

# SynDEX v7 Grammar

**Julien Forget, Maxence Guesdon, Cécile Stentzel**

16 novembre 2010

# Table des matières

<b>1</b>	<b>Conventions</b>	<b>2</b>
<b>2</b>	<b>Keywords and base types</b>	<b>3</b>
2.1	General application information . . . . .	3
2.2	Operation Groups were previously called Software Components . . . . .	3
2.3	Algorithm . . . . .	3
2.4	Architecture . . . . .	4
2.5	Adequation result . . . . .	4
2.6	Misc . . . . .	5
2.7	Symbols . . . . .	5
<b>3</b>	<b>Regular expressions</b>	<b>6</b>
<b>4</b>	<b>Application specification</b>	<b>7</b>

# Chapitre 1

## Conventions

- upper-case text stands for keywords or base types ;
- lower-case text stands for rule names ;
- the first square brackets [...] for a rule only delimit the description of the rule ;
- the second square brackets (inside a rule description) [...] represent optional elements ;
- curly brackets {...} represent zero, one or several repetitions of the enclosed element ;
- pipes | represent alternatives for a rule ;
- usual brackets (...) are used inside a rule for sub-alternatives ;

# Chapitre 2

## Keywords and base types

### 2.1 General application information

"include":	INCLUDE
"def":	DEF
"main":	MAIN
"application":	APPLICATION
"description":	DESCRIPTION

### 2.2 Operation Groups were previously called Software Components

"operation_group":	OG
"software_component":	XSC
"constraint":	CONSTRAINT
"absolute":	ABSOLUTE
"relative":	RELATIVE
"union":	UNION
"disjunction":	DISJUNCTION
"syndex_version":	SYNDEX_VERSION
"initseq":	INIT_SEQ
"loopseq":	LOOP_SEQ
"endseq":	END_SEQ
"code_phases":	CODE_PHASES

### 2.3 Algorithm

"constant":	CONSTANT
"sensor":	SENSOR
"actuator":	ACTUATOR
"memory":	DELAY
"algorithm":	ALGORITHM
"internal":	INTERNAL
"attach_all":	ATTACH_ALL
"attach_ref":	ATTACH_REF

"attach_condi":	ATTACH_CONDI
"attach_condo":	ATTACH_CONDO
"attach_explode":	ATTACH_EXPLODE
"attach_implode":	ATTACH_IMPLODE
"conditions":	CONDITIONS
"references":	REFERENCES
"dependences":	DEPENDANCES
"strong_precedence_data":	STRONGPRECEDENCEDATA
"weak_precedence_data":	WEAKPRECEDENCEDATA
"precedence":	PRECEDENCE
"data":	DATA
"condition_synchro":	CONDITION_SYNCHRO

## 2.4 Architecture

"architecture":	ARCHITECTURE
"operator":	OPERATOR
"operators":	OPERATORS
"gate":	GATE
"media":	MEDIA
"medias":	MEDIAS
"sampp":	SAMPP
"sammp":	SAMMP
"ram":	RAM
"broadcast":	BROADCAST
"no_broadcast":	NOBROADCAST
"extra_durations_operator":	EXTRA_DURATIONS_OPERATOR
"extra_durations_media":	EXTRA_DURATIONS_MEDIA
"connections":	CONNECTIONS

## 2.5 Adequation result

"ports":	PORTS
"schedules":	SCHEDULES
"operation_scheduled":	OPERATION_SCHEDULED
"scheduled":	SCHEDULED
"calcul":	CALCUL
"communication":	COMMUNICATION
"send":	SEND
"receive":	RECEIVE
"sync":	SYNC
"send_synchro":	SEND_SYNCHRO
"receive_synchro":	RECEIVE_SYNCHRO
"read":	READ
"write":	WRITE
"ihm":	IHM
"condI":	CONDI
"condO":	CONDO
"explode":	EXPLODE
"implode":	IMPLODE

