3 Property overview

Page	Properties	Access	Description
159	CacheData	rw	Controls the copy-on-write behaviour of all resources
158	Count	r	The number of resources in the object
159	Items	r	Indexed array of resources in the object

21.22.4 TResources.Create

Synopsis: Creates a new TResources object

Declaration: `constructor Create`

Visibility: `public`

21.22.5 TResources.Destroy

Synopsis: Destroys the object

Declaration: `destructor Destroy; Override`

Visibility: `public`

Description: All resources are destroyed as well.

21.22.6 TResources.Add

Synopsis: Adds a resource

Declaration: `procedure Add(aResource: TAbstractResource)`

Visibility: `public`

Description: This method adds `aResource` to the object, and sets itself as the owner list of the resource.

Errors: If a resource with the same type, name and language ID already exists, an `EResourceDuplicateException` ([130](#)) exception is raised.

See also: `TResources.AddAutoID` ([154](#))

21.22.7 `TResources.AddAutoID`

Synopsis: Adds a resource and gives it a new autogenerated name

Declaration: `function AddAutoID(aResource: TAbstractResource) : TResID`

Visibility: `public`

Description: This method tries to find a spare ID to use as a name for the given resource, assigns it to the resource, and adds it.

This method is useful when the name of the resource is not important. E.g. a group resource doesn't care about the names of its sub-resources, so it could use this method to ensure that its sub-resources don't clash with names of other sub-resources of the same type.

Errors: If there are no more free IDs for the resource type of the given resource (that is, when the number of resources of the same type of `aResource` with an ID name is equal to 65536) an `ENoMoreFreeIDsException` ([129](#)) exception is raised.

See also: `TResources.Add` ([153](#))

21.22.8 `TResources.Clear`

Synopsis: Deletes all resources

Declaration: `procedure Clear`

Visibility: `public`

Description: This method empties the `TResources` object destroying all resources.

21.22.9 `TResources.Find`

Synopsis: Searches for a resource

Declaration:

```
function Find(aType: TResourceDesc;aName: TResourceDesc;
              const aLangID: TLangID) : TAbstractResource; Overload
function Find(aType: TResourceDesc;aName: TResourceDesc)
              : TAbstractResource; Overload
function Find(const aType: TResName;const aName: TResName;
              const aLangID: TLangID) : TAbstractResource; Overload
function Find(const aType: TResName;const aName: TResID;
              const aLangID: TLangID) : TAbstractResource; Overload
function Find(const aType: TResID;const aName: TResName;
              const aLangID: TLangID) : TAbstractResource; Overload
function Find(const aType: TResID;const aName: TResID;
              const aLangID: TLangID) : TAbstractResource; Overload
function Find(const aType: TResName;const aName: TResName)
              : TAbstractResource; Overload
function Find(const aType: TResName;const aName: TResID)
              : TAbstractResource; Overload
function Find(const aType: TResID;const aName: TResName)
              : TAbstractResource; Overload
function Find(const aType: TResID;const aName: TResID)
              : TAbstractResource; Overload
```

Visibility: public

Description: This method searches for a resource with the given type and name. If a language ID is not provided, the first resource found that matches aType and aName is returned.

Errors: If the resource is not found, an EResourceNotFoundException (130) exception is raised.

21.22.10 TResources.FindReader

Synopsis: Searches for a suitable resource reader

Declaration: `class function FindReader(aStream: TStream; aExtension: string)`
`class function FindReader(aStream: TStream)`

Visibility: public

Description: This method tries to find a resource reader able to read the stream passed as parameter.

If an extension is specified, only readers matching that extension are tried. The extension is case-insensitive and includes the leading dot, unless the empty string is passed (which means "no extension", e.g. a unix executable, which doesn't have an extension).

If a suitable reader is found, an instance of that reader is returned.

Remark: To make a resource reader class known, add that resource reader unit to the uses clause of your program.

Errors: If no suitable reader is found, an EResourceReaderNotFoundException (130) exception is raised.

See also: TAbstractResourceReader (141)

21.22.11 TResources.MoveFrom

Synopsis: Moves all resources of another TResources object to itself

Declaration: `procedure MoveFrom(aResources: TResources)`

Visibility: public

Description: This method takes all resources from object aResources and adds them to this object. aResources object is left empty.

Errors: If a resource with the same type, name and language ID already exists, an EResourceDuplicateException (130) exception is raised.

See also: TResources.Add (153)

21.22.12 TResources.Remove

Synopsis: Removes a resource

Declaration: `function Remove(aType: TResourceDesc; aName: TResourceDesc;`
`const aLangID: TLangID) : TAbstractResource; Overload`
`function Remove(aType: TResourceDesc; aName: TResourceDesc)`
`: TAbstractResource; Overload`
`function Remove(aResource: TAbstractResource) : TAbstractResource`
`; Overload`
`function Remove(aIndex: Integer) : TAbstractResource; Overload`

Visibility: public

Description: This method searches for a resource based on passed parameters and removes it from the object.
The removed resource is then returned.

Errors: If no matching resource is found, an `EResourceNotFoundException` (130) exception is raised.

See also: `TResources.Find` (154)

21.22.13 `TResources.LoadFromStream`

Synopsis: Loads the contents of the object from a stream

Declaration: `procedure LoadFromStream(aStream: TStream); Overload`
`procedure LoadFromStream(aStream: TStream;`
`aReader: TAbstractResourceReader); Overload`

Visibility: public

Description: This method clears the `TResources` object and loads its contents from the stream passed as parameter.
If a reader is specified, that reader is used. Otherwise, the stream is probed to find a suitable reader.

Remark: If `CacheData` (159) is set to `true`, the stream will be used as the underlying stream of each resource `RawData` (140) stream. This means that the stream must not be freed until all resources in the `TResources` object are freed: this happens when the `TResources` object is cleared or is loaded again from a different source. If you need to free the stream while there are still resources, disable the copy-on-write mechanism by setting `CacheData` (159) property to `false`.

Errors: If no reader is passed and probing fails, an `EResourceReaderNotFoundException` (130) exception is raised.

See also: `TAbstractResourceReader` (141), `TAbstractResource.RawData` (140), `TAbstractResource.CacheData` (140), `TResources.CacheData` (159), `TResources.LoadFromFile` (156), `TResources.Clear` (154), `TResources.FindReader` (155)

21.22.14 `TResources.LoadFromFile`

Synopsis: Loads the contents of the object from a file

Declaration: `procedure LoadFromFile(aFileName: string); Overload`
`procedure LoadFromFile(aFileName: string;`
`aReader: TAbstractResourceReader); Overload`

Visibility: public

Description: This method clears the `TResources` object and loads its contents from the file passed as parameter.
If a reader is specified, that reader is used. Otherwise, the file is probed to find a suitable reader.

Remark: If `CacheData` (159) is set to `true`, the file will be left open and used as the underlying stream of each resource `RawData` (140) stream. This means that the file will be open until the `TResources` object is cleared or is loaded again from a different source. If you want the file to be closed while there are still resources, disable the copy-on-write mechanism by setting `CacheData` (159) property to `false`.

Sample code

This code extracts resources from an exe file

```

var
    resources : TResources;
begin
    resources:=TResources.Create;
    resources.LoadFromFile('myexe.exe');
    resources.WriteToFile('myexe.res');
    resources.Free;
end;

```

Errors: If no reader is passed and probing fails, an `EResourceReaderNotFoundException` (130) exception is raised.

See also: `TAbstractResourceReader` (141), `TAbstractResource.RawData` (140), `TAbstractResource.CacheData` (140), `TResources.CacheData` (159), `TResources.LoadFromStream` (156), `TResources.Clear` (154), `TResources.FindReader` (155)

21.22.15 TResources.RegisterReader

Synopsis: Registers a resource reader class

Declaration: `class procedure RegisterReader(const aExtension: string;
aClass: TResourceReaderClass)`

Visibility: public

Description: This class method registers a resource reader class.

When registered, a class is known to `TResources` class, and can be used by `FindReader` (155), `LoadFromStream` (156) and `LoadFromFile` (156) methods when probing.

Usually this method is called in the `initialization` section of the unit implementing a `TAbstractResourceReader` (141) descendant.

A class can be registered multiple times, one for each extension it is able to read. Multiple class can be registered for the same extension (e.g. both a coff and a elf reader can be registered for the .o extension). The extension must include the leading dot unless the empty string is used (which means "no extension", e.g. a unix executable, which doesn't have an extension).

