**VISION SDK**

**Use-Case Auto-Ge****neration Tool**

**User Guide**

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# Introduction

Vision SDK Use-Case Auto Generation tool allows users to generate C code for Vision SDK use-cases from configuration file.

This document explains procedure for writing configuration files and generating use-case files

This document assumes that the reader is familiar with basics of links and chains

architecture used in Vision SDK.

# Requirements

Install the following to use Auto Generation tool:

* Graphviz : Graphviz version 2.38.0 or higher
  + <http://www.graphviz.org/Download.php>

Install the below tools to compile and build the Auto Generation tool:

For windows,

* Install GCC compiler (v4.8.1 or higher) for Windows (ex, <http://www.codeblocks.org/>)
* Install GNU Make (v3.81 or higher) for Windows (ex, “gmake” is available as part XDC install at $(xdc\_PATH)/gmake) or <http://gnuwin32.sourceforge.net/packages/make.htm>
* Install bash shell in Windows via tool like <https://msysgit.github.io/> or Cygwin
* Flex : flex version 2.5.\* or higher
  + <http://gnuwin32.sourceforge.net/packages/flex.htm>
* Bison : bison version 2.4.\* or higher
  + <http://gnuwin32.sourceforge.net/packages/bison.htm>

# Generating Use-Case files

Generating Use-Case files involves:

1. Writing Configuration file
2. Generating files

## Configuration files

### Usecase Name

* Use-case name can be mentioned in configuration file. It is used as prefix in files generated and struct and function names.

Example:

UseCase: chains\_vipSingleCam\_Display

### Naming Of Link

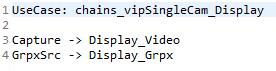
* Every link has a particular basename, i.e. all instances of a particular type of link starts with basename. E.g.: All links of Capture type should start with basename Capture
* Basename information is available in help option (./vsdk.exe -help)
* A Link is named as Basename or Basename\_suffix. For e.g Capture, Capture\_1
* Different instances of a particular link have same basename but different suffix, i.e. Display\_Video, Display\_Grpx
* If it is algorithm link it has to be named Alg\_<plugin name>\_suffix. For e.g: Alg\_FrameCopy\_xyz
* In case link does not match any of the supported links an error will be shown.

### Connections

* Grammar of Connections:

Connection : ID | ID -> Connection | ID ( [CPU] ) | ID ( [CPU] ) -> Connection

* Example: Single camera display



* Intermediate IPC are autogenerated. So, no need to mention in config file.

Example:



Above Configuration file generates IPC links, which makes overall connections:

Capture -> IPCOut\_IPU1\_0\_EVE1\_0 -> IPCIn\_EVE1\_IPU\_0\_0 (EVE1) -> Alg\_EdgeDetect(EVE1) -> IPCOut\_ EVE1\_IPU1\_0 \_0 (EVE1)->

IPCIn \_IPU\_0\_ EVE1\_0 -> Display

## Generating Files

* To generate usecase files, type:
  + ./vsdk.exe –file configFile
  + This generates file in the folder where command is executed
* To generate usecase files in an “output” folder, type:
  + ./vsdk –file configFile –path ./output
* To generate image along with file, type:
  + ./vsdk –file –img configFile
* Other options supported are:
  + -help Shows help regarding supported cmd line options, links and CPU
  + -v Verbose

## Error Handling

Error is handled in following cases:

* Input file is not present
* Wrong number of input or output is provided to a link
* Link is assigned Invalid CPU or two different CPU
* Naming of Link does not follow the rules, i.e. Basename, Basename\_suffix

# Tool Development

This section describes how to extend the tool by modifying its source code.

