



CFG(Control Flow Graph) - SASD

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Statement of Purpose



Statement of Purpose

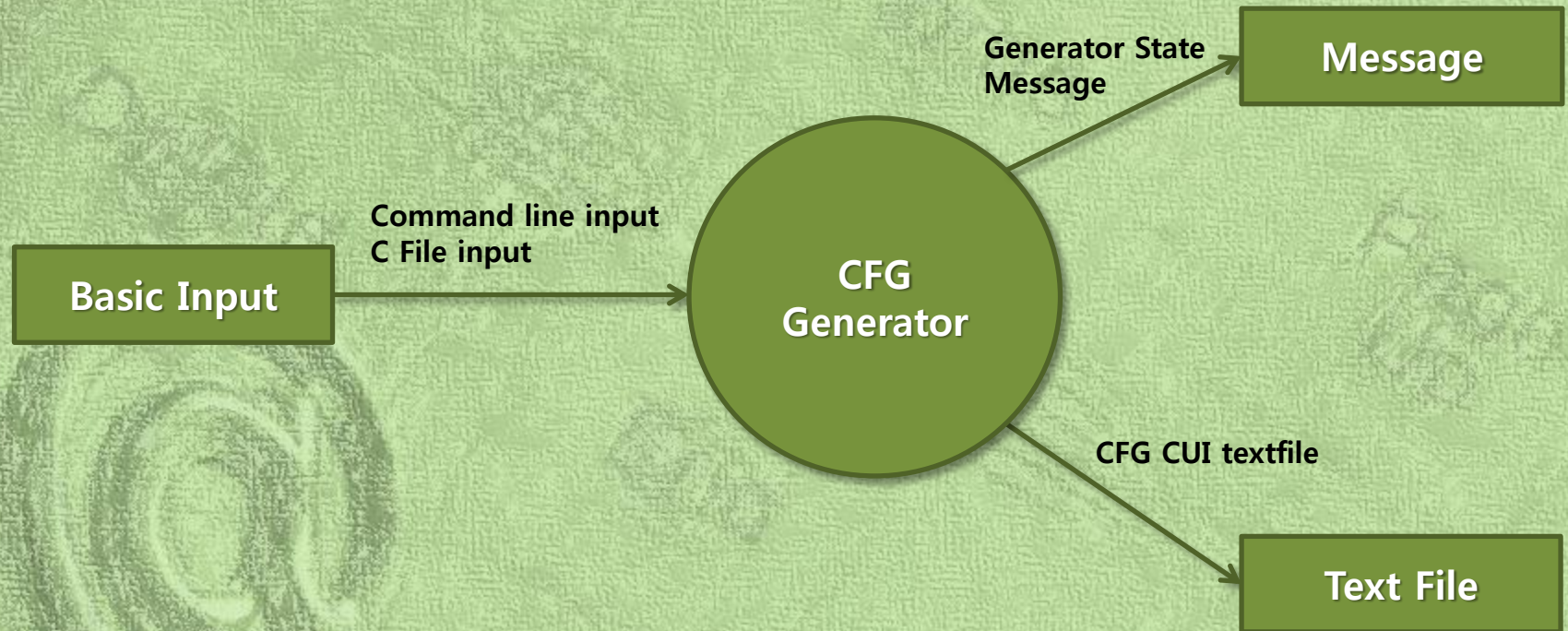
1. CFG Generator can be executed in CUI Interface like cygwin.
2. C source codes can have maximum 200 lines.
3. C source code file should not include pointers. CFG Generator only check source that include main function, and that consist of one file. (No multiple file)
4. C Source can use standard header in standard library like `<stdio.h>`, `<stdlib.h>`.
4. It shows state by message about CFG Generating process. Message will be showed like "File load success", "Start Generating", "Fail to load file", etc.
5. Only C source codes can be input and After being inserted, it will be converted CFG with a text file.
6. If a wrong command is input, help method will be printed.
7. If CFG Generator can't find C File that defined in input command, it prints error message.
8. Only CUI(Character User Interface) can be used for example like this. `/CG Inputcode.c result.txt`
Executable file name C source file name Report file name.



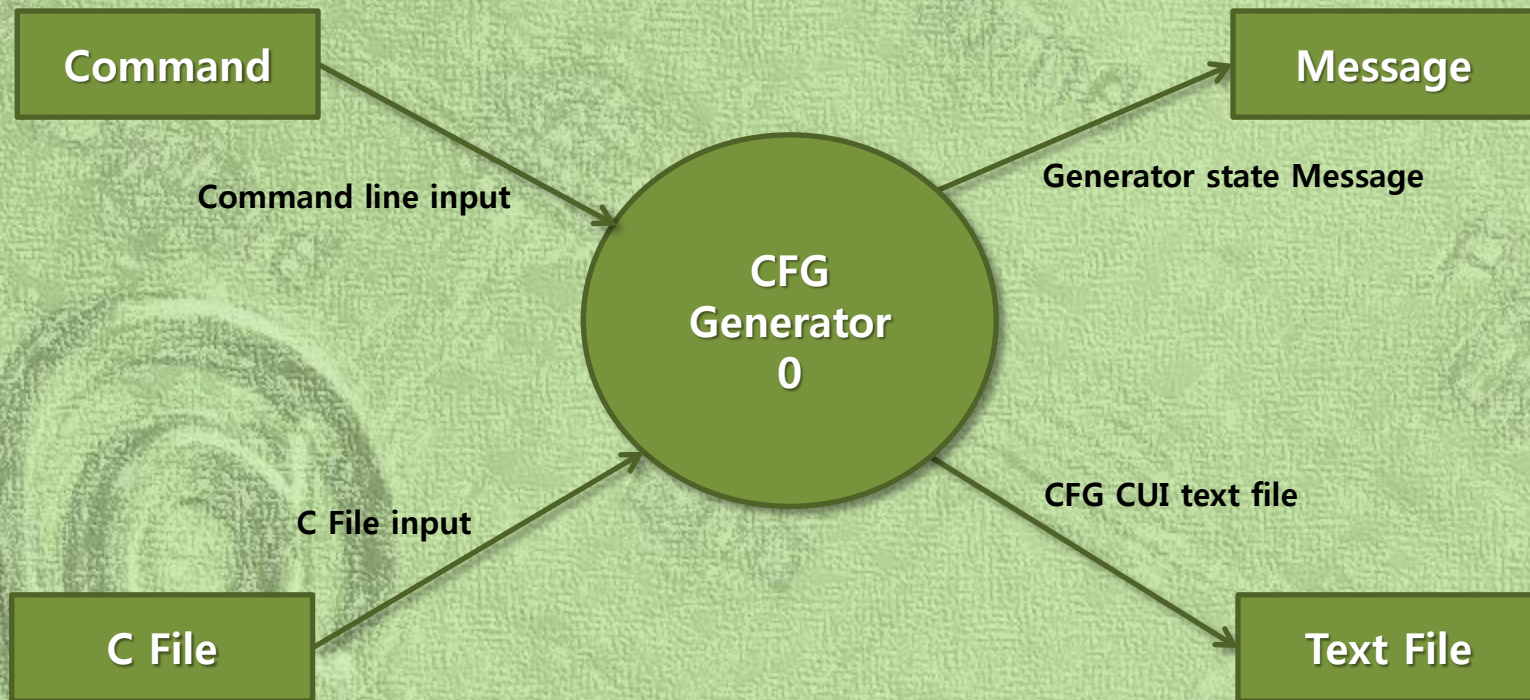
Data flow diagram



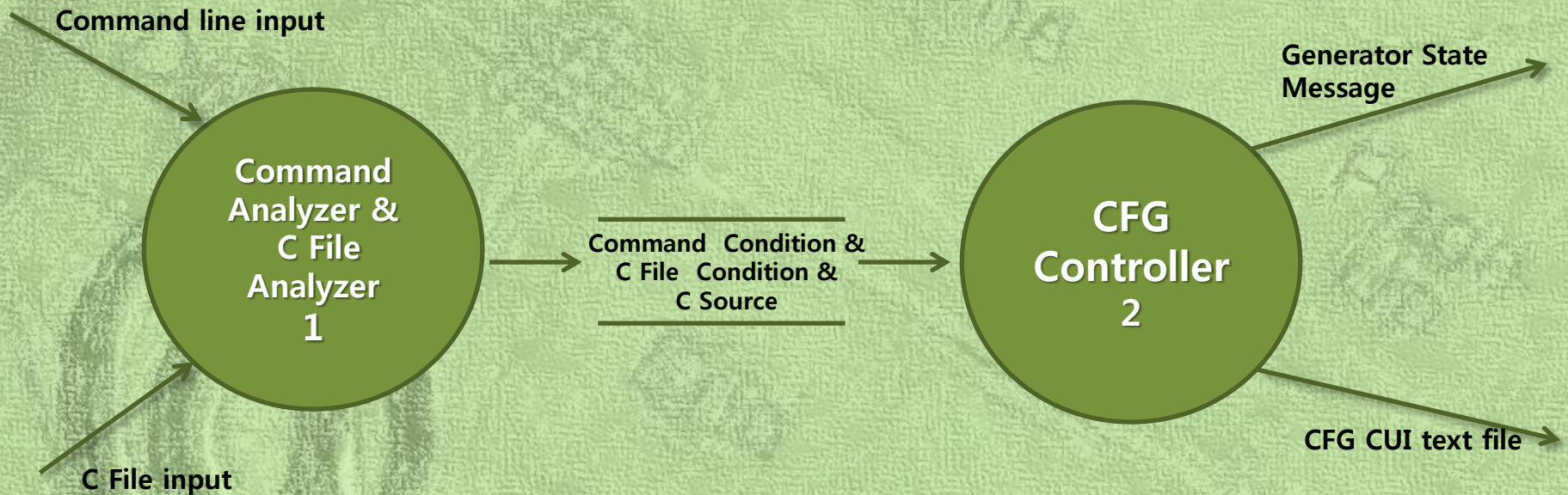
System Context Diagram



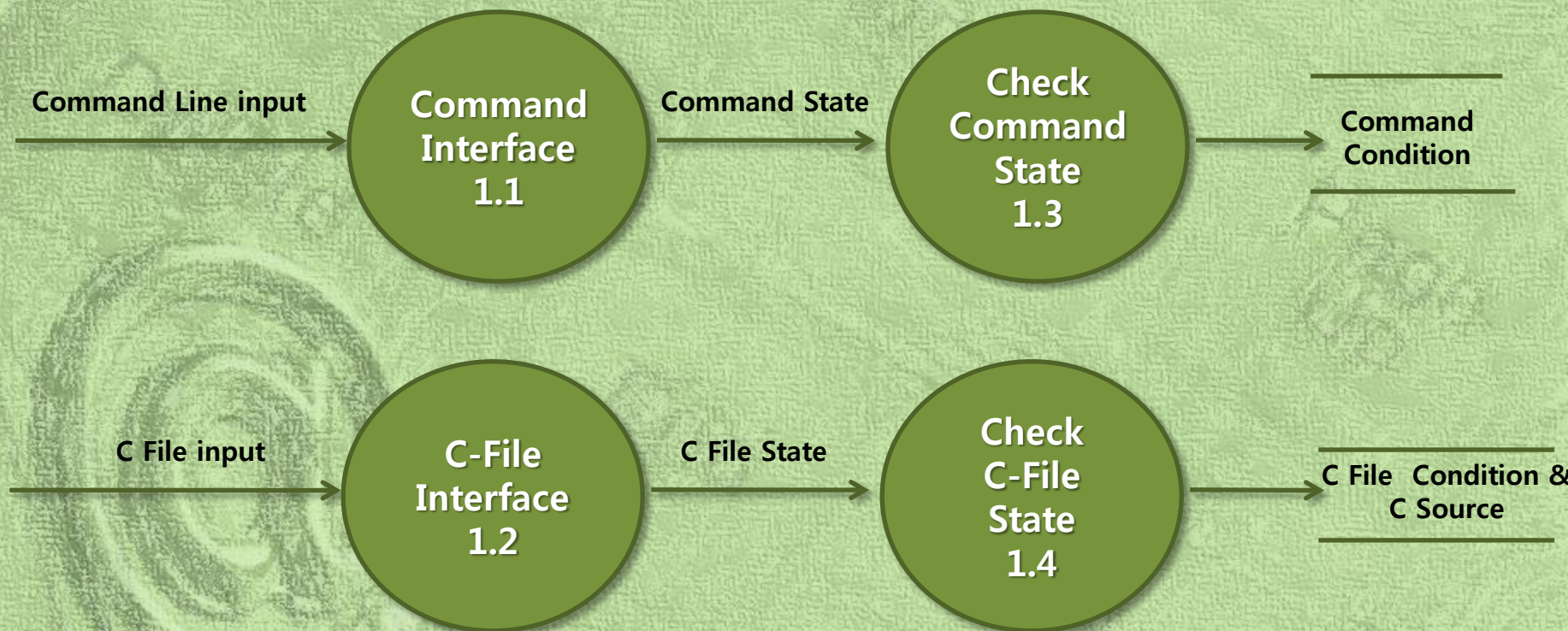
DFD Level 0



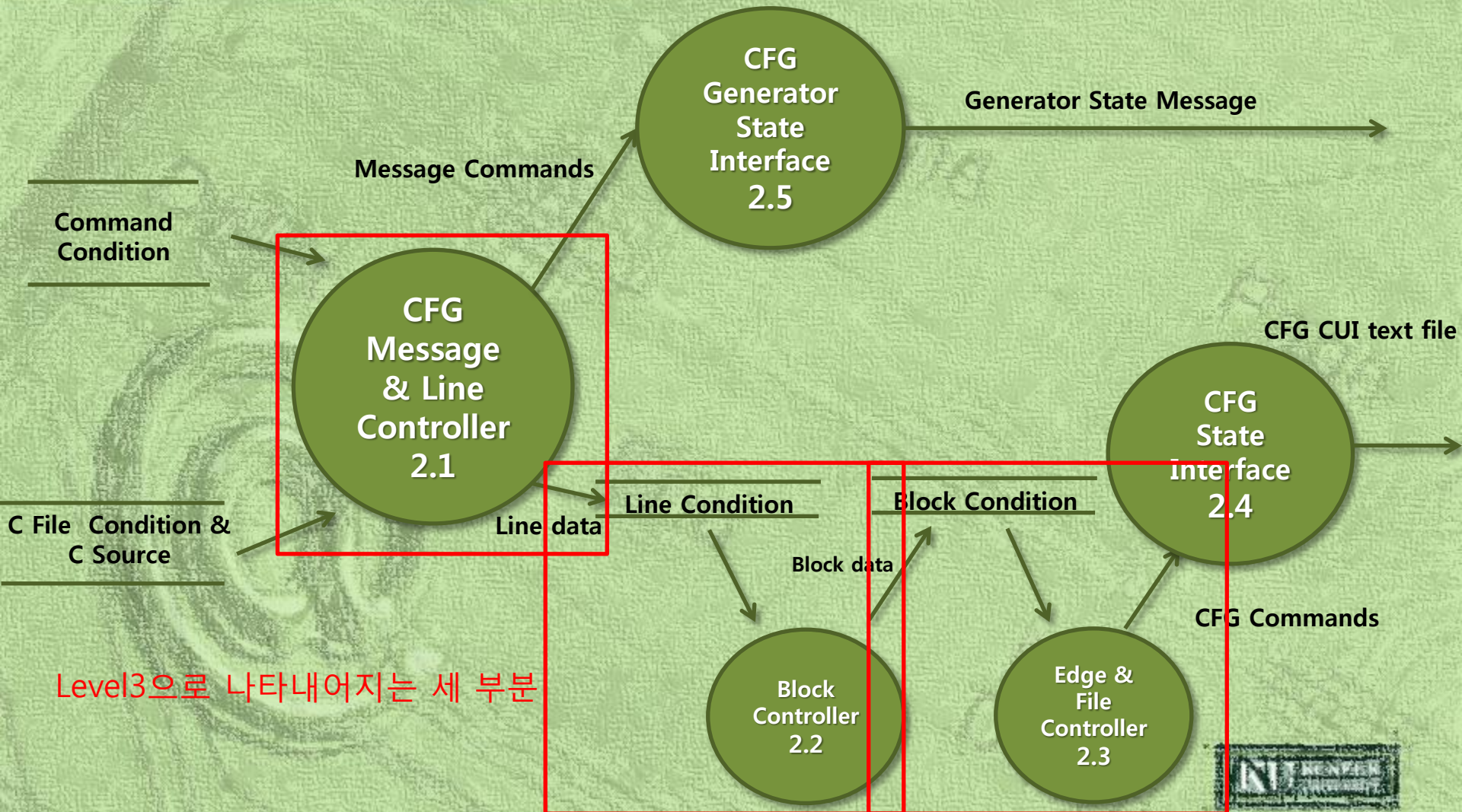
DFD Level 1



DFD Level 2



DFD Level 2 (cont.)



