EGG

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This specification of EGG format is available on the following link.

* Download at: http://www.altools.co.kr/Product/ALZip_Egg.aspx

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Update History

Version	Change Description	Date
1.0	First Edition	09/28/2009
1.0	Added comment to algorithm, and corrected type-o	02/16/2011
1.0	License Updated	03/15/2011
1.0	Encrypt Header Table Updated	03/31/2011
1.0	Encrypt Header Table Updated – Added LEA	09/19/2016

Content

Section 1: Concept

Considerations for Design

Flexibility in Extensions
Modifying existing or adding new functions should be easy.

Compatibility to Previous Versions
Basic functions such as viewing and extracting of compressed files created by later version should be executed by previous versions.

Support Different Environments
It should support other operating systems besides Windows operating systems.

It should also apply on Stream, Embedded and other environments, not only on files.

Saving Specific Information on Each File
Have to save specific information on each file of the compressed file.

Random Access
Each compressed file should be extracted without extracting the entire compressed file.

Complete Support for Unicode
Saving data should be possible in both Unicode supported environment and Unicode unsupported environment.

Compressing Massive Capacity
There should be no error in compressing files with large capacity.

Support for Advanced Encryption
It should support verified encryption method such as AES in addition to the previous simple encryption method, and should also support for digital signature and DRM.

Reinforce Split Compressing Function
It should support split compressing function that restoration and extension is considered not just dividing files, and should maintain the same format.

Support for Solid Compression
It should support compressing function for Solid type.

Format Features

Compress Massive Capacity
Should support compression for large size more than 2GB or 4GB

Save String
Multi-byte, Unicode, utf-8 and other forms should be available when saving file names or comments.

Relative Path
Support for relative path of superior and sub relations.

Support for Encryption
Support Zip 2.0 Compatible, AES-128, AES-256 encryption methods.

Split Compression
Support 2*32–1 numbers of splits.

Forward Compatibility
Ensure basic forward compatibility.

Basic extracting should be available with v1.0 specification.

Data Block
Available to compress a single file into multi split blocks.

Byte Order
Little Endian

Header Features

Basic Header
Basic header has static capacity.

Extended Header
Iterate signature, length, data structure.

Each iteration continue until a stop-iterate signature appears.

Implement by handling only currently recognized signatures and skipping the rest.

Section 2: Specification

Overall

<table>
<tr><td colspan="3">EGG Header</td><td>1</td></tr>
<tr><td colspan="3">Extra Field1:
Split Compression
Solid Compression
Global Encryption Header</td><td>0~N</td></tr>
<tr><td>File Header</td><td>1</td><td rowspan="2">1~N</td><td rowspan="6">0~N</td></tr>
<tr><td>Extra Field 2:
Filename Header
Comment Header
Windows File Information
Posix File Information
Encrypt Header</td><td>0~N</td></tr>
<tr><td>Block Header</td><td>1</td><td rowspan="3">0~N</td></tr>
<tr><td>Extra Field 3</td><td>0~N</td></tr>
<tr><td>Compressed Data</td><td>1</td></tr>
<tr><td colspan="3">Extra Field 4:
Global Comment Header</td><td>0~N</td></tr>
</table>

EGG Header

Magic	4	0x41474745
Version	2	0x0100
Header ID	4	Random number of the program (Cannot be 0)
Reserved	4	0x00000000

File Header

Magic	4	0x0A8590E3
File ID	4	Unique value for each header (Includes 0)
File Length	8	Total size of the file

Block Header

Magic	4	0x02B50C13	
Compress Method	2	0	Algorithm Number 0-Store, 1-Deflate, 2-Bzip2, 3-AZO, 4-LZMA
		1	Hint
Uncompress Size	4	Size of the block before compressed	
Compress Size	4	Size of the block after compressed	
CRC32	4	CRC value of the block	

Split block of files exceeding 4G

Extra Field

Magic	4	Unique value for each field	
General Purpose Bit flag	1	1	0: Size of 2Byte 1: Size of 4Byte
		2	Always Unset
		3~8	Field Custom Bit
Size	2 or 4	Total data size of the field excluding Magic, Bit Flag and Size area.	

