GameX

An Asset Guide to Video Games

Sky Morey

Families

The following are the game tables per family

Bethesda Family

Bethesda Game Studios is an American video game developer and a studio of ZeniMax Media based in Rockville, Maryland. It is best known for its action role-playing franchises, including The Elder Scrolls, Fallout, and Starfield. Bethesda Game Studios opened in 2001 as the development unit of Bethesda Softworks, separating from publishing operations. Todd Howard serves as the studio's executive producer, leading it with managing director Ashley Cheng and studio director Angela Browder. As of November 2023, Bethesda Game Studios had 450 employees. [Bethesda]

References

- [Bethesda]^*Wikipedia*. "Bethesda Game Studios" (2025, September 08). https://en.wikipedia.org/w/index.php?title=Bethesda_Game_Studios&oldid=1310201512.

Binary Formats

Binary: Ba2

The BA2 file format

There is a single format of a BA2 file, we use magic to determine which.

Fallout 4 - Starfield

The BA2 file format for Fallout4 through Starfield

if magic = F4_BSAHEADER_FILEID:

ID	Field	Type	Description
HDR	**Header**		
	Version	uint:4	
	Type	uint:4	GNRL=General, DX10=Textures, GNMF=
	NumFiles	uint:4	
	NameTableOffset	ulong:8	Relative to start of file

ID	Field	Type	Description
FILE	**File**		
	NameHash	uint:4	
	Ext	ascii:4	extension
	DirHash	uint:4	
	Flags	uint:4	Flags: 00100100
	Offset	ulong:8	Relative to start of file
	PackedSize	uint:4	Packed length (zlib)
	FileSize	uint:4	Unpacked length
	Align	uint:4	BAADF00D
TEX	**Texture**		
	NameHash	uint:4	
	Ext	ascii:4	extension
	DirHash	uint:4	
	Unk0C	byte:1	
	NumChunks	byte:1	
	ChunkHeaderSize	ushort:2	Size of one chunk header
	Height	ushort:2	
	Width	ushort:2	
	NumMips	byte:1	
	Format	byte:1	DXGI_FORMAT
	IsCubemap	byte:1	
	TileMode	byte:1	

ID	Field	Type	Description
GNMF	**Texture**		
	NameHash	uint:4	
	Ext	ascii:4	extension
	DirHash	uint:4	
	Unk0C	byte:1	
	NumChunks	byte:1	
	Unk0E	ushort:2	
	Header	bytes:32	
	Offset	ulong:8	
	PackedSize	uint:4	
	FileSize	uint:4	
	Unk40	uint:4	
	Align	uint:4	
TEXC	**Texture Chunk**		
	Offset	ulong:8	
	PackedSize	uint:4	
	FileSize	uint:4	
	StartMip	ushort:2	
	EndMip	ushort:2	
	Align	uint:4	

To access a FILE

```
r.seek(file.position)
# General BA2 Format
if file.fileInfo == null:
    return
        decompressZlib2(r, file.packedSize, file.fileSize) if file.compressed != 0 else \
        r.read(file.fileSize)
```

