## **Generated tests scripts**

In order to test the csl language and the csl compiler, small tests that are generated by Perl scripts are used. There are almost 250 scripts written by the test team, which can generate valid or invalid tests, and the scripts are created accordingly. One test generator can only have valid or invalid tests. The name of the script suggests what command(s)/object(s) are being tested in the current script. Each script creates a directory which will contain all the generated tests. This folder and the tests in it have a suggestive name also.

There are two ways to generate all the tests and then run them:

1. This is the classic method were you have to do it all manually. The first step is to delete everything you have in the directory test/csl\_test\_gen/ (because this is where the generated tests will stored). Then you have to run all the scripts in test/scripts/ (this is the location were all the scripts that generate tests are), one script at a time. The path with the generated tests is shown when the script is ran. Last step is to run the regression script run\_regress.pl for the csl\_test\_gen directory:

run\_regress.pl -hdl csl\_test\_gen

2. The second method is to go in misc/scripts/ and run the script: run\_all\_gen\_tests.pl . That's it! Simple, no? The script will do everything that is in the first method, which includes : delete the old generated tests from test/csl\_test\_gen/, run all the scripts in test/scripts/, compile the generated csl tests using the regression script and publish the results in test/report/.

The test matrices contain all the different cases that can be used as tests, and each cell in the matrix represents one of these cases. For every cell there is a test generated using the scripts. For example, in the connect\_by\_name matrix, a connection between a signal part select (rows) and an input port part select (columns) represents a legal test case that has a corresponding test which will be generated by a Perl script.

The test generators (Perl scripts) create csl code with all the cases in the test matrices.

If we want to generate the tests just for one script and compile them, we can consider the example above; in order to run the script that generates the test and then compile the generated csl code, the following must be done:

```
    in test/scripts/:
        //ar_conn_name_port_valid.pl
    in test/csl_test_gen/:
        //run_regress.pl -hdl csl_test_gen -dir_filter ar_conn_name_port_valid
    the results are stored as HTML pages in: test/report/results_2008.09.20_13_41_55/
```

The script will only generate valid csl tests, which is suggested by the name of it. The created directory with the tests has the same name as the script and is used with the -dir\_filter option in order to compile just the tests from it. The number of generated tests depends on how many cases are included in the script and each test has a unique but suggestive name (e.g. ar\_conn\_name\_port93\_legal.csl).

One of the generated tests for verifying the connection between signal part select with port part select, and port part select with port is:

## //Generated by oanab

```
csl_bitrange br1(17);
csl_bitrange br2(15);
csl_bitrange br3(83);
csl_unit a13 {
  csl_port p_x388(input,32);
  a13 () { }
};
```

```
csl_unit b13 {
 a13 a13_0;
 b13(){}
};
csl_unit c13 {
 b13 b13_0;
 csl_port p_c388(input,32);
 csl_port p_b388(input,br2);
 c13(){
  b13_0.a13_0.p_x388[31:17].connect_by_name(p_b388); // p.ps---port (CP)
 }
};
csl_unit d13 {
 c13 c13_0(.p_b388(s_d388[97-:15]));
 csl_signal s_d388(98);
 a13 a13_1;
 d13 () {
  s_d388[97:83].connect_by_name(c13_0.p_c388[31-:15]); // sig.ps---p.ps (PC)
 }
};
```

Note that a script contains more than one test case, otherwise there would have been way too many scripts and running such a large number of test generators is not justified.

Assign matrix

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RHS	c - inout	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
RHS	p - outpl c - outpl p - inout					illegal	illegal		illegal			illegal		illegal	illegal			illegal		illegal	illegal		illegal	illegal
RHS	c - outpi					illegal	illegal		illegal			illegal		illegal	illegal			illegal		illegal	illegal		illegal	illegal
RHS	p – outp	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
RHS	c – input	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
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RHS	S					illegal illegal	illegal illegal		illegal illegal			illegal illegal		illegal illegal	illegal illegal			Illegal		illegal illegal	illegal illegal		llegal	illegal illegal
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Connect by name matrix

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## Connect\_by\_pattern matrix

