gpnode reference documentation v1.21

Sebastien CAUX

March 3, 2017

1 Introduction

gpnode is a command line tool that permits to create and manage a node project in GPStudio toolchain.

A node in GPStudio is a physical node, it can be a smart camera or a sensor.

2 Use

gpnode always takes the project in the current directory, so you only can have one project per directory. A node project file have the '.node' extension.

At the beginning, you need to create a project with the *newproject* command. After that, you can use all the commands set on this project.

Please read the tutorial 'GPStudio command line quick start' to learn how to use this tool.

Under linux, you have a completion script to help you writing commands.

3 Commands

3.1 project

3.1.1 newproject

gpnode newproject -n <project-name>

Create a project file inside the current directory named '`<project-name>`.node'.

Option	Description	Example
-n	project name without space	project1

- **Example**:

> **gpnode newproject** -n project1

Create a new project named ***`project1`****. After that, you have a file project* ***`project1.node`*** *in the current directory.*

3.1.2 setboard

gpnode setboard -n <board-name>

You need to specify a for the used board board before setting up any device in the project.

Option	Description	Example
-n	board name support, contained in library	dreamcam_c3

- **Example**:

> **gpnode setboard** -n dreamcam_c3

Your project is now based on the dreamcam platform. You can now use all the image sensors and communication for this platform.

See also :
gplib listboards and **gpnode showboard**

3.1.3 showboard

gpnode showboard

Prints the name of the board specified in the current project.

- **Example**:

> **gpnode showboard**
>
> `dreamcam_c3`

See also :
gpnode setboard

3.1.4 generate

gpnode generate [-o <dir>]

Generates all the files needed for the specified toolchain and Makefile. After that, you just need to call 'make compile' in the directory `build/` to compile the project with specific tools needed by the node.

Option	Description	Example
-o	output directory	build

- **Example**:

> **gpnode generate** -o build/
> cd build
> make compile

Generates the project in the subdirectory `build/` with a Makefile. In this directory, you can execute make compile to call the compiler for the specified platform.

3.2 device

3.2.1 adddevice

gpnode adddevice -n <device-name>

Adds IP support in the project to manage `<device-name>`. `<device-name>` must be define in the board file definition.

Option	Description	Example
-n	device name specified in the support board package	mt9

- **Example**:

```
> gpnode adddevice -n mt9
> gpnode showblock

blocks :
  + mt9 [mt9]
```

Adds the support for mt9 image sensor. You have a block named mt9 in the project.

See also :
gpnode showdevice, **gpnode deldevice** and **gpnode listavailabledevice**

3.2.2 deldevice

gpnode deldevice -n <device-name>

Removes device support named `<device-name>`.

Option	Description	Example
-n	device name almost added	mt9

- **Example**:

```
> gpnode deldevice -n mt9
```

Removes the 'mt9' block with its support and all the flow connection from it.

See also :
gpnode showdevice and **gpnode adddevice**

3.2.3 showdevice

gpnode showdevice

Prints the list of all the device support in the current project. The output format is : + `<block-name>` [`<block-driver>`]

- **Example**:

```
> gpnode showdevice

devices :
  + mt9 [mt9]
  + usb [usb_cypress_CY7C68014A]
```

3.2.4 listavailabledevice

gpnode listavailabledevice

Prints the list of all available devices for the platform that you have specified before.

- **Example**:

```
> gpnode listavailabledevice

led mt9 e2v ethernet usb
```

3.3 process

3.3.1 addprocess

gpnode addprocess -n <*process-name*> -d <*driver-name*>

Adds a process named `<process-name>` as an instance of `<driver-name>` IP in the library or the project dir.

Option	Description	Example
-n	name of the process instance	process1
-d	driver name to instantiate. Could be defined in library or locally in the project with gpproc.	gradianthw myproc/myproc.proc

- **Example**:

```
> gpnode addprocess -n process1 -d gradienthw
> gpnode showprocess

process :
  + process1 [gradienthw]
```

Adds a process named process1 based on a process declared in library gradienthw.

See also :
gpnode delprocess and **gplib listprocess**

3.3.2 delprocess

gpnode delprocess -n <process-name>

Removes process `<process-name>` and all the connections to or from it.