If you are a user of the tool, then you can skip this section

## Adding support for new link in the tool

To create a new Link class:

1. In link.h create new class in following format:

class LinkName: public Link {

~LinkName ();

public:

LinkName(string nm);

void genIncludes(ostream &fp);

void genLinkID(ostream &fp);

void genCreatePrms(ostream &fp);

void genResetLinkPrms(ostream &fp, string obj);

void genSetLinkPrms(ostream &fp, string obj);

int setInLink(Link\* obj);

int setOutLink(Link\* obj);

};

1. In processor.h, introduce extra enum in ClassType, cLinkName
2. Implement the functions in link.cpp file:
   1. Constructor:

LinkName(string nm){

cType = cLinkName; //cType is classType which is set in Processor.h

name = nm;

linkIDName = name + string("LinkID");

prmName = name + string("Prm");

execPos = -1;

procID = -1;

pType = IPU1\_0; //default processor type

mulInQue = false; //set to true if the link can have multiple input

mulOutQue = false; //set to true if the link can have multiple output

}

* 1. genIncludes: Include the header file where the link is implemented

void LinkName::genIncludes(ostream &fp) {

fp << "headerName.h"<< endl;

}

* 1. genLinkID : Not required to change

void LinkName::genLinkID(ostream &fp) {

fp << BLOCK\_SPACE << setw(10) << left << "UInt32" << linkIDName << ";" << endl;

}

* 1. genCreatePrms : Modify LinkName \_CreateParams with actual CreateParams struct name

void LinkName::genCreatePrms(ostream &fp) {

fp << BLOCK\_SPACE << setw(40) << left << " LinkName \_CreateParams " << prmName<< ";" << endl;

}

* 1. genResetLinkPrms : Modify LinkName \_CreateParams\_Init function name

void LinkName::genResetLinkPrms(ostream &fp, string obj) {

fp << BLOCK\_SPACE << " LinkName \_CreateParams\_Init(&" << obj << "->"

<< prmName << ");" << endl;

}

* 1. setInLink : Leave the function as it is. Uncomment in case you want to introduce error if number of incoming links exceeds maxIncoming. Also, replace maxIncoming with actual number

int LinkName::setInLink(Link\* obj) {

//CHECK\_ERROR\_ABORT(inLink.size() >= maxIncoming, "Error: "+name+" Link //should not have more than “+maxIncoming+” ingoing links");

inLink.push\_back(make\_pair(obj, -1));

if(inLink.size() > 1)

mulInQue = true;

return (inLink.size() - 1);

}

* 1. setOutLink: Same rules as setInLink

int LinkName::setOutLink(Link\* obj) {

//CHECK\_ERROR\_ABORT(outLink.size() >= maxOutGoing, "Error: //"+name+" Link should not have more than “+maxOutGoing +” outgoing links");

outLink.push\_back(make\_pair(obj, -1));

return (outLink.size() - 1);

}

* 1. genSetLinkPrms: Can set any parameters for the link

void LinkName::genSetLinkPrms(ostream &fp, string obj)

{

}

1. In processor.cpp getLinkID function, introduce an extra case in switch. Replace ID with LinkID which needs to be assigned. Other switch cases serve as an example.

case cDecode:

linkIDName = ID;

linkIDAsgn[cType]++;

break;

1. In usecase.cpp in createNewObj function, include a new condition. Where “NewLinkBase” is the base name and NewLink is the class created.

else if (root == "NewLinkBase")

obj = new NewLink(name);

1. In options.cpp in process\_Options function, add a new text string for the newly added link. Where “NewLinkBase” is the new link that is added  
    string usage =  
   …  
   " Supported Links: \n"  
   …  
   “ NewLinkBase\n”

## Adding support for new Algorithm Plugin in the tool

To develop a new Algorithm:

1. Follow all the steps in developing new link above except 5th. Preferably name class as Alg\_LinkName
2. In processor.cpp getProcID introduce a new case to validate the CPU.
3. In usecase.cpp, in createNewObj function, include a new condition inside Alg condition.

e.g:

else if (root == "Alg") { //insert condition inside Alg Condition

string sec = getSecRoot(name);

if (sec == "NewLinkBase") //NewLinkBase is the base name of Alg link

obj = new Alg\_NewLink(name); // Alg\_NewLink is class of new Alg

}

# Revision History

|  |  |  |
| --- | --- | --- |
| **Version** | **Date** | **Revision History** |
| 0.1 | 03rd March 2016 | Draft |
| 0.2 | 29th June 2017 | Updated for Vision SDK rel 3.0 |