See also: `TAbstractResourceReader` (141), `TResources.FindReader` (155), `TResources.LoadFromStream` (156), `TResources.LoadFromFile` (156)

21.22.16 TResources.RegisterWriter

Synopsis: Registers a resource writer class

Declaration: `class procedure RegisterWriter(const aExtension: string;
aClass: TResourceWriterClass)`

Visibility: public

Description: This class method registers a resource writer class.

When registered, a class is known to `TResources` class, and can be used by `WriteToFile` (158) method when probing.

Usually this method is called in the `initialization` section of the unit implementing a `TAbstractResourceWriter` (146) descendant.

A class can be registered multiple times, one for each extension it is able to write. Multiple class can be registered for the same extension (e.g. both a coff and a elf writer can be registered for the .o

extension) although only the first one found will be used when probing. The extension must include the leading dot unless the empty string is used (which means "no extension", e.g. a unix executable, which doesn't have an extension).

See also: [TAbstractResourceWriter \(146\)](#), [TResources.WriteToFile \(158\)](#)

21.22.17 TResources.WriteToStream

Synopsis: Writes the contents of the object to a stream

Declaration: `procedure WriteToStream(aStream: TStream;
aWriter: TAbstractResourceWriter)`

Visibility: public

Description: This method writes the contents of the object to a stream via the specified [TAbstractResourceWriter \(146\)](#) descendant

See also: [TAbstractResourceWriter \(146\)](#), [TResources.WriteToFile \(158\)](#)

21.22.18 TResources.WriteToFile

Synopsis: Writes the contents of the object to a file

Declaration: `procedure WriteToFile(aFileName: string); Overload
procedure WriteToFile(aFileName: string;
aWriter: TAbstractResourceWriter); Overload`

Visibility: public

Description: This method writes the contents of the object to a file whose name is passed as parameter.

If a writer is specified, that writer is used. Otherwise, the first registered writer matching the file name extension is used.

Errors: If no writer is passed and no suitable writer is found, an [EResourceWriterNotFoundException \(131\)](#) exception is raised.

See also: [TAbstractResourceWriter \(146\)](#), [TResources.WriteToStream \(158\)](#)

21.22.19 TResources.Count

Synopsis: The number of resources in the object

Declaration: `Property Count : LongWord`

Visibility: public

Access: Read

See also: [TResources.Items \(159\)](#)

21.22.20 TResources.Items

Synopsis: Indexed array of resources in the object

Declaration: `Property Items[Index: Integer]: TAbstractResource; default`

Visibility: public

Access: Read

Description: This property can be used to access all resources in the object.

Remark: This array is 0-based: valid elements range from 0 to Count (158)-1.

See also: TResources.Count (158), TAbstractResource (131)

21.22.21 TResources.CacheData

Synopsis: Controls the copy-on-write behaviour of all resources

Declaration: `Property CacheData : Boolean`

Visibility: public

Access: Read,Write

Description: Changing this property changes CacheData (140) property of all resources contained in the object.

This property affects existing resources and resources that are added or loaded.

By default, CacheData is true.

See also: TAbstractResource.CacheData (140), TAbstractResource.RawData (140)

Chapter 22

Reference for unit 'resourcetree'

22.1 Used units

Table 22.1: Used units by unit 'resourcetree'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

22.2 Overview

This unit implements classes that represent an ordered tree of resources.

Such a tree is used internally by TResources ([160](#)) to speed up operations, and by certain resource readers and writers that deal with resource formats where data is stored as ordered trees of resources. For this reason, only implementors of resource readers and writers should be interested in these classes.

A tree begins with a root node, which is an instance of TRootResTreeNode ([167](#)). The root node contains type nodes, that contain name nodes, that contain language id nodes. Finally, a language id node contains a resource.

Each node contains its sub nodes in two lists: a Named list for nodes identified by a name (a string), and an ID list for nodes identified by an ID (an integer). In each list, nodes are sorted in ascending order.

Many resource formats (PECOFF, ELF, Mach-O, and external resource files) use this exact format to store resource information.

Remark: When a tree is destroyed, the resources it references aren't destroyed.

22.3 TResourceTreeNode

22.3.1 Description

This class represents a node in a resource tree.

Remark: An object of this class should never be directly instantiated. To create a node, call `CreateSubNode` (163) method of an already existing node.

22.3.2 Method overview

Page	Method	Description
163	Add	Adds a new resource to the tree
163	Clear	Destroys all sub nodes
162	Create	
163	CreateResource	Creates a new resource
163	CreateSubNode	Creates a subnode
162	Destroy	Destroys the object.
164	Find	Searches for a resource
164	FindFreeID	Find a free ID to be used as a resource name
162	GetData	
162	GetIDCount	
162	GetIDEntry	
161	GetNamedCount	
161	GetNamedEntry	
162	InternalFind	
164	IsLeaf	Reports whether the node is a leaf node.
164	Remove	Removes a resource from the tree

22.3.3 Property overview

Page	Properties	Access	Description
167	Data	r	The resource contained in this node
167	DataRVA	rw	To be used by readers and writers
165	Desc	r	The description of the node
165	IDCount	r	The number of ID sub nodes of the node
166	IDEntries	r	Indexed array of ID sub nodes of the node
165	NamedCount	r	The number of named sub nodes of the node
165	NamedEntries	r	Indexed array of named sub nodes of the node
166	NameRVA	rw	To be used by readers and writers
165	Parent	r	
166	SubDirRVA	rw	To be used by readers and writers

22.3.4 TResourceTreeNode.GetNamedCount

Declaration: `function GetNamedCount : LongWord`

Visibility: `protected`

22.3.5 TResourceTreeNode.GetNamedEntry

Declaration: `function GetNamedEntry(index: Integer) : TResourceTreeNode`

Visibility: protected

22.3.6 TResourceTreeNode.GetIDCount

Declaration: function GetIDCount : LongWord

Visibility: protected

22.3.7 TResourceTreeNode.GetIDEntry

Declaration: function GetIDEntry(index: Integer) : TResourceTreeNode

Visibility: protected

22.3.8 TResourceTreeNode.GetData

Declaration: function GetData : TAbstractResource; Virtual

Visibility: protected

22.3.9 TResourceTreeNode.InternalFind

Declaration: function InternalFind(aList: TFPList; aDesc: TResourceDesc;
 out index: Integer) : Boolean; Overload
 function InternalFind(aList: TFPList; aLangID: TLangID;
 out index: Integer) : Boolean; Overload
 function InternalFind(aType: TResourceDesc; aName: TResourceDesc;
 const aLangID: TLangID; const noLangID: Boolean;
 const toDelete: Boolean) : TAbstractResource
 ; Virtual; Abstract; Overload

Visibility: protected

22.3.10 TResourceTreeNode.Create

Declaration: constructor Create; Virtual; Overload

Visibility: protected

22.3.11 TResourceTreeNode.Destroy

Synopsis: Destroys the object.

Declaration: destructor Destroy; Override

Visibility: public

Description: Only root nodes (instances of TRootResTreeNode (167)) should be destroyed. Children nodes are destroyed by their parent when needed.

22.3.12 TResourceTreeNode.Add

Synopsis: Adds a new resource to the tree

Declaration: `procedure Add(aResource: TAbstractResource); Virtual; Abstract`

Visibility: public

Description: This method adds a new resource to the tree, creating all needed sub nodes

Remark: This method should only be called on root nodes (instances of `TRootResTreeNode` (167)).

Errors: If a resource with the same type, name and language ID already exists, an `EResourceDuplicateException` (160) exception is raised.

See also: `TResourceTreeNode.Remove` (164)

22.3.13 TResourceTreeNode.CreateSubNode

Synopsis: Creates a subnode

Declaration: `function CreateSubNode(aDesc: TResourceDesc) : TResourceTreeNode
; Virtual; Abstract`

Visibility: public

Description: This method creates a subnode, identified by the given resource description.

See also: `TResourceTreeNode.Desc` (165)

22.3.14 TResourceTreeNode.CreateResource

Synopsis: Creates a new resource

Declaration: `function CreateResource : TAbstractResource; Virtual`

Visibility: public

Description: This method creates a new resource.

A new resource is created and its type, name and language id are determined from the ancestor nodes in the tree hierarchy.

Usually `CreateResource` is called by resource readers that read files in which resources are stored as trees.

Remark: This method is meaningful only when called on leaf nodes (language id nodes).

