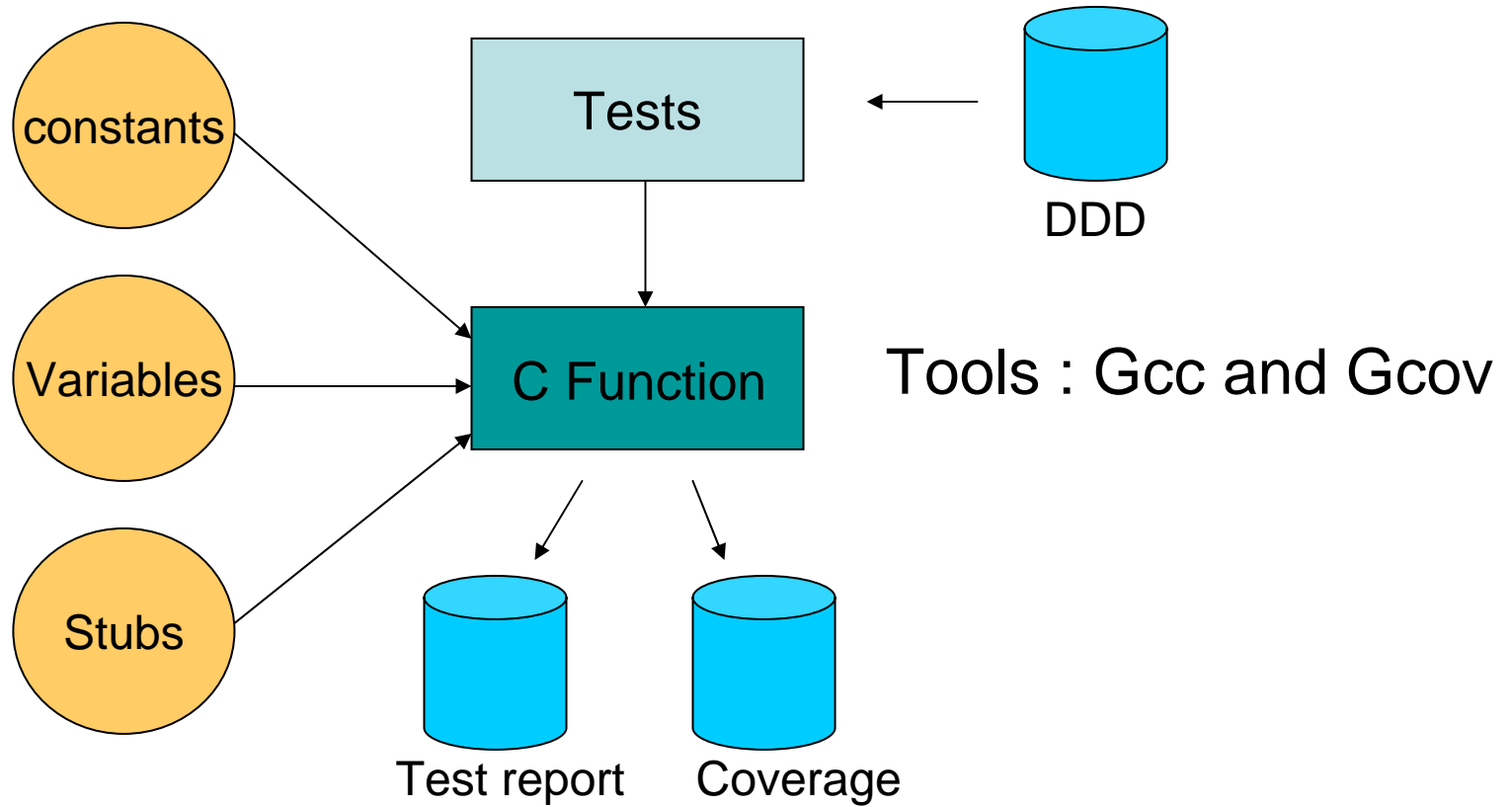


DPU de Planck : architecture et conception

Michel Dehamme
et Jean-Claude Marrucho

Unit tests



Pour extraire les fonctions depuis le programme

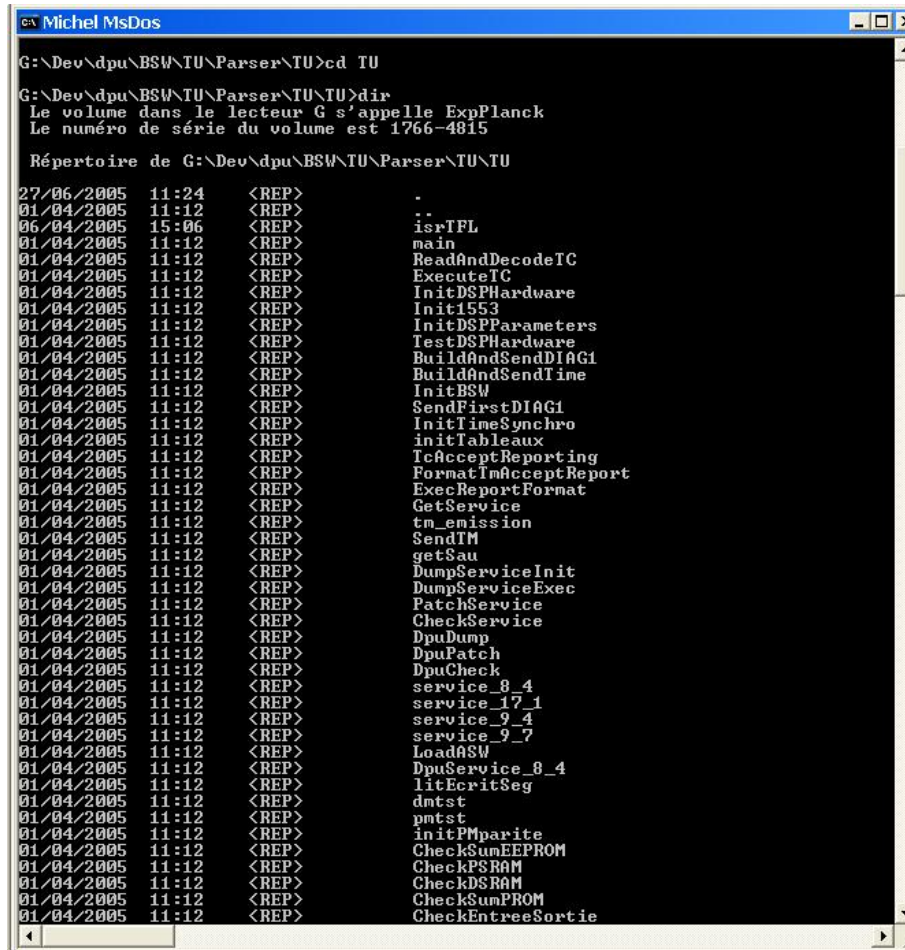
source

The screenshot shows a Windows desktop environment. In the foreground, there are two windows:

- Microsoft Visual C++ - [G:\...\v1\src\DpuFcts.c]**: This window displays the source code for a function named `CheckAPID`. The code is written in C and includes a header section with comments and a function body. The function body contains a conditional check for `apidd` and a `return` statement.
- TU_Parser v1.62**: This utility window is used for extracting functions from source code. It has a menu bar with options like 'Functions', 'Variables', '#define', 'Types', 'configuration', and 'Error Report'. The 'Files' section shows a list of source files with checkboxes, and the 'working files' section shows a list of files in a working directory, also with checkboxes.

The Windows taskbar at the bottom shows the 'démarrer' button and several open applications, including '2 SSH...', '4 Expl...', '4 Inte...', 'Mulber...', 'Michel D...', 'Adobe R...', 'Microsof...', '2 Micr...', 'TU_parser', and 'FR'. The system clock shows the time as 10:32.