Data Store (Command Condition)

Command Condition

Data Type	Data Format
Correct Command	True / False

Data Store (C File Condition)

C File Condition & C Source

Data Type	Data Format
C File Existence	True / False
C filename	String
C File Qualified	True / False

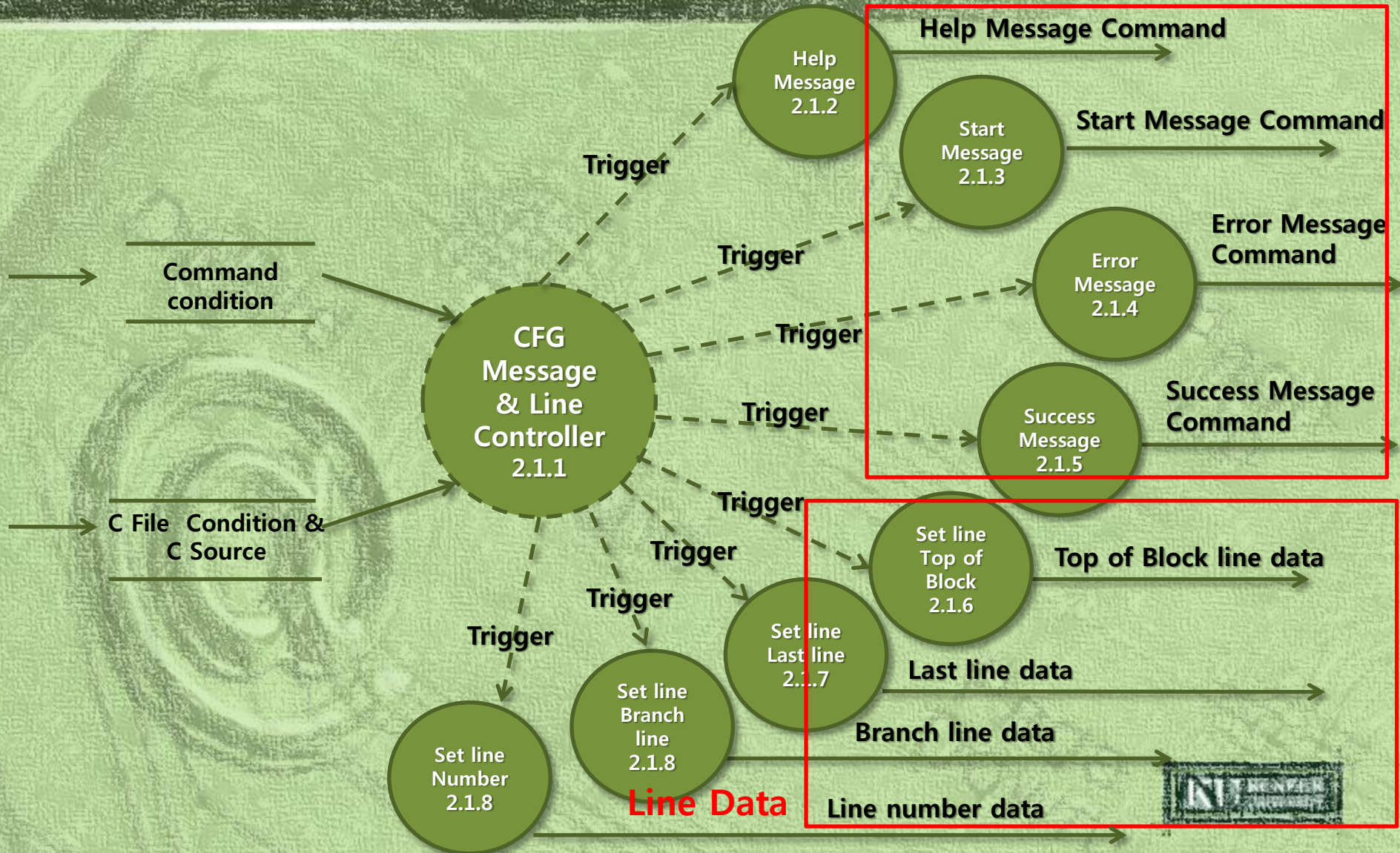
Data Store (C Source)

C File Condition & C Source

Data Type	Data Format
C Source	C code

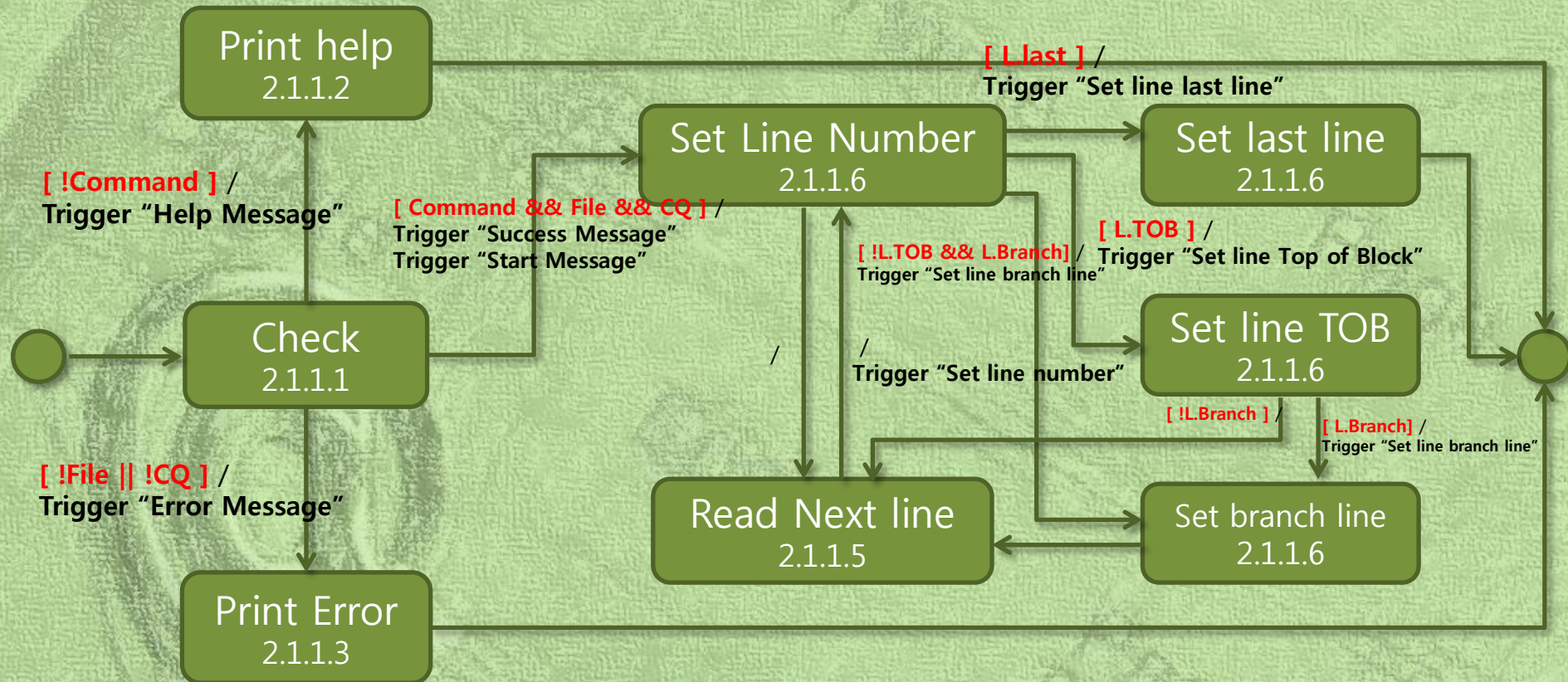
DFD Level 3

Message Commands



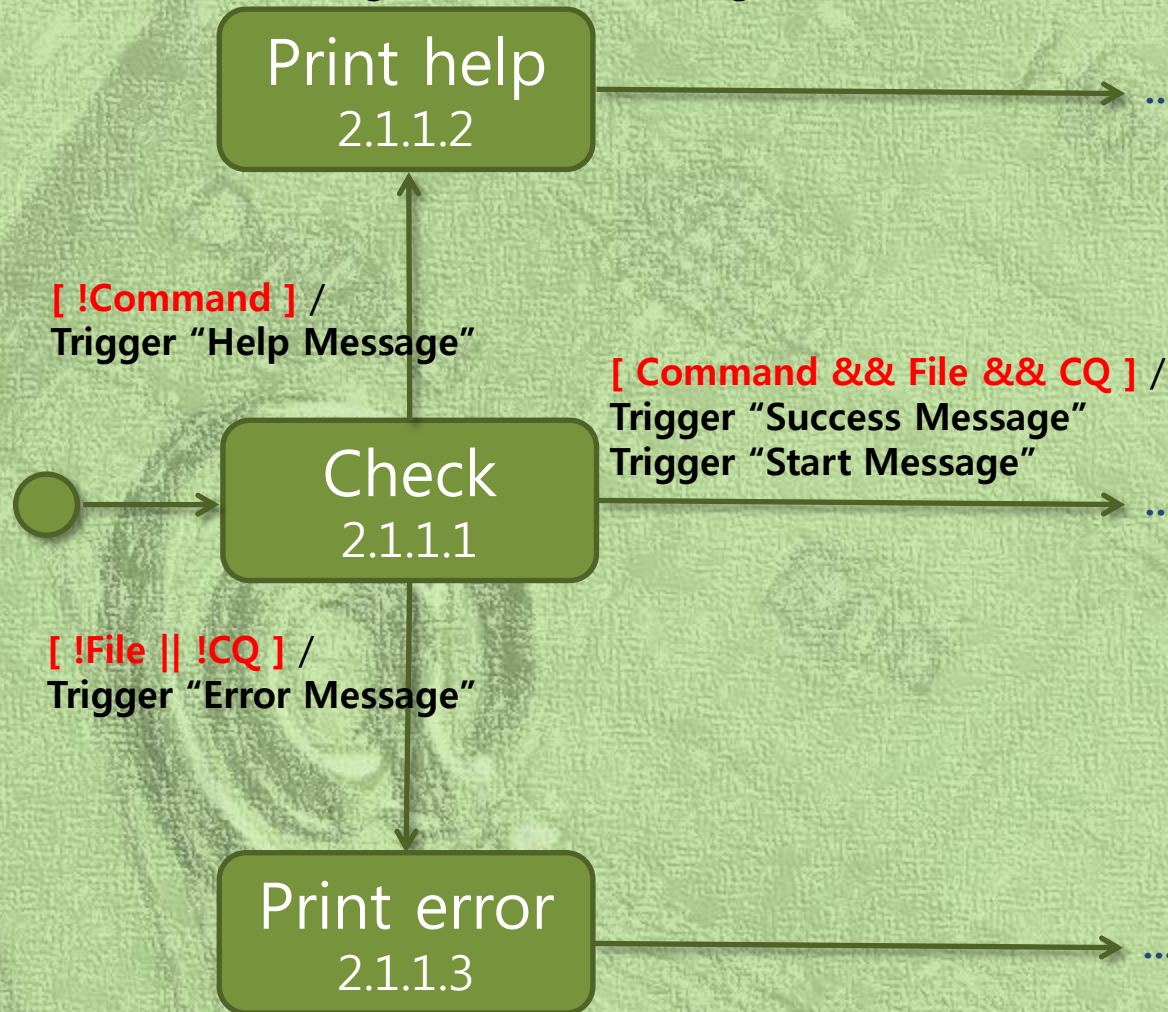
DFD Level 4

State transition Diagram for CFG Message & Line Controller 2.1.1



CFG Level 4 (Expand.)

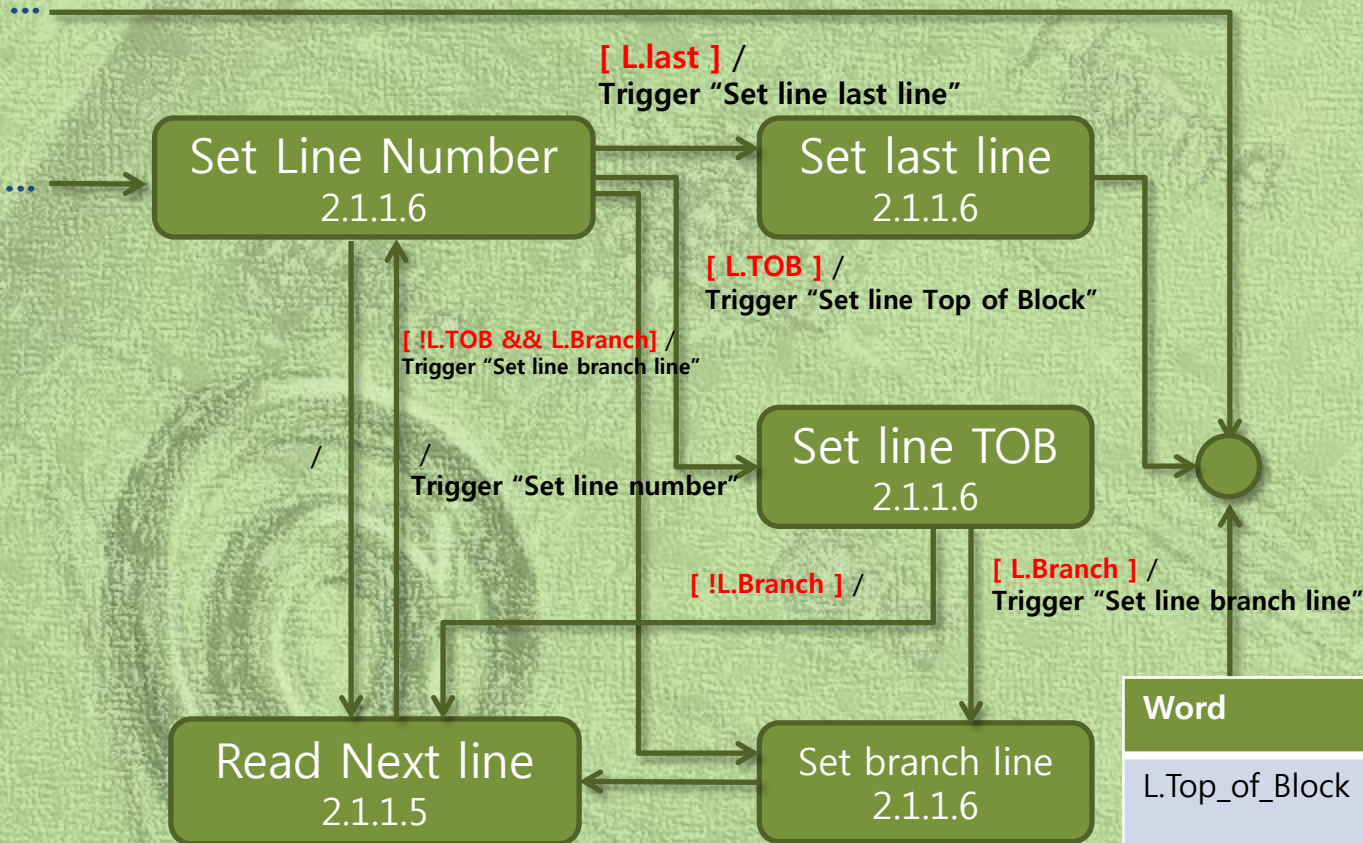
State transition Diagram for CFG Message & Line Controller 2.1.1



Word	Definition
Command	Correct command? (Command Condition)
File	File existence (C File Condition)
CQ	Qualified C code? (C File Condition)

CFG Level 4 (Expand.)