Source code

```
# Binary_Ba2
class Binary_Ba2(ArcBinaryT):

    #region Headers : TES5

    # Default header data
    F4_BSAHEADER_FILEID = 0x58445442    # Magic for Fallout 4 BA2, the literal string "BTDX".
    F4_BSAHEADER_VERSION1 = 0x01        # Version number of a Fallout 4 BA2
    F4_BSAHEADER_VERSION2 = 0x02        # Version number of a Starfield BA2

    class F4_HeaderType(Enum):
```

```
        GNRL = 0x4c524e47
        DX10 = 0x30315844
        GNMF = 0x464d4e47

    class F4_Header:
        _struct = ('<3IQ', 20)
        def __init__(self, tuple):
            self.version, \
            self.type, \
            self.numFiles, \
            self.nameTableOffset = tuple
            self.type = Binary_Ba2.F4_HeaderType(self.type)

    class F4_File:
        _struct = ('<4IQ3I', 36)
        def __init__(self, tuple):
            self.nameHash, \
            self.ext, \
            self.dirHash, \
            self.flags, \
            self.offset, \
            self.packedSize, \
            self.fileSize, \
            self.align = tuple

    class F4_Texture:
        _struct = ('<3I2B3H4B', 24)
        def __init__(self, tuple):
            self.nameHash, \
            self.ext, \
            self.dirHash, \
            self.unk0C, \
            self.numChunks, \
            self.chunkHeaderSize, \
            self.height, \
            self.width, \
            self.numMips, \
            self.format, \
            self.isCubemap, \
            self.tileMode = tuple

    class F4_TextureChunk:
        _struct = ('<Q2I2HI', 24)
        def __init__(self, tuple):
            self.offset, \
            self.packedSize, \
            self.fileSize, \
            self.startMip, \
            self.endMip, \
            self.align = tuple

    class F4_GNMF:
        _struct = ('<3I2BH32sQ4I', 72)
        def __init__(self, tuple):
            self.nameHash, \
            self.ext, \
            self.dirHash, \
            self.unk0C, \
            self.numChunks, \
            self.unk0E, \
            self.header, \
            self.offset, \
            self.packedSize, \
            self.fileSize, \
            self.unk40, \
            self.align = tuple

    #endregion

    # read
```

```
    def read(self, source: BinaryArchive, r: BinaryReader, tag: object = None) -> None:
        source.magic = magic = r.readUInt32()

        # Fallout 4 - Starfield
        if magic == self.F4_BSAHEADER_FILEID:
            header = r.readS(self.F4_Header)
            if header.version > self.F4_BSAHEADER_VERSION2:
                raise Exception('BAD MAGIC')
            source.version = header.version
            source.files = files = [None] * header.numFiles
            # version2
            # if header.version == self.F4_BSAHEADER_VERSION2: r.skip(8)

            # General BA2 Format
            match header.type:
                # General BA2 Format
                case self.F4_HeaderType.GNRL:
                    headerFiles = r.readTArray(self.F4_File, header.numFiles)
                    for i in range(header.numFiles):
                        headerFile = headerFiles[i]
                        files[i] = FileSource(
                            compressed = 1 if headerFile.packedSize != 0 else 0,
                            packedSize = headerFile.packedSize,
                            fileSize = headerFile.fileSize,
                            offset = headerFile.offset)
                # Texture BA2 Format
                case self.F4_HeaderType.DX10:
                    for i in range(header.numFiles):
                        headerTexture = r.readS(self.F4_Texture)
                        headerTextureChunks = r.readTArray(self.F4_TextureChunk, headerTexture.numChunks)
                        firstChunk = headerTextureChunks[0]
                        files[i] = FileSource(
                            fileInfo = headerTexture,
                            packedSize = firstChunk.packedSize,
                            fileSize = firstChunk.fileSize,
                            offset = firstChunk.offset,
                            tag = headerTextureChunks)
                # GNMF BA2 Format
                case self.F4_HeaderType.GNMF:
                    for i in range(header.numFiles):
                        headerGNMF = r.readS(self.F4_GNMF)
                        headerTextureChunks = r.readTArray(self.F4_TextureChunk, headerGNMF.numChunks)
                        files[i] = FileSource(
                            fileInfo = headerGNMF,
                            packedSize = headerGNMF.packedSize,
                            fileSize = headerGNMF.fileSize,
                            offset = headerGNMF.offset,
                            tag = headerTextureChunks)
                case _: raise Exception(f'Unknown: {header.type}')

            # assign full names to each file
            if header.nameTableOffset > 0:
                r.seek(header.nameTableOffset)
                path = r.readL16Encoding().replace('\\', '/')
                for file in files: file.path = path

    # readData
    def readData(self, source: BinaryArchive, r: BinaryReader, file: FileSource, option: object = None) -> BytesIO:
        r.seek(file.offset)

        # General BA2 Format
        if file.fileInfo == None:
            return BytesIO(
                decompressZlib(r, file.packedSize, file.fileSize) if file.compressed != 0 else \
                r.readBytes(file.fileSize))

        # Texture BA2 Format
        elif file.fileInfo is self.F4_Texture:
            pass
```

```
        # GNMF BA2 Format
        elif file.fileInfo is self.F4_GNMF:
            pass

        else: raise Exception(f'Unknown fileInfo: {file.fileInfo}')
```

Binary: Bsa

The BSA file format

There are two formats of a BSA file, we use magic to determine which.