"synchro_constant":	SYNCHRO_CONSTANT
"cond_level":	COND_LEVEL
"schedule_dependences":	SCHEDULE_DEPENDENCES
"schedule_conditions":	SCHEDULE_CONDITIONS

## 2.6 Misc

"on":	ON
"true":	TRUE
"false":	FALSE

## 2.7 Symbols

eof:	EOF
"?":	IN
"!":	OUT
"->":	TO
"<=":	BACKARROW
'@':	AT
'=':	EQU
'\\':	BACKSLASH
'/':	DIV
'-':	MINUS
' ':	BAR
'[':	LDIM
']':	RDIM
'<':	LARG
'>':	RARG
'{':	LLIST
'}':	RLIST
'(':	LPAR
')':	RPAR
'&':	AND
':':	COL
'#[^\n]*:	COMMENT
'"[\^"]*"':	STRING

[ 'a'-'z' 'A'-'Z' '\_' ] [ 'a'-'z' 'A'-'Z' '\_' '-' '0'-'9' '\*' ] \*: NAME ( if not a keyword )

[ '+' '-' ]? [ '0'-'9' ]+ ( '.' [ '0'-'9' ]\* )? ( 'e' [ '+' '-' ]? [ '0'-'9' ]+ )?: FLOAT

## Chapitre 3

# Regular expressions

```
expr_list      ::= [ [ expr_list_continue ] ]
expr_list_continue ::= [ { expr COMMA } expr ]
expr           ::= [ NAME | FLOAT | STRING | LPAREN expr RPAREN | expr PLUS expr
                    | expr MINUS expr | expr TIMES expr | expr DIV expr | CEIL expr |
                    MINUS expr | LLIST expr_list RLIST | BAR expr BAR ]
expression     ::= expr EOE
```

## Chapitre 4

# Application specification

The entry point of the application is the *file* rule.

def_desc	::=	[ [ DESCRIPTION COL STRING ] ]
rfc_desc	::=	[ [ STRING ] ]
comment	::=	COMMENT
boolean	::=	[ FALSE   TRUE ]
int	::=	FLOAT
integer	::=	[ [ MINUS ] int ]
name_list	::=	[ { NAME } ]
rfc	::=	[ NAME [ DIV NAME ] ]
rfc_name	::=	rfc DOT NAME
rfc_name_list	::=	[ { rfc_name } ]
rfc_path	::=	[ { BACKSLASH [ NAME ] } ]
attachement_type	::=	[ ATTACH_ALL   ATTACH_REF   ATTACH_CONDI   ATTACH_CONDO   ATTACH_EXPLODE   ATTACH_IMPLODE ]
operation_attached	::=	[ LDIM rfc_path ( RDIM   COMMA attachement_type RDIM ) ]
operation_attached_list	::=	[ { operation_attached } ]
expression	::=	
arg_names_list	::=	[ { NAME SCOL } NAME ]
arg_names	::=	[ [ LARG arg_names_list RARG ] ]
arg_vals_list	::=	[ { expression SCOL } expression ]
arg_vals	::=	[ [ LARG arg_vals_list RARG ] ]
dimension	::=	[ [ LDIM expression RDIM ] ]
range	::=	[ [ LDIM expression ( RDIM   DOT DOT expression RDIM ) ] ]
coord2d	::=	integer COMMA integer
period_port	::=	[ [ int ] ]
rfc_prd	::=	[ [ int ] ]
rank	::=	[ [ int ] ]
pos	::=	[ [ AT coord2d ] ]
dim_window	::=	[ [ coord2d ] ]
version	::=	SYNDEX_VERSION COL STRING
code_phase	::=	[ INIT_SEQ   LOOP_SEQ   END_SEQ ]
code_phase_list	::=	[ { code_phase } ]
code_phases	::=	[ [ CODE_PHASES COL code_phase_list SCOL ] ]