Combinatio	ons of LHS and RH	S																
		RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS
		S	Sg[+].s	Sg[+]	lfc[+]	p – input	C – input	p – output	C – output	Many p – input	Many C – input	Many p – output	Many C – output	op_expr	Cc_expr	Cc_expr_nums	Rep_expr	Rep_expr_nums
LHS	S	illegal	illegal	illega	illegal					illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	Sg[+].s	illegal	illegal	illega	illegal					illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	Sg[+]	illegal	illegal	illega		illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	lfc[+]	illegal	illegal			illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	p – input			illega	illegal	illega		illega	illegal	illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	C – input			illega	illegal		illegal	illega	l	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	p – output			illega	illegal	illega	illegal	illega		illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	C – output			illega	illegal	illega			illegal	illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	op_expr	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
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	cc expr nums	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
	rep expr	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
	Rep expr nums	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal

p – parent

c - child

Sig – signal

sg – signal group

ifc - interface

ps - part select

expr – expression

cc - concatenate

rep - replication

Connect\_by\_
name with
parameter
and part
select

		ko			bmo			<u> </u>	pmo with	th kps	y) (	<u> </u>	ko with pps	sdd			pmo with pmps	ith p	sdu		ob e)	expr p		႘	expr	a	<u>re</u>	rep expr	r p	
	0,	d s	ifc	SG	s	) Ji d	ifc §	sg s.	S.ps p.	jį sd d	ifc.p.⁴sc	sg.s. s.ps		jį sd.d	c.p.p	sars ars bs ard oil		p.ps ii	fc.p.p	s de sos de si		p ifc	SG	s	р	ifc s	s bs	р	ifc	Sd
ko	li s	illeg≯ <u>iw_</u> ∮illega <sup>j</sup> illeg <sup>k</sup> illeg <sup>k</sup> iw_jw_jillegkillega¦illegakilw_ <u>rw</u> iw_	illeg	a illeg	<b>∲</b> illeg	W=P	leg <sup>b</sup> ill	eg≱ill	ega	/= IV		illega <mark>∤illega∤</mark> iw= <u>w</u> ∤w=m	ega Iw	N N =	N=IW	llegal	llegal	N=N	illegal illegal w=m'iw=m illegal		lleg It	SS.∳ille	eg∳ille	g∲ille¢	√sdi	\$30   \$30   \$30  \$30   \$30   \$30  \$30	leg∲ille	Sdips	lps∲ille¢ <mark>ill</mark> ega	llega
	l d	W=r* W=	illeg	a illeg	<u> </u>   <u> </u>	W=r	leg <sup>b</sup> ill	eg≉lw	/=IV	V=IV		W=W W=W W=W W=W	/=rv	V=IV		W=W	<u>[w=m w=n</u>  w=m	N=IV	W=ľW	W=rw	DSV I	SS.∳ille	eg ille	ghlps	\sd	ysovileg*illeg*igsvigsvilleg*illeg*illeg*	leg <b>⊁</b> lp	sylps	l <u>ps</u> ∱illeg¹illega	llega
	ifc	lleg*illeg*i <u>iii=r*imi=-</u> iilleg*iilleg*i <u>imi=*imi</u> =g*illega*iillega*iillega	-jwi	:r*  wi	Illeg	lleg*	Ni= Ni=	Vi=r	ega	ega		illega <mark>∕</mark> illega⁄illegal	ega ill	ega		illegal i	illegal illeg≉illegal	lega		illegal	lleg	le¢ille	eg∳ille	g∲ille¢	∮ille¢	illeg <sup>i</sup> illeg	leg <b>≯</b> ille	ğ illeç	illeç	llega