Option	Description	Example
-n	process name almost added	process1

- **Example**:

```
> gpnode delprocess -n process1
```

Removes 'process1'.

See also :
gpnode addprocess

3.3.3 showprocess

gpnode showprocess

Prints the list of processes in the current project. The output format is : + `<block-name>` [`<block-driver>`]

- **Example**:

```
> gpnode showprocess

process :
  + process1 [gradienthw]
  + process2 [lbp]
```

3.3.4 showblock

gpnode showblock [-n *<process-name>* [-d *<driver-name>*]]

If -n option is not set, it prints the list of processes and device in the current project. The output format is : + `<block-name>` [`<block-type>` - `<block-driver>`]

Option	Description	Example
-n	name of the process instance to show and only this one	process1
-f	filter	flows params clocks resets

- **Example**:

```
> gpnode showblock

blocks :
  + led [device - leds]
  + mt9 [device - mt9]
  + usb [devicecom - usbcypressCY7C68014A]
  + process1 [process - gradienthw]
  + conv [process - conv]
  + lbp [process - lbp]
```

If -n option is set, it prints the list of params, clocks, resets and flows of the block `<block-name>`.

- **Example**:

```
> gpnode showblock -n usb

flows :
       -------------
  in0  |           |  out0
------>|           |------->
  in1  |           |  out1
------>|           |------->
  in2  |    usb    |
------>|           |
  in3  |           |
------>|           |
       -------------
params :
  + generic IN0NBWORDS type: int value: 32768
  + generic IN1NBWORDS type: int value: 32768
  + generic IN2NBWORDS type: int value: 32768
  + generic IN3NBWORDS type: int value: 32768
  + generic OUT0NBWORDS type: int value: 1024
  + generic OUT1NBWORDS type: int value: 1024
  + register status regaddr: 0 propertymap:
  + register flowin0 regaddr: 1 propertymap: -
  + register flowin1 regaddr: 2 propertymap: -
  + register flowin2 regaddr: 3 propertymap: -
  + register flowin3 regaddr: 4 propertymap: -
clocks :
  + clkproc  Hz in
  + clkusb 48 MHz out
resets :
  + reset resetn out
```

If -f is specified with -n, the command shows only the list of `<filter>`.

- **Example**:

```
> gpnode showblock -n usb -f params

params :
  + generic IN0NBWORDS type: int value: 32768
  + generic IN1NBWORDS type: int value: 32768
  + generic IN2NBWORDS type: int value: 32768
  + generic IN3NBWORDS type: int value: 32768
  + generic OUT0NBWORDS type: int value: 1024
  + generic OUT1NBWORDS type: int value: 1024
  + register status regaddr: 0 propertymap:
  + register flowin0 regaddr: 1 propertymap: -
  + register flowin1 regaddr: 2 propertymap: -
  + register flowin2 regaddr: 3 propertymap: -
  + register flowin3 regaddr: 4 propertymap: -
```

Prints only the list of params

3.4 block attributes

3.4.1 renameblock

gpnode renameblock -n <block-name> -v <new-name>

Renames block the block named `<block-name>` with the name `<new-name>`. Please notify that device block could not be renamed.

Option	Description	Example
-n	name of the process instance to rename	process1
-v	new block instance name	convolve

- **Example**:

```
> gpnode renameblock -n process1 -v first_gradient
```

Renames the block named 'process1' with the name 'first_gradient'.

3.4.2 setproperty

gpnode setproperty -n <property-name> -v <default-value>

Defines a default value `<default-value>` to the property `<property-name>`.

Option	Description	Example
-n	name of the property composed by the name of the block, a (dot) and the name of the property. A property could be a subproperty of another, in this case, name of the block, (dot), name of the parent property, (dot) and name of the child property.	process1.prop process1.prop.prop2
-v	value to give to the property	50 true

- **Example**:

```
> gpnode setproperty -n mt9.roi1.w -v 1280
> gpnode setproperty -n mt9.enable -v true
```

When you launch the camera, you have an image from mt9 with 1280 pixels of width. The mt9 block is enabled at the beginning.