in_port	: :=	IN NAME dimension NAME rank pos SCOL period_port
out_port	: :=	OUT NAME dimension NAME rank pos SCOL period_port
inout_port	: :=	AND NAME dimension NAME rank pos SCOL period_port
in_port_list	: :=	[ { in_port } ]
out_port_list	: :=	[ { out_port } ]
port_list	: :=	[ { ( in_port   out_port   inout_port ) } ]
dpd_prt	: :=	[ NAME [ DOT NAME ] ]
abstract	: :=	[ [ TRUE   FALSE ] ]
dpd_rfc	: :=	NAME
dependence	: :=	[ ( STRONGPRECEDENCEDATA dpd_prt TO dpd_prt   WEAKPRECEDENCEDATA dpd_prt TO dpd_prt   PRECEDENCE dpd_rfc TO dpd_rfc   DATA dpd_prt TO dpd_prt ) SCOL ]
dependence_list	: :=	[ { dependence } ]
rep_prts	: :=	[ NAME BACKARROW NAME [ COMMA rep_prts ] ]
rep	: :=	[ [ LDIM expression ( RDIM   COL rep_prts RDIM ) ] ]
reference	: :=	rfc arg_vals rep NAME pos rfc_desc rfc_prd abstract SCOL
reference_list	: :=	[ { reference } ]
condition_algo	: :=	[ [ boolean   NAME EQU integer ] ]
condition	: :=	CONDITIONS COL condition_algo SCOL
references	: :=	REFERENCES COL reference_list
dependences	: :=	DEPENDANCES COL dependence_list
cnd_rfcs_dpds	: :=	condition references dependences
cnd_rfcs_dpds_list	: :=	[ { cnd_rfcs_dpds } ]
internal	: :=	DEF INTERNAL NAME arg_names COL port_list
constant	: :=	DEF CONSTANT NAME arg_names dim_window COL out_port_list def_desc
sensor	: :=	DEF SENSOR NAME arg_names dim_window COL out_port_list def_desc
actuator	: :=	DEF ACTUATOR NAME arg_names dim_window COL in_port_list def_desc
delay	: :=	DEF DELAY NAME range arg_names dim_window COL port_list def_desc
algorithm	: :=	DEF ALGORITHM NAME arg_names dim_window COL port_list cnd_rfcs_dpds_list code_phases def_desc
algo	: :=	[ internal   constant   sensor   actuator   delay   algorithm ]
bus_type	: :=	[ ( SAMPP   SAMMP   RAM ) SCOL ]
broadcast	: :=	[ [ BROADCAST   NOBROADCAST ] ]
gate	: :=	GATE NAME NAME SCOL
gate_list	: :=	[ { gate } ]
duration	: :=	rfc EQU FLOAT SCOL
durations_list	: :=	[ { duration } ]
gateref	: :=	NAME DOT NAME
operatorref	: :=	rfc NAME pos SCOL
operatorref_list	: :=	[ { operatorref } ]
mediaref	: :=	rfc NAME broadcast pos SCOL
mediaref_list	: :=	[ { mediaref } ]

```

connection          ::= gateref NAME SCOL
connection_list     ::= [ { connection } ]
operators           ::= OPERATORS COL operatorref_list
medias              ::= MEDIAS COL mediaref_list
connections         ::= CONNECTIONS COL connection_list
main_operator       ::= [ [ MAIN OPERATOR NAME SCOL ] ]
operator            ::= DEF OPERATOR NAME COL gate_list durations_list
                    def_desc code_phases
media               ::= DEF MEDIA NAME COL bus_type durations_list
                    def_desc
extra_durations_operator ::= EXTRA_DURATIONS_OPERATOR rfc COL
                    durations_list
extra_durations_media ::= EXTRA_DURATIONS_MEDIA rfc COL durations_list
architecture        ::= DEF ARCHITECTURE NAME dim_window COL
                    operators main_operator medias connections def_desc
archi               ::= [ operator | media | extra_durations_operator |
                    extra_durations_media | architecture ]
main                ::= [ MAIN ( ALGORITHM rfc arg_vals SCOL |
                    ARCHITECTURE rfc SCOL ) ]
xsc_definition      ::= [ ( XSC | OG ) NAME COL operation_attached_list
                    SCOL ]
operationonproc     ::= CONSTRAINT COL rfc_path ON rfc_name_list SCOL
absoluteconstraint  ::= ABSOLUTE CONSTRAINT COL NAME ON
                    rfc_name_list SCOL
relativeconstraint_type ::= [ UNION | DISJUNCTION ]
relativeconstraint  ::= RELATIVE CONSTRAINT COL
                    relativeconstraint_type name_list SCOL
constraints         ::= [ operationonproc | absoluteconstraint | relativeconstraint
                    ]
description         ::= APPLICATION def_desc
calcul_path         ::= [ [ DIV | calcul_path ] DIV NAME ]
communication_name  ::= [ { NAME COMMA } NAME ]
string_path         ::= [ [ DIV | string_path ] DIV NAME ]
communication_path_not_repeated ::= [ DIV communication_name LPAR string_path DOT
                    NAME RPAR ]
communication_path  ::= [ communication_path_not_repeated [ NAME ] ]
operation_path      ::= [ calcul_path | communication_path ]
operator_list       ::= [ { NAME COMMA } NAME ]
receivers           ::= LPAR operator_list RPAR
operation_port      ::= operation_path DOT NAME
calcul_class        ::= [ CONSTANT | SENSOR | ACTUATOR | DELAY |
                    ALGORITHM | INTERNAL ]
communication_class ::= [ WRITE NAME operation_port | READ NAME
                    operation_port | SEND NAME receivers operation_port |
                    RECEIVE NAME receivers NAME operation_port |
                    SYNC NAME receivers NAME operation_port |
                    SEND_SYNCHRO NAME NAME |
                    RECEIVE_SYNCHRO NAME NAME ]
opn_class           ::= [ CALCUL calcul_class rfc | COMMUNICATION
                    communication_class ]
origin              ::= [ ( IHM | CONDI | CONDO | EXPLODE | IMplode |
                    SYNCHRO_CONSTANT ) operation_path ]
opn_title           ::= opn_class arg_vals LPAR origin RPAR SCOL