	sg ii	illega <sup>k</sup> iileg <sup>k</sup> i <u>iiij=r</u> kiilega <sup>k</sup> iillega <sup>k</sup> iillega <sup>k</sup> iillega <sup>k</sup> iillega <sup>k</sup> iillega <sup>k</sup> iillega	-jwi	ir	Meg	lleg*	Ni=⊅il	eg≉∭	ega	ega*ill		illega <mark>lillega</mark> illegal	ega ill	ega		illegal i	illegal illega⁴illegal	lega	llegal i	illegal	lleg	le¢ille	eg ille	g∲ille¢	∮ille¢	illeg <sup>i</sup> illeg	leg*ille	illeć	illeg	llega
pmo	ii S	illeg≉ <u>lw</u> =	illeg	a illeg	<u> </u>    <u>   </u>	W=r	leg ill	eg≉III	ega	VI N		illega <mark>∤illega</mark> ¦ <u>w=</u> w w= <u>w</u>	ega Iw	N = I	₩=W	illegal i	illegal w=m/w=m	N=N	W=ľW	illegal	lleg It	SS.∳ille	eg ille	g⁵ille¢	\sdi	illeg^ips^illeg^illeg^illeg illeg illeg^illeg	leg∲ille		lps∲illeg•illega	llega
	l d	<u></u> <u>w=relimes=pilleg=pilleg=pilw=plilleg=pilleg=merge=m</u>	illeg	a illeg	W=r	W=r	leg*ill	eg≉lw	W /\=/	V=IV		W=M  W=M  W=M	W = IV	N N	W=ľW	W=rw	W=rw	N=IV	W=WW=WW=WW W=W		DSV	SS.∳ille	eg ille	ghlps	\sd	<u>psv</u> ipsvillegvillegvipsville¢iileg≯ipsvipsvillegiilega	leg <b>⊁</b> lp	sylps	illeg	llega
	ifc	illega <mark>iillega</mark> i <u>imi=raimi=aillegaiillegaiillegaiillegaaiillegaaiillegaa</u> iillegaa	-jwi	= Mi	llleg	∥eg∳.	Λi=IV	Vi=j• III	ega	ega*III		illega illega illega illegal	ega ill	ega	egal	llegal	llegalli	lega	illegal illegalilleg≉illegal illegal		llegil	le¢ille	eg ille	g⁵ille¢	∮ille¢	illeg <sup>i</sup> illeg <sup>iill</sup> eg	leg∲ille	illeć	illeg	llega
	i Sg	illeg≯illeg∕i <u>iwi =r</u> viillegviillegviilleg <mark>v</mark> i <u>iwi ⇒iilleg</u> ayiillegaviillega	-iwi	ir illeg	Milleg	lleg*	Mi=⊅	eg≱ill	ega ill	ega III		illega illega illegal	ega ill	ega		illegal	illegal illega⁴illegal	leg <i>z</i> ii		illegal	lleg	le¢ille	age ille	geille	∮ille¢	illeg <sup>i</sup> illega	leg <b>≯</b> ille	jelle Schille	illeç	llega
omd	s.ps	#wega الأجيور  الأهوااأ أجوااأ أجهاأ  إهااا إجهاا  إخير  إخير  إخير  إخير  إخير  إخير	illeg	a illeg	Filleg	W=r	leg ill	eg≉ill	d ebe	SW.		ega	d ebe	SW:	=MSC	llegal	llegal	MSC	illega <mark>r</mark> illega <mark>r</mark> ipsw_ipsw=rillegal illegalipswripsw=rillegal		lleg lt	SS.∳ille	eg ille	geille	∖sdi	©elli¶gelli¶gelli¶gelli¶gelli¶gelli¶gelli	leg <b>⊁</b> ille		lps∲ille¢ <sup>i</sup> illega	llega
with kps	sd.d	weighter المُعَالِّ الْمُعَالِّ الْمُعَالِيِّ الْمُعَالِيِّ الْمُعَالِينِ الْمُعَالِينِ الْمُعَالِينِ الْمُعَالِينِ إِنْ الْمُعَالِينِ إِنْ الْمُعَالِينِ الْمُعَالِينِ إِنْ الْمُعَالِينِ إِنْ الْمُعَالِينِ إِنْ الْمُعَالِينِ إِنْ الْمُعَالِينِ الْمُعالِينِ الْمُعَالِينِ الْمُعَالِي	illeg	a illeg	IW=M	W=r	leg <sup>b</sup> ill	di≱bə	di-ws	SW.	ĺ	SW.	di4-sd	SW:	=MSC	=MSd	-MSG	MSC	_=Msd	psw.*Alps.*Ipsw.*Ipsw.=Vpsw.=Vpsw.*Ipsw.*Ipsw.*Ipsw.=rVpsw.=rVpsw.illegvillegvillegvillegvillegvillegvillegvilleg	DSV I	SS.∳ille	eg∳ille	ghlps	\sd	∭∳e∭	di≱bə	solvs	illeç	llega
	ifc.p.ps w=r* w=r* w=r* illega* illeg* w=r* i leg* illeg* psw* psw* psw*	W=M=W	illeg	a illeg	IW=I	W=r	leg*ill	di≱bə	d -ws	SW.	- '	d ws	gw.	SW.	=MSC	=MSG	-MSd	wsc	d=wsd	psw*lpsw*lpsw*lpsw=*lpsw=*lpsw*lpsw*lpsw=*lpsw=* psw=r*lpsv*lps*illeg*illeg* psy*illeg*illeg*illeg*illeg*illeg	DSV I	SS.∳ille	eg∳ille	ghlps	∖sdi	∭eç∮ill	di√bə	sylps	illeç	llega