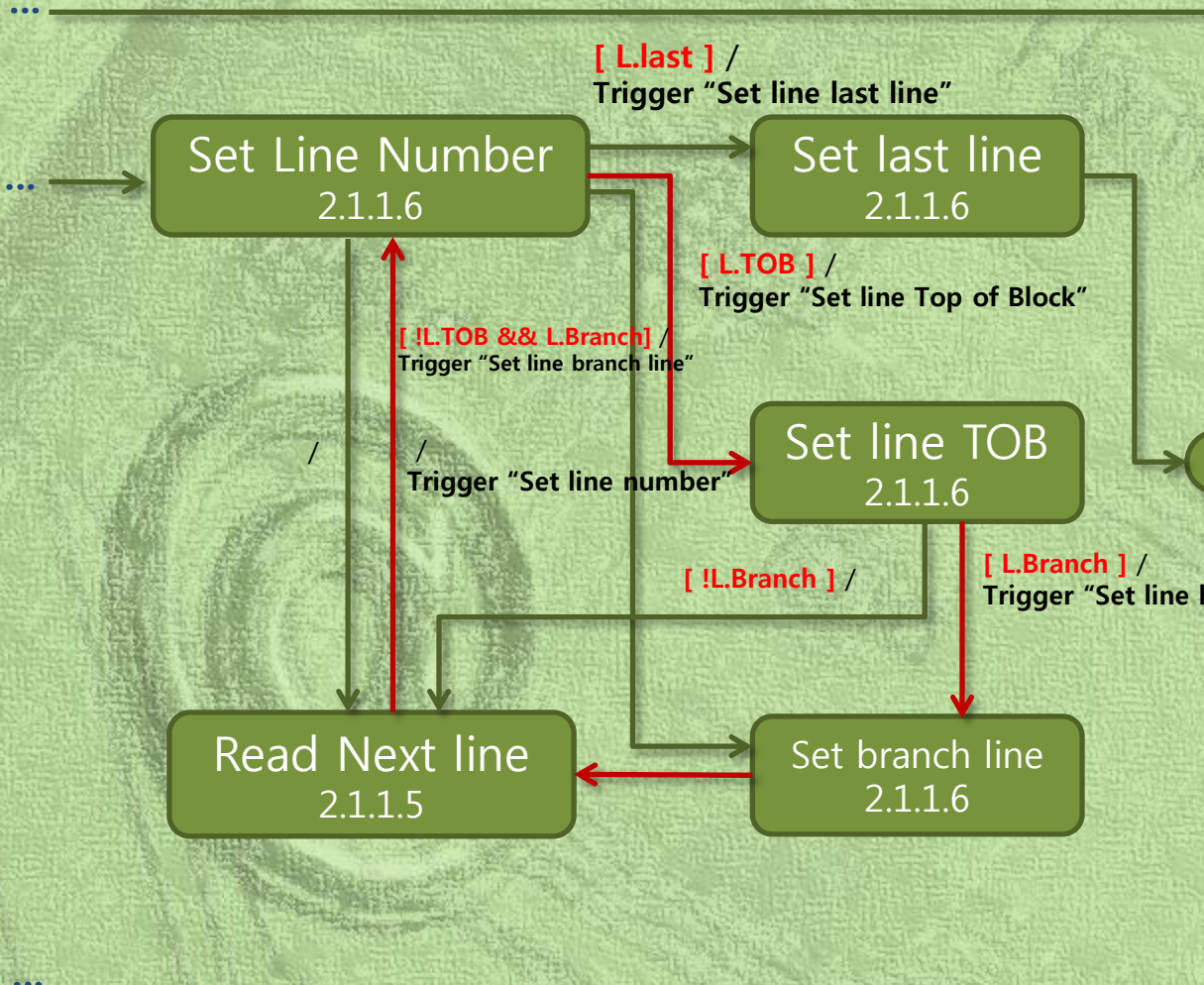
State transition Diagram for CFG Message & Line Controller 2.1.1



Word	Definition
L.Top_of_Block	Top line of the block? (If line first affected in switch/if/for/while statement)
L.last	Last line in C code?
L.Branch	Has line branch? (If line has switch/if/for/while statement)

CFG Level 4 (Expand.)

State transition Diagram for CFG Message & Line Controller 2.1.1



**In case,
If line is TOB & Branch.**

**In case,
If line is TOB.**

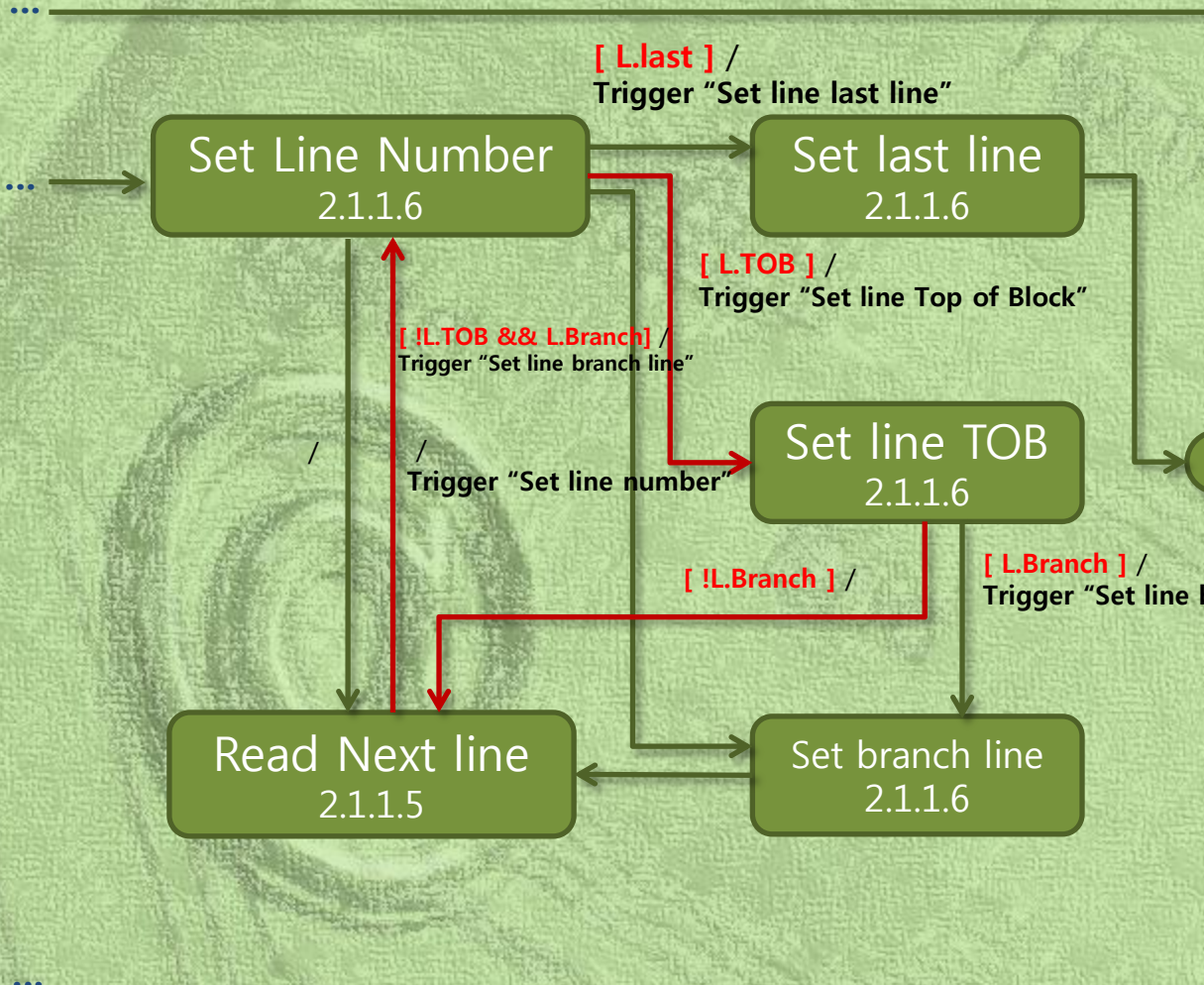
**In case,
If line is Branch.**

**In case,
If line is last line.**

**In case,
If line has no attribute.**

CFG Level 4 (Expand.)

State transition Diagram for CFG Message & Line Controller 2.1.1



In case,
If line is TOB & Branch.

In case,
If line is TOB.

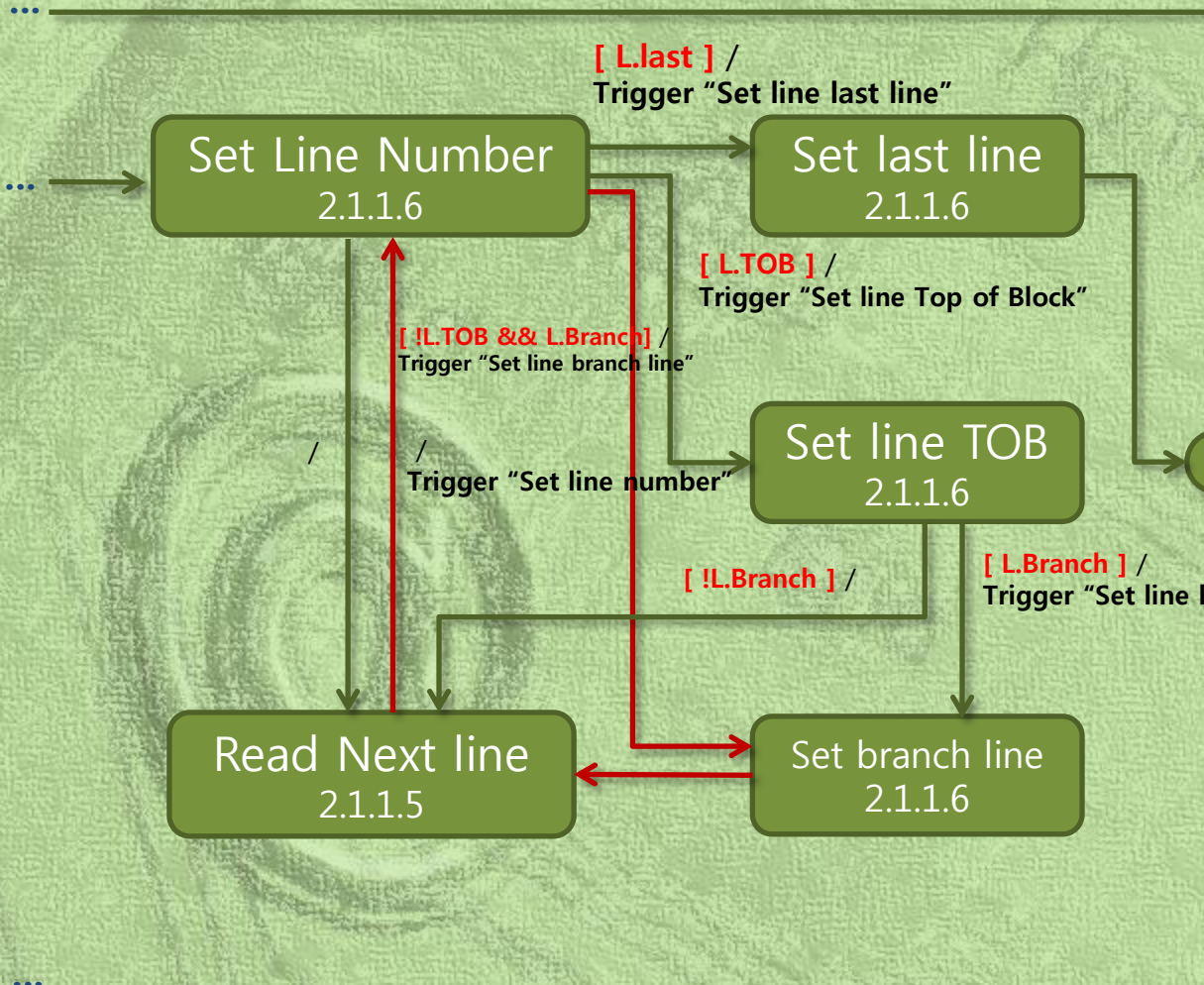
In case,
If line is Branch.

In case,
If line is last line.

In case,
If line has no attribute.

CFG Level 4 (Expand.)

State transition Diagram for CFG Message & Line Controller 2.1.1



In case,
If line is TOB & Branch.

In case,
If line is TOB.

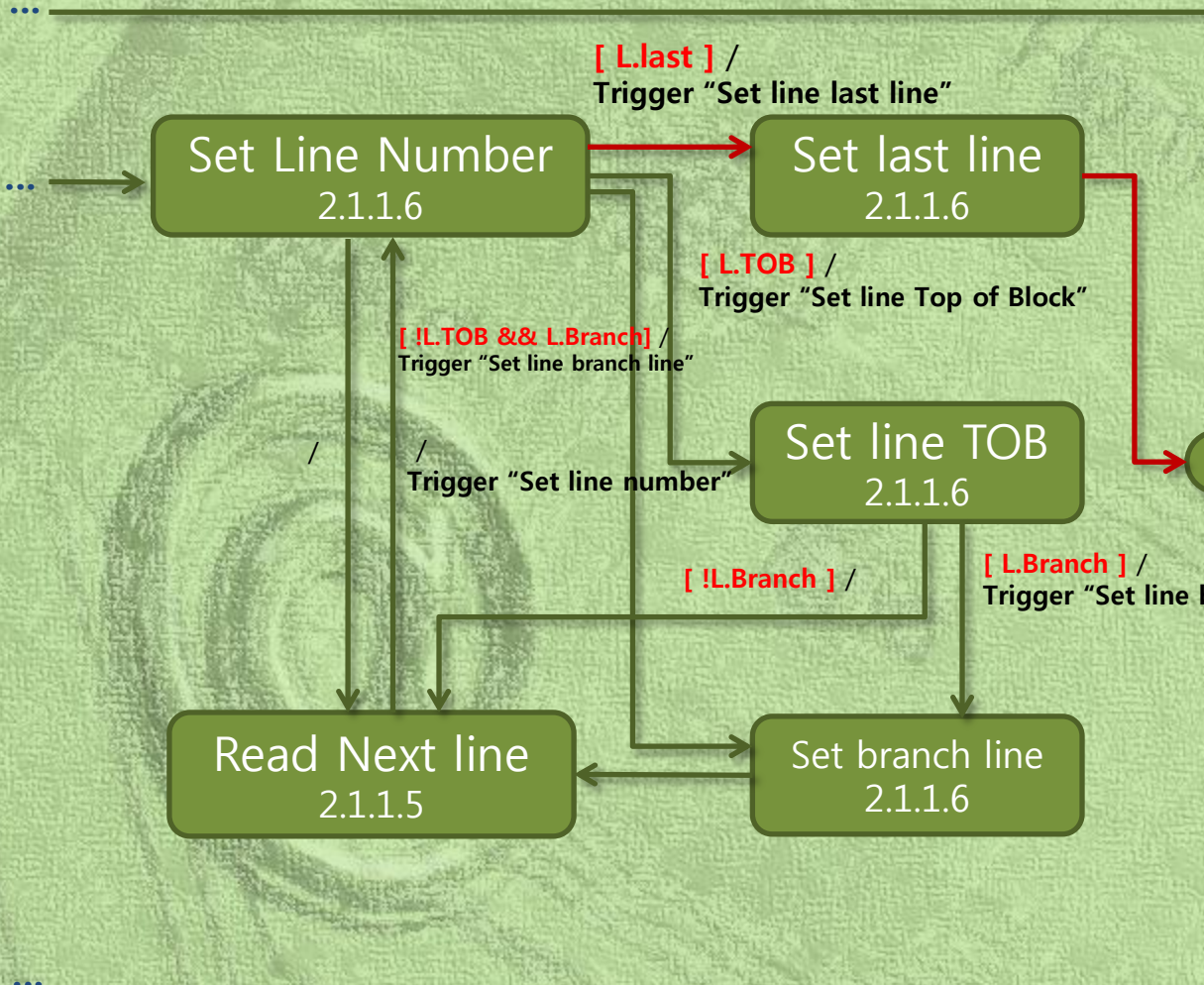
In case,
If line is Branch.

In case,
If line is last line.

In case,
If line has no attribute.

CFG Level 4 (Expand.)

State transition Diagram for CFG Message & Line Controller 2.1.1



In case,
If line is TOB & Branch.

In case,
If line is TOB.

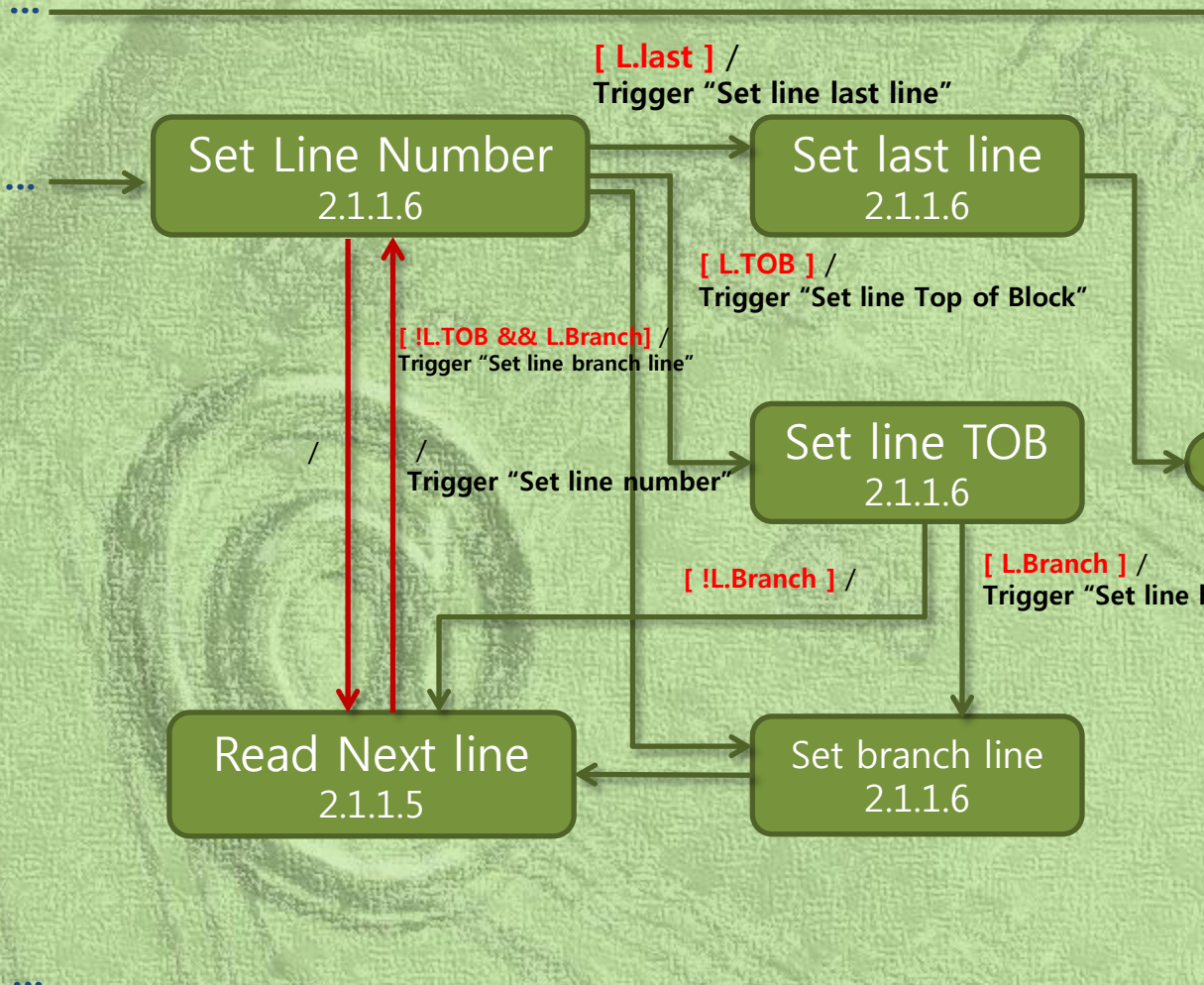
In case,
If line is Branch.