```

operator_class	: :=	[ ( OPERATOR   MEDIA ) NAME ]
schedule_place	: :=	SCHEDULED COL operator_class integer FLOAT integer
adeq_condition	: :=	operation_port EQU integer
adeq_cond_list	: :=	[ { adeq_condition AND } adeq_condition ]
adeq_conditions	: :=	[ CONDITIONS COL ( boolean   adeq_cond_list ) ]
dir	: :=	[ IN   OUT   AND ]
port_class	: :=	[ DATA   PRECEDENCE   DELAY   CONDITION_SYNCHRO ]
adeq_port	: :=	dir NAME LDIM int RDIM NAME port_class integer period_port SCOL
adeq_port_list	: :=	[ { adeq_port } ]
adeq_ports	: :=	PORTS COL adeq_port_list
adeq_dependence	: :=	[ ( STRONGPRECEDENCEDATA COND_LEVEL EQU int operation_port TO operation_port   STRONGPRECEDENCEDATA operation_port TO operation_port   PRECEDENCE operation_path TO operation_path ) adeq_conditions SCOL ]
adeq_dpd_list	: :=	[ { adeq_dependence } ]
adeq_dpds	: :=	SCHEDULE_DEPENDENCES COL adeq_dpd_list
operation_condition	: :=	operation_path adeq_conditions
operation_condition_list	: :=	[ { operation_condition } ]
adeq_operations_conditions	: :=	SCHEDULE_CONDITIONS operation_condition_list
operation_scheduled	: :=	OPERATION_SCHEDULED operation_path COL opn_title schedule_place adeq_ports
schedules	: :=	SCHEDULES COL
command	: :=	[ version   description   algo   archi   main   schedules   operation_scheduled   adeq_dpds   adeq_operations_conditions   xsc_definition   constraints   comment ]
command_list	: :=	[ { command } ]
fileinclude	: :=	INCLUDE STRING SCOL
file	: :=	[ command_list ( fileinclude   EOF ) ]