

ORC Guide (Version 1.3)

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Contents

1	Introduction	1
2	Terminology	1
3	Definition	1
4	Changes	3
4.1	Version 1.3	3
4.2	Version 1.2	4
4.3	Version 1.1	4

1 Introduction

The ORC file format is roughly a simplified version of ELF, with a few differences.

2 Terminology

by7e: 7 bits

Text7: a sequence of by7es terminated with a null byte

Word28: a 28-bit value, serialized in order from the least-significant bit to the most-significant bit.

3 Definition

The file format follows the C-like pseudocode below:

```
Byte7 enum SymbolType {  
    EXTERN = 0,  
    FUNC = 1,  
    SECTION = 2,  
}
```

```

Byte7 enum FileType {
    EXE = 0,
    OBJ = 1,
}

Byte7 enum Bool {
    FALSE = 0,
    TRUE = 1,
}

struct ORCFile {
    Text7 header = "orc";
    FileType type;
    Bool hasEntryPoint;
    if hasEntryPoint {
        Word28 entryPoint;
    }
    SymbolTable symbolTable;
    RelocationTable relocationTable;
    SectionTable sectionTable;
    SegmentTable segmentTable;
    Byte7[] contents;
}

struct SymbolTable {
    Word28 numEntries;
    Symbol symbols[numEntries];
}

struct Symbol {
    Text7 name;
    SymbolType type;
    Bool isDefined;
    if isDefined {
        Word28 section;
        Word28 offset;
    }
}

struct RelocationTable {
    Word28 numEntries;
    Relocation relocations[numEntries];
}

struct Relocation {
    Word28 offset;
}

```

```

    Word28 section;
    Text7 symbol;
    Word28 plus;
}

struct SectionTable {
    Word28 numEntries;
    Section section[numEntries];
}

struct Section {
    Permissions permissions;
    Word28 offset;
    Text7 name;
    Word28 size;
}

struct SegmentTable {
    Word28 numEntries;
    Segment segment[numEntries];
}

Byte7 enum SegmentType {
    PROGBITS = 0b10,
    NOTE = 0b01,
}

struct Segment {
    Text7 name;
    Word28 offset;
    Word28 base;
    Word28 size;
    Permissions permissions;
    SegmentType type;
}

```

Conditionals express fields that may or may not be present— for example, if the `hasEntryPoint` field in an ORC file is false, then the `entryPoint` field will not be present. All fields are no smaller than 1 byte and `Permission` is serialized as `rxw0000`

4 Changes

4.1 Version 1.3

- Add `size` field to `Segment`.
- Add `SymbolType` and `add type` field to `Symbol`.

4.2 Version 1.2

- Expand MSB and LSB in `Word28` terminology.

4.3 Version 1.1

- Corrected ordering of `offset` and `section` fields in `Relocation`.