



# LIBNVVM API

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## API Reference Manual



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# Chapter 1.

## MODULES

Here is a list of all modules:

- ▶ Error Handling
- ▶ General Information Query
- ▶ Compilation

### 1.1. Error Handling

#### **enum nvvmResult**

NVVM API call result code.

##### **Values**

```
NVVM_SUCCESS = 0
NVVM_ERROR_OUT_OF_MEMORY = 1
NVVM_ERROR_PROGRAM_CREATION_FAILURE = 2
NVVM_ERROR_IR_VERSION_MISMATCH = 3
NVVM_ERROR_INVALID_INPUT = 4
NVVM_ERROR_INVALID_PROGRAM = 5
NVVM_ERROR_INVALID_IR = 6
NVVM_ERROR_INVALID_OPTION = 7
NVVM_ERROR_NO_MODULE_IN_PROGRAM = 8
NVVM_ERROR_COMPILATION = 9
```

## `const char *nvvmGetErrorString (nvvmResult result)`

Get the message string for the given nvvmResult code.

### Parameters

#### **result**

NVVM API result code.

### Returns

Message string for the given `nvvmResult` code.

## 1.2. General Information Query

## `nvvmResult nvvmVersion (int *major, int *minor)`

Get the NVVM version.

### Parameters

#### **major**

NVVM major version number.

#### **minor**

NVVM minor version number.

### Returns

- ▶ `NVVM_SUCCESS`

## 1.3. Compilation

## `typedef _nvvmProgram *nvvmProgram`

NVVM Program.

An opaque handle for a program

## **nvvmResult nvvmAddModuleToProgram (nvvmProgram prog, const char \*buffer, size\_t size, const char \*name)**

Add a module level NVVM IR to a program.

### **Parameters**

**prog**

NVVM program.

**buffer**

NVVM IR module in the bitcode or text representation.

**size**

Size of the NVVM IR module.

**name**

Name of the NVVM IR module. If NULL, "<unnamed>" is used as the name.

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_OUT\_OF\_MEMORY
- ▶ NVVM\_ERROR\_INVALID\_INPUT
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM

### **Description**

The buffer should contain an NVVM IR module either in the bitcode representation or in the text representation.

## **nvvmResult nvvmCompileProgram (nvvmProgram prog, int numOptions, const char \*\*options)**

Compile the NVVM program.

### **Parameters**

**prog**

NVVM program.

**numOptions**

Number of compiler options passed.

**options**

Compiler options in the form of C string array.

### **Returns**

- ▶ NVVM\_SUCCESS

- ▶ NVVM\_ERROR\_OUT\_OF\_MEMORY
- ▶ NVVM\_ERROR\_IR\_VERSION\_MISMATCH
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM
- ▶ NVVM\_ERROR\_INVALID\_IR
- ▶ NVVM\_ERROR\_INVALID\_OPTION
- ▶ NVVM\_ERROR\_NO\_MODULE\_IN\_PROGRAM
- ▶ NVVM\_ERROR\_COMPILATION

## Description

The valid compiler options are:

- ▶ -g (enable generation of debugging information)
- ▶ -opt=
  - ▶ 0 (disable optimizations)
  - ▶ 3 (default, enable optimizations)
- ▶ -arch=
  - ▶ compute\_20 (default)
  - ▶ compute\_30
  - ▶ compute\_35
- ▶ -ftz=
  - ▶ 0 (default, preserve denormal values, when performing single-precision floating-point operations)
  - ▶ 1 (flush denormal values to zero, when performing single-precision floating-point operations)
- ▶ -prec-sqrt=
  - ▶ 0 (use a faster approximation for single-precision floating-point square root)
  - ▶ 1 (default, use IEEE round-to-nearest mode for single-precision floating-point square root)
- ▶ -prec-div=
  - ▶ 0 (use a faster approximation for single-precision floating-point division and reciprocals)
  - ▶ 1 (default, use IEEE round-to-nearest mode for single-precision floating-point division and reciprocals)
- ▶ -fma=
  - ▶ 0 (disable FMA contraction)
  - ▶ 1 (default, enable FMA contraction)

## **nvvmResult nvvmCreateProgram (nvvmProgram \*prog)**

Create a program, and set the value of its handle to \*prog.

### **Parameters**

#### **prog**

NVVM program.

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_OUT\_OF\_MEMORY
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM

### **Description**

#### **See also:**

[nvvmDestroyProgram\(\)](#)

## **nvvmResult nvvmDestroyProgram (nvvmProgram \*prog)**

Destroy a program.

### **Parameters**

#### **prog**

NVVM program.

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM

### **Description**

#### **See also:**

[nvvmCreateProgram\(\)](#)

## **nvvmResult nvvmGetCompiledResult (nvvmProgram prog, char \*buffer)**

Get the compiled result.

### **Parameters**

#### **prog**

NVVM program.

#### **buffer**

Compiled result.

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM

### **Description**

The result is stored in the memory pointed by 'buffer'.

## **nvvmResult nvvmGetCompiledResultSize (nvvmProgram prog, size\_t \*bufferSizeRet)**

Get the size of the compiled result.

### **Parameters**

#### **prog**

NVVM program.

#### **bufferSizeRet**

Size of the compiled result (including the trailing NULL).

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM



## **nvvmResult nvvmGetProgramLog (nvvmProgram prog, char \*buffer)**

Get the Compiler/Verifier Message.

### **Parameters**

#### **prog**

NVVM program program.

#### **buffer**

Compilation/Verification log.

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM

### **Description**

The NULL terminated message string is stored in the memory pointed by 'buffer' when the return value is NVVM\_SUCCESS.

## **nvvmResult nvvmGetProgramLogSize (nvvmProgram prog, size\_t \*bufferSizeRet)**

Get the Size of Compiler/Verifier Message.

### **Parameters**

#### **prog**

NVVM program.

#### **bufferSizeRet**

Size of the compilation/verification log (including the trailing NULL).

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM

### **Description**

The size of the message string (including the trailing NULL) is stored into 'buffer\_size\_ret' when the return value is NVVM\_SUCCESS.

## **nvvmResult nvvmVerifyProgram (nvvmProgram prog, int numOptions, const char \*\*options)**

Verify the NVVM program.

### **Parameters**

#### **prog**

NVVM program.

#### **numOptions**

Number of compiler options passed.

#### **options**

Compiler options in the form of C string array.

### **Returns**

- ▶ NVVM\_SUCCESS
- ▶ NVVM\_ERROR\_OUT\_OF\_MEMORY
- ▶ NVVM\_ERROR\_IR\_VERSION\_MISMATCH
- ▶ NVVM\_ERROR\_INVALID\_PROGRAM
- ▶ NVVM\_ERROR\_INVALID\_IR
- ▶ NVVM\_ERROR\_INVALID\_OPTION
- ▶ NVVM\_ERROR\_NO\_MODULE\_IN\_PROGRAM

### **Description**

The valid compiler options are:

NONE. The numOptions and options parameters are ignored, and are for future use.

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