Oblivion - Skyrim

The BSA file format for Oblivion through Skyrim

if magic = OB_BSAHEADER_FILEID:

ID	Type	Field	Description
HDR			**Header**
	uint:4	version	04
	uint:4	folderRecordOffset	Offset of beginning of folder records
	uint:4	archiveFlags	Archive flags
	uint:4	folderCount	Total number of folder records (OBBSAFolderInfo)
	uint:4	fileCount	Total number of file records (OBBSAFileInfo)
	uint:4	folderNameLength	Total length of folder names
	uint:4	fileNameLength	Total length of file names
	uint:4	fileFlags	File flags
FLDR1	repeat: folderCount		**Folder** (SSE)
	ulong:8	hash	Hash of the folder name
	uint:4	fileCount	Number of files in folder
	uint:4	offset	The offset
FLDR2	repeat: folderCount		**Folder** (not SSE)
	ulong:8	hash	Hash of the folder name
	uint:4	fileCount	Number of files in folder
	uint:4	unk	Unknown
	ulong:8	offset	The offset

ID	Type	Field	Description
FLNM	repeat: folderCount		**Folder Name**
	ascii:l8-1	folderName	The folder name
	byte:1	unk	Unknown
FILE	repeat: fileCount		**File**
	ulong:8	hash	Hash of the filename
	uint:4	size	Size of the data, possibly with OB_BSAFILE_SIZECOMPRESS set
	uint:4	offset	Offset to raw file data

Morrowind

The BSA file format for Morrowind

if magic = MW_BSAHEADER_FILEID

ID	Type	Field	Description
HDR			**Header**
	uint:4	HashOffset	Offset of hash table minus header size (12)
	uint:4	fileCount	Number of files in the archive
FILE	repeat: fileCount		**File**
	uint:4	fileSize	File size
	uint:4	fileOffset	File offset relative to data position
	formula:-	getSize()	The size of the file inside the BSA
FNOFF	repeat: fileCount		**Filename Offsets**
	uint:4	offset	Offset
FNAME	repeat: fileCount, seek: filenameOffsets		**Filenames**
	cstr:+	path	File path

To access a FILE

```
fileSize = file.packedSize & self.OB_BSAFILE_SIZEMASK if source.version == self.SSE_BSAHEADER_VERSION else
file.packedSize
r.seek(file.position)
if source.params['namePrefix'] == 'Y':
    prefixLength = r.readByte() + 1
    if source.version == self.SSE_BSAHEADER_VERSION: fileSize -= prefixLength
    r.seek(file.position + prefixLength)

# not compressed
if fileSize <= 0 or file.compressed == 0:
    return r.read(fileSize)

# compressed
```

```
newFileSize = r.readUInt32(); fileSize -= 4
return
    decompressLz4(r, fileSize, newFileSize) if source.version == self.SSE_BSAHEADER_VERSION else \
    decompressZlib2(r, fileSize, newFileSize)
```