In case,
If line is last line.

In case,
If line has no attribute.

CFG Level 4 (Expand.)

State transition Diagram for CFG Message & Line Controller 2.1.1



In case,
If line is TOB & Branch.

In case,
If line is TOB.

In case,
If line is Branch.

In case,
If line is last line.

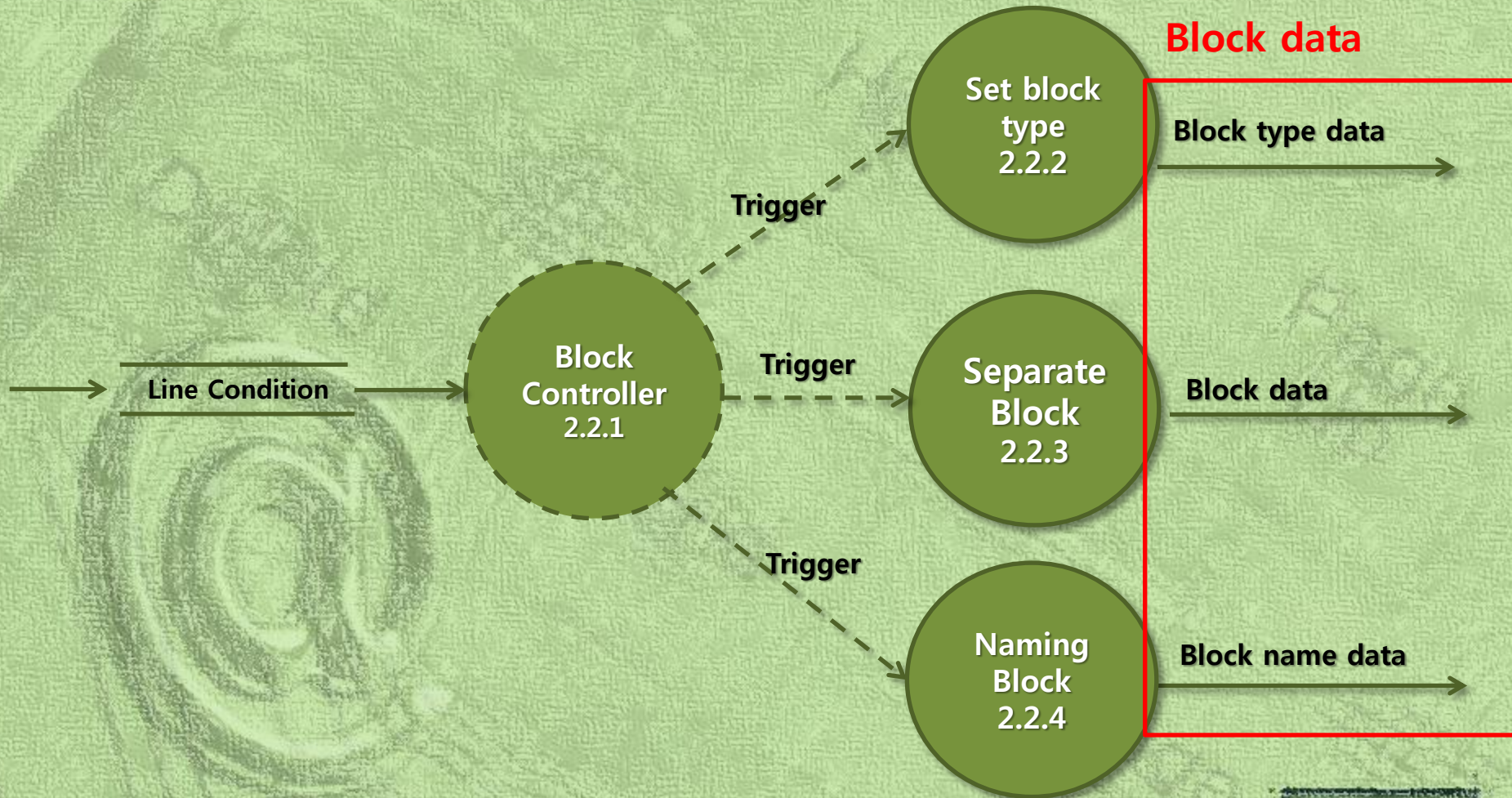
In case,
If line has no attribute.

Data Store (Line Condition)

Line Condition

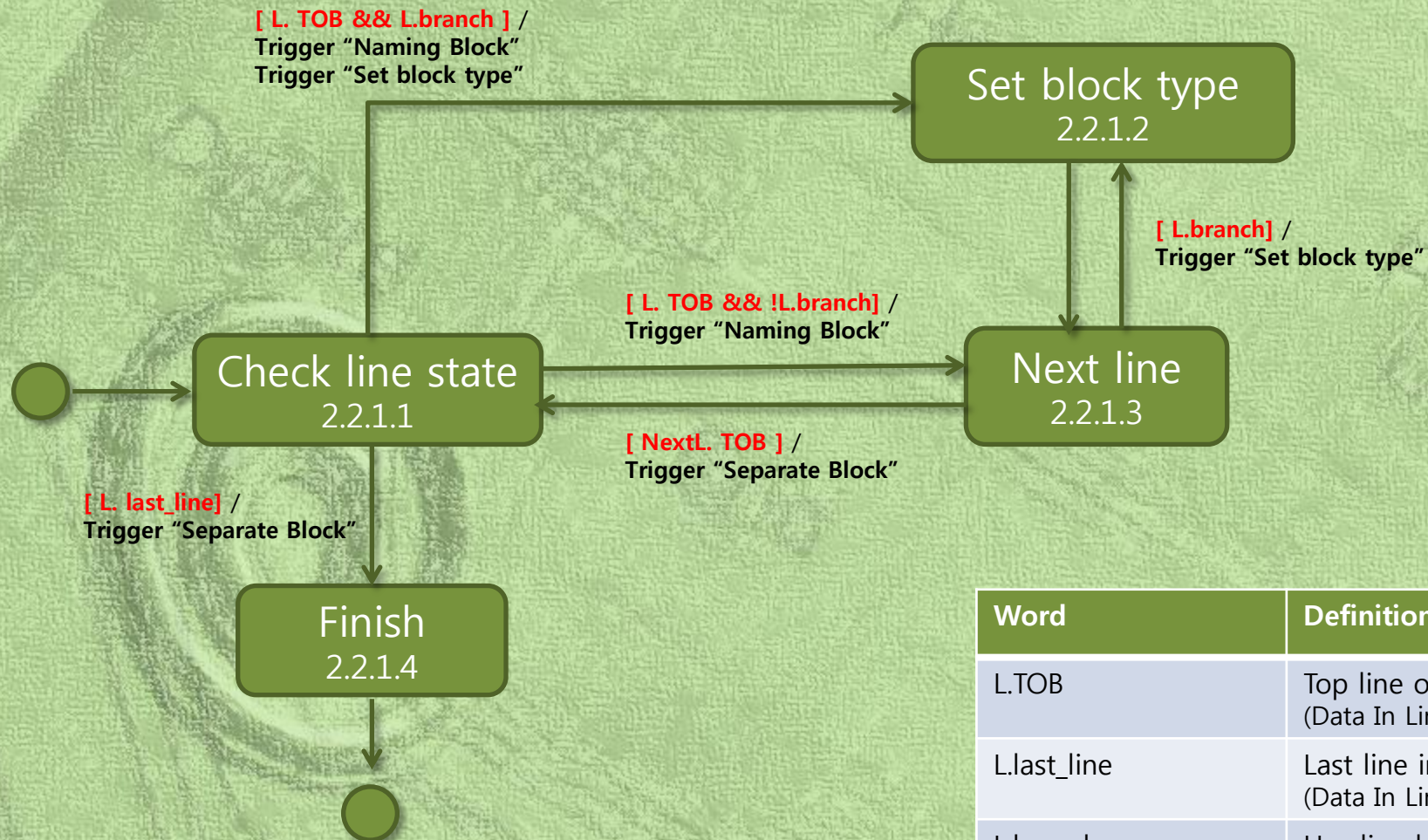
Data Type	Data Format
Top of Block	True / False
Branches	Integer
Last Line	True / False

DFD Level 3 (Cont.)



DFD Level 4

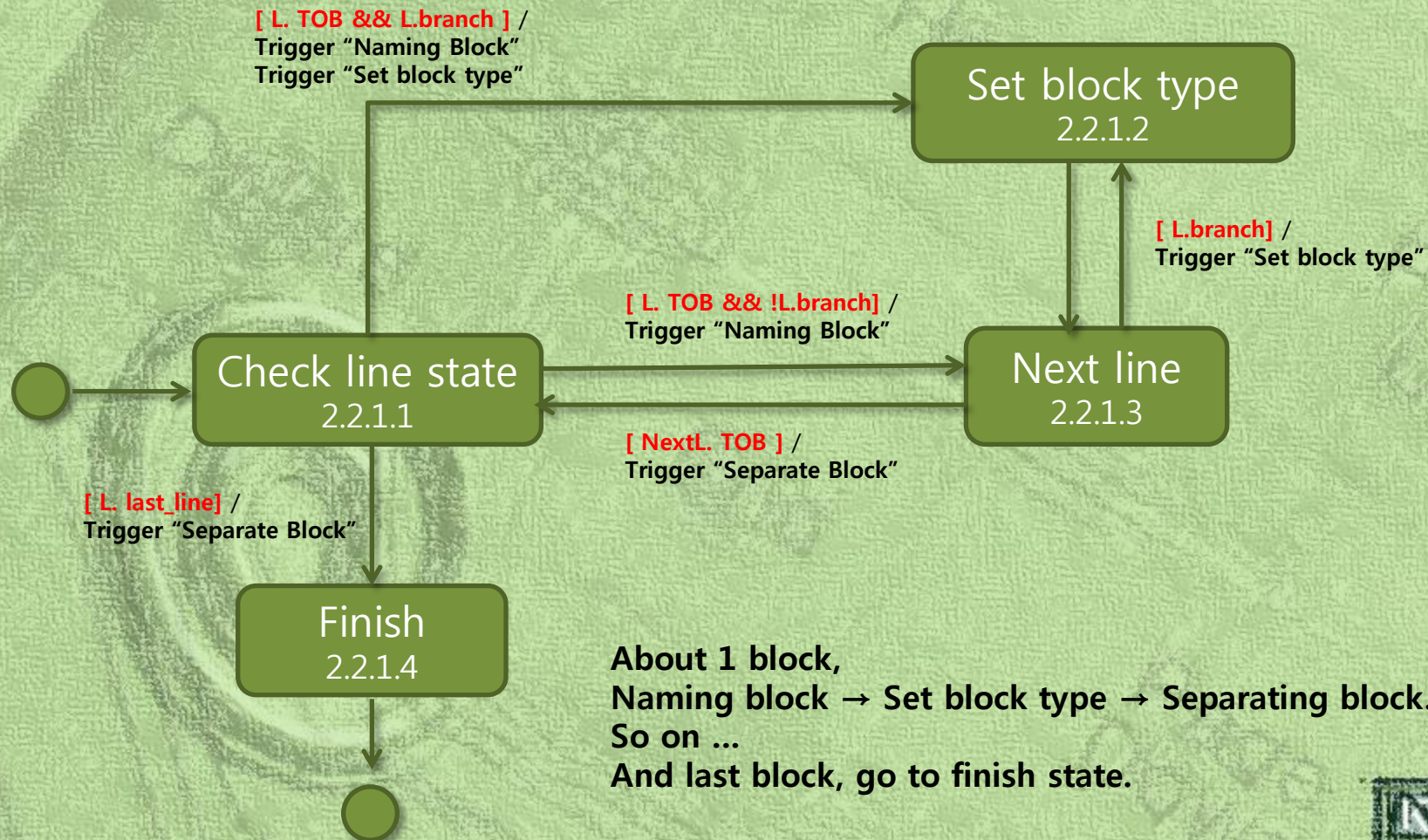
State transition Diagram for Block Controller 2.2.1



Word	Definition
L.TOB	Top line of the block? (Data In Line Condition)
L.last_line	Last line in C code? (Data In Line Condition)
L.branch	Has line branch? (Data in Line Condition)

DFD Level 4

State transition Diagram for Block Controller 2.2.1



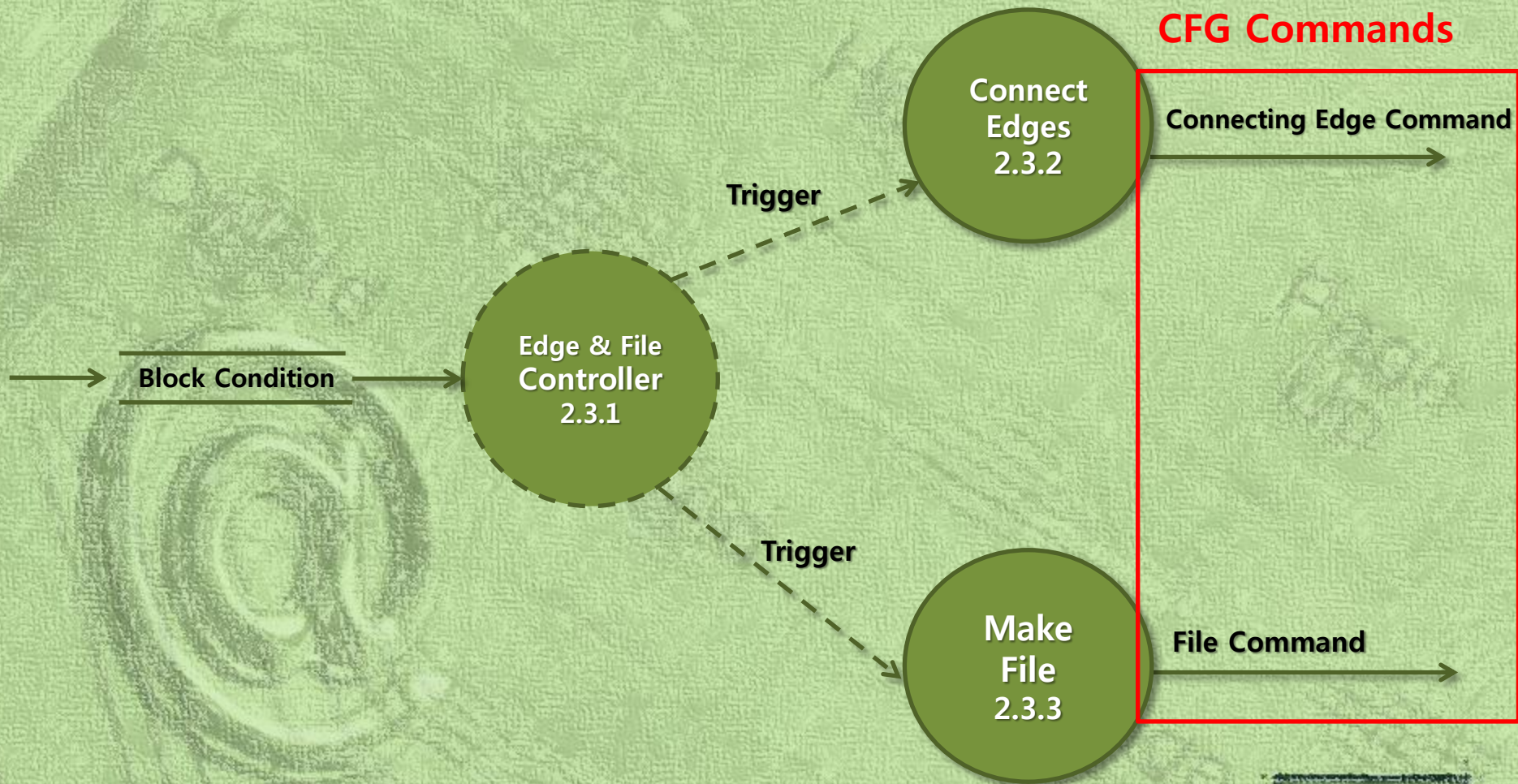
About 1 block,
Naming block → Set block type → Separating block.
So on ...
And last block, go to finish state.