Encrypt Header

Magic(ENCRYP)	4	0x08D1470F	
Bit flag	1	0	
Size	17		
Encrypt Method	1	0	Key base XOR (Low security)
		1	AES128
		2	AES256
		5	LEA128
		6	LEA256
verify Data(Key Base)	12	Encryption Verification Data	
CRC32(Key Base)	4	Partial Block CRC	
AES Header(AES/LEA)	(128-10, 256-18)	AES/LEA Header	
AES Footer(AES/LEA)	10	AES/LEA Footer	

* Inserted in Extra Field 2(optional depending on KeyBase, AES or LEA)

Windows File Information

Magic	4	0x2C86950B	
Bit flag	1	0	
Size	2	9	
Last Modified DataTime	8	100-nanosecond Time since the Epoch (00:00:00 UTC, January 1, 1601)	
Attribute	1	bit	Description
		1	ReadOnly

		2	Hidden
		3	System File
		4	Link File (Junction File)
		5~7	Always Unset
		8	Directory

Posix File Information

Magic	4	0x1EE922E5
Bit flag	1	0
Size	2	20
Mode	4	0170000 bitmask for the file type bitfields 0140000 socket 0120000 symbolic link 0100000 regular file 0060000 block device 0040000 directory 0020000 character device 0010000 FIFO 0004000 set UID bit 0002000 set-group-ID bit (see below) 0001000 sticky bit (see below) 00700 mask for file owner permissions 00400 owner has read permission 00200 owner has write permission 00100 owner has execute permission 00070 mask for group permissions 00040 group has read permission 00020 group has write permission 00010 group has execute permission 00007 mask for permissions for others (not in group) 00004 others have read permission 00002 others have write permission 00001 others have execute permission
UID	4	user ID

GID	4	group ID
Last Modified Time	8	Second Time since the Epoch (00:00:00 UTC, January 1, 1970)

Dummy Header

Magic	4	0x07463307
Bit flag	1	0
Size	2	Size of Dummy Data
Dummy Data	size	Dummy Data. Ignore.

No need to consider if the size is too small to fit the dummy header because it can be distinguished by size calculation.

Filename Header

<table>
<tr><td>Magic</td><td>4</td><td colspan="3">0x0A8591AC</td></tr>
<tr><td rowspan="4">Bit flag</td><td rowspan="4">1</td><td>bit</td><td>Unset</td><td>Set</td></tr>
<tr><td>3</td><td>No encryption</td><td>Encrypt</td></tr>
<tr><td>4</td><td>Use UTF-8</td><td>Use area code</td></tr>
<tr><td>5</td><td>Absolute Path</td><td>Relative Path</td></tr>
<tr><td>Size</td><td>2</td><td colspan="3"></td></tr>
<tr><td>Locale</td><td>0 or 2</td><td colspan="3">Can specify locale when Unicode is not in use.

0: Depend on system locale
932: Japanese (Shift-JIS)
949: Korean

* Refence(IBM, MSDN)</td></tr>
<tr><td>Parent Path ID</td><td>0 or 4</td><td colspan="3">Exists only when the fifth Bit flag is set, and it is the ID of the file which possess parent path.</td></tr>
<tr><td>Name</td><td>N</td><td colspan="3">Exclude NULL character</td></tr>
</table>

Comment Header

Magic	4	0x04C63672		
Bit flag	1	bit	Unset	Set
		3	No Encryption	Encrypt
		4	Use UTF-8	Use area code
Size	2			
Comment	N	Exclude NULL character		

Split Compression

Magic	4	0x24F5A262
Bit flag	1	0
Size	2	8
Prev File ID	4	ID of previous file If 0, it is the first file.
Next File ID	4	ID of next file If 0, it is the last file.

It is the first file if previous file's ID is 0, and is the last file if next file's ID is 0.

Header and Extra Field shouldn't be cut when split compressing.

Compressed Block Data can be saved cut.

If header is excluded from the split size, insert Dummy Extra Field.

If file compression ratio not applied when split compressing, modify Magic of the header into Dummy Header or Skip Header (0xFFFF0000) so it can be skipped.

Solid Compression

Magic	4	0x24E5A060
Bit flag	1	0
Size	2	0

Section 3: Examples

Simple Archive

For Compressing String “hello”

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	01 00 00 00
	Reserved2	4	00 00 00 00
EOFARC	End of Egg Header	4	22 82 E2 08
File Header	Magic	4	E3 90 85 0A
	Uniq ID	4	00 00 00 00
	File Length	8	05 00 00 00 00 00 00 00
EOFARC	End of File Header	4	22 82 E2 08
Block Header	Magic	4	13 0C B5 02
	Compress Method(M)	1	00
	Compress Method(H)	1	00
	Uncompress Size	4	05 00 00 00
	Compress Size	4	05 00 00 00
	CRC32	4	86 A6 10 36
EOFARC	End of Block Header	4	22 82 E2 08
Compressed Data		5	'h' 'e' 'l' 'l' 'o'
EOFARC	End of Archive	4	22 82 E2 08