See also: `TResourceTreeNode.IsLeaf` (164)

22.3.15 TResourceTreeNode.Clear

Synopsis: Destroys all sub nodes

Declaration: `procedure Clear`

Visibility: public

Description: This method destroys all sub nodes of the node.

22.3.16 TResourceTreeNode.Remove

Synopsis: Removes a resource from the tree

Declaration: `function Remove(aType: TResourceDesc; aName: TResourceDesc)
: TAbstractResource; Overload
function Remove(aType: TResourceDesc; aName: TResourceDesc;
const aLangID: TLangID) : TAbstractResource; Overload`

Visibility: public

Description: This method searches for the specified resource and removes it from the tree. If a language ID is not provided, the first resource found that matches `aType` and `aName` is returned. The removed resource is then returned.

If no resource is found, `nil` is returned.

Remark: This method should only be called on root nodes (instances of `TRootResTreeNode` (167)).

See also: `TResourceTreeNode.Add` (163)

22.3.17 TResourceTreeNode.Find

Synopsis: Searches for a resource

Declaration: `function Find(aType: TResourceDesc; aName: TResourceDesc)
: TAbstractResource; Overload
function Find(aType: TResourceDesc; aName: TResourceDesc;
const aLangID: TLangID) : TAbstractResource; Overload`

Visibility: public

Description: This method searches for a resource with the given type and name in the tree. If a language ID is not provided, the first resource found that matches `aType` and `aName` is returned.

If no resource is found, `nil` is returned.

Remark: This method should only be called on root nodes (instances of `TRootResTreeNode` (167)).

22.3.18 TResourceTreeNode.FindFreeID

Synopsis: Find a free ID to be used as a resource name

Declaration: `function FindFreeID(aType: TResourceDesc) : TResID; Virtual`

Visibility: public

Description: This method is used to find an available ID to be used as a name for a resource, given a resource type. It is used internally by `AddAutoID` (160) method of `TResources` (160).

Remark: This method should only be called on root nodes (instances of `TRootResTreeNode` (167)).

Errors: If there are no free ids left for the given resource type, an `ENoMoreFreeIDsException` (160) is raised.

22.3.19 TResourceTreeNode.IsLeaf

Synopsis: Reports whether the node is a leaf node.

Declaration: `function IsLeaf : Boolean; Virtual`

Visibility: public

Description: Returns `true` if the node is a leaf node. A leaf node is a language ID node.

22.3.20 TResourceTreeNode.Parent

Declaration: Property Parent : TResourceTreeNode

Visibility: protected

Access: Read

22.3.21 TResourceTreeNode.Desc

Synopsis: The description of the node

Declaration: Property Desc : TResourceDesc

Visibility: public

Access: Read

Description: The description of a node identifies that node. According to the type of the node, it can be a resource type, name or language id.

22.3.22 TResourceTreeNode.NamedCount

Synopsis: The number of named sub nodes of the node

Declaration: Property NamedCount : LongWord

Visibility: public

Access: Read

See also: TResourceTreeNode.NamedEntries ([165](#)), TResourceTreeNode.IDCount ([165](#))

22.3.23 TResourceTreeNode.NamedEntries

Synopsis: Indexed array of named sub nodes of the node

Declaration: Property NamedEntries[index: Integer]: TResourceTreeNode

Visibility: public

Access: Read

Description: This property can be used to access all named sub nodes in the node.

Remark: This array is 0-based: valid elements range from 0 to NamedCount ([165](#))-1.

See also: TResourceTreeNode.NamedCount ([165](#)), TResourceTreeNode.IDEntries ([166](#))

22.3.24 TResourceTreeNode.IDCount

Synopsis: The number of ID sub nodes of the node

Declaration: Property IDCount : LongWord

Visibility: public

Access: Read

See also: TResourceTreeNode.IDEntries ([166](#)), TResourceTreeNode.NamedCount ([165](#))

22.3.25 TResourceTreeNode.IDEntries

Synopsis: Indexed array of ID sub nodes of the node

Declaration: `Property IDEntries[index: Integer]: TResourceTreeNode`

Visibility: public

Access: Read

Description: This property can be used to access all ID sub nodes in the node.

Remark: This array is 0-based: valid elements range from 0 to IDCount (165)-1.

See also: TResourceTreeNode.IDCount (165), TResourceTreeNode.NamedEntries (165)

22.3.26 TResourceTreeNode.NameRVA

Synopsis: To be used by readers and writers

Declaration: `Property NameRVA : LongWord`

Visibility: public

Access: Read,Write

Description: This property can be freely used by resource readers and writers to store a file offset or address needed to load or write other data, since it isn't used by TResourceTreeNode (161) or TResources (160).

Remark: Do not rely on the value of this property when accessing a new tree: other readers or writers could have changed it for their internal operations.

See also: TResourceTreeNode.SubDirRVA (166), TResourceTreeNode.DataRVA (167)

22.3.27 TResourceTreeNode.SubDirRVA

Synopsis: To be used by readers and writers

Declaration: `Property SubDirRVA : LongWord`

Visibility: public

Access: Read,Write

Description: This property can be freely used by resource readers and writers to store a file offset or address needed to load or write other data, since it isn't used by TResourceTreeNode (161) or TResources (160).

Remark: Do not rely on the value of this property when accessing a new tree: other readers or writers could have changed it for their internal operations.

See also: TResourceTreeNode.NameRVA (166), TResourceTreeNode.DataRVA (167)

22.3.28 TResourceTreeNode.DataRVA

Synopsis: To be used by readers and writers

Declaration: `Property DataRVA : LongWord`

Visibility: public

Access: Read, Write

Description: This property can be freely used by resource readers and writers to store a file offset or address needed to load or write other data, since it isn't used by TResourceTreeNode (161) or TResources (160).

Remark: Do not rely on the value of this property when accessing a new tree: other readers or writers could have changed it for their internal operations.

See also: TResourceTreeNode.NameRVA (166), TResourceTreeNode.SubDirRVA (166)

22.3.29 TResourceTreeNode.Data

Synopsis: The resource contained in this node

Declaration: `Property Data : TAbstractResource`

Visibility: public

Access: Read

Description: This property references the resource contained in this node.

Remark: This property is meaningful only on leaf nodes (language id nodes).

See also: TResourceTreeNode.IsLeaf (164)

22.4 TRootResTreeNode

22.4.1 Description

This node represents the root node of a resource tree.

It is the only node which must be created with its constructor: other nodes in the tree are automatically created when adding a resource, or calling CreateSubNode (163) method of their parent.

Normally all search, add and delete operations on the tree are performed by calling methods of this node.

22.4.2 Method overview

Page	Method	Description
168	Add	
168	Create	Creates a new root node
168	CreateSubNode	
168	FindFreeID	
168	InternalFind	

22.4.3 TRootResTreeNode.InternalFind

Declaration: `function InternalFind(aType: TResourceDesc; aName: TResourceDesc;
 const aLangID: TLangID; const noLangID: Boolean;
 const toDelete: Boolean) : TAbstractResource
 ; Override`

Visibility: protected

22.4.4 TRootResTreeNode.Create

Synopsis: Creates a new root node

Declaration: `constructor Create; Override`

Visibility: public

Description: This method creates a new tree, represented by a root node without children.

Other nodes in the tree are automatically created when adding a resource, or calling `CreateSubNode` (163) method of their parent.

See also: `TRResourceTreeNode.CreateSubNode` (163), `TRResourceTreeNode.Add` (163)

22.4.5 TRootResTreeNode.CreateSubNode

Declaration: `function CreateSubNode(aDesc: TResourceDesc) : TResourceTreeNode
 ; Override`

Visibility: public

22.4.6 TRootResTreeNode.Add

Declaration: `procedure Add(aResource: TAbstractResource); Override`

Visibility: public

22.4.7 TRootResTreeNode.FindFreeID

Declaration: `function FindFreeID(aType: TResourceDesc) : TResID; Override`

Visibility: public

Chapter 23

Reference for unit 'resreader'

23.1 Used units

Table 23.1: Used units by unit 'resreader'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

23.2 Overview

This unit contains `TResResourceReader` ([169](#)), a `TAbstractResourceReader` ([169](#)) descendant that is able to read .res resource files.

Adding this unit to a program's `uses` clause registers class `TResResourceReader` ([169](#)) with `TResources` ([169](#)).

23.3 TResResourceReader

23.3.1 Description

This class provides a reader for .res resource files.