Après passage par « l'extracteur »



```
Michel MsDos
G:\Dev\dpu\BSW\TU\Parser\TU>cd TU
G:\Dev\dpu\BSW\TU\Parser\TU\TU>dir
Le volume dans le lecteur G s'appelle ExpPlanck
Le numéro de série du volume est 1766-4815

Répertoire de G:\Dev\dpu\BSW\TU\Parser\TU\TU

27/06/2005  11:24    <REP>          -
01/04/2005  11:12    <REP>          .
06/04/2005  15:06    <REP>          isrTFL
01/04/2005  11:12    <REP>          main
01/04/2005  11:12    <REP>          ReadAndDecodeTC
01/04/2005  11:12    <REP>          ExecuteTC
01/04/2005  11:12    <REP>          InitDSPHardware
01/04/2005  11:12    <REP>          Init1553
01/04/2005  11:12    <REP>          InitDSPParameters
01/04/2005  11:12    <REP>          TestDSPHardware
01/04/2005  11:12    <REP>          BuildAndSendDIAGI
01/04/2005  11:12    <REP>          BuildAndSendTime
01/04/2005  11:12    <REP>          InitBSW
01/04/2005  11:12    <REP>          SendFirstDIAGI
01/04/2005  11:12    <REP>          InitTimeSynchrono
01/04/2005  11:12    <REP>          initTableaux
01/04/2005  11:12    <REP>          IcAcceptReporting
01/04/2005  11:12    <REP>          FormatImAcceptReport
01/04/2005  11:12    <REP>          ExecReportFormat
01/04/2005  11:12    <REP>          GetService
01/04/2005  11:12    <REP>          tn_emission
01/04/2005  11:12    <REP>          SendTM
01/04/2005  11:12    <REP>          getSau
01/04/2005  11:12    <REP>          DumpServiceInit
01/04/2005  11:12    <REP>          DumpServiceExec
01/04/2005  11:12    <REP>          PatchService
01/04/2005  11:12    <REP>          CheckService
01/04/2005  11:12    <REP>          DpuDump
01/04/2005  11:12    <REP>          DpuPatch
01/04/2005  11:12    <REP>          DpuCheck
01/04/2005  11:12    <REP>          service_8_4
01/04/2005  11:12    <REP>          service_17_1
01/04/2005  11:12    <REP>          service_9_4
01/04/2005  11:12    <REP>          service_9_7
01/04/2005  11:12    <REP>          LoadASW
01/04/2005  11:12    <REP>          DpuService_8_4
01/04/2005  11:12    <REP>          litCritSeg
01/04/2005  11:12    <REP>          dmtst
01/04/2005  11:12    <REP>          pmtst
01/04/2005  11:12    <REP>          initPMparite
01/04/2005  11:12    <REP>          CheckSumEEPROM
01/04/2005  11:12    <REP>          CheckPSRAM
01/04/2005  11:12    <REP>          CheckKSRAM
01/04/2005  11:12    <REP>          CheckSumPROM
01/04/2005  11:12    <REP>          CheckEntreeSortie
```