Source code

```
# Binary_Bsa
class Binary_Bsa(ArcBinaryT):

    #region Headers : TES4

    OB_BSAHEADER_FILEID = 0x00415342    # Magic for Oblivion BSA, the literal string "BSA\0".
    OB_BSAHEADER_VERSION = 0x67         # Version number of an Oblivion BSA
    F3_BSAHEADER_VERSION = 0x68         # Version number of a Fallout 3 BSA
    SSE_BSAHEADER_VERSION = 0x69        # Version number of a Skyrim SE BSA

    # Archive flags
    OB_BSAARCHIVE_PATHNAMES = 0x0001    # Whether the BSA has names for paths
    OB_BSAARCHIVE_FILENAMES = 0x0002    # Whether the BSA has names for files
    OB_BSAARCHIVE_COMPRESSFILES = 0x0004 # Whether the files are compressed
    F3_BSAARCHIVE_PREFIXFULLFILENAMES = 0x0100 # Whether the name is prefixed to the data?

    # Bitmasks for the size field in the header
    OB_BSAFILE_SIZEMASK = 0x3fffffff    # Bit mask with OB_HeaderFile:SizeFlags to get the compression status
    OB_BSAFILE_SIZECOMPRESS = 0xC0000000 # Bit mask with OB_HeaderFile:SizeFlags to get the compression status

    class OB_Header:
        _struct = ('<8I', 32)
        def __init__(self, tuple):
            self.version, \
            self.folderRecordOffset, \
            self.archiveFlags, \
            self.folderCount, \
            self.fileCount, \
            self.folderNameLength, \
            self.fileNameLength, \
            self.fileFlags = tuple

    class OB_Folder:
        _struct = ('<Q2I', 16)
        def __init__(self, tuple):
            self.hash, \
            self.fileCount, \
            self.offset = tuple

    class OB_FolderSSE:
        _struct = ('<Q2IQ', 24)
        def __init__(self, tuple):
            self.hash, \
            self.fileCount, \
            self.unk, \
            self.offset = tuple

    class OB_File:
        _struct = ('<Q2I', 16)
        def __init__(self, tuple):
            self.hash, \
            self.size, \
            self.offset = tuple

    #endregion

    #region Headers : TES3

    MW_BSAHEADER_FILEID = 0x00000100    # Magic for Morrowind BSA
```

```
    class MW_Header:
        _struct = ('<2I', 8)
        def __init__(self, tuple):
            self.hashOffset, \
            self.fileCount = tuple

    class MW_File:
        _struct = ('<2I', 8)
        def __init__(self, tuple):
            self.fileSize, \
            self.fileOffset = tuple
        @property
        def size(self): return self.fileSize & 0x3FFFFFFF if self.fileSize > 0 else 0

    #endregion

    # read
    def read(self, source: BinaryArchive, r: BinaryReader, tag: object = None) -> None:
        files: list[FileSource]
        magic = source.magic = r.readUInt32()

        # Oblivion - Skyrim
        if magic == self.OB_BSAHEADER_FILEID:
            header = r.readS(self.OB_Header)
            if header.version != self.OB_BSAHEADER_VERSION \
                and header.version != self.F3_BSAHEADER_VERSION \
                and header.version != self.SSE_BSAHEADER_VERSION:
                raise Exception('BAD MAGIC')
            if (header.archiveFlags & self.OB_BSAARCHIVE_PATHNAMES) == 0 \
                or (header.archiveFlags & self.OB_BSAARCHIVE_FILENAMES) == 0:
                raise Exception('HEADER FLAGS')
            source.version = header.version

            # calculate some useful values
            compressedToggle = (header.archiveFlags & self.OB_BSAARCHIVE_COMPRESSFILES) > 0
            if header.version == self.F3_BSAHEADER_VERSION \
                or header.version == self.SSE_BSAHEADER_VERSION:
                source.tag = (header.archiveFlags & self.F3_BSAARCHIVE_PREFIXFULLFILENAMES) > 0

            # read-all folders
            foldersFiles = [x.fileCount for x in r.readSArray(self.OB_FolderSSE, header.folderCount)] if header.version
== self.SSE_BSAHEADER_VERSION else \
                [x.fileCount for x in r.readSArray(self.OB_Folder, header.folderCount)]

            # read-all folder files
            fileX = 0
            source.files = files = [None] * header.fileCount
            for i in range(header.folderCount):
                folderName = r.readFAString(r.readByte() - 1).replace('\\', '/')
                r.skip(1)
                headerFiles = r.readSArray(self.OB_File, foldersFiles[i])
                for headerFile in headerFiles:
                    compressed = (headerFile.size & self.OB_BSAFILE_SIZECOMPRESS) != 0
                    packedSize = headerFile.size ^ self.OB_BSAFILE_SIZECOMPRESS if compressed else headerFile.size
                    files[fileX] = FileSource(
                        path = folderName,
                        offset = headerFile.offset,
                        compressed = 1 if compressed ^ compressedToggle else 0,
                        packedSize = packedSize,
                        fileSize = packedSize & self.OB_BSAFILE_SIZEMASK if source.version ==
self.SSE_BSAHEADER_VERSION else packedSize)
                    fileX += 1

            # read-all names
            for file in files: file.path = f'{file.path}/{r.readVWString()}'

        # Morrowind
        elif magic == self.MW_BSAHEADER_FILEID:
            header = r.readS(self.MW_Header)
            dataOffset = 12 + header.hashOffset + (header.fileCount << 3)
```

```
            # create filesources
            source.files = files = [None] * header.fileCount
            headerFiles = r.readSArray(self.MW_File, header.fileCount)
            for i in range(header.fileCount):
                headerFile = headerFiles[i]
                size = headerFile.size
                files[i] = FileSource(
                    offset = dataOffset + headerFile.fileOffset,
                    compressed = 0,
                    fileSize = size,
                    packedSize = size)

            # read filename offsets
            filenameOffsets = r.readPArray(None, 'I', header.fileCount) # relative offset in filenames section

            # read filenames
            filenamesPosition = r.tell()
            for i in range(header.fileCount):
                r.seek(filenamesPosition + filenameOffsets[i])
                files[i].path = r.readVAString(1000).replace('\\', '/')
        else: raise Exception('BAD MAGIC')

    # readData
    def readData(self, source: BinaryArchive, r: BinaryReader, file: FileSource, option: object = None) -> BytesIO:
        # position
        fileSize = file.fileSize
        r.seek(file.offset)
        if source.tag:
            prefixLength = r.readByte() + 1
            if source.version == self.SSE_BSAHEADER_VERSION: fileSize -= prefixLength
            r.seek(file.offset + prefixLength)

        # not compressed
        if fileSize <= 0 or file.compressed == 0:
            return BytesIO(r.readBytes(fileSize))

        # compressed
        newFileSize = r.readUInt32(); fileSize -= 4
        return BytesIO(
            decompressLz4(r, fileSize, newFileSize) if source.version == self.SSE_BSAHEADER_VERSION else \
            decompressZlib(r, fileSize, newFileSize))
```