General File Archive

Compressing File hello.txt

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	01 00 00 00
	Reserved2	4	00 00 00 00
EOFARC	End of Egg Header	4	22 82 E2 08
File Header	Magic	4	E3 90 85 0A
	Uniq ID	4	00 00 00 00
	File Length	8	05 00 00 00 00 00 00 00
File Name	Magic	4	AC 91 85 0A
	Bit flag	1	00
	Size	2	09 00
	Name	9	'h' 'e' 'l' 'l' 'o' '.' 't' 'x' 't'
Windows File Information	Magic	4	0B 95 86 2C
	Bit flag	1	00
	Size	2	09 00
	Last Modified DataTime	8	23 C9 A3 4F 63 FB C7 01
	Attribute	1	00
EOFARC	End of File Header	4	22 82 E2 08
Block Header	Magic	4	13 0C B5 02
	Compress Method(M)	1	00
	Compress Method(H)	1	00
	Uncompress Size	4	05 00 00 00
	Compress Size	4	05 00 00 00
	CRC32	4	86 A6 10 36
EOFARC	End of Block Header	4	22 82 E2 08
Compressed Data		5	'h' 'e' 'l' 'l' 'o'
EOFARC	End of Archive	4	22 82 E2 08

Solid Archive

Compressing a.txt(1byte, “a”), b.txt(2byte, “bc”)

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	01 00 00 00
	Reserved2	4	00 00 00 00
Solid Header	Magic	4	60 A0 E5 24
	Bit flag	1	00
	Size	2	00 00
EOFARC	End of EGG Header	4	22 82 E2 08
File Header	Magic	4	E3 90 85 0A
	Uniq ID	4	00 00 00 00
	File Length	8	01 00 00 00 00 00 00 00
File Name	Magic	4	AC 91 85 0A
	Bit flag	1	00
	Size	2	05 00
	Name	5	'a' '.' 't' 'x' 't'
Windows File Information	Magic	4	0B 95 86 2C
	Bit flag	1	00
	Size	2	09 00
	Last Modified DataTime	8	23 C9 A3 4F 63 FB C7 01
	Attribute	1	00
EOFARC	End of File Header	4	22 82 E2 08
File Header	Magic	4	E3 90 85 0A

	Uniq ID	4	01 00 00 00
	File Length	8	02 00 00 00 00 00 00 00
File Name	Magic	4	AC 91 85 0A
	Bit flag	1	00
	Size	2	05 00
	Name	5	'b' '.' 't' 'x' 't'
Windows File Information	Signature	4	0B 95 86 2C
	Bit flag	1	00
	Size	2	09 00
	Last Modified DataTime	8	67 FA A3 4F 63 FB C7 01
	Attribute	1	00
EOFARC	End of File Header	4	22 82 E2 08
Block Header	Magic	4	13 0C B5 02
	Compress Method(M)	1	00
	Compress Method(H)	1	00
	Uncompress Size	4	03 00 00 00
	Compress Size	4	03 00 00 00
	CRC32	4	6D 48 83 9E
EOFARC	End of Block Header	4	22 82 E2 08
Compressed Data		3	'a' 'b' 'c'
EOFARC	End of Archive	4	22 82 E2 08

Big File Archive

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	01 00 00 00
	Reserved2	4	00 00 00 00
EOFARC	End of Archive	4	22 82 E2 08
File Header	Magic	4	E3 90 85 0A
	Uniq ID	4	00 00 00 00
	File Length	8	00 00 00 00 00 00 00 18
File Name	Magic	4	AC 91 85 0A
	Bit flag	1	00
	Size	2	08 00
	Name	8	't' 'e' 's' 't' '.' 'd' 'a' 't'
Windows File Information	Magic	4	0B 95 86 2C
	Bit flag	1	00
	Size	2	09 00
	Last Modified DataTime	8	23 C9 A3 4F 63 FB C7 01
	Attribute	1	00
EOFARC	End of File Header	4	22 82 E2 08
Block Header	Magic	4	13 0C B5 02
	Compress Method(M)	1	00
	Compress Method(H)	1	00
	Uncompress Size	4	C0 00 00 00
	Compress Size	4	C0 00 00 00
	CRC32	4	B2 A6 34 25
EOFARC	End of Block Header	4	22 82 E2 08
Compressed Data		3G	…
Block Header	Magic	4	22 82 E2 08
	Compress Method(M)	1	00
	Compress Method(H)	1	00

	Uncompress Size	4	C0 00 00 00
	Compress Size	4	C0 00 00 00
	CRC32	4	86 A8 13 36
EOFARC	End of Block Header	4	22 82 E2 08
Compressed Data		3G	….
EOFARC	End of Block Header	4	22 82 E2 08