Data Store (Block Condition)

Block Condition

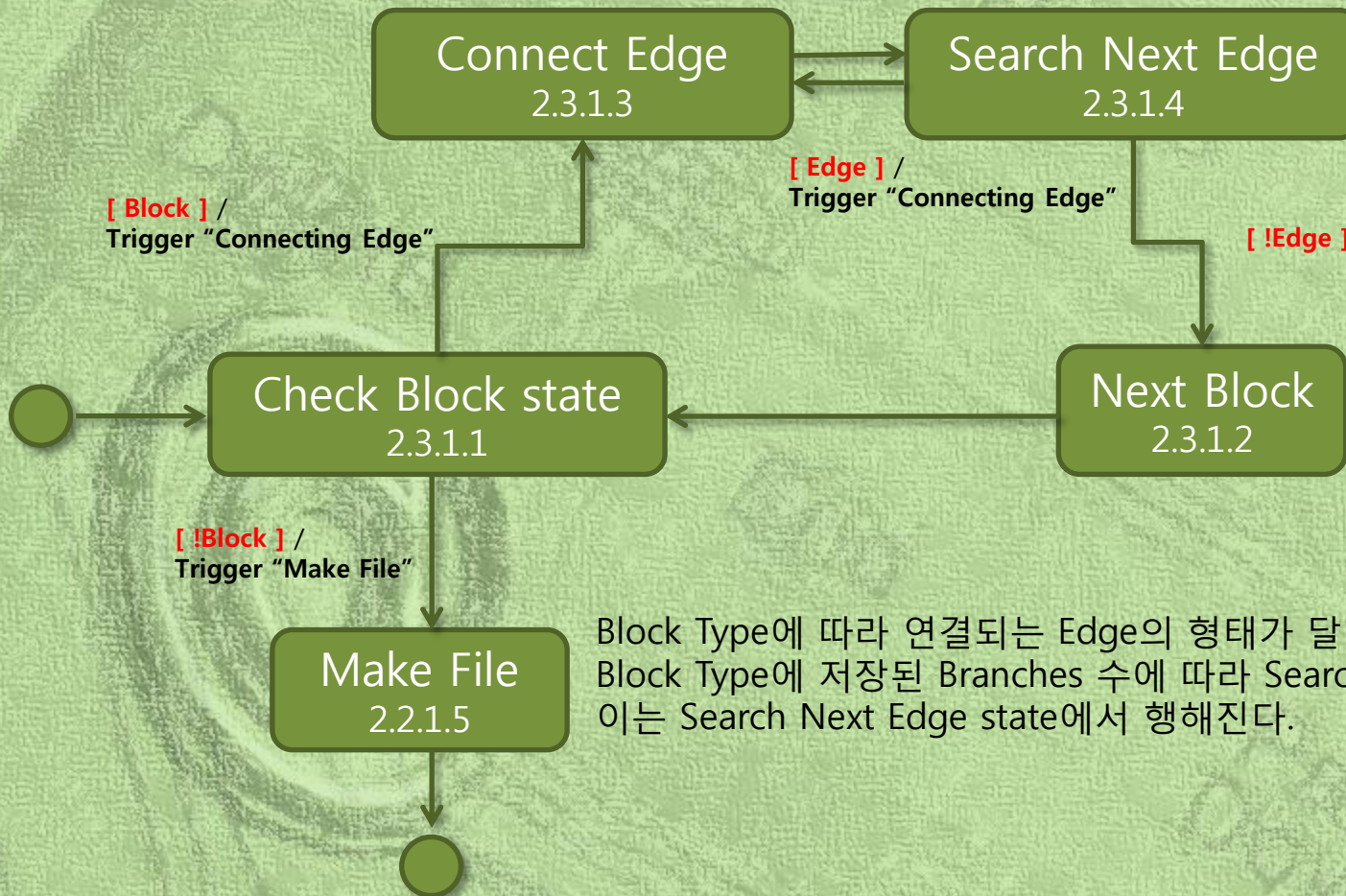
Data Type	Data Format
Block name	Char
Block type	Integer array[2] (1 = if else 2 = switch 3 = while 4 = for) / (Block branches)

CFG Level 3 (Cont.)



CFG Level 4

State transition Diagram for Edge & File Controller 2.3.1



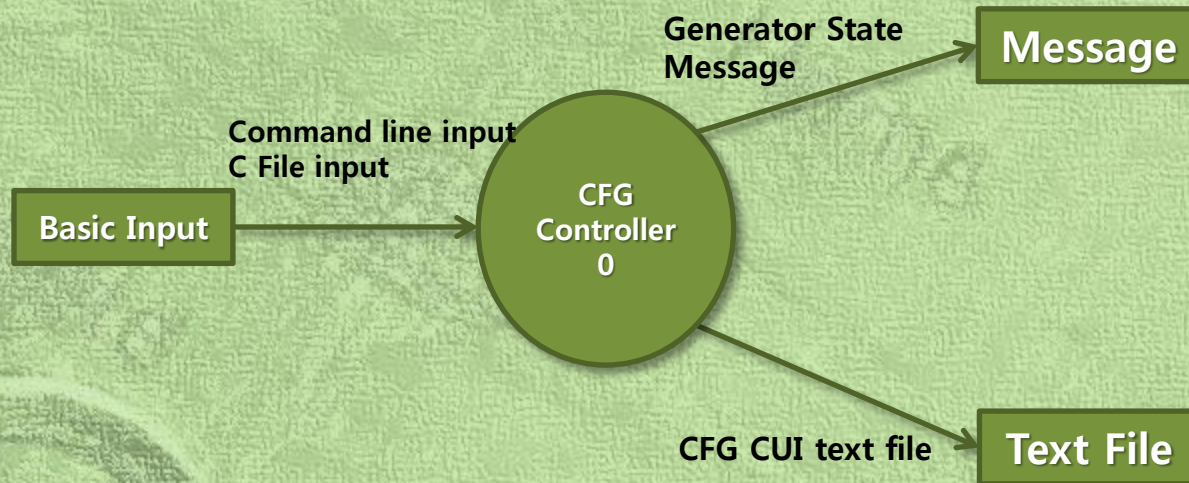
Block Type에 따라 연결되는 Edge의 형태가 달라지고,
Block Type에 저장된 Branches 수에 따라 Search되는 Edge 개수가 달라짐.
이는 Search Next Edge state에서 행해진다.



Event list & Data Dictionary

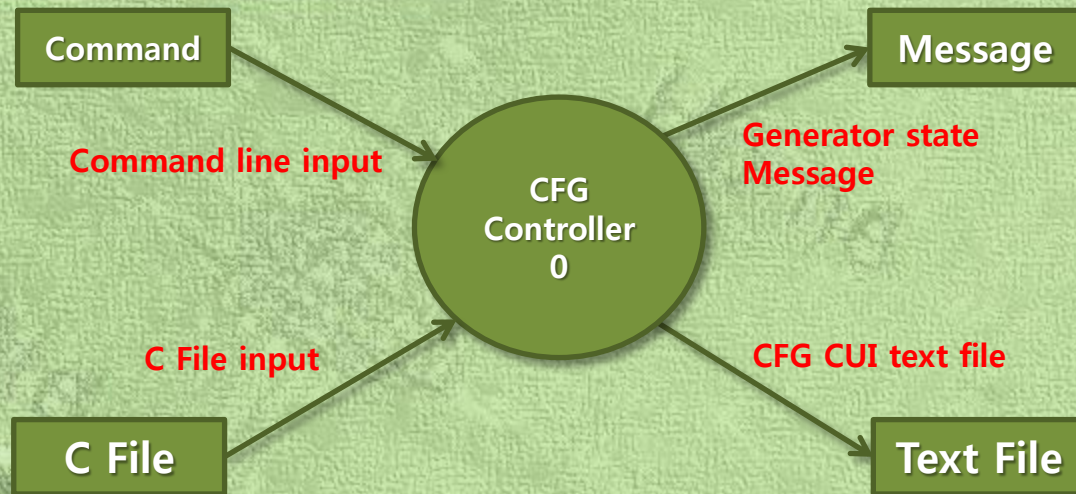


Event List



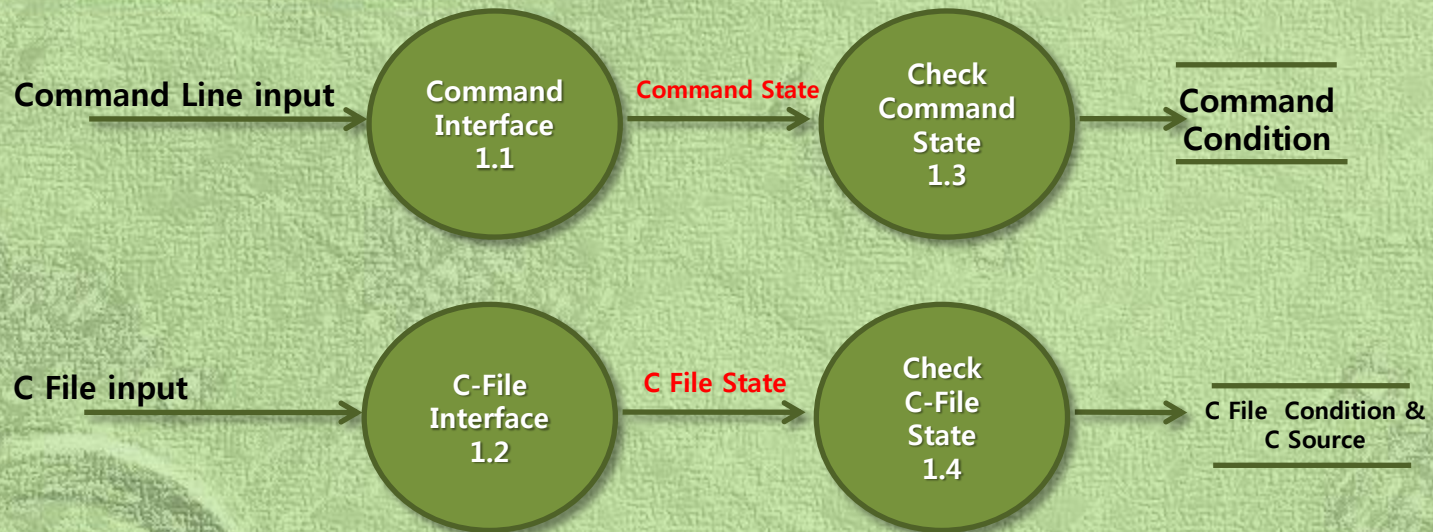
Input / Output Event	Description
Command line input	Command line in Basic Input
C File input	C File that defined in Basic Input
Generator State Message	Message showing generator's running state
CFG CUI textfile	Text file that generated CFG from C Code

Data Dictionary (Level 0)



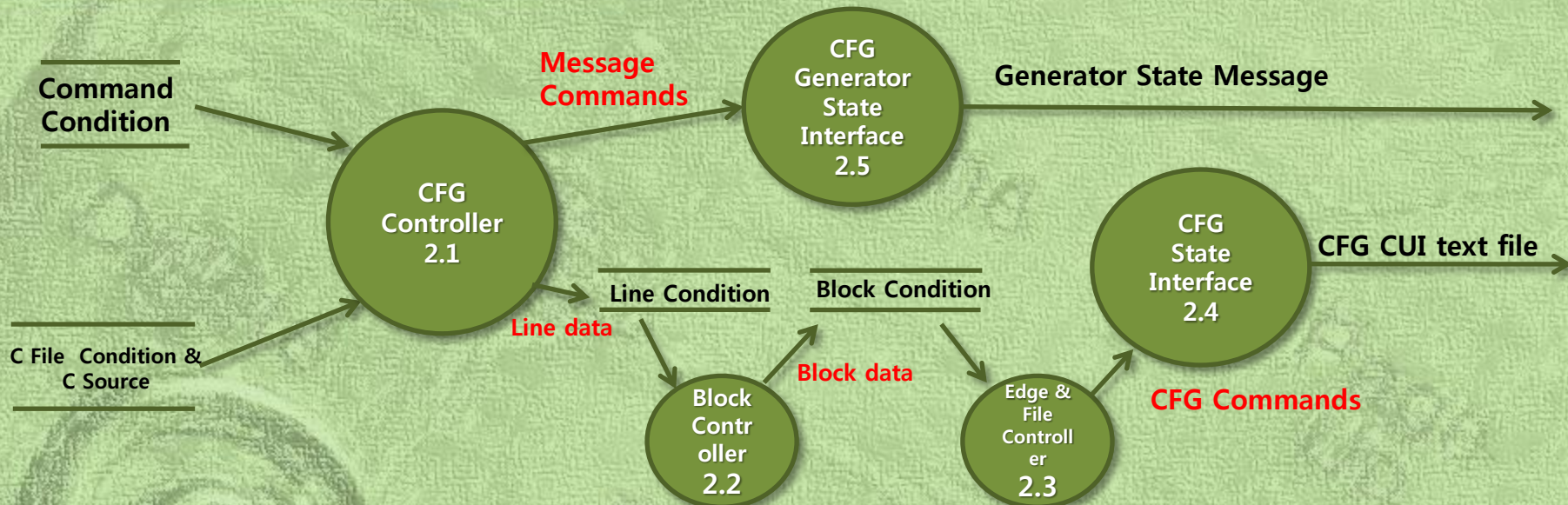
Input / Output Event	Description	Format / Type
Command line input	Command line in Basic Input	String
C File input	C File that defined in Basic Input	File / *.c file
Generator State Message	Message show generator's running state	String
CFG CUI textfile	Text file that generated CFG from C Code	File / *.txt file

Data Dictionary (Level 2)



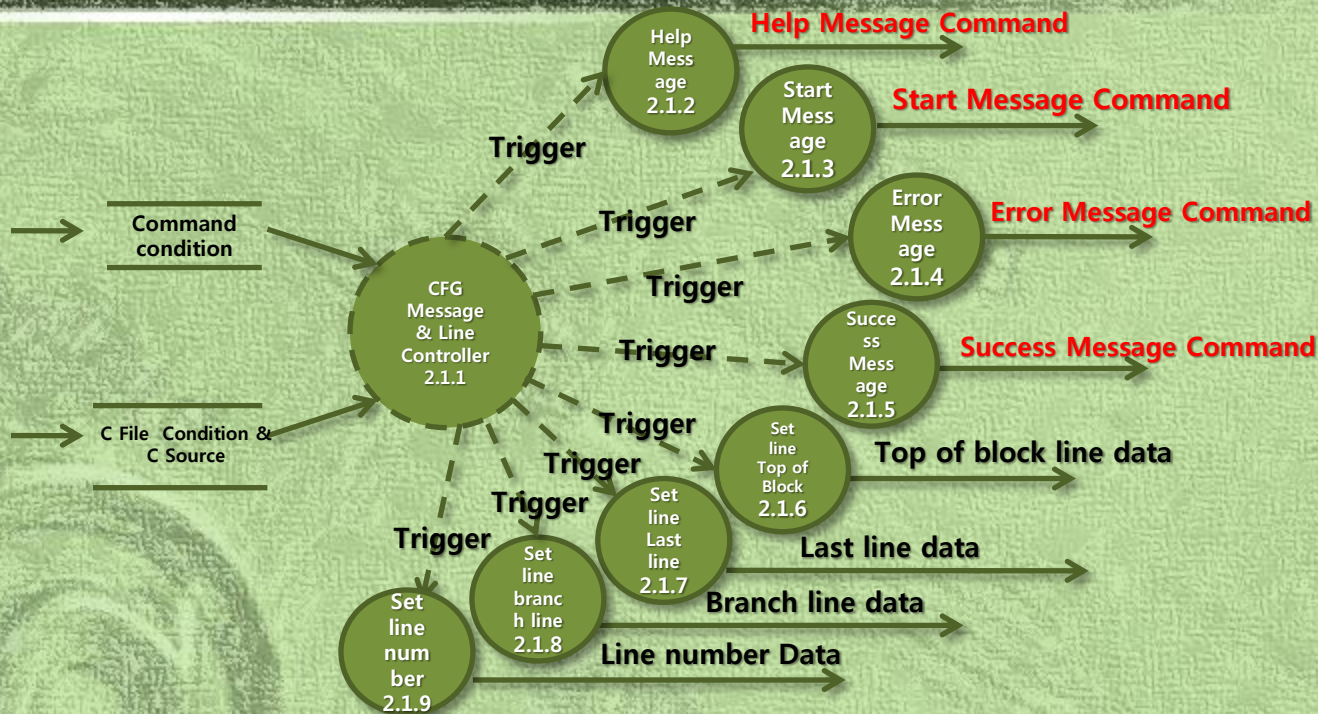
Input / Output Event	Description	Format / Type
Command State	Set data that showing input command state.	String
C File State	Set data that showing input C File State.	File / *.c file

Data Dictionary (Level 2)