Records

Records

Records for bb

Records

The BA2 file format for Fallout4 through Starfield

ID	Type	Field	Action	Description
AACT	**Action - 0050**			
	EDID	STRVField		Editor ID
	CNAM	CREFField		RGB Color

	To access a FILE
	`class AACTRecord(Record):`
	`  CNAM: CREFField # RGB Color`
	`  def createField(self, r: Header, type: FieldType, dataSize: int) -> object:`
	`  match type:`
	`  case FieldType.EDID: return self.EDID := r.readSTRV(dataSize)`
	`  case FieldType.CNAM: return self.CNAM := r.readS(CREFField, dataSize)`
	`  case _: return Record.empty`			

ID	Type	Field	Action	Description
ACRE	**Placed creature - 0400**			
	EDID	STRVField		Editor ID
	NAME	RefField<Record>		Base
	DATA	REFRRecord.DATAField		Position/Rotation
	XOWN+	List<CELLRecord.XOWNGroup>	XOWNs.add	Ownership (optional)
	XRNK^	IN32Field	XOWN.last.XRNK	Faction Rank
	XGLB^	RefField<Record>	XOWN.last.XGLB	Faction Glob
	XESP	REFRRecord.XESPField		Enable Parent (optional)
	XSCL	FLTVField		Scale (optional)
	XRGD	BYTVField		Ragdoll Data (optional)

```
class ACRERecord(Record):
    NAME: RefField[Record] # Base
    DATA: REFRRecord.DATAField # Position/Rotation
    XOWNs: list[CELLRecord.XOWNGroup] # Ownership (optional)
    XESP: REFRRecord.XESPField # Enable Parent (optional)
    XSCL: FLTVField # Scale (optional)
    XRGD: BYTVField # Ragdoll Data (optional)

    def createField(self, r: Header, type: FieldType, dataSize: int) -> object:
        match type:
            case FieldType.EDID: return self.EDID := r.readSTRV(dataSize)
            case FieldType.NAME: return self.NAME := RefField[Record](r, dataSize)
            case FieldType.DATA: return self.DATA := REFRRecord.DATAField(r, dataSize)
            case FieldType.XOWN: return self.XOWNs := addX((self.XOWNs or []), CELLRecord.XOWNGroup(XOWN
= RefField[Record](r, dataSize)))
            case FieldType.XRNK: return XOWNs.Last().XRNK = r.readS(IN32Field, dataSize)
            case FieldType.XGLB: return XOWNs.Last().XGLB = RefField<Record>(r, dataSize)
            case FieldType.XESP: return self.XESP := REFRRecord.XESPField(r, dataSize)
            case FieldType.XSCL: return self.XSCL := r.readS<FLTVField>(dataSize)
            case FieldType.XRGD: return self.XRGD := r.readBYTV(dataSize)
            case _: return Record.empty
```