Split Archive

Split Compressing Hello.txt into 64Bytes

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	01 00 00 00
	Reserved2	4	00 00 00 00
Split Header	Magic	4	62 A2 F5 24
	Bit flag	1	00
	Size	2	08 00
	Prev File ID	4	00 00 00 00
	Next File ID	4	02 00 00 00
EOFARC	End of Archive	4	22 82 E2 08
File Header	Magic	4	E3 90 85 0A
	Uniq ID	4	00 00 00 00
	File Length	8	04 00 00 00 00 00 00 00
Dummy	Magic	4	07 33 46 07
	Bit flag	1	00
	Size	2	08 00
	Dummy Data	8	00 00 00 00 00 00 00 00

total 64 Byte

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	02 00 00 00
	Reserved2	4	00 00 00 00

Split Header	Magic	4	62 A2 F5 24
	Bit flag	1	00
	Size	2	08 00
	Prev File ID	4	01 00 00 00
	Next File ID	4	03 00 00 00
EOFARC	End of Archive	4	22 82 E2 08
File Name	Magic	4	AC 91 85 0A
	Bit flag	1	00
	Size	2	09 00
	Name	9	'h' 'e' 'l' 'l' 'o' '.' 't' 'x' 't'
Dummy	Magic	4	07 33 46 07
	Bit flag	1	00
	Size	2	08 00
	Dummy Data	8	00 00 00 00 00 00 00 00

total 64 byte

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	03 00 00 00
	Reserved2	4	00 00 00 00
Split Header	Magic	4	62 A2 F5 24
	Bit flag	1	00
	Size	2	08 00
	Prev File ID	4	02 00 00 00

	Next File ID	4	04 00 00 00
EOFARC	End of Archive	4	22 82 E2 08
Windows File Information	Magic	4	0B 95 86 2C
	Bit flag	1	00
	Size	2	09 00
	Last Modified DataTime	8	23 C9 A3 4F 63 FB C7 01
	Attribute	1	00
Dummy	Magic	4	07 33 46 07
	Bit flag	1	00
	Size	2	08 00
	Dummy Data	8	00 00 00 00 00 00 00 00

total 64 byte

EGG Header	Magic	4	45 47 47 41
	Version	2	00 01
	File ID	4	04 00 00 00
	Reserved2	4	00 00 00 00
Split Header	Magic	4	62 A2 F5 24
	Bit flag	1	00
	Size	2	08
	Prev File ID	4	03 00 00 00
	Next File ID	4	00 00 00 00
EOFARC	End of Archive	4	22 82 E2 08
Block Header	Magic	4	13 0C B5 02
	Compress Method(M)	1	00

	Compress Method(H)	1	00
	Uncompress Size	4	04 00 00 00
	Compress Size	4	04 00 00 00
	CRC32	4	86 A6 10 36
EOFARC	End of Archive	4	22 82 E2 08
Compressed Data		4	'e' 'x' 'i' 't'
EOFARC	End of Archive	4	22 82 E2 08

total 63 byte

Section 4: Binary Samples

Hello.txt – 5Bytes string (‘h’, ‘e’, ‘l’, ‘l’, ‘o’)

45	47	47	41	00	01	01	00	00	00	00	00	00	00	22	82
Egg Signature				Version		ID				Reserved				End	
E2	08	E3	90	85	0A	00	00	00	00	05	00	00	00	00	00
Signature		File Signature				ID				File Length					
00	00	AC	91	85	0A	00	09	00	‘h’	‘e’	‘l’	‘l’	‘o’	‘.’	‘t’
		Filename Signature				BF	Size		File Name						
‘x’	‘t’	0B	95	86	2C	00	09	00	80	95	7F	15	43	DD	C9
		File Attribute(Win)				BF	Size		DateTime						
01	00	22	82	E2	08	13	0C	B5	02	00	00	05	00	00	00
	Attr	Eng Signature				Block Signature				CM	Hint	Uncompress Size			
05	00	00	00	86	A6	10	35	22	82	E2	08	‘h’	‘e’	‘l’	‘l’
Compress Size				CRC32				End Signature				Data			
‘o’	22	82	E2	08											
	End Signature														

Section 5: Signatures

EGG Header	0x41474745
File Header	0x0A8590E3
Block Header	0x02B50C13
Encrypt Header	0x08D1470F
Filename Header	0x0A8591AC
Windows File Information	0x2C86950B
Posix File Information	0x1EE922E5
Comment Header	0x04C63672
Split Compression	0x24F5A262
Dummy Header	0x07463307
Skip Header	0xFFFF0000
Global Encrypt Header	0x08D144A8