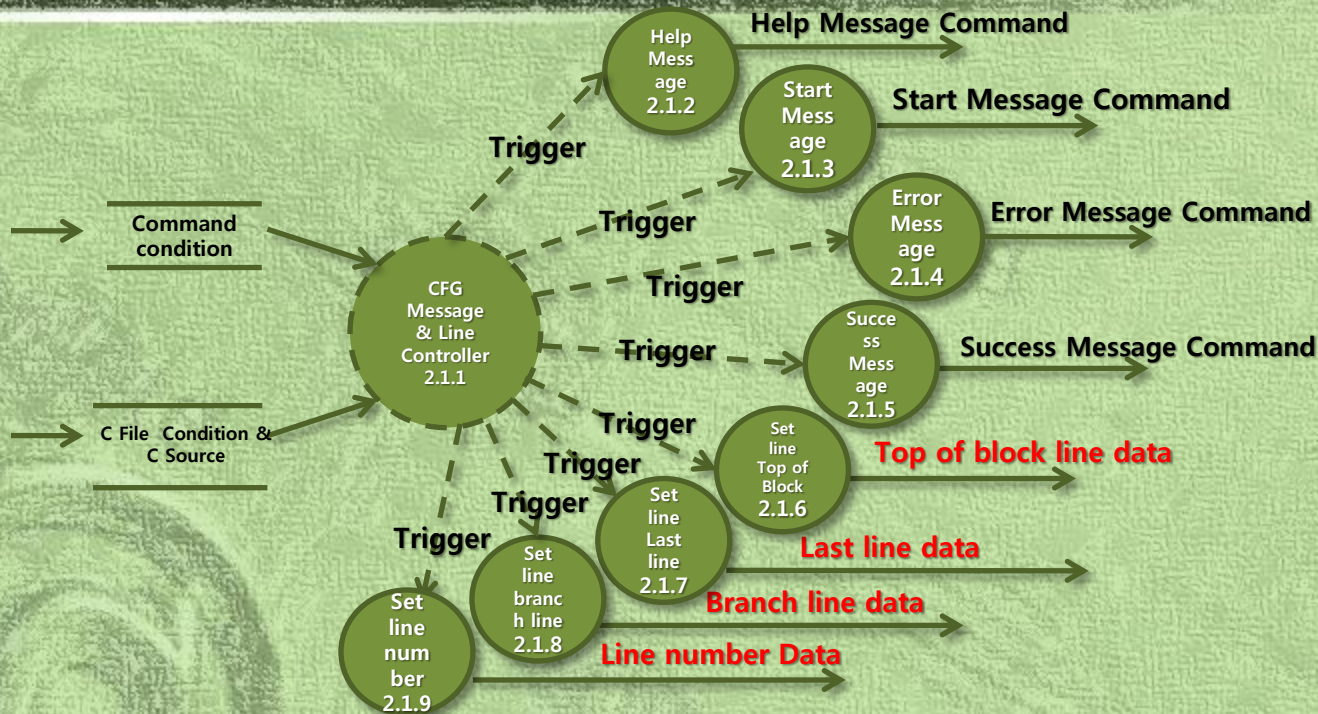
Input / Output Event	Description	Format / Type
Message Commands	Commands are a group of Message command that will print out current state. [Help / Start / Success / Error Message]	Command
Line data	Data that contains information about line number, top_of_block, last line.	struct
Block data	Data that conatins information about block type, block name.	struct
CFG Commands	Theses commands generating Commands and text file concerning edge which are necessary to draw CFG. [File / Connect edge]	Command

Data Dictionary (Level 3)



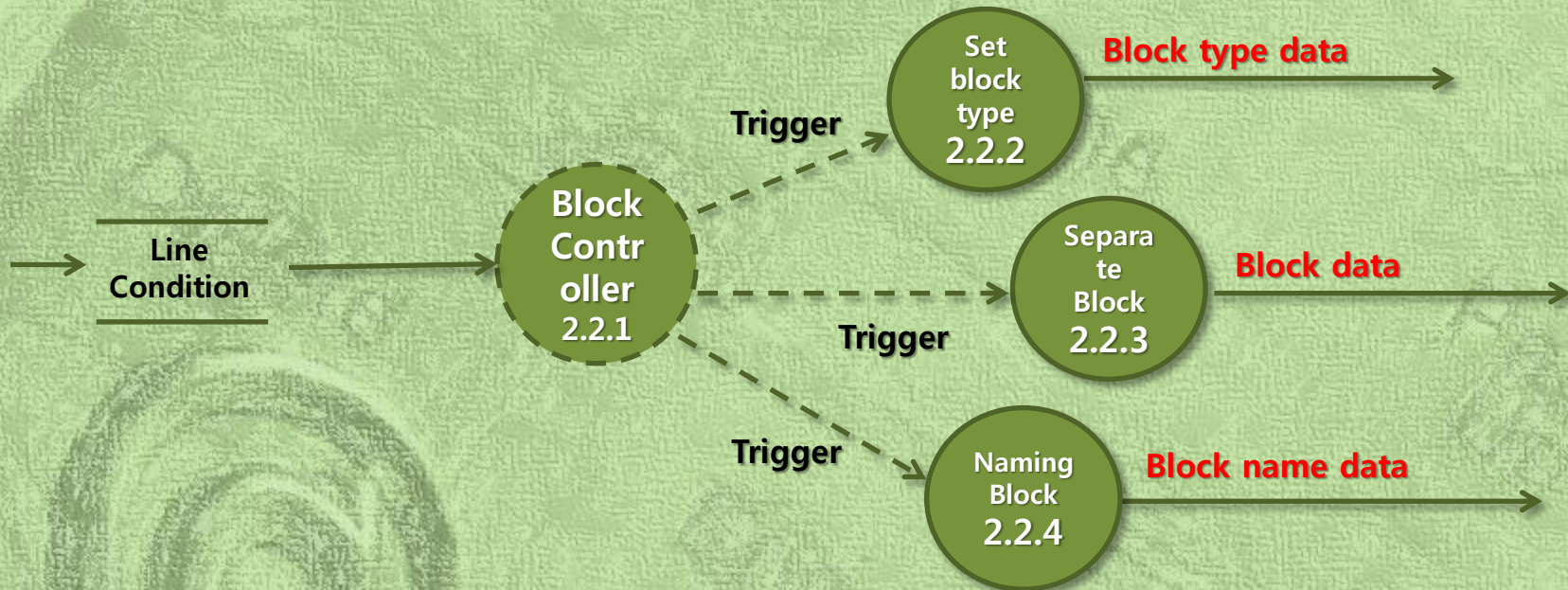
Input / Output Event	Description	Format / Type
Help Message Command	Command to print help message	Command
Start Message Command	Command to print start message	Command
Error Message Command	Command to print error message	Command
Success Message Command	Command to print success message	Command

Data Dictionary (Level 3)



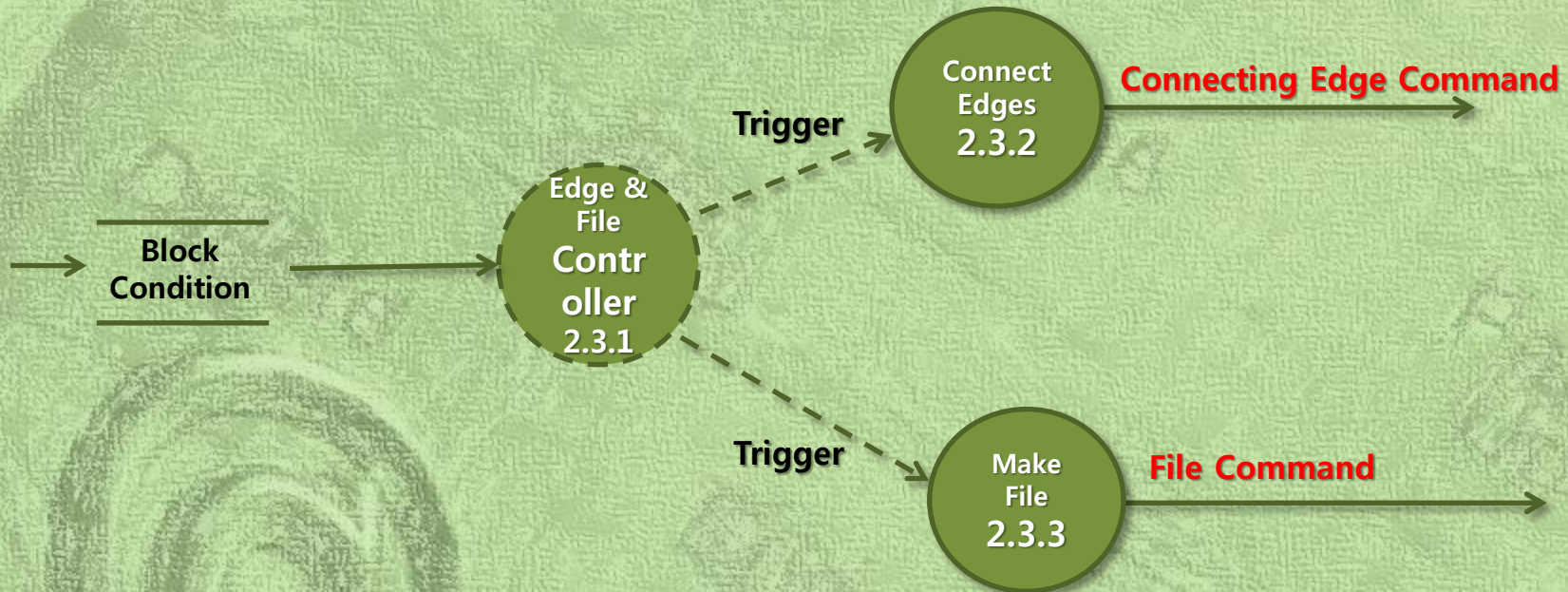
Input / Output Event	Description	Format / Type
Top of block line data	Data about Top of block line	Boolean / T,F
Last line data	Data about Last line	Boolean / T,F
Branch line data	Data about line's branches	Integer
Line number data	Data about line number	Integer

Data Dictionary (Level 3)



Input / Output Event	Description	Format / Type
Top of block line data	Data about Top of block line	Boolean / T,F
Last line data	Data about Last line	Boolean / T,F
Branch line data	Data about line's branches	Integer

Data Dictionary (Level 3)



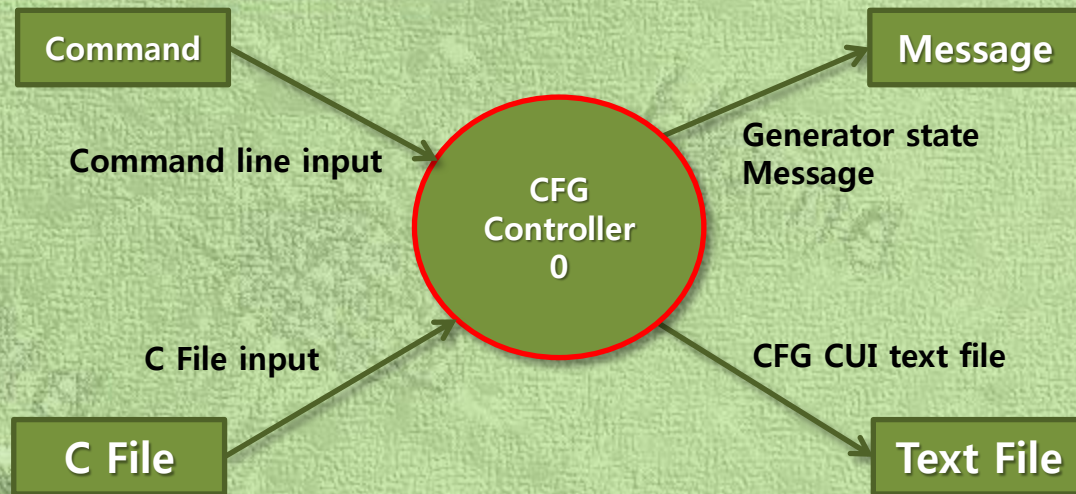
Input / Output Event	Description	Format / Type
Connecting Edge Command	Command about connect edge block to block	Command
File Command	Command about making CFG text file	Command



Process Specification

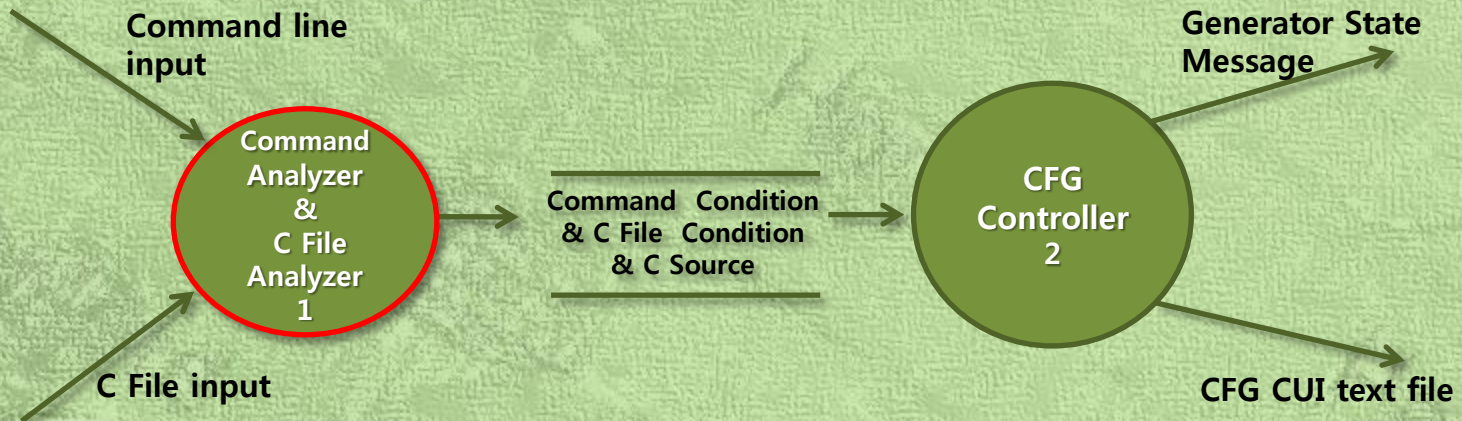


Process Specification (L0)



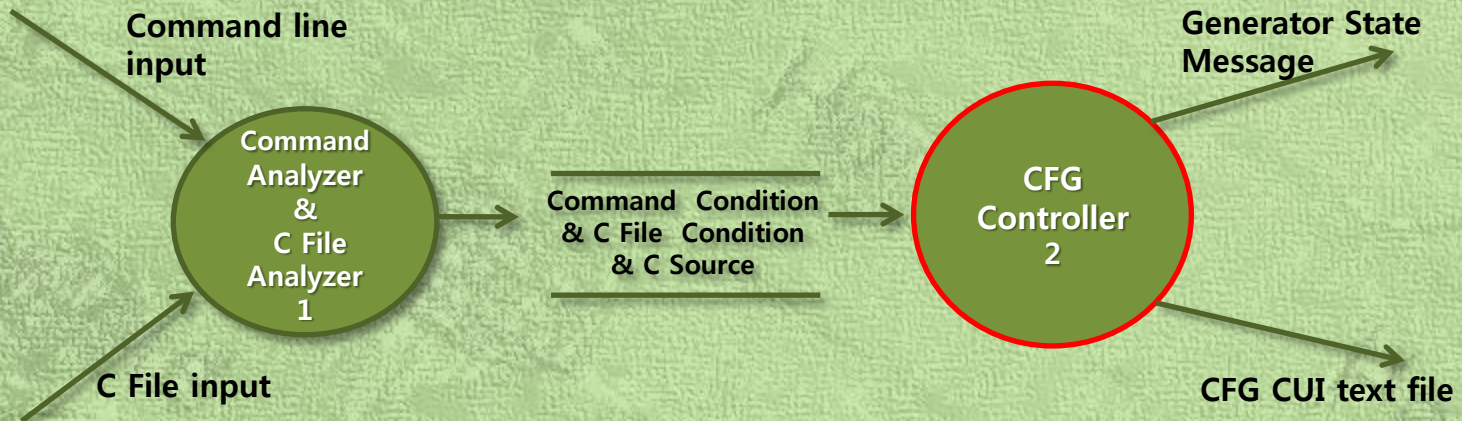
Reference No.	0
Name	CFG Controller
Input	Command line input, C File input
Output	Message, Text File
Process Description	When command line and C File are input into the CFG Controller, CFG Controller will generate Message and Text File.