Et en particulier : pour la fonction choisie « CheckAPID »

```
Michel MsDos
G:\Dev>cd dpu
G:\Dev\dpu>cd bsw
G:\Dev\dpu\BSW>cd tu
G:\Dev\dpu\BSW\TU>cd parser
G:\Dev\dpu\BSW\TU\Parser>cd tu
G:\Dev\dpu\BSW\TU\Parser\TU>dir
Le volume dans le lecteur G s'appelle ExpPlanck
Le numéro de série du volume est 1766-4815

Répertoire de G:\Dev\dpu\BSW\TU\Parser\TU

01/04/2005  11:12    <REP>      .
01/04/2005  14:39    <REP>      -
27/06/2005  11:24    <REP>      TU
01/04/2005  16:56    <REP>      stubs
27/04/2005  17:00    <REP>      include
                0 fichier(s)                0 octets
                5 Rép(s)  93 904 466 944 octets libres

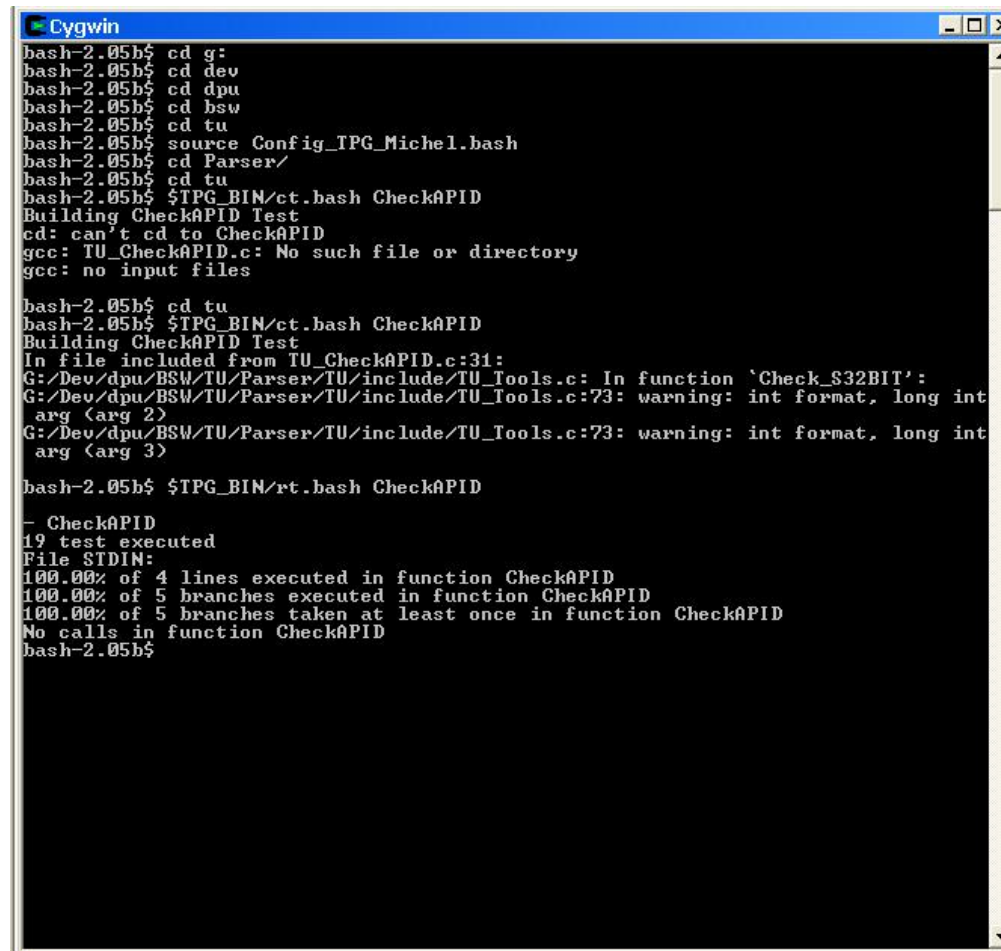
G:\Dev\dpu\BSW\TU\Parser\TU>cd tu
G:\Dev\dpu\BSW\TU\Parser\TU\TU>dir CheckAPID
Le volume dans le lecteur G s'appelle ExpPlanck
Le numéro de série du volume est 1766-4815

Répertoire de G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID

28/04/2005  15:17    <REP>      .
27/06/2005  11:24    <REP>      ..
27/06/2005  10:36                679 CheckAPID.c
01/04/2005  11:12                35 OptionnalAlloc.c
12/04/2005  17:18                449 CheckAPID.checks
27/06/2005  10:36                644 TU_CheckAPID.c
27/06/2005  10:36                1 591 CheckAPID.tests
28/04/2005  15:17                1 572 TU_CheckAPID.bb
28/04/2005  15:17                2 192 TU_CheckAPID.bbg
28/04/2005  15:17                27 428 TU_CheckAPID.exe
28/04/2005  15:17                1 127 CheckAPID.checks.gcov
28/04/2005  15:17                2 846 CheckAPID.tests.gcov
28/04/2005  15:17                1 407 TU_GlobalAlloc.c.gcov
22/04/2005  09:48                40 TU_OptionnalDefine.h
28/04/2005  15:17                1 082 TU_init.c.gcov
28/04/2005  15:17                5 858 TU_Tools.c.gcov
28/04/2005  15:17                1 314 CheckAPID.c.gcov
                15 fichier(s)                48 264 octets
                2 Rép(s)  93 904 466 944 octets libres

G:\Dev\dpu\BSW\TU\Parser\TU\TU>
```