A .res file is a standard Windows file type that contains resources. This is not an object file format, so it's not suitable for being linked with other object files. For this reason, it is a good choice for a platform-independent format to store resources.

See also: `TAbstractResourceReader` ([169](#)), `TResResourceWriter` ([169](#))

23.3.2 Method overview

Page	Method	Description
170	CheckMagic	
170	Create	
170	Destroy	
170	GetDescription	
170	GetExtensions	
170	Load	

23.3.3 TResResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

23.3.4 TResResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

23.3.5 TResResourceReader.Load

Declaration: `procedure Load(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

23.3.6 TResResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: `protected`

23.3.7 TResResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: `public`

23.3.8 TResResourceReader.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

Chapter 24

Reference for unit 'reswriter'

24.1 Used units

Table 24.1: Used units by unit 'reswriter'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

24.2 Overview

This unit contains `TResResourceWriter` ([171](#)), a `TAbstractResourceWriter` ([171](#)) descendant that is able to write .res resource files.

Adding this unit to a program's `uses` clause registers class `TResResourceWriter` ([171](#)) with TResources ([171](#)).

24.3 TResResourceWriter

24.3.1 Description

This class provides a writer for .res resource files.

A .res file is a standard Windows file type that contains resources. This is not an object file format, so it's not suitable for being linked with other object files. For this reason, it is a good choice for a platform-independent format to store resources.

See also: `TAbstractResourceWriter` ([171](#)), `TResResourceReader` ([171](#))

24.3.2 Method overview

Page	Method	Description
172	Create	
172	GetDescription	
172	GetExtensions	
172	Write	

24.3.3 TResResourceWriter.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: `protected`

24.3.4 TResResourceWriter.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: `protected`

24.3.5 TResResourceWriter.Write

Declaration: `procedure Write(aResources: TResources;aStream: TStream); Override`

Visibility: `protected`

24.3.6 TResResourceWriter.Create

Declaration: `constructor Create; Override`

Visibility: `public`

Chapter 25

Reference for unit 'stringtableresource'

25.1 Used units

Table 25.1: Used units by unit 'stringtableresource'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

25.2 Overview

This unit contains `TStringTableResource` ([174](#)), a `TAbstractResource` ([173](#)) descendant specialized in handling resource of type `RT_STRING` ([173](#)).

Adding this unit to a program's `uses` clause registers class `TStringTableResource` ([174](#)) for type `RT_STRING` ([173](#)) with `TResourceFactory` ([173](#)).

25.3 Constants, types and variables

25.3.1 Resource strings

```
SIndexOutOfBounds = 'String ID out of bounds: %d'
```

```
SNameNotAllowed = 'Resource ID must be an ordinal in the range 1-4096'
```

25.4 TStringTableIndexOutOfBoundsException

25.4.1 Description

This exception is raised when the id specified to access a string of TStringTableResource.Strings (177) property is not in the range TStringTableResource.FirstID (176) - TStringTableResource.LastID (177).

See also: TStringTableResource (174), TStringTableResource.Strings (177), TStringTableResource.FirstID (176), TStringTableResource.LastID (177)

25.5 TStringTableNameNotAllowedException

25.5.1 Description

This exception is raised by constructor TStringTableResource.Create (176) if the name of the resource isn't of type dtID (173) and/or its name is not in the range 1-4096.

See also: TStringTableResource.Create (176)

25.6 TStringTableResourceException

25.6.1 Description

Base class for string table resource-related exceptions

25.7 TStringTableResource

25.7.1 Description

This class represents a resource of type RT_STRING (173).

A string table is a resource containing strings, identified by an integer id in the range 0-65535. A string table contains exactly 16 strings, and its name is an ID in the range 1-4096, determined by the highest 12 bits of the strings ID it contains, plus one. That is, a string table with 1 as name holds strings with IDs from 0 to 15, string table 2 contains strings with IDs from 16 to 31 and so on. There is no difference between an empty string and a non-existent string.

For these reasons, it is not possible to set the name of a string table: it is autogenerated from the value of FirstID (176) property. Moreover, Count (177) property is always 16.

Strings (177) property is provided to access and modify individual strings.

Remark: This class doesn't allow its type to be changed to anything else than RT_BITMAP (173). Its name can't be changed too. Attempts to do so result in a EResourceDescChangeNotAllowedException (173).

25.7.2 Method overview

Page	Method	Description
175	ChangeDescTypeAllowed	
175	ChangeDescValueAllowed	
176	Create	Creates a new string table resource
176	Destroy	
175	GetName	
175	GetType	
175	NotifyResourcesLoaded	
176	UpdateRawData	

25.7.3 Property overview

Page	Properties	Access	Description
177	Count	r	The number of strings contained in the string table
176	FirstID	rw	The ID of first the string contained in the string table
177	LastID	r	The ID of the last string contained in the string table
177	Strings	rw	Indexed array of strings in the string table

25.7.4 TStringTableResource.GetType

Declaration: `function GetType : TResourceDesc; Override`

Visibility: `protected`

25.7.5 TStringTableResource.GetName

Declaration: `function GetName : TResourceDesc; Override`

Visibility: `protected`

25.7.6 TStringTableResource.ChangeDescTypeAllowed

Declaration: `function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: `protected`

25.7.7 TStringTableResource.ChangeDescValueAllowed

Declaration: `function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: `protected`

25.7.8 TStringTableResource.NotifyResourcesLoaded

Declaration: `procedure NotifyResourcesLoaded; Override`

Visibility: `protected`

25.7.9 TStringTableResource.Create

Synopsis: Creates a new string table resource

Declaration: `constructor Create; Override`
`constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override`

Visibility: public

Description: Please note that `aType` parameter is not used, since this class always uses `RT_STRING` (173) as type.

Remark: `aName` must be a `TResourceDesc` (173) of type `dtID` (173) and its value must be in the range 1-4096, otherwise an `EStringTableNameNotAllowedException` (174) exception is raised.

Errors: If `aName` is not of type `dtID` (173) and/or its value isn't in the range 1-4096, an `EStringTableNameNotAllowedException` (174) exception is raised.

See also: `TStringTableResource.FirstID` (176)

25.7.10 TStringTableResource.Destroy

Declaration: `destructor Destroy; Override`

Visibility: public

25.7.11 TStringTableResource.UpdateRawData

Declaration: `procedure UpdateRawData; Override`

Visibility: public

25.7.12 TStringTableResource.FirstID

Synopsis: The ID of first the string contained in the string table

Declaration: `Property FirstID : Word`

Visibility: public

Access: Read,Write

Description: This property holds the value of the ID of the first string of the table. It is a multiple of 16.

The name of the resource is determined by this property, so changing `FirstID` also changes the resource name.

Remark: If an attempt of setting this property to an integer that isn't a multiple of 16 is made, the value is automatically corrected to the closest multiple of 16 less than the value specified (e.g. setting it to 36 sets it to 32).

See also: `TStringTableResource` (174), `TStringTableResource.LastID` (177), `TStringTableResource.Strings` (177)

25.7.13 TStringTableResource.LastID

Synopsis: The ID of the last string contained in the string table

Declaration: `Property LastID : Word`

Visibility: public

Access: Read

Description: The value of this property is always FirstID (176)+15.

See also: TStringTableResource (174), TStringTableResource.FirstID (176), TStringTableResource.Strings (177)

25.7.14 TStringTableResource.Count

Synopsis: The number of strings contained in the string table

Declaration: `Property Count : Integer`

Visibility: public

Access: Read

Description: Since a string table resource always contains exactly 16 strings, this property is always 16

See also: TStringTableResource (174), TStringTableResource.FirstID (176)

25.7.15 TStringTableResource.Strings

Synopsis: Indexed array of strings in the string table

Declaration: `Property Strings[id: Word]: string; default`

Visibility: public

Access: Read,Write

Description: This property can be used to access all strings in the object.

Remark: Strings are accessed by their ID: valid elements range from FirstID (176) to LastID (177). If the index specified isn't in this range, an EStringTableIndexOutOfBoundsException (174) exception is raised.

Remark: If you need to access RawData (173) after you modified strings, be sure to call UpdateRawData (173) first. This isn't needed however when resource is written to a stream, since TResources (173) takes care of it.

See also: TStringTableResource (174), TStringTableResource.FirstID (176), TStringTableResource.LastID (177)

Chapter 26

Reference for unit 'versionconsts'

26.1 Overview

This unit contains constants used by TVersionResource ([178](#)).