Process Specification (L1)



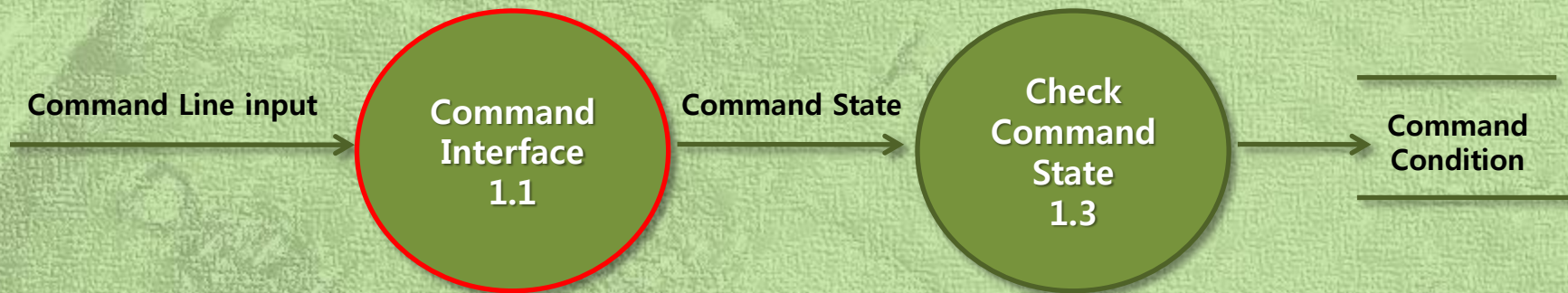
Reference No.	1
Name	Command Analyzer & C File Analyzer
Input	Command line input, C File input
Output	Command Condition & C File Condition & C Source
Process Description	When Command line and C File are input into the controller, they will be handled by Command Analyzer and C File Analyzer respectively and those analyzers will output Command Condition and C File Condition respectively.

Process Specification (L1)



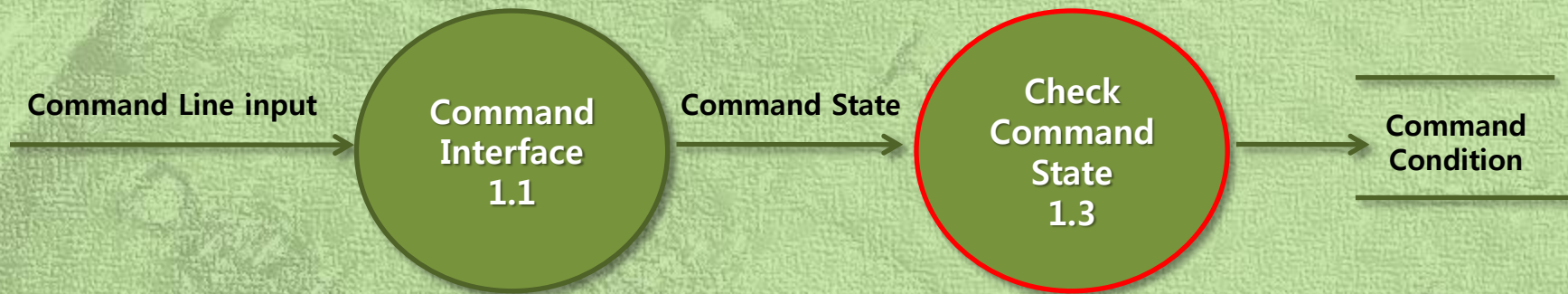
Reference No.	2
Name	CFG Controller
Input	Command Condition & C File Condition & C Source
Output	Generator State Message & CFG CUI text file
Process Description	It would make reference to Data stored in Command Condition and C File Condition and output Generator State Message(concerning Command Condition & C File Condition), CFG CUI text file (concerning C File Condition & Line Condition & C Source).

Process Specification (L2)



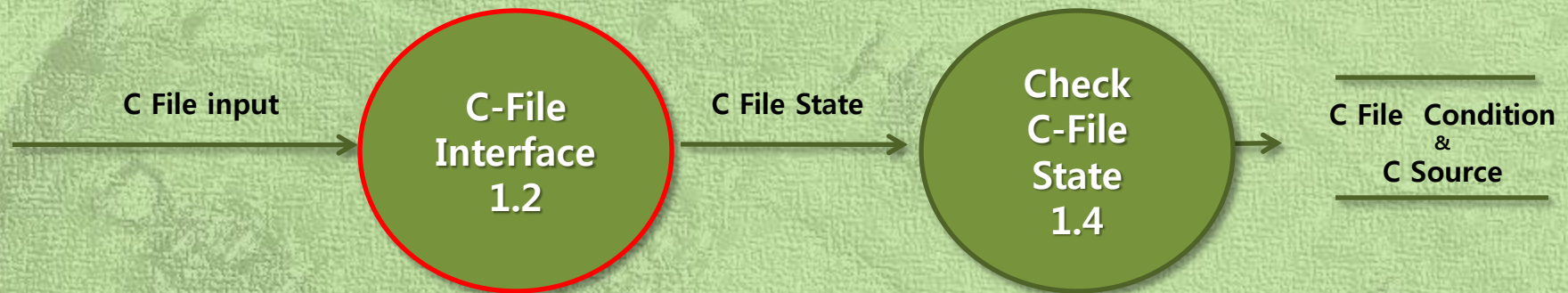
Reference No.	1.1
Name	Command Interface
Input	Command Line input
Output	Command State
Process Description	When Command Line is input into Command Interface 1.1, Command interface 1.1 will convert command line to command state.

Process Specification (L2)



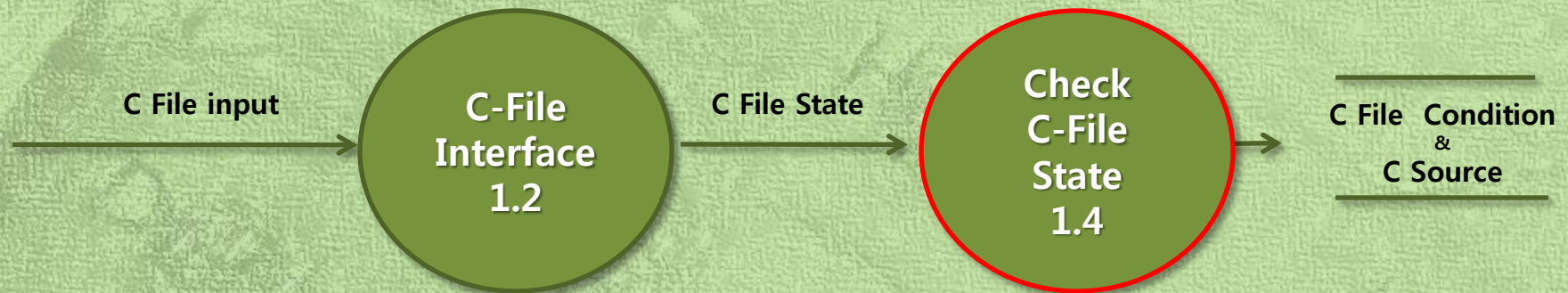
Reference No.	1.3
Name	Check Command State
Input	Command State
Output	Command Condition
Process Description	When command state is received by Check Command State 1.3, Check Command State 1.3 will store command state in command condition variable.

Process Specification (L2)



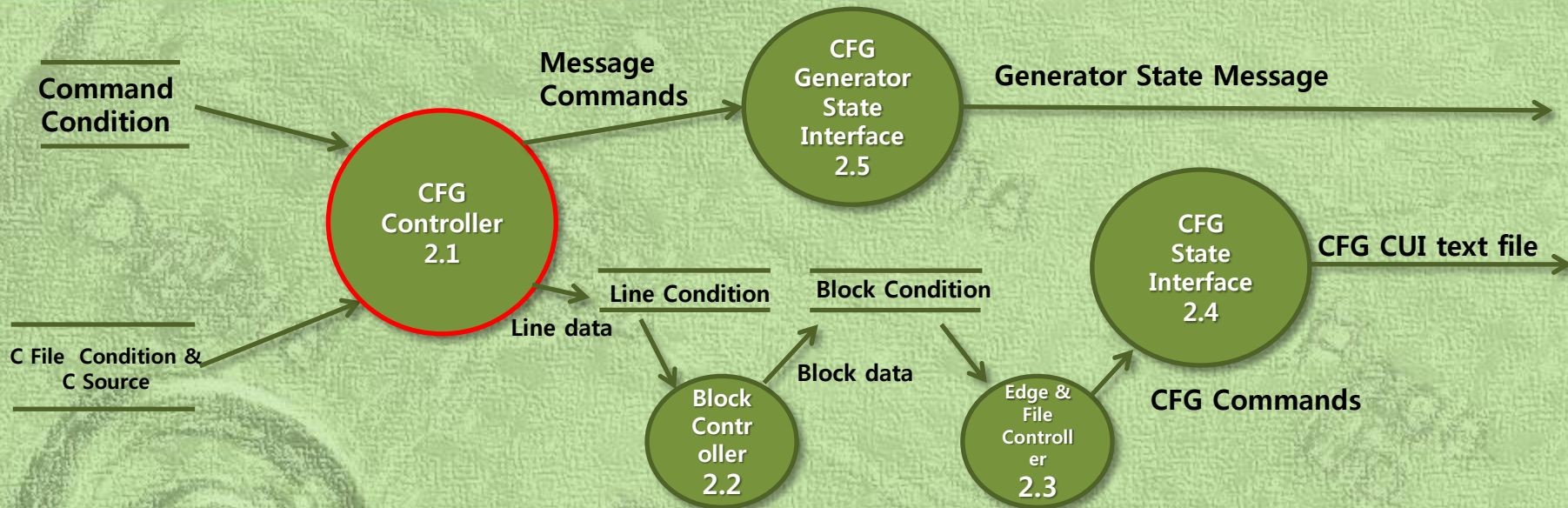
Reference No.	1.2
Name	C File interface
Input	C File input
Output	C File State
Process Description	When C File input is input into C File interface 1.2, C File interface will convert C File input into C File State.

Process Specification (L2)



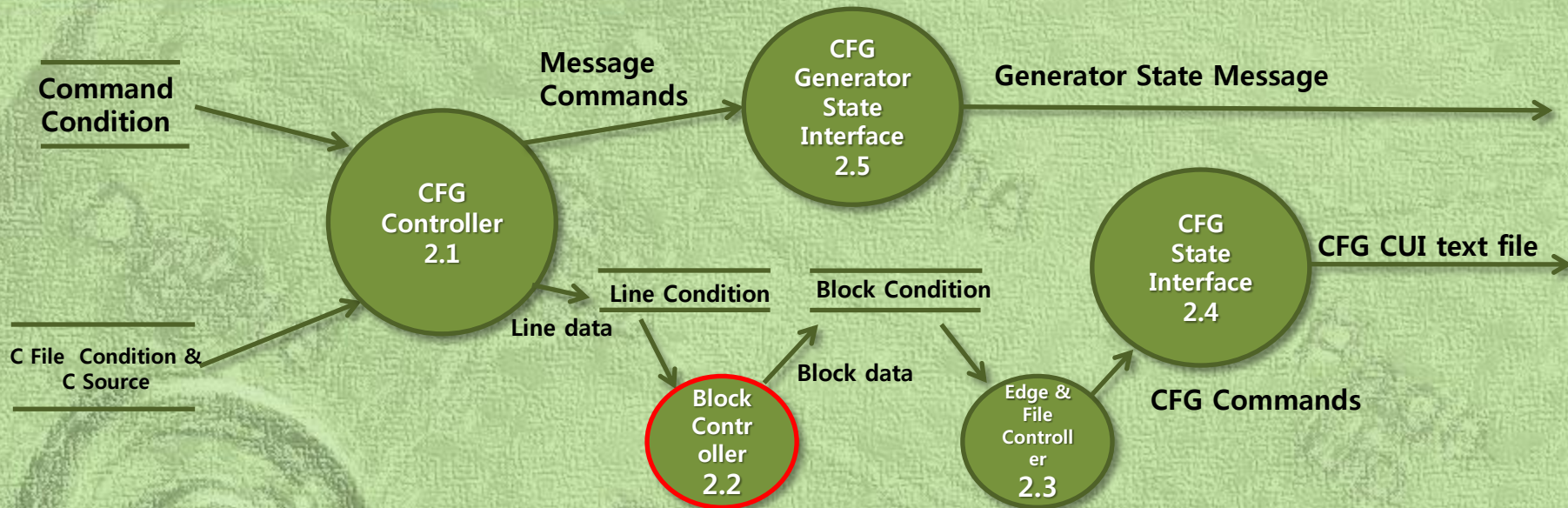
Reference No.	1.4
Name	Check C-File State
Input	C-File State
Output	C File Condition & Source
Process Description	When C File state is received by Check C File State 1.4, Check C File State will store C File state in C File Condition and Source.

Process Specification (L2)



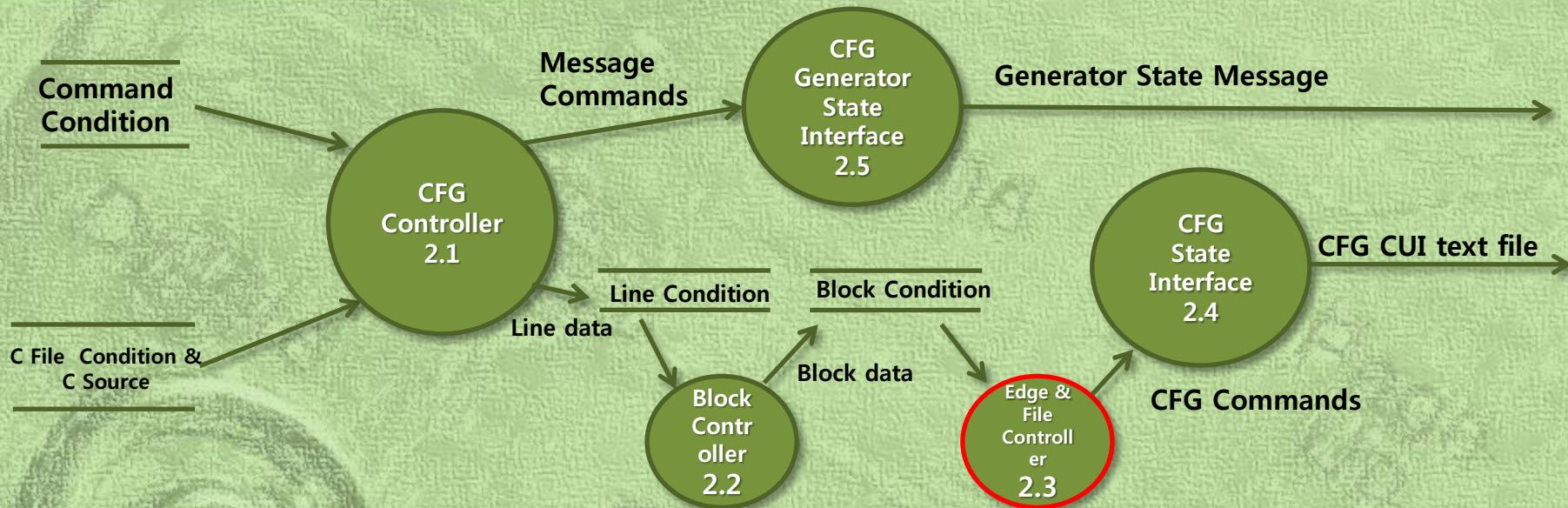
Reference No.	2.1
Name	CFG Controller
Input	Command Condition & C File Condition & C Source
Output	Message Commands & Line data
Process Description	It would give Message Commands while are needed to refer to Data stored in Command Condition and C File Condition to CFG Generator State Interface Process and also give away CFG Commands that results from C File Condition & C Source to CFG State Interface Process.

Process Specification (L2)



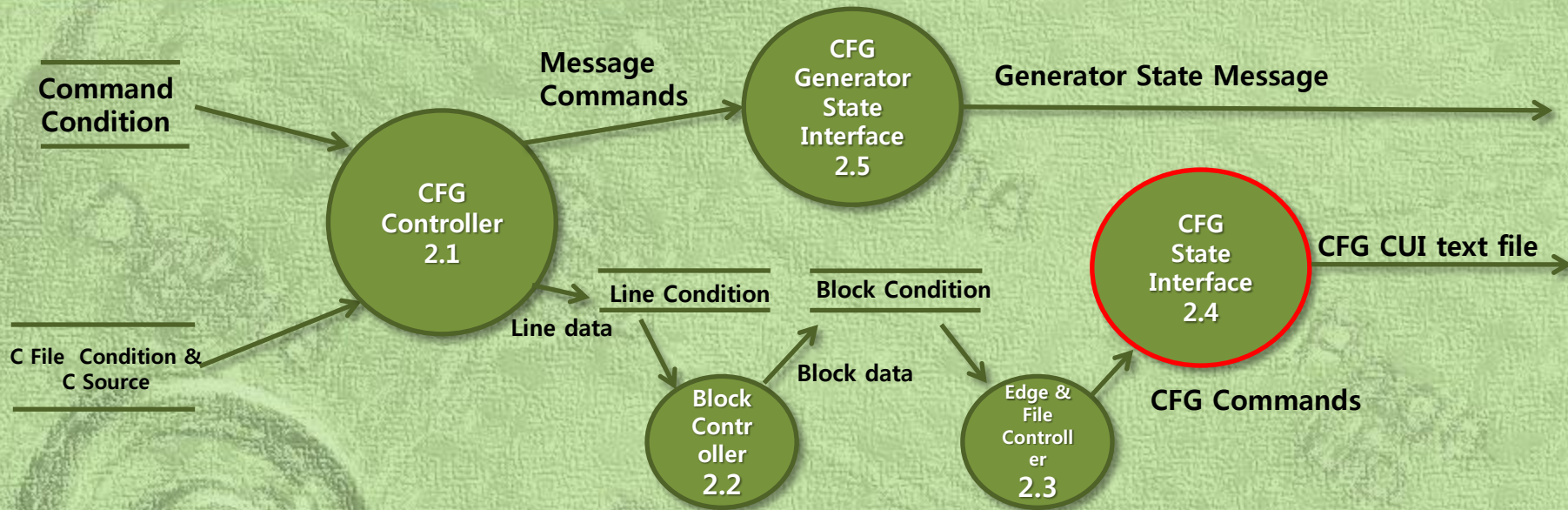
Reference No.	2.2
Name	Block Controller
Input	Line Condition
Output	Block data
Process Description	It would give Block data while are needed to refer to Data stored in Line Condition to CFG State Interface Process. It triggered inner process to output Block data.