Deux scripts : un pour compiler et un pour exécuter dans l'environnement de « cygwin »

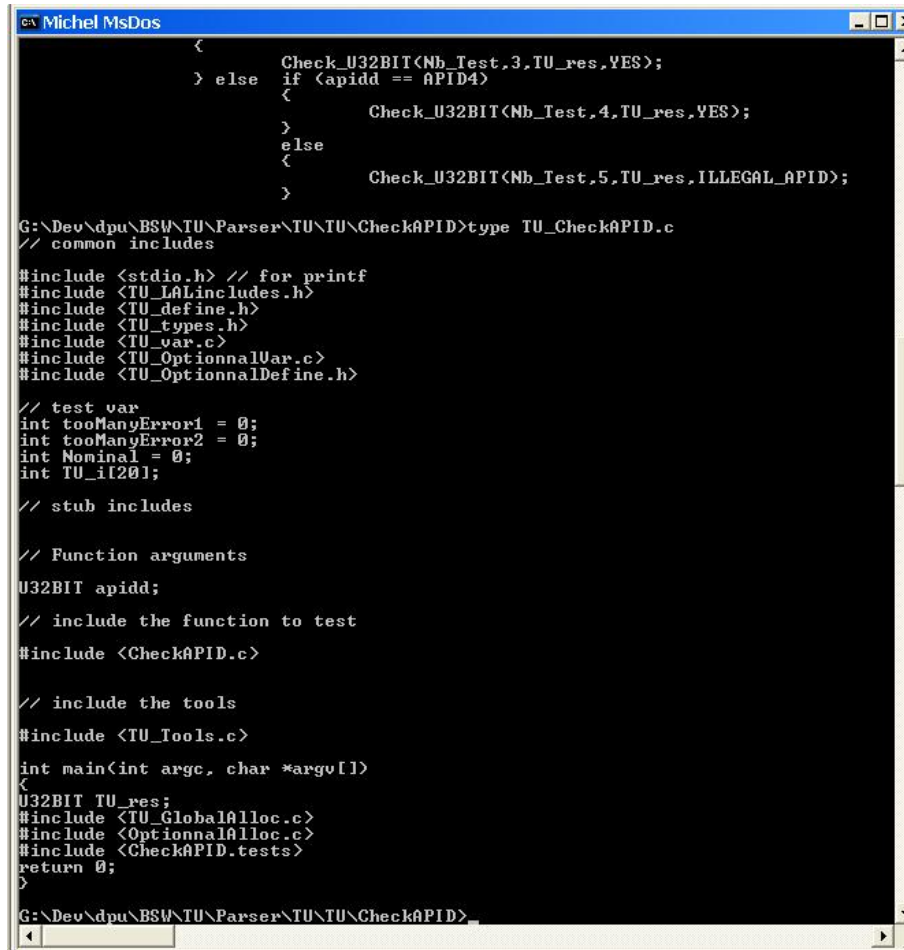


```
Cygwin
bash-2.05b$ cd g:
bash-2.05b$ cd dev
bash-2.05b$ cd dpu
bash-2.05b$ cd bsw
bash-2.05b$ cd tu
bash-2.05b$ source Config_TPG_Michel.bash
bash-2.05b$ cd Parser/
bash-2.05b$ cd tu
bash-2.05b$ $TPG_BIN/ct.bash CheckAPID
Building CheckAPID Test
cd: can't cd to CheckAPID
gcc: TU_CheckAPID.c: No such file or directory
gcc: no input files

bash-2.05b$ cd tu
bash-2.05b$ $TPG_BIN/ct.bash CheckAPID
Building CheckAPID Test
In file included from TU_CheckAPID.c:31:
G:/Dev/dpu/BSW/TU/Parser/TU/include/TU_Tools.c: In function 'Check_S32BIT':
G:/Dev/dpu/BSW/TU/Parser/TU/include/TU_Tools.c:73: warning: int format, long int
arg (arg 2)
G:/Dev/dpu/BSW/TU/Parser/TU/include/TU_Tools.c:73: warning: int format, long int
arg (arg 3)

bash-2.05b$ $TPG_BIN/rt.bash CheckAPID
- CheckAPID
19 test executed
File STDIN:
100.00% of 4 lines executed in function CheckAPID
100.00% of 5 branches executed in function CheckAPID
100.00% of 5 branches taken at least once in function CheckAPID
No calls in function CheckAPID
bash-2.05b$
```