	sg.s.ps illeg* lw=pilleg* illeg* illeg* illeg* lw=pilleg* illeg* illeg* lwsw.	lleg≉[w=	illeg	a illeg	▶illeg	W=r	leg ill	eg≉∭	d ega	SW.		illega <mark>r</mark> illega	d ege	SW.	=MSC	llegal	llegal	wsc	psw* psw= illegal  illegal psw* psw= illegal		lleg It	SS.∳ille	eg ille	g⁵ille¢	\sdi	illeg*ips*illeg*illeg*illeg*illeg*illeg*illeg	leg∲ille	Sdips	lps∲illeg⁴illega	llega
ko with	s.ps	illeg? w_pillegabilleg/illeg/willeg/illeg/illeg/illegapillegapillegar/wasw	illeg	a illeg	▶illeg	W=r	leg•ill	eg≉ill	d ega	SW		illega <mark>r</mark> illega	debe	SW.	=MSC	legal	llegal	wsc	llegal illegal illegal psw psw=jillegal		lleg It	Se∳ille	eg∲ille	geille	\sdi	illeg/ips/illeg/illeg/illeg/illeg/illeg/illeg	leg <b>≯</b> ille		ps∲illeg•illega	llega
sdwd	Sd.d	<u>w=r</u> *  <u>w=</u> r*illega*illeg*  <u>w=r* w=</u> r*illegr*illega* psw* psw*	illeg	a illeg	IW=M	W=r	leg*ill	di≱bə	di-ws	SW.		d-ws	gw.	SW.	=MSC	=MSG	-MSG	wsc	_wsd	psw*/psw*/psw/psw-/psw-/psw-/psw/psw/psw-/psw-/ps	) Asd	Se ille	eg ille	g	\sd	∭eÇ•iii	di√bə	sdivs	lps∲illeg•illega	llega
	ifc.p.ps w=r*lw=r*lw=r*lilega*illeg* w=r*lw=r*lileg* psw*lpsw* psw*	W=r* W=	illec	a∲illeg	W=r	W=r	leg*il	di≱bə	d ws	SW.		d ws	di-ws	SW.	=MSC	-MSG	-MSd	wsc	_wsd	psw²lpsw²lpsw²lpsw=²lpsw=²lpsw²lpsw²lpsw²lpsw=²lpsw=r²lpsy²lps⁴iileg²iileg²lpsy¹iileç²iileg²lpsy¹ileg³iileg³iileg	) Asd	Se ille	eg∳ille	g	\sd	ille¢iii	d del	sdivs	illeç	llega
	sq.s.ps illeg* [w=pilleg* illeg* illeg* [w=pilleg* illeg* illeg* illeg* illeg* illeg* [psw* psw]	lleg≉lw=	illeg	a illeg	▶illeg	W=r	leg*ill	eg≉ill	ega	SW.		illega illega	d ebe	SW.	=MSC	llegal	llegal	wsc	psw* psw= illegal  illegal psw psw= illegal		lleg I	Se ille	eg ille	g⁵ille¢	\sd	illeg'ips illeg'illeg'illeg'illeg'illeg'illeg	leg⁴ille	Sdi	lps∲illeg•illega	llega
pmo	s.ps	illega <mark>i</mark> w_pillega <mark>i</mark> illegaillegaiw_pillegaillegaillegaillegaillegail	illeg	a illeg	<b>∲</b> illeg	W=r	leg*il	eg≉ill	d ega	SW.		ega ill	diebe	SW.	=MSC	legal	llegal	wsc	illega≯illega≯ <u>lpsw</u> ≯l <u>psw</u> -⊁illegal illegal  <u>psw</u> -⊬illegal		lleg	SS∳ille	eg∳ille	geille	\sdi	illeg• jgg• illeg• illeg• illeg• illeg• illeg•	leg <b>∲</b> ille		lps∲illeg•illega	llega
with pmp p.ps		w=r* w=r* llega*illega w=r* w=r* illega* illega* psw* psw* psw	illeg	arilleg	W=W	W=r	leg*ill	di≱bə	d ws	SW.		d-ws	SW.	SW.	=MSC	=MSG	-MSG	wsc	-wsd	psw* psw* psw* psw= psw= psw* psw* psw* psw= psw= psw= psw ps* ileg* ileg* psy ileg* ileg* ileg* ileg* ileg*	) Asd	SS∳ille	eg•ille	g	\sd	ille¢iil	d del	sdivs	illeç	llega
	ifc.p.ps w=r* w=r* w=r* llega* llega* w=r* w=r* w=r* llega* psw* psw* psw*	W=r* W=	illec	a illeg	IW=	M-I	leg ill	di≱bə	d-ws	SW.		d ws	SW.	SW.	=MSC	-MSG	DSW-	MSC	DSW=	psw≠lpsw≠lpsw≠lpsw=Plpsw=Plpsw+Ppsw+Ppsw=Plpsw=Plpsw=rPpsvPlps+illeg*illeg*Ipsy*illeg*illeg*illeg*illeg*illeg	) Asd	SS.∳ille	ge	ghlps	lps	ille¢	d del	Sd	illeç	llega
	sg.s.ps illeg* lw=pilleg* illeg* illeg* lw=pilleg* lilleg* lilleg* lilleg* lilleg* lpsw* lpsw	lleg≉lw=	illeg	a illeg	<b>∲</b> illeg	W=r	leg ill	eg≱ill	ega	SW.		ega	debe	SW.	=MSC	legal	llegal	wsc	DSW=	illega≯illega∕ipsw.≐yillegal illegal psw.≐yillegal  illegal psw.=yillega  illeg∕illegyillegyillegyillegyilleg	lleg It	SS.	age ille	geille	\sd	ille¢iii	leg∲ille	Sd	illeg	llega