ID	Type	Field	Action	Description
ACHR	**Actor Reference - 0450**			
	EDID	STRVField		Editor ID
	NAME	RefField<Record>		Base
	DATA	REFRRecord.DATAField		Position/Rotation
	XPCI	RefField<CELLRecord>		Unused (optional)
	FULL	String	XPCI.Value.SetName	Unused (optional)
	XLOD	BYTVField		Distant LOD Data (optional)
	XESP	REFRRecord.XESPField		Enable Parent (optional)
	XMRC	RefField<REFRRecord>		Merchant Container (optional)
	XHRS	RefField<ACRERecord>		Horse (optional)
	XSCL	FLTVField		Scale (optional)
	XRGD	BYTVField		Ragdoll Data (optional)
ACTI	**Activator - 3450**			IHaveMODL
	EDID, NAME	STRVField		Editor ID
	MODL	MODLGroup		Model Name
	MODB	MODBField	MODL.MODBField	Model Bound
	MODT	MODTField	MODL.MODTField	Model Texture
	FULL, FNAM	STRVField		Item Name
	SCRI	STRVField		Script (Optional)
	TES4			
	SNAM	RefField<SOUNRecord>		Sound (Optional)
ADDN	**Addon Node - 0050**			
	EDID	STRVField		Editor ID
	CNAM	CREFField		RGB Color

ID	Type	Field	Action	Description
ALCH				

	SCRI	RefField<SCPTRecord>		Script (optional)

ID	Type	Field	Action	Description
	ENIT	ENITField	DATA.ENITField	
	EFID	n/a	{skip}	
	EFIT+	List<ENCHRecord.EFITField>		Effect Data
	SCIT+	List<ENCHRecord.SCITField>		Script Effect Data

AMMO	**Ammo - 0450**			
	DATAField **If** / **Name** / **Type** / **Description** (Weight / float:4) TES3 / Value / int:4 TES3 / Flags / int:4 / AutoCalc ENITField() / Value / int:4 ENITField() / Flags / byte:1 ENITField() / {skip} / byte:3 / Unknown			
	EDID	STRVField		Editor ID
	MODL	MODLGroup		Model
	MODB	MODBField	MODL.MODBField	Model Bound
	MODT	MODTField	MODL.MODTField	Model Textures
	FULL	STRVField		Item Name
	ICON	FILEField		Male Icon (optional)
	ENAM	RefField<ENCHRecord>		Enchantment ID (optional)
	ANAM	IN16Field		Enchantment Points (optional)
	DATA	DATAField^		Ammo Data

ID	Type	Field	Action	Description
ANIO	**Animated Object - 0450**			IHaveMODL
	EDID	STRVField		Editor ID
	MODL	MODLGroup	MODL.MODBField	Model
	MODB	MODBField		Model Bound
	DATA	RefField<IDLERecord>		IDLE Animation

ID	Type	Field	Action	Description
APPA	**Alchem Apparatus - 3450**			
	DATAField **If** / **Name** / **Type** / **Description** TES3 / Type / int:4(byte:1) / 0 = Mortar and Pestle, 1 = Albemic, 2 = Calcinator, 3 = Retort TES3 / Quality / float:4 / TES3 / Weight / float:4 / TES3 / Value / int:4 / else / Type / byte:1 / 0 = Mortar and Pestle, 1 = Albemic, 2 = Calcinator, 3 = Retort else / Value / int:4 / else / Weight / float:4 / else / Quality / float:4 /			
	EDID, NAME	STRVField		Editor ID
	MODL	MODLGroup		Model
	MODB	MODBField	MODL.MODBField	Model Bound
	MODT	MODTField	MODL.MODTField	Model Textures
	FULL, FNAM	STRVField		Item Name
	DATA	DATAField^		Alchemy Data
	ICON	FILEField		Inventory Icon
	SCRI	RefField<SCPTRecord>		Script Name
ARMA	**Armature (Model) - 0050**			
	EDID	STRVField		Editor ID