Test Unitaire de la fonction choisie



```

    <
  > else
    <
      Check_U32BIT(Nb_Test,3,TU_res,YES);
    <
      if (apidd == APID4)
    <
      <
        Check_U32BIT(Nb_Test,4,TU_res,YES);
      >
    <
      else
    <
      <
        Check_U32BIT(Nb_Test,5,TU_res,ILLEGAL_APID);
      >
    >
  >
}

G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID>type TU_CheckAPID.c
// common includes

#include <stdio.h> // for printf
#include <TU_LALincludes.h>
#include <TU_define.h>
#include <TU_types.h>
#include <TU_var.c>
#include <TU_OptionnalVar.c>
#include <TU_OptionnalDefine.h>

// test var
int tooManyError1 = 0;
int tooManyError2 = 0;
int Nominal = 0;
int TU_i[20];

// stub includes

// Function arguments
U32BIT apidd;

// include the function to test
#include <CheckAPID.c>

// include the tools
#include <TU_Tools.c>

int main(int argc, char *argv[])
<
U32BIT TU_res;
#include <TU_GlobalAlloc.c>
#include <OptionnalAlloc.c>
#include <CheckAPID.tests>
return 0;
>
}

G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID>
```

Fichier.tests

```
cx Michel MsDos
Vars[0][0]._u32bit = 0x0;
Vars[0][1].Classe = 'N';
Vars[0][1]._u32bit = <<(APID1-1 + 0x0)/2>;
Vars[0][2].Classe = 'N';
Vars[0][2]._u32bit = APID1-1;
Vars[0][3].Classe = 'N';
Vars[0][3]._u32bit = APID1;
Vars[0][4].Classe = 'N';
Vars[0][4]._u32bit = APID1+1;
Vars[0][5].Classe = 'N';
Vars[0][5]._u32bit = <<(APID2-1 + APID1+1)/2>;
Vars[0][6].Classe = 'N';
Vars[0][6]._u32bit = APID2-1;
Vars[0][7].Classe = 'N';
Vars[0][7]._u32bit = APID2;
Vars[0][8].Classe = 'N';
Vars[0][8]._u32bit = APID2+1;
Vars[0][9].Classe = 'N';
Vars[0][9]._u32bit = <<(APID3-1 + APID2+1)/2>;
Vars[0][10].Classe = 'N';
Vars[0][10]._u32bit = APID3-1;
Vars[0][11].Classe = 'N';
Vars[0][11]._u32bit = APID3;
Vars[0][12].Classe = 'N';
Vars[0][12]._u32bit = APID3+1;
Vars[0][13].Classe = 'N';
Vars[0][13]._u32bit = <<(APID4-1 + APID3+1)/2>;
Vars[0][14].Classe = 'N';
Vars[0][14]._u32bit = APID4-1;
Vars[0][15].Classe = 'N';
Vars[0][15]._u32bit = APID4;
Vars[0][16].Classe = 'N';
Vars[0][16]._u32bit = APID4+1;
Vars[0][17].Classe = 'N';
Vars[0][17]._u32bit = <<(0xFFFFFFFF)/2> + <<(APID4+1)/2>>;
Vars[0][18].Classe = 'N';
Vars[0][18]._u32bit = 0xFFFFFFFF;

for (tu_i[0]=0; tu_i[0]<19;tu_i[0]++)
{
  Init_Test<>;
  Nominal = 1;

  apidd = Vars[0][tu_i[0]]._u32bit;
  Nominal = Nominal && (Vars[0][tu_i[0]].Classe == 'N');

  TU_res = CheckAPID(apidd);
  #include <CheckAPID.checks>

  Nb_Test = Nb_Test + 1 ;
}
printf("%d test executed\n",Nb_Test);
G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID>
```