pmo -parametrized object kps - constant part select (not parametrized) pmps - parametrized part select ko -constant object (no parametrized)

Iw – LHS width
 rw – RHS width
 Iwi – LHS object i-th component width
 rwi – RHS object i-th component width
 Ipsw – LSH partselect width
 rpsw – RHS partselect width

op\_expr\_p – operator expression with parameter cc\_expr\_p -concatenation expression with parameter rep\_expr\_p – replication expression with parameter

Extra test cases for connect with parameter:

Illegal cases:

- 1. Different width
- 2. Wrong directions
- 3. Wrong range for part select
- 4. Different names for ports and signals for ifc and sg connections

## Formal to actual matrix

Actual errors		
FORMALS	S	illogal
FORMALS		illegal
	sg.s	illegal
FORMALS	sg.sg.s	illegal
FORMALS	s.ps	illegal 
FORMALS	sg.s.ps	illegal
FORMALS	sg.sg.s.ps	illegal
FORMALS	sg	illegal
FORMALS	sg.sg	illegal
FORMALS	ifc	
FORMALS	ifc.ifc	
FORMALS	е	illegal
FORMALS	p – input	illegal
FORMALS	c - input	
FORMALS	p – output	illegal
FORMALS	c – output	
FORMALS	p – inout	illegal
FORMALS	c – inout	
FORMALS	p – input ps	illegal
FORMALS	c – input ps	illegal
FORMALS	p – output ps	illegal
FORMALS	c – output ps	illegal
FORMALS	p – inout ps	illegal
FORMALS	c – inout ps	illegal
FORMALS	op expr	illegal
FORMALS	cc expr vars	illegal
FORMALS	cc expr nums	illegal
FORMALS	rep expr	illegal
	المارين ماد.	

Combinations of formals and actuals that are errors	ns of form	als and	actuals	that are	errors																
F2A		Actual	Actual	Actual	Actual /	Actual /	Actual	Actual	Actual A	Ictual Ac	ctual A	ctual A	ctual	ctual /	Actual /		Actual /	Actual	Actual Actual		Actual
		S	SG.S	SQ.SQ.S	S.ps	30.S.DS	sd:sd:sbs	93	SQ.59	<u></u> 2]	9 (ij)	۵	- input	- output	o - inout	o - input ps	sq.s. sq.s.q.s. sq.s.q.s.q.s.q.s.q.s.q.s	p - inout ps	op expr	concat ex	dxe de.
FORMALS IC	<u></u>	illegal	illegal	illegal illegal illegal illegal illegal	llegal	llegal	llegal					egal	egali	illegal illegal i	illegal illegal	llegal	illegal	illegal	illegal	llegal illegal	illegal
FORMALS Ifc.ifc illegal illegal illegal	ifc.ifc	illegal	illegal	illegal	illegal	ega	illegal					legal illegal		illegal	illegal	illegal	llegal	llegal	illegal	legal	illegal
FORMALS c - input	c – input							illegal	illegal	llegal illegal illegal	gal										
FORMALS c - output	c - output							llegal	illegal	llegal illegal illegal	agal										
FORMALS c - inout	c - inout						_	llegal	illegal	llegal illegal illegal	egal										