Constants for TVersionFixedInfo.FileFlags ([178](#)):

- VS_FF_DEBUG ([183](#)).
- VS_FF_INFOINFERRED ([183](#)).
- VS_FF_PATCHED ([183](#)).
- VS_FF_PRERELEASE ([183](#)).
- VS_FF_PRIVATEBUILD ([183](#)).
- VS_FF_SPECIALBUILD ([183](#)).

Constants for TVersionFixedInfo.FileOS ([178](#)):

- VOS_UNKNOWN ([182](#))
- VOS_DOS ([181](#))
- VOS_OS216 ([182](#))
- VOS_OS232 ([182](#))
- VOS_NT ([182](#))
- VOS__WINDOWS16 ([182](#))
- VOS__WINDOWS32 ([182](#))
- VOS__PM16 ([182](#))
- VOS__PM32 ([182](#))
- VOS_DOS_WINDOWS16 ([181](#))
- VOS_DOS_WINDOWS32 ([182](#))
- VOS_OS216_PM16 ([182](#))

- VOS_OS232_PM32 (182)
- VOS_NT_WINDOWS32 (182)

Constants for TVersionFixedInfo.FileType (178):

- VFT_UNKNOWN (181)
- VFT_APP (181)
- VFT_DLL (181)
- VFT_DRV (181)
- VFT_FONT (181)
- VFT_VXD (181)
- VFT_STATIC_LIB (181)

Constants for TVersionFixedInfo.FileSubType (178):

- VFT2_UNKNOWN (181)
- VFT2_DRV_COMM (179)
- VFT2_DRV_PRINTER (180)
- VFT2_DRV_KEYBOARD (180)
- VFT2_DRV_LANGUAGE (180)
- VFT2_DRV_DISPLAY (180)
- VFT2_DRV_MOUSE (180)
- VFT2_DRV_NETWORK (180)
- VFT2_DRV_SYSTEM (180)
- VFT2_DRV_INSTALLABLE (180)
- VFT2_DRV_SOUND (180)
- VFT2_FONT_RASTER (180)
- VFT2_FONT_VECTOR (181)
- VFT2_FONT_TRUETYPE (181)

26.2 Constants, types and variables

26.2.1 Constants

VFT2_DRV_COMM = \$0000000A

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_DISPLAY = \$00000004

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_INSTALLABLE = \$00000008

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_KEYBOARD = \$00000002

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_LANGUAGE = \$00000003

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_MOUSE = \$00000005

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_NETWORK = \$00000006

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_PRINTER = \$00000001

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_SOUND = \$00000009

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_DRV_SYSTEM = \$00000007

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_DRV (181).

VFT2_FONT_RASTER = \$00000001

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_FONT (181).

VFT2_FONT_TRUETYPE = \$00000003

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_FONT (181).

VFT2_FONT_VECTOR = \$00000002

This constant is used for TVersionFixedInfo.FileSubType (178) when TVersionFixedInfo.FileType (178) is VFT_FONT (181).

VFT2_UNKNOWN = \$00000000

This constant is used for TVersionFixedInfo.FileSubType (178).

VFT_APP = \$00000001

This constant is used for TVersionFixedInfo.FileType (178).

VFT_DLL = \$00000002

This constant is used for TVersionFixedInfo.FileType (178).

VFT_DRV = \$00000003

This constant is used for TVersionFixedInfo.FileType (178).

The device driver type is specified in TVersionFixedInfo.FileSubType (178).

VFT_FONT = \$00000004

This constant is used for TVersionFixedInfo.FileType (178).

The font driver type is specified in TVersionFixedInfo.FileSubType (178).

VFT_STATIC_LIB = \$00000007

This constant is used for TVersionFixedInfo.FileType (178).

VFT_UNKNOWN = \$00000000

This constant is used for TVersionFixedInfo.FileType (178).

VFT_VXD = \$00000005

This constant is used for TVersionFixedInfo.FileType (178).

VOS_DOS = \$00010000

This constant is used for TVersionFixedInfo.FileOS (178).

VOS_DOS_WINDOWS16 = \$00010001

This constant is used for TVersionFixedInfo.FileOS (178).

VOS_DOS_WINDOWS32 = \$00010004

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_NT = \$00040000

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_NT_WINDOWS32 = \$00040004

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_OS216 = \$00020000

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_OS216_PM16 = \$00020002

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_OS232 = \$00030000

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_OS232_PM32 = \$00030003

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS_UNKNOWN = \$00000000

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS__BASE = \$00000000

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS__PM16 = \$00000002

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS__PM32 = \$00000003

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS__WINDOWS16 = \$00000001

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

VOS__WINDOWS32 = \$00000004

This constant is used for TVersionFixedInfo.FileOS ([178](#)).

`VS_FFI_FILEFLAGSMASK = $0000003F`

This constant is used mainly for `TVersionFixedInfo.FileFlagsMask` (178) to signal which bits are used in `TVersionFixedInfo.FileFlags` (178) field.

`VS_FF_DEBUG = $00000001`

This constant is used for `TVersionFixedInfo.FileFlags` (178).

`VS_FF_INFOINFERRED = $00000010`

This constant is used for `TVersionFixedInfo.FileFlags` (178).

`VS_FF_PATCHED = $00000004`

This constant is used for `TVersionFixedInfo.FileFlags` (178).

`VS_FF_PRERELEASE = $00000002`

This constant is used for `TVersionFixedInfo.FileFlags` (178).

`VS_FF_PRIVATEBUILD = $00000008`

This constant is used for `TVersionFixedInfo.FileFlags` (178).

When this flag is set, a `TVersionStringTable` (178) in `TVersionResource.StringFileInfo` (178) should contain an item with `PrivateBuild` as key.

`VS_FF_SPECIALBUILD = $00000020`

This constant is used for `TVersionFixedInfo.FileFlags` (178).

When this flag is set, a `TVersionStringTable` (178) in `TVersionResource.StringFileInfo` (178) should contain an item with `SpecialBuild` as key.

Chapter 27

Reference for unit 'versionresource'

27.1 Used units

Table 27.1: Used units by unit 'versionresource'

Name	Page
Classes	??
resource	125
System	??
sysutils	??
versiontypes	189

27.2 Overview

This unit contains `TVersionResource` ([185](#)), a `TAbstractResource` ([184](#)) descendant specialized in handling resource of type `RT_VERSION` ([184](#)).

Adding this unit to a program's `uses` clause registers class `TVersionResource` ([185](#)) for type `RT_VERSION` ([184](#)) with `TResourceFactory` ([184](#)).

27.3 Constants, types and variables

27.3.1 Types

```
TVerBlockHeader = packed record
  length : Word;
  vallength : Word;
  valtype : Word;
  key : string;
end
```

This type is internally used by `TVersionResource` ([185](#))

27.4 TVersionResource

27.4.1 Description

This class represents a resource of type RT_VERSION (184).

A resource of this type provides version information for a Microsoft Windows executable or dll, which is shown when checking properties of a file in Windows Explorer.

Information is stored in FixedInfo (187), StringFileInfo (187) and VarFileInfo (188).

Remark: This class doesn't allow its type to be changed to anything else than RT_VERSION (184), and its name to be different from 1. Attempts to do so result in a EResourceDescChangeNotAllowedException (184).

Remark: If you need to access RawData (184) after you modified something, be sure to call UpdateRawData (184) first. This isn't needed however when resource is written to a stream, since TResources (184) takes care of it.