Fichier.checks

```
ct Michel MsDos
15 fichier(s)          48 264 octets
2 Rép(s) 93 904 466 944 octets libres

G:\Dev\dpu\BSW\TU\Parser\TU\TU>dir CheckAPID
Le volume dans le lecteur G s'appelle ExpPlanck
Le numéro de série du volume est 1766-4815

Répertoire de G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID
20/03/2006  13:32    <REP>          -
27/06/2005  11:24    <REP>          -
27/06/2005  10:36                679 CheckAPID.c
01/04/2005  11:12                35 OptionnalAlloc.c
12/04/2005  17:18                449 CheckAPID.checks
27/06/2005  10:36                644 TU_CheckAPID.c
27/06/2005  10:36                1 591 CheckAPID.tests
20/03/2006  13:32                1 572 TU_CheckAPID.hh
20/03/2006  13:32                2 192 TU_CheckAPID.hbg
20/03/2006  13:32                27 501 TU_CheckAPID.exe
20/03/2006  13:32                1 127 CheckAPID.checks.gcov
20/03/2006  13:32                2 046 CheckAPID.tests.gcov
20/03/2006  13:32                1 407 TU_GlobalAlloc.c.gcov
22/04/2005  09:48                 40 TU_OptionnalDefine.h
20/03/2006  13:32                1 082 TU_init.c.gcov
20/03/2006  13:32                5 858 TU_tools.c.gcov
20/03/2006  13:32                1 314 CheckAPID.c.gcov
15 fichier(s)          48 337 octets
2 Rép(s) 93 897 785 344 octets libres

G:\Dev\dpu\BSW\TU\Parser\TU\TU>cd CheckAPID
G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID>type CheckAPID.checks
// insert checks here
//printf("No checks written !!!\r\n"); // <- delete this line
if (apid == APID1)
{
    Check_U32BIT(Nb_Test,1,TU_res,YES);
} else if (apid == APID2)
{
    Check_U32BIT(Nb_Test,2,TU_res,YES);
} else if (apid == APID3)
{
    Check_U32BIT(Nb_Test,3,TU_res,YES);
} else if (apid == APID4)
{
    Check_U32BIT(Nb_Test,4,TU_res,YES);
} else
{
    Check_U32BIT(Nb_Test,5,TU_res,ILLEGAL_APID);
}

G:\Dev\dpu\BSW\TU\Parser\TU\TU\CheckAPID>
```