3.4.3 setparam

gpnode setparam -n <param-name> -v <value>

Sets the value `<value>` to the param `<param-name>`. If <param-name> is a constant parameter, it sets the value. If it is a register, it sets the default value.

Option	Description	Example
-n	name of the param composed by the name of the block, a (dot) and the name of the param	process1.LINEW
-v	value to give to the param	1280 ON

- **Example**:

> **gpnode setparam** -n usb.IN0_NBWORDS -v 2048

Redefines the parameter IN0_NBWORDS of usb block to 2048 blocks. It is the size of the fifo for in0 input flow.

3.4.4 setclock

gpnode setclock -n <clock-name> -v <frequency>

Defines the clock frequency `<frequency>` to the clock `<clock-name>`.

Option	Description	Example
-n	name of the clock composed by the name of the block, a (dot) and the name of the clock.	process1.clockimg
-v	frequency to give to the clock. It is possible to use multiplier suffix like 'G', 'M' or 'k'.	0.25G 62M 5.5k

- **Example**:

> **gpnode setclock** -n mt9.clk_img -v 10M

Redefines the input pixel clock of mt9 device block.

3.4.5 setflowsize

gpnode setflowsize -n <flow-name> -v <flow-size>

Redefines the flow size `<flow-size>` to the flow `<flow-name>`.

Option	Description	Example
-n	name of the flow composed by the name of the block, a (dot) and the name of the flow	process1.in
-v	size in bits	8

- **Example**:

> **gpnode setflowsize** -n usb.in0 -v 16

Redefines the width of input flow in0 of usb block to 16 bits.

3.5 flow interconnect

3.5.1 connect

gpnode connect -f <flow-out> -t <flow-in> [-s <bit-shift>]

Adds a flow connection between a flow out `<flow-out>` (ex: mt9.out) to a flow in `<flow-in>`. Option -s could be used in case your flow don't have the same data width. You can choose between 'msb' or 'lsb' connection.

Option	Description	Example
-f	name of the flow source composed by the name of the block, a (dot) and the name of the flow	process1.out
-t	name of the flow in	process1.in
-s	order	msb lsb

- **Example**:

> **gpnode connect** -f mt9.out -t usb.in0

Connect the output 'out' of mt9 block to the input 'in0' of usb to have a direct connection between the image sensor and usb communication.

See also :
gpnode unconnect and **gpnode showconnect**

3.5.2 unconnect

gpnode unconnect -f <flow-out> -t <flow-in>

Remove a flow connection between a flow out `<flow-out>` (ex: mt9.out) to a flow in `<flow-in>`.

Option	Description	Example
-f	name of the flow out	process1.out
-t	name of the flow in	process1.in

- **Example**:

> **gpnode unconnect** -f mt9.out -t usb.in0

Remove the direct connection between the image sensor and usb communication.

See also :
gpnode connect and **gpnode showconnect**

3.5.3 showconnect

gpnode showconnect

Print the list of flow connections in the current project.

- **Example**:

> **gpnode showconnect**

```
connects :
  + mt9.out -> usb.in0 (msb)
  + process1.magnitude -> usb.in0 (lsb)
  + mt9.out -> conv.in (msb)
  + conv.out -> usb.in1 (msb)
  + mt9.out -> process1.in (lsb)
  + mt9.out -> lbp.in (msb)
  + lbp.out -> usb.in1 (msb)
```

See also :
gpnode connect and **gpnode unconnect**

3.6 clock interconnect

3.6.1 setclockdomain

gpnode setclockdomain -n <domain-name> -v <frequency>

Define a clock frequency `<frequency>` the the clock domain `<domain-name>`.

Option	Description	Example
-n	name of the clock domain	clk_proc
-v	frequency to give to the clock domain. It is possible to use multiplier suffix like 'G', 'M' or 'k'.	0.25G 62M 5.5k

- **Example**:

> **gpnode setclockdomain** -n clk_proc -v 50M

Set the main clock domain to 50MHz.

See also :
gpnode showclockdomain

3.6.2 showclockdomain

gpnode showclockdomain

Print the list of clock domains in the current project.

- **Example**:

> **gpnode showclockdomain**

```
domains :
  + clk_proc = 48 MHz
```

See also :
gpnode setclockdomain