Sample code

This code creates a version information resource

```
const
  myVersion : TFileProductVersion = (1,2,0,0);

var
  resources : TResources;
  aRes : TVersionResource;
  st : TVersionStringTable;
  ti : TVerTranslationInfo;
begin
  aRes:=TVersionResource.Create(nil,nil); //it's always RT_VERSION and 1 respectively
  resources:=TResources.Create;
  resources.Add(aRes);

  aRes.FixedInfo.FileVersion:=myversion;
  aRes.FixedInfo.ProductVersion:=myversion;
  aRes.FixedInfo.FileFlagsMask:=VS_FFI_FILEFLAGSMASK;
  aRes.FixedInfo.FileFlags:=0;
  aRes.FixedInfo.FileOS:=VOS_NT_WINDOWS32;
  aRes.FixedInfo.FileType:=VFT_APP;
  aRes.FixedInfo.FileSubType:=0;
  aRes.FixedInfo.FileDate:=0;

  st:=TVersionStringTable.Create('041004B0'); //Italian, unicode codepage
  st.Add('CompanyName','Foo Corporation');
  st.Add('FileDescription','Foo suite core program');
  st.Add('FileVersion','1.2');
  st.Add('ProductVersion','1.2');
  aRes.StringFileInfo.Add(st);

  ti.language:=$0410; //Italian
  ti.codepage:=$04B0; //Unicode codepage
  aRes.VarFileInfo.Add(ti);

  resources.WriteToFile('myresource.res');
  resources.Free; //destroys aRes as well.
```

end;

See also: `TVersionResource.FixedInfo` ([187](#)), `TVersionResource.StringFileInfo` ([187](#)), `TVersionResource.VarFileInfo` ([188](#))

27.4.2 Method overview

Page	Method	Description
186	<code>ChangeDescTypeAllowed</code>	
186	<code>ChangeDescValueAllowed</code>	
187	<code>Create</code>	Creates a new version information resource
187	<code>Destroy</code>	
186	<code>GetName</code>	
186	<code>GetType</code>	
187	<code>NotifyResourcesLoaded</code>	
187	<code>UpdateRawData</code>	

27.4.3 Property overview

Page	Properties	Access	Description
187	<code>FixedInfo</code>	r	Language independent part of version information
187	<code>StringFileInfo</code>	r	Language dependent part of version information
188	<code>VarFileInfo</code>	r	List of supported languages

27.4.4 TVersionResource.GetType

Declaration: `function GetType : TResourceDesc; Override`

Visibility: protected

27.4.5 TVersionResource.GetName

Declaration: `function GetName : TResourceDesc; Override`

Visibility: protected

27.4.6 TVersionResource.ChangeDescTypeAllowed

Declaration: `function ChangeDescTypeAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: protected

27.4.7 TVersionResource.ChangeDescValueAllowed

Declaration: `function ChangeDescValueAllowed(aDesc: TResourceDesc) : Boolean
; Override`

Visibility: protected

27.4.8 TVersionResource.NotifyResourcesLoaded

Declaration: `procedure NotifyResourcesLoaded; Override`

Visibility: `protected`

27.4.9 TVersionResource.Create

Synopsis: Creates a new version information resource

Declaration: `constructor Create; Override`

`constructor Create(aType: TResourceDesc; aName: TResourceDesc); Override`

Visibility: `public`

Description: Please note that `aType` and `aName` parameters are not used, since this class always uses `RT_VERSION` (184) as type and 1 as name.

27.4.10 TVersionResource.Destroy

Declaration: `destructor Destroy; Override`

Visibility: `public`

27.4.11 TVersionResource.UpdateRawData

Declaration: `procedure UpdateRawData; Override`

Visibility: `public`

27.4.12 TVersionResource.FixedInfo

Synopsis: Language independent part of version information

Declaration: `Property FixedInfo : TVersionFixedInfo`

Visibility: `public`

Access: `Read`

See also: `TVersionFixedInfo` (184)

27.4.13 TVersionResource.StringFileInfo

Synopsis: Language dependent part of version information

Declaration: `Property StringFileInfo : TVersionStringFileInfo`

Visibility: `public`

Access: `Read`

See also: `TVersionStringFileInfo` (184)

27.4.14 TVersionResource.VarFileInfo

Synopsis: List of supported languages

Declaration: `Property VarFileInfo : TVersionVarFileInfo`

Visibility: `public`

Access: `Read`

See also: `TVersionVarFileInfo` ([184](#))

Chapter 28

Reference for unit 'versiontypes'

28.1 Used units

Table 28.1: Used units by unit 'versiontypes'

Name	Page
Classes	??
resource	125
System	??
sysutils	??

28.2 Overview

This unit contains classes used by TVersionResource ([189](#)).

28.3 Constants, types and variables

28.3.1 Resource strings

```
SVerStrTableDuplicateKey = 'Duplicate key ''%s'''
```

```
SVerStrTableKeyNotFound = 'Key ''%s'' not found'
```

```
SVerStrTableNameNotAllowed = 'Name ''%s'' is not a valid 8-cipher hex sequence'
```

28.3.2 Types

```
PVerTranslationInfo = ^TVerTranslationInfo
```

Pointer to a TVerTranslationInfo

```
TFileProductVersion = Array[0..3] of Word
```

This type is a 4-element array of words that is used to represent a file or product version.

Major version number is stored in the lowest word

Example

Product version 4.2.1.1200 can be represented this way

```
const
  myver : TFileProductVersion = (4, 2, 1, 1200);

TVerTranslationInfo = packed record
  language : Word;
  codepage : Word;
end
```

This record represents a language id - codepage pair that is used by TVersionVarFileInfo (201).

28.4 EDuplicateKeyException

28.4.1 Description

This exception is raised when an attempt is made to add an item to a TVersionStringTable (197) object and the specified key is already present.

See also: TVersionStringTable.Add (198)

28.5 EKeyNotFoundException

28.5.1 Description

This exception is raised when the specified key is not found in the TVersionStringTable (197) object.

See also: TVersionStringTable.Delete (199), TVersionStringTable.Values (200)

28.6 ENameNotAllowedException

28.6.1 Description

This exception is raised when an attempt is made to set Name (199) property of TVersionStringTable (197) with a string that isn't an 8-cipher hexadecimal string.

See also: TVersionStringTable.Create (198), TVersionStringTable.Name (199)

28.7 EVersionStringTableException

28.7.1 Description

Base class for version string table - related exceptions

28.8 TVersionFixedInfo

28.8.1 Description

This class represents the language independent part of version information, and is always present in a version information resource.

See also: TVersionResource ([189](#)), TVersionResource.FixedInfo ([189](#))

28.8.2 Method overview

Page	Method	Description
191	Create	

28.8.3 Property overview

Page	Properties	Access	Description
194	FileDate	rw	The file creation timestamp.
192	FileFlags	rw	The file flags
192	FileFlagsMask	rw	Mask for FileFlags
192	FileOS	rw	The operating system the file was designed to run on
193	FileSubType	rw	Additional type information
193	FileType	rw	The type of the file
191	FileVersion	rw	The file version
191	ProductVersion	rw	The product version

28.8.4 TVersionFixedInfo.Create

Declaration: `constructor Create`

Visibility: `public`

28.8.5 TVersionFixedInfo.FileVersion

Synopsis: The file version

Declaration: `Property FileVersion : TFileProductVersion`

Visibility: `public`

Access: Read,Write

See also: TFileProductVersion ([190](#))

28.8.6 TVersionFixedInfo.ProductVersion

Synopsis: The product version

Declaration: `Property ProductVersion : TFileProductVersion`

Visibility: `public`

Access: Read,Write

See also: TFileProductVersion ([190](#))

28.8.7 TVersionFixedInfo.FileFlagsMask

Synopsis: Mask for FileFlags

Declaration: `Property FileFlagsMask : LongWord`

Visibility: public

Access: Read,Write

Description: This property specifies which bits of FileFlags (192) are valid.
Usually it is VS_FFI_FILEFLAGSMASK (189).

See also: TVersionFixedInfo.FileFlags (192)

28.8.8 TVersionFixedInfo.FileFlags

Synopsis: The file flags

Declaration: `Property FileFlags : LongWord`

Visibility: public

Access: Read,Write

Description: It is a combination of the following values:

- VS_FF_DEBUG (189).
- VS_FF_INFOINFERRED (189).
- VS_FF_PATCHED (189).
- VS_FF_PRERELEASE (189).
- VS_FF_PRIVATEBUILD (189).
- VS_FF_SPECIALBUILD (189).

See also: TVersionFixedInfo.FileFlagsMask (192)

28.8.9 TVersionFixedInfo.FileOS

Synopsis: The operating system the file was designed to run on

Declaration: `Property FileOS : LongWord`

Visibility: public

Access: Read,Write

Description: It is one of the following values:

- VOS_UNKNOWN (189)
- VOS_DOS (189)
- VOS_OS216 (189)
- VOS_OS232 (189)
- VOS_NT (189)

combined with one of the following values:

- VOS__WINDOWS16 ([189](#))
- VOS__WINDOWS32 ([189](#))
- VOS__PM16 ([189](#))
- VOS__PM32 ([189](#))

Note: some predefined combinations do exist:

- VOS_DOS_WINDOWS16 ([189](#))
- VOS_DOS_WINDOWS32 ([189](#))
- VOS_OS216_PM16 ([189](#))
- VOS_OS232_PM32 ([189](#))
- VOS_NT_WINDOWS32 ([189](#))

28.8.10 TVersionFixedInfo.FileType

Synopsis: The type of the file

Declaration: `Property FileType : LongWord`

Visibility: public

Access: Read,Write

Description: It can be one of the following values:

- VFT_UNKNOWN ([189](#))
- VFT_APP ([189](#))
- VFT_DLL ([189](#))
- VFT_DRV ([189](#))
- VFT_FONT ([189](#))
- VFT_VXD ([189](#))
- VFT_STATIC_LIB ([189](#))

See also: TVersionFixedInfo.FileSubType ([193](#))

28.8.11 TVersionFixedInfo.FileSubType

Synopsis: Additional type information

Declaration: `Property FileSubType : LongWord`

Visibility: public

Access: Read,Write

Description: This property is meaningful only for some values of FileSubType ([193](#)). For all other types, this property must be zero.