Stubs...

```
ex Michel MsDos
G:\Dev\dpu\BSW\TU\Parser\TU\stubs\CheckAPID>type stub_CheckAPID.c
int cpt_CheckAPID;

U32BIT res_CheckAPID;
U32BIT CheckAPID(U32BIT apidd){
cpt_CheckAPID++;
int nominalCall;
nominalCall = 2;
if (<apidd>=0x0) && <apidd>=APID1-1)
    nominalCall = 0;
else
if <apidd>=APID1)
    nominalCall = 0;
else
if (<apidd>=APID1+1) && <apidd>=APID2-1)
    nominalCall = 0;
else
if <apidd>=APID2)
    nominalCall = 0;
else
if (<apidd>=APID2+1) && <apidd>=APID3-1)
    nominalCall = 0;
else
if <apidd>=APID3)
    nominalCall = 0;
else
if (<apidd>=APID3+1) && <apidd>=APID4-1)
    nominalCall = 0;
else
if <apidd>=APID4)
    nominalCall = 0;
else
if (<apidd>=APID4+1) && <apidd>=0xFFFFFFFF)
    nominalCall = 0;
if (<Nominal == 1) && <nominalCall == 1>&&<tooManyError1<=10)
{
    tooManyError1++;
    printf("WARNING : stub CheckAPID called with degraded value of apidd\r\n");
}
if (<nominalCall == 2>&&<tooManyError2<=10)
{
    tooManyError2++;
    printf("ERROR : stub CheckAPID called with failure value of apidd\r\n");
}

if (tooManyError1 == 10)
    printf("Too many degraded errors...\r\n");
if (tooManyError2 == 10)
    printf("Too many failure errors...\r\n");
#include <./CheckAPID/OptionnalStubCode.c>
return res_CheckAPID;
}

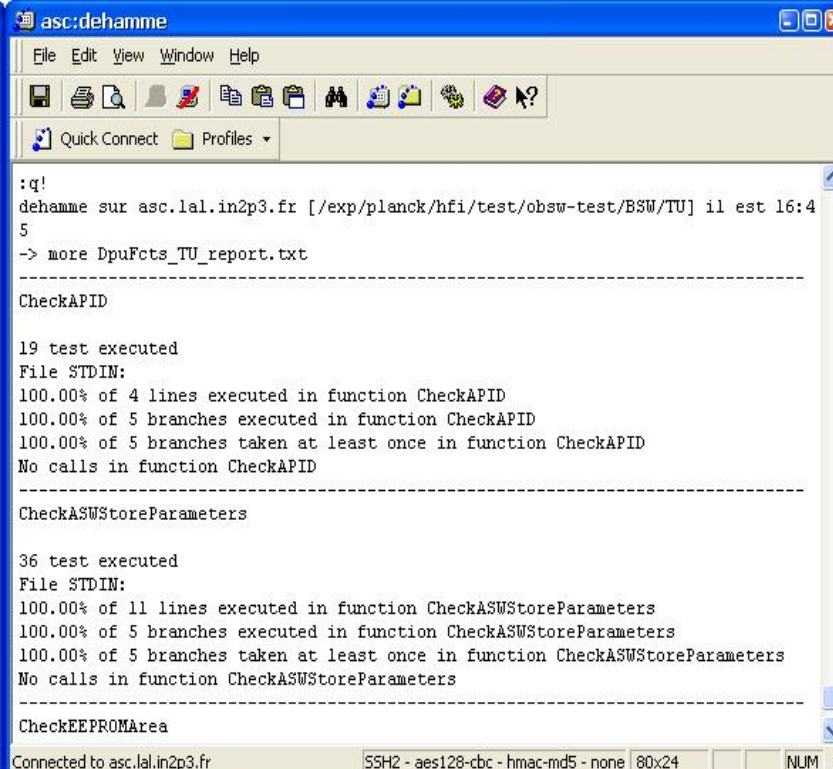
G:\Dev\dpu\BSW\TU\Parser\TU\stubs\CheckAPID>type OptionnalStubCode.c
// insert special stub code here

G:\Dev\dpu\BSW\TU\Parser\TU\stubs\CheckAPID>
```

Un dernier script....

> Build_and_run.bash > file.txt

Pour faire le rapport de toutes les fonctions testées sous forme de fichier texte :



```
asc:dehamme
File Edit View Window Help
Quick Connect Profiles
:q!
dehamme sur asc.lal.in2p3.fr [/exp/planck/hfi/test/obsw-test/BSW/TU] il est 16:45
-> more DpuFcts_TU_report.txt
-----
CheckAPID

19 test executed
File STDIN:
100.00% of 4 lines executed in function CheckAPID
100.00% of 5 branches executed in function CheckAPID
100.00% of 5 branches taken at least once in function CheckAPID
No calls in function CheckAPID
-----

CheckASWStoreParameters

36 test executed
File STDIN:
100.00% of 11 lines executed in function CheckASWStoreParameters
100.00% of 5 branches executed in function CheckASWStoreParameters
100.00% of 5 branches taken at least once in function CheckASWStoreParameters
No calls in function CheckASWStoreParameters
-----

CheckEEPROMArea
Connected to asc.lal.in2p3.fr  SSH2 - aes128-cbc - hmac-md5 - none  80x24  NUM
```

21 mars 2006