ID	Type	Field	Action	Description
ARMO				

		NDXFieldGroup>		
	BNAM^	STRVField	INDXs.Last().BNA	

ID	Type	Field	Action	Description
	CNAM^	STRVField	INDXs.Last().BNAM	
	TES4			
	BMDT	UI32Field		Flags
	MOD2	MODLGroup		Male Biped Model
	MO2B	MODBField	MO2B.MODBField	Male Biped Model Bound
	MO2T	MODTField	MO2T.MODTField	Biped Model Textures
	MOD3	MODLGroup		Female Biped Model (optional)
	MO3B	MODBField	MO3B.MODBField	Female Biped Model Bound
	MO3T	MODTField	MO3T.MODTField	Female Biped Model Textures
	MOD4	MODLGroup		Female World Model (optional)
	MO4B	MODBField	MO4B.MODBField	Female World Model Bound
	MO4T	MODTField	MO4T.MODTField	Female World Model Textures
	ICO2	FILEField		Female Icon (optional)
	ANAM	IN16Field		Enchantment Points (optional)
ARTO	**Art Object - 0050**			
	EDID	STRVField		Editor ID
	CNAM	CREFField		RGB Color
ASPC	**Acoustic Space - 0050**			
	EDID	STRVField		Editor ID
	CNAM	CREFField		RGB Color
ASTP	**Association Type - 0050**			
	EDID	STRVField		Editor ID
	CNAM	CREFField		RGB Color
AVIF	**Actor Values_Perk Tree Graphics - 0050**			
	EDID	STRVField		Editor ID
	CNAM	CREFField		RGB Color

<table>
<tr><th>ID</th><th>Type</th><th>Field</th><th>Action</th><th>Description</th></tr>
<tr><td>BODY</td><td colspan="3">Body - 3000</td><td>IHaveMODL</td></tr>
<tr><td></td><td colspan="4">BYDTField
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<tr><th>If</th><th>Name</th><th>Type</th><th>Description</th></tr>
<tr><td></td><td>Part</td><td>byte:1</td><td></td></tr>
<tr><td></td><td>Vampire</td><td>byte:1</td><td></td></tr>
<tr><td></td><td>Flags</td><td>byte:1</td><td></td></tr>
<tr><td></td><td>PartType</td><td>byte:1</td><td></td></tr>
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<tr><td></td><td>EDID</td><td>STRVField</td><td></td><td>Editor ID</td></tr>
<tr><td></td><td>MODL</td><td>MODLGroup</td><td></td><td>NIF Model</td></tr>
<tr><td></td><td>FNAM</td><td>STRVField</td><td></td><td>Body Name</td></tr>
<tr><td></td><td>BYDT</td><td>BYDTField^</td><td></td><td></td></tr>
</table>

ID	Type	Field	Action	Description
BOOK	**Book - 3450**			IHaveMODL
	DATAField			

If	Name	Type	Description
TES3	Weight	float:4	
TES3	Value	int:4	
TES3	Flags	int:4(byte:1)	Scroll - (1 is scroll, 0 not)
TES3	Teaches	int:4(byte:1)	SkillId - (-1 is no skill)
TES3	EnchantPts	int:4	
else	Flags	byte:1	Scroll - (1 is scroll, 0 not)
else	Teaches	byte:1	SkillId - (-1 is no skill)
else	Value	int:4	
else	Weight	float:4	
else	EnchantPts	{default}	

EDID, NAME	STRVField		Editor ID
MODL	MODLGroup		Model (optional)
MODB	MODBField	MODL.MODBField	Model Bound
MODT	MODTField	MODL.MODTField	Model Textures
FULL, FNAM	STRVField		Item Name
DATA, BKDT	DATAField^		Book Data
ICON, ITEX	FILEField		Inventory Icon (optional)
SCRI	RefField<SCPTRecord>		Script Name (optional)
DESC, TEXT	STRVField		Book Text
ENAM	RefField<ENCHRecord>		Enchantment FormId (optional)
ANAM	IN16Field		Enchantment points (optional)

ID	Type	Field	Action	Description
BSGN	**Birthsign - 3400**			
	EDID, DATA	STRVField		Editor ID
	FULL, FNAM	STRVField		Sign Name
	ICON, TNAM	FILEField		Texture
	DESC	STRVField		Description
	SPLO+	List<RefField<Record>>	SPLOs.AddX	TES3: Spell/ability
	NPCS+	List<STRVField>	NPCSs.AddX	TES4: (points to a SPEL or LVSP record)

ID	Type	Field	Action	Description
CELL				

ID	Type	Field	Action	Description

	Directional RotationZ	int:4		

ID	Type	Field	Action	Description
	EDID	STRVField		Editor ID
	EDID	STRVField		Editor ID