If FileSubType ([193](#)) is VFT_DRV ([189](#)):

- VFT2_UNKNOWN ([189](#))
- VFT2_DRV_COMM ([189](#))

- VFT2_DRV_PRINTER ([189](#))
- VFT2_DRV_KEYBOARD ([189](#))
- VFT2_DRV_LANGUAGE ([189](#))
- VFT2_DRV_DISPLAY ([189](#))
- VFT2_DRV_MOUSE ([189](#))
- VFT2_DRV_NETWORK ([189](#))
- VFT2_DRV_SYSTEM ([189](#))
- VFT2_DRV_INSTALLABLE ([189](#))
- VFT2_DRV_SOUND ([189](#))

If FileSubType ([193](#)) is VFT_FONT ([189](#)):

- VFT2_UNKNOWN ([189](#))
- VFT2_FONT_RASTER ([189](#))
- VFT2_FONT_VECTOR ([189](#))
- VFT2_FONT_TRUETYPE ([189](#))

See also: TVersionFixedInfo.FileType ([193](#))

28.8.12 TVersionFixedInfo.FileDate

Synopsis: The file creation timestamp.

Declaration: Property FileDate : QWord

Visibility: public

Access: Read,Write

Description: It is a 64 bit timestamp.

28.9 TVersionStringFileInfo

28.9.1 Description

This class represents the language dependent part of version information.

It is a list of TVersionStringTable ([197](#)) objects, each representing information for a specific language-codepage combination.

See also: TVersionResource ([189](#)), TVersionResource.StringFileInfo ([189](#)), TVersionStringTable ([197](#))

28.9.2 Method overview

Page	Method	Description
195	Add	Adds a new string table
196	Clear	Deletes all string tables in the list
195	Create	
196	Delete	Deletes a string table
195	Destroy	Destroys the object
195	GetCount	
195	GetItem	
195	SetItem	

28.9.3 Property overview

Page	Properties	Access	Description
196	Count	r	The number of string tables in the object
196	Items	rw	Indexed array of string tables in the object

28.9.4 TVersionStringFileInfo.GetCount

Declaration: `function GetCount : Integer`

Visibility: protected

28.9.5 TVersionStringFileInfo.GetItem

Declaration: `function GetItem(index: Integer) : TVersionStringTable`

Visibility: protected

28.9.6 TVersionStringFileInfo.SetItem

Declaration: `procedure SetItem(index: Integer; aValue: TVersionStringTable)`

Visibility: protected

28.9.7 TVersionStringFileInfo.Create

Declaration: `constructor Create`

Visibility: public

28.9.8 TVersionStringFileInfo.Destroy

Synopsis: Destroys the object

Declaration: `destructor Destroy; Override`

Visibility: public

Description: All items are destroyed as well.

See also: `TVersionStringFileInfo.Clear` ([196](#))

28.9.9 TVersionStringFileInfo.Add

Synopsis: Adds a new string table

Declaration: `procedure Add(aStrTable: TVersionStringTable)`

Visibility: public

See also: `TVersionStringFileInfo.Delete` ([196](#))

28.9.10 TVersionStringFileInfo.Clear

Synopsis: Deletes all string tables in the list

Declaration: `procedure Clear`

Visibility: `public`

Description: This method empties the object. All string tables are freed.

See also: `TVersionStringFileInfo.Delete` ([196](#)), `TVersionStringFileInfo.Add` ([195](#))

28.9.11 TVersionStringFileInfo.Delete

Synopsis: Deletes a string table

Declaration: `procedure Delete(const aIndex: Integer)`

Visibility: `public`

Description: This method removes the string table identified by `aIndex` from the list. The string table is freed.

See also: `TVersionStringFileInfo.Clear` ([196](#)), `TVersionStringFileInfo.Add` ([195](#))

28.9.12 TVersionStringFileInfo.Count

Synopsis: The number of string tables in the object

Declaration: `Property Count : Integer`

Visibility: `public`

Access: `Read`

See also: `TVersionStringFileInfo.Items` ([196](#))

28.9.13 TVersionStringFileInfo.Items

Synopsis: Indexed array of string tables in the object

Declaration: `Property Items[index: Integer]: TVersionStringTable; default`

Visibility: `public`

Access: `Read, Write`

Description: This property can be used to access all string tables in the object.

Remark: This array is 0-based: valid elements range from 0 to `Count` ([196](#))-1.

See also: `TVersionStringFileInfo.Count` ([196](#)), `TVersionStringTable` ([197](#))

28.10 TVersionStringTable

28.10.1 Description

This class represents version information for a specific language-codepage combination.

It is contained in a TVersionStringFileInfo (194) object.

Information is stored as key-value pairs. The name of the string table specifies the language id - codepage to which the object applies.

There are some predefined keys that Microsoft Windows searches for. They are:

- Comments
- CompanyName
- FileDescription
- FileVersion
- InternalName
- LegalCopyright
- LegalTrademarks
- OriginalFilename
- PrivateBuild (only if VS_FF_PRIVATEBUILD (189) is set in TVersionFixedInfo.FileFlags (192))
- ProductName
- ProductVersion
- SpecialBuild (only if VS_FF_SPECIALBUILD (189) is set in TVersionFixedInfo.FileFlags (192))

See also: TVersionStringFileInfo (194), TVersionStringTable.Name (199), TVersionStringTable.Keys (200), TVersionStringTable.Values (200), TVersionStringTable.ValuesByIndex (200)

28.10.2 Method overview

Page	Method	Description
198	Add	Adds a new item to the string table
199	Clear	Deletes all items
198	Create	Creates a new string table
199	Delete	Deletes an item
198	Destroy	Destroys the string table

28.10.3 Property overview

Page	Properties	Access	Description
199	Count	r	The number of items in the object
200	Keys	r	Indexed array of keys in the object
199	Name	r	The name of the string table
200	Values	rw	Array of values in the object, accessed by key
200	ValuesByIndex	rw	Indexed array of values in the object

28.10.4 TVersionStringTable.Create

Synopsis: Creates a new string table

Declaration: `constructor Create(const aName: string)`

Visibility: `public`

Description: Creates a new string table with the name passed as `aName` parameter.

`aName` must be a hex representation of a 4-bytes unsigned number: first 4 ciphers represent the language id, and last 4 the codepage.

Sample code

This code creates a string table for Italian, with unicode codepage.

```
var
  st : TVersionStringTable;
begin
  //0410 = Italian
  //04B0 = unicode codepage
  st:=TVersionStringTable.Create('041004B0');

  //do something useful...

  st.Free;
end;
```

Errors: If name is not a valid 8-cipher hexadecimal string, an `ENameNotAllowedException` ([190](#)) exception is raised.

See also: `TVersionStringTable.Name` ([199](#))

28.10.5 TVersionStringTable.Destroy

Synopsis: Destroys the string table

Declaration: `destructor Destroy; Override`

Visibility: `public`

28.10.6 TVersionStringTable.Add

Synopsis: Adds a new item to the string table

Declaration: `procedure Add(const aKey: string;const aValue: string)`

Visibility: `public`

Description: This methods adds a new key-value pair to the string table.

Note that some predefined keys do exist. See `TVersionStringTable` ([197](#)) for further information.

Errors: If an item with the same key already exists, an `EDuplicateKeyException` ([190](#)) exception is raised.

See also: `TVersionStringTable` ([197](#)), `TVersionStringTable.Keys` ([200](#)), `TVersionStringTable.Values` ([200](#)), `TVersionStringTable.ValuesByIndex` ([200](#))

28.10.7 TVersionStringTable.Clear

Synopsis: Deletes all items

Declaration: `procedure Clear`

Visibility: `public`

Description: This method empties the object deleting all items.