Family Info

Bethesda
name: Bethesda Game Studios
studio: Bethesda Game Studios
description: File formats used by Bethesda


List of Engines

ID	Name
Gamebryo	Gamebryo
Creation	Creation Engine
Creation2	Creation Engine 2

List of Games

ID	Name	Date	Exts	Urls
Morrowind	The Elder Scrolls III: Morrowind Engine: Gamebryo	Apr 29, 2002	.bsa, .esm	

Files	Value
Steam	22320
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 22320
Local	Morrowind
Data Files	

Virtuals	Value
Morrowind.cell	b'-2,-9'
Morrowind.start	b'-137.94f,2.30f,-1037.6f'

IHRA	IHRA Professional Drag Racing 2005 Engine: Gamebryo	Nov 01, 2004	-	
Oblivion	The Elder Scrolls IV: Oblivion Engine: Gamebryo	Sep 11, 2007	.bsa	

Files	Value
Steam	22330
WinReg	Bethesda Softworks/Oblivion
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 22330
Local	Oblivion
Data	

ID	Name	Date	Exts	Urls
Fallout3	Fallout 3 Engine: Gamebryo	Oct 13, 2009	.bsa	

Files	Value
Steam	22370
WinReg	Bethesda Softworks/Fallout3
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 22370
Local	Fallout 3 goty
Data	

ID	Name	Date	Exts	Urls
FalloutNV	Fallout New Vegas Engine: Gamebryo	Oct 19, 2010	.bsa	

Files	Value
Steam	22380
WinReg	Bethesda Softworks/falloutnv
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 22380
Local	Fallout New Vegas
Data	

ID	Name	Date	Exts	Urls
Skyrim	The Elder Scrolls V: Skyrim Engine: Creation	Nov 10, 2011	.bsa	

Files	Value
Steam	72850
WinReg	Bethesda Softworks/skyrim
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 72850
Local	Skyrim
Data	

ID	Name	Date	Exts	Urls
Fallout4	Fallout 4 Engine: Creation	Nov 09, 2015	.ba2	

Files	Value
Steam	377160
WinReg	Bethesda Softworks/Fallout4
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 377160
Local	Fallout 4
Data	

SkyrimSE	The Elder Scrolls V: Skyrim - Special Edition Engine: Creation	Oct 27, 2016	.bsa	

Files	Value
Steam	489830
WinReg	Bethesda Softworks/Skyrim SE
WinReg	Bethesda Softworks/Skyrim Special Edition
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 489830
Local	Skyrim Special Edition
Data	

Fallout:S	Fallout Shelter Engine: Unity	Mar 29, 2017	-	

Files	Value
Steam	588430
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 588430
Local	Fallout Shelter

ID	Name	Date	Exts	Urls
Fallout4VR	Fallout 4 VR Engine: Creation	Dec 11, 2017	.ba2	

Files	Value
Steam	611660
WinReg	Bethesda Softworks/Fallout 4 VR
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 611660
Local	Fallout 4 VR
Data	

SkyrimVR	The Elder Scrolls V: Skyrim VR Engine: Creation	Apr 02, 2018	.bsa	

Files	Value
Steam	611670
WinReg	Bethesda Softworks/Skyrim VR
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 611670
Local	SkyrimVR
Data	

Fallout76	Fallout 76 Engine: Creation	Apr 14, 2020	.ba2	

Files	Value
Steam	1151340
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 1151340
Local	Fallout76
Data	

TES:B	The Elder Scrolls: Blades Engine: Unity	May 12, 2020	-	

ID	Name	Date	Exts	Urls
Starfield	Starfield Engine: Creation2	Sep 05, 2023	.ba2	

Files	Value
Steam	1716740
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 1716740
Local	Starfield
Data	

TES:C	The Elder Scrolls: Castles Engine: Unity	Sep 10, 2024	-	
Oblivion:R	The Elder Scrolls IV: Oblivion Remastered Engine: Unreal:5	Apr 22, 2025	.bsa	

Files	Value
Steam	2623190
WinReg	Microsoft/Windows/CurrentVersion/Uninstall/Steam App 2623190
Local	Oblivion Remastered
OblivionRemastered/Content	

TES6	The Elder Scrolls VI (future)	-	-	
Fallout5	Fallout 5 (future)	-	-	