See also: `TVersionStringTable.Delete` ([199](#))

28.10.8 TVersionStringTable.Delete

Synopsis: Deletes an item

Declaration: `procedure Delete(const aIndex: Integer); Overload`
`procedure Delete(const aKey: string); Overload`

Visibility: `public`

Description: The item to delete can be specified by its index or by its key.

Errors: If `aKey` is not found, an `EKeyNotFoundException` ([190](#)) exception is raised.

See also: `TVersionStringTable.Keys` ([200](#)), `TVersionStringTable.Values` ([200](#)), `TVersionStringTable.ValuesByIndex` ([200](#))

28.10.9 TVersionStringTable.Name

Synopsis: The name of the string table

Declaration: `Property Name : string`

Visibility: `public`

Access: `Read`

Description: Name must be a hex representation of a 4-bytes unsigned number: first 4 ciphers represent the language id, and last 4 the codepage.

Errors: If an attempt is made to set `Name` with a string that isn't an 8-cipher hexadecimal string, an `ENameNotAllowedException` ([190](#)) exception is raised.

See also: `TVersionStringTable.Create` ([198](#))

28.10.10 TVersionStringTable.Count

Synopsis: The number of items in the object

Declaration: `Property Count : Integer`

Visibility: `public`

Access: `Read`

See also: `TVersionStringTable.ValuesByIndex` ([200](#))

28.10.11 TVersionStringTable.Keys

Synopsis: Indexed array of keys in the object

Declaration: `Property Keys[index: Integer]: string`

Visibility: public

Access: Read

Description: This property can be used to access all keys in the object.

Values associated to keys are stored in `ValuesByIndex` (200) property: a key and its value have the same index in the two properties.

Remark: This array is 0-based: valid elements range from 0 to `Count` (199)-1.

Note that some predefined keys do exist. See `TVersionStringTable` (197) for further information.

See also: `TVersionStringTable` (197), `TVersionStringTable.Values` (200), `TVersionStringTable.ValuesByIndex` (200)

28.10.12 TVersionStringTable.ValuesByIndex

Synopsis: Indexed array of values in the object

Declaration: `Property ValuesByIndex[index: Integer]: string`

Visibility: public

Access: Read,Write

Description: This property can be used to access all values in the object.

Keys associated to values are stored in `Keys` (200) property: a key and its value have the same index in the two properties.

Remark: This array is 0-based: valid elements range from 0 to `Count` (199)-1.

See also: `TVersionStringTable.Keys` (200), `TVersionStringTable.Values` (200)

28.10.13 TVersionStringTable.Values

Synopsis: Array of values in the object, accessed by key

Declaration: `Property Values[Key: string]: string; default`

Visibility: public

Access: Read,Write

Description: This property can be used to retrieve the value of an item when the corresponding key is known.

If you need to iterate over all values of the string table, use `ValuesByIndex` (200) instead.

If the key is not found, an `EKeyNotFoundException` (190) exception is raised.

See also: `TVersionStringTable.Keys` (200), `TVersionStringTable.ValuesByIndex` (200)

28.11 TVersionVarFileInfo

28.11.1 Description

This class represents the language-codepage pairs that the program or dll supports. It can be used to avoid including several RT_VERSION (189) resources for each language-codepage supported.

It is a list of TVerTranslationInfo (190) records.

See also: TVersionResource.VarFileInfo (189), TVerTranslationInfo (190)

28.11.2 Method overview

Page	Method	Description
202	Add	Adds a new translation information item
202	Clear	Deletes all items
201	Create	
202	Delete	Deletes an item
202	Destroy	Destroys the object
201	GetCount	
201	GetItem	
201	SetItem	

28.11.3 Property overview

Page	Properties	Access	Description
202	Count	r	The number of items in the object
203	Items	rw	Indexed array of items in the object

28.11.4 TVersionVarFileInfo.GetCount

Declaration: `function GetCount : Integer`

Visibility: `protected`

28.11.5 TVersionVarFileInfo.GetItem

Declaration: `function GetItem(index: Integer) : TVerTranslationInfo`

Visibility: `protected`

28.11.6 TVersionVarFileInfo.SetItem

Declaration: `procedure SetItem(index: Integer; aValue: TVerTranslationInfo)`

Visibility: `protected`

28.11.7 TVersionVarFileInfo.Create

Declaration: `constructor Create`

Visibility: `public`

28.11.8 TVersionVarFileInfo.Destroy

Synopsis: Destroys the object

Declaration: `destructor Destroy; Override`

Visibility: `public`

Description: All items are destroyed as well.

See also: `TVersionVarFileInfo.Clear` ([202](#))

28.11.9 TVersionVarFileInfo.Add

Synopsis: Adds a new translation information item

Declaration: `procedure Add(aInfo: TVerTranslationInfo)`

Visibility: `public`

See also: `TVersionVarFileInfo.Items` ([203](#))

28.11.10 TVersionVarFileInfo.Clear

Synopsis: Deletes all items

Declaration: `procedure Clear`

Visibility: `public`

Description: This method empties the object deleting all items.

See also: `TVersionVarFileInfo.Delete` ([202](#))

28.11.11 TVersionVarFileInfo.Delete

Synopsis: Deletes an item

Declaration: `procedure Delete(const aIndex: Integer)`

Visibility: `public`

See also: `TVersionVarFileInfo.Items` ([203](#))

28.11.12 TVersionVarFileInfo.Count

Synopsis: The number of items in the object

Declaration: `Property Count : Integer`

Visibility: `public`

Access: `Read`

See also: `TVersionVarFileInfo.Items` ([203](#))

28.11.13 TVersionVarFileInfo.Items

Synopsis: Indexed array of items in the object

Declaration: `Property Items[index: Integer]: TVerTranslationInfo; default`

Visibility: public

Access: Read, Write

Description: This property can be used to access all translation information items in the object.

Remark: This array is 0-based: valid elements range from 0 to Count ([202](#))-1.

See also: TVersionVarFileInfo.Count ([202](#))

Chapter 29

Reference for unit 'winpeimagereader'

29.1 Used units

Table 29.1: Used units by unit 'winpeimagereader'

Name	Page
Classes	??
coffreader	51
resource	125
System	??
sysutils	??

29.2 Overview

This unit contains `TWinPEImageResourceReader` ([204](#)), a `TAbstractResourceReader` ([204](#)) descendant that is able to read Microsoft Windows PE image files (executables, dynamic link libraries and so on).

Adding this unit to a program's `uses` clause registers class `TWinPEImageResourceReader` ([204](#)) with `TResources` ([204](#)).

29.3 TWinPEImageResourceReader

29.3.1 Description

This class provides a reader for Microsoft Windows PE image files containing resources.

PE is the file format used by Microsoft Windows executables, dynamic link libraries and so on.

Remark: This reader can only read full PE images, not COFF object files. Use `TCoffResourceReader` ([204](#)) instead.

See also: `TAbstractResourceReader` ([204](#)), `TCoffResourceReader` ([204](#))

29.3.2 Method overview

Page	Method	Description
205	CheckDosStub	
205	CheckMagic	
205	CheckPESignature	
205	Create	
206	Destroy	
205	GetDescription	
205	GetExtensions	
205	Load	

29.3.3 TWinPEImageResourceReader.CheckDosStub

Declaration: `function CheckDosStub(aStream: TStream) : Boolean`

Visibility: protected

29.3.4 TWinPEImageResourceReader.CheckPESignature

Declaration: `function CheckPESignature(aStream: TStream) : Boolean`

Visibility: protected

29.3.5 TWinPEImageResourceReader.GetExtensions

Declaration: `function GetExtensions : string; Override`

Visibility: protected

29.3.6 TWinPEImageResourceReader.GetDescription

Declaration: `function GetDescription : string; Override`

Visibility: protected

29.3.7 TWinPEImageResourceReader.Load

Declaration: `procedure Load(aResources: TResources; aStream: TStream); Override`

Visibility: protected

29.3.8 TWinPEImageResourceReader.CheckMagic

Declaration: `function CheckMagic(aStream: TStream) : Boolean; Override`

Visibility: protected

29.3.9 TWinPEImageResourceReader.Create

Declaration: `constructor Create; Override`

Visibility: public

29.3.10 TWinPEImageResourceReader.Destroy

Declaration: `destructor Destroy;` `Override`

Visibility: `public`