Process Specification (L2)



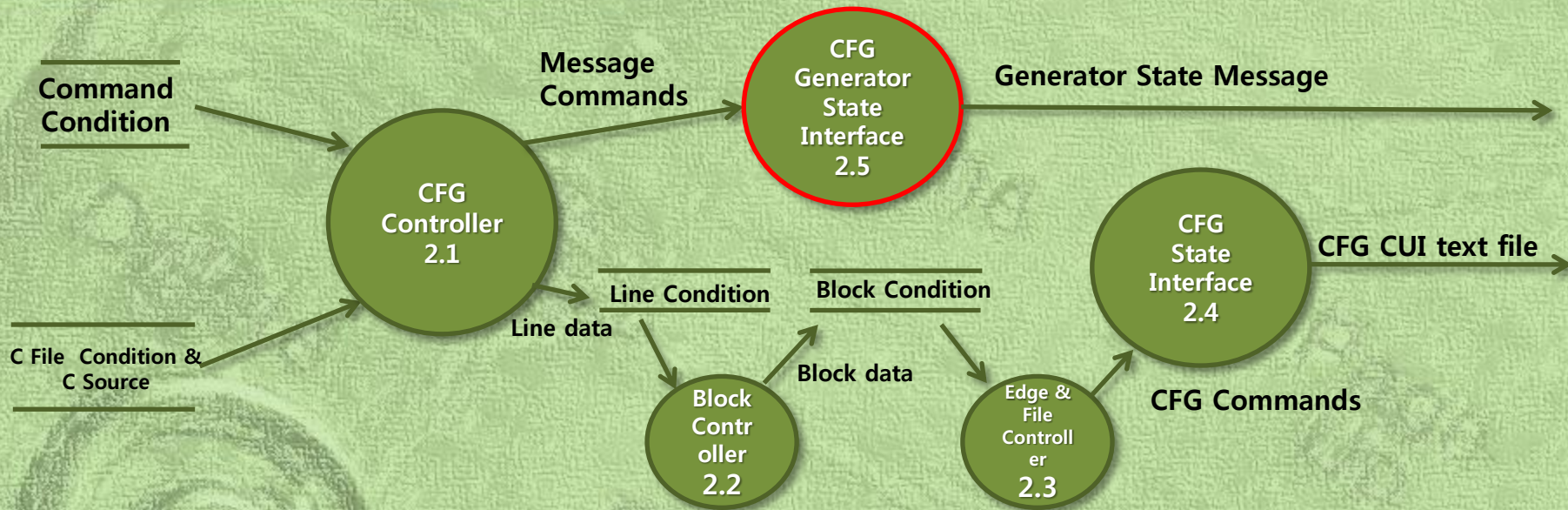
Reference No.	2.3
Name	Edge & File Controller
Input	Block Condition
Output	CFG Commands
Process Description	It would give CFG Commands while are needed to refer to Data stored in Block Condition to CFG State Interface Process. It triggered inner process to output CFG Commands.

Process Specification (L2)



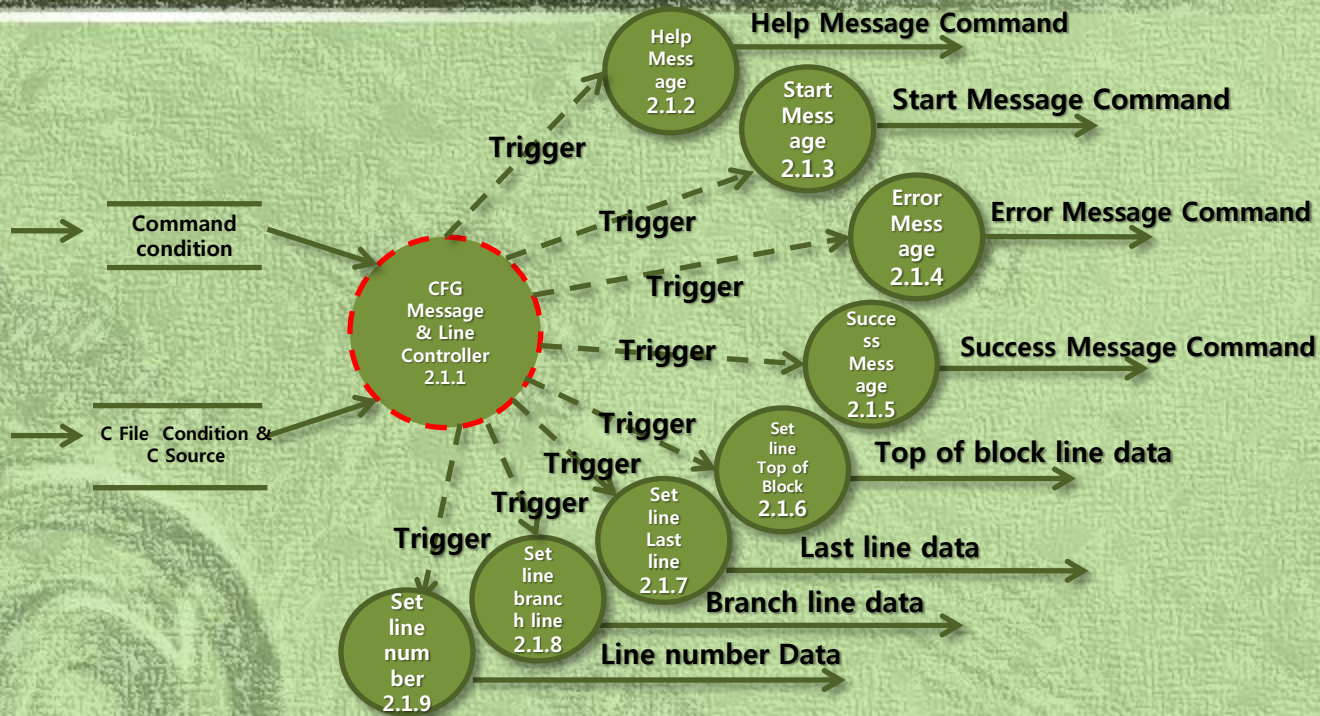
Reference No.	2.4
Name	CFG State Interface
Input	CFG Commands
Output	CFG CUI text file
Process Description	When it is received CFG Commands from Edge & File Controller, it will store and sort out and output CFG CUI text file after converting it to a type of text file.

Process Specification (L2)



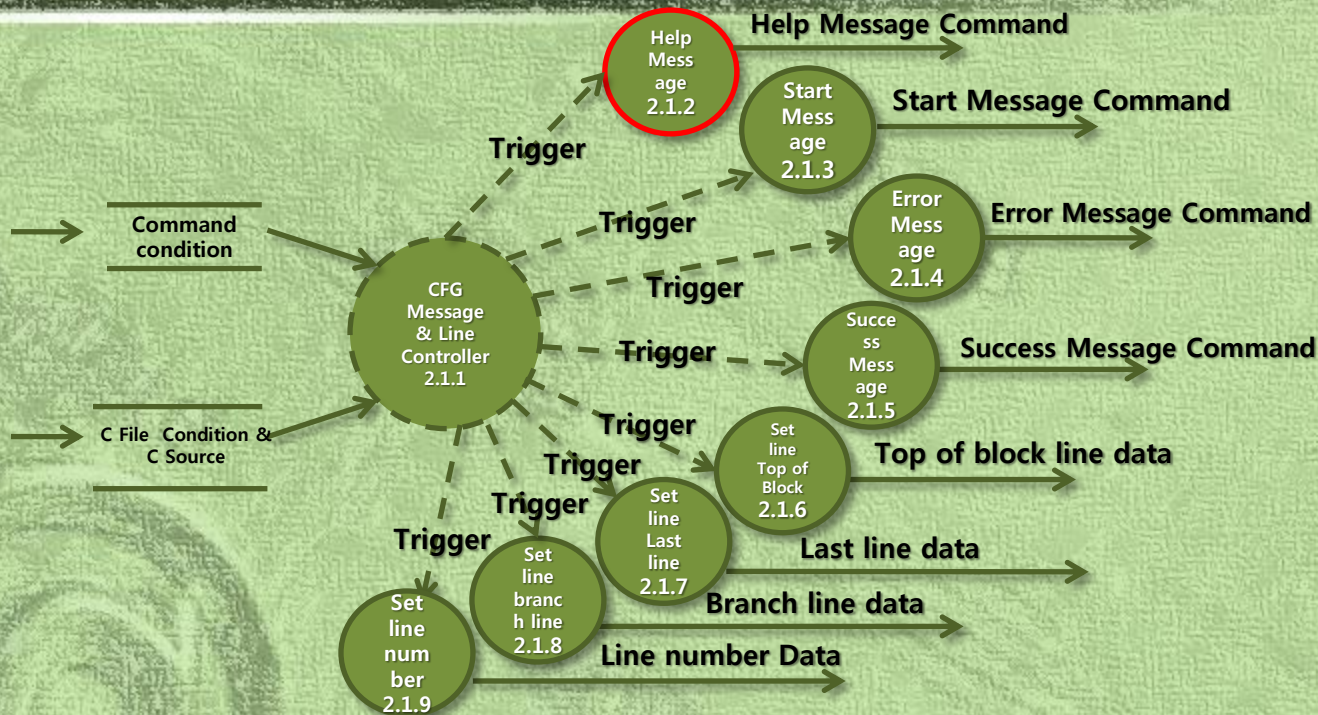
Reference No.	2.5
Name	CFG Generator State Interface
Input	Message Commands
Output	Generator State Message
Process Description	It would store Messaged Command when received and output a type of string into Message, Generator State Message after sorting it out.

Process Specification (L2)



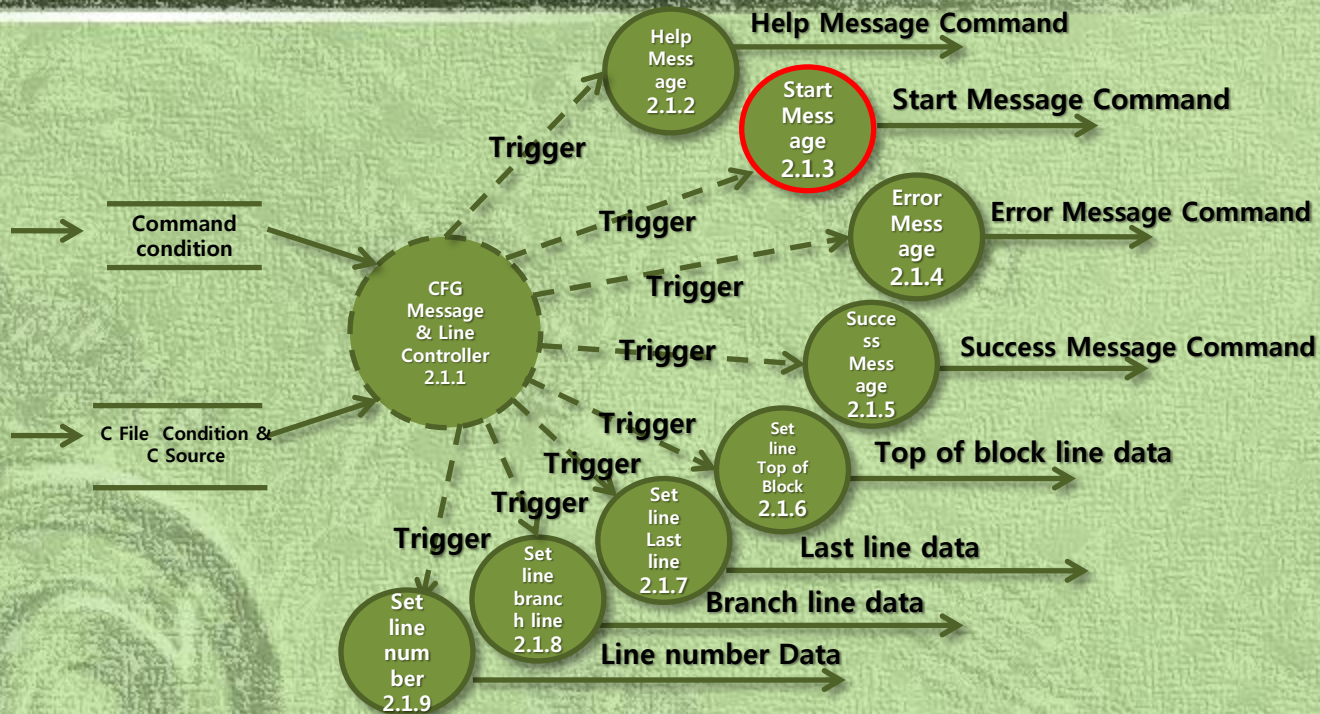
Reference No.	2.1.1
Name	CFG Message & Line Controller
Input	Command condition & C File Condition & C Source
Output	Trigger
Process Description	After making reference to Command Condition & C File Condition & C Source, it would activate inner process depending on the situation and keep outer process that will be triggered and send out command under control.

Process Specification (L3)



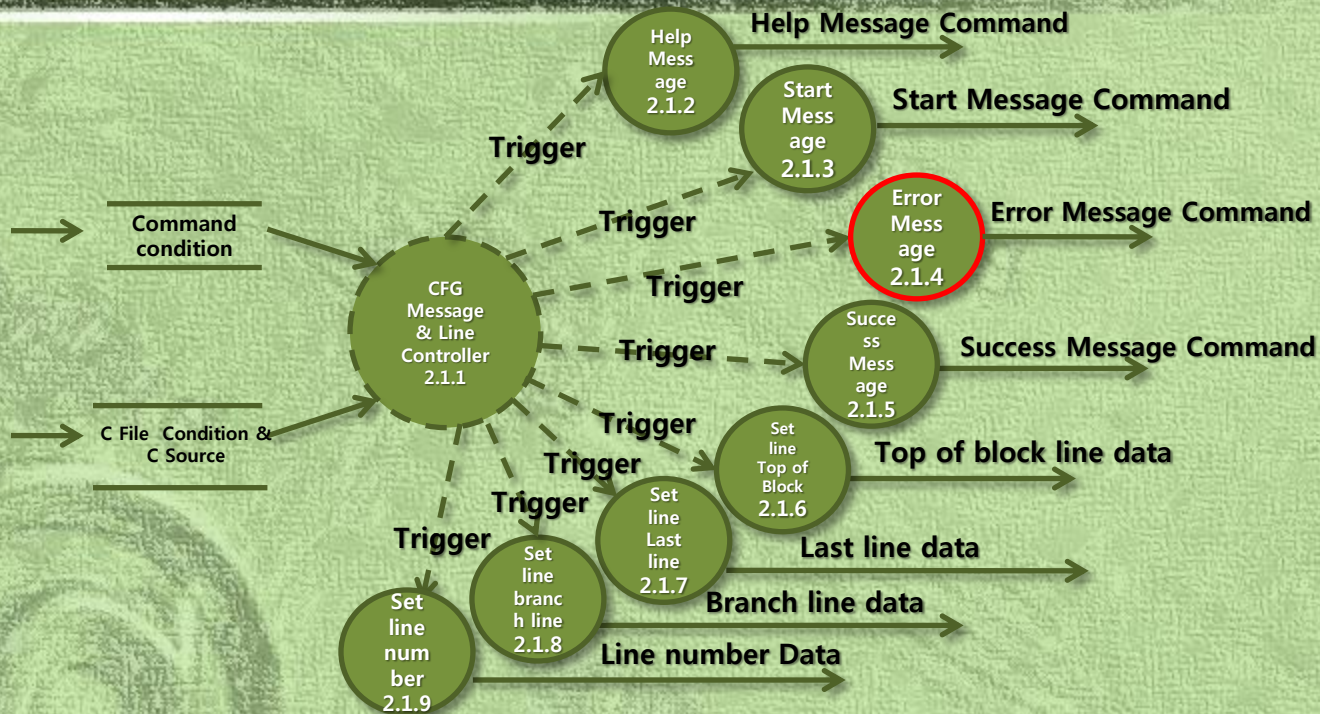
Reference No.	2.1.2
Name	Help Message
Input	Trigger
Output	Help Message Command
Process Description	When Help Message 2.1.2 receives trigger from Main Controller, it will output Help Message Command.

Process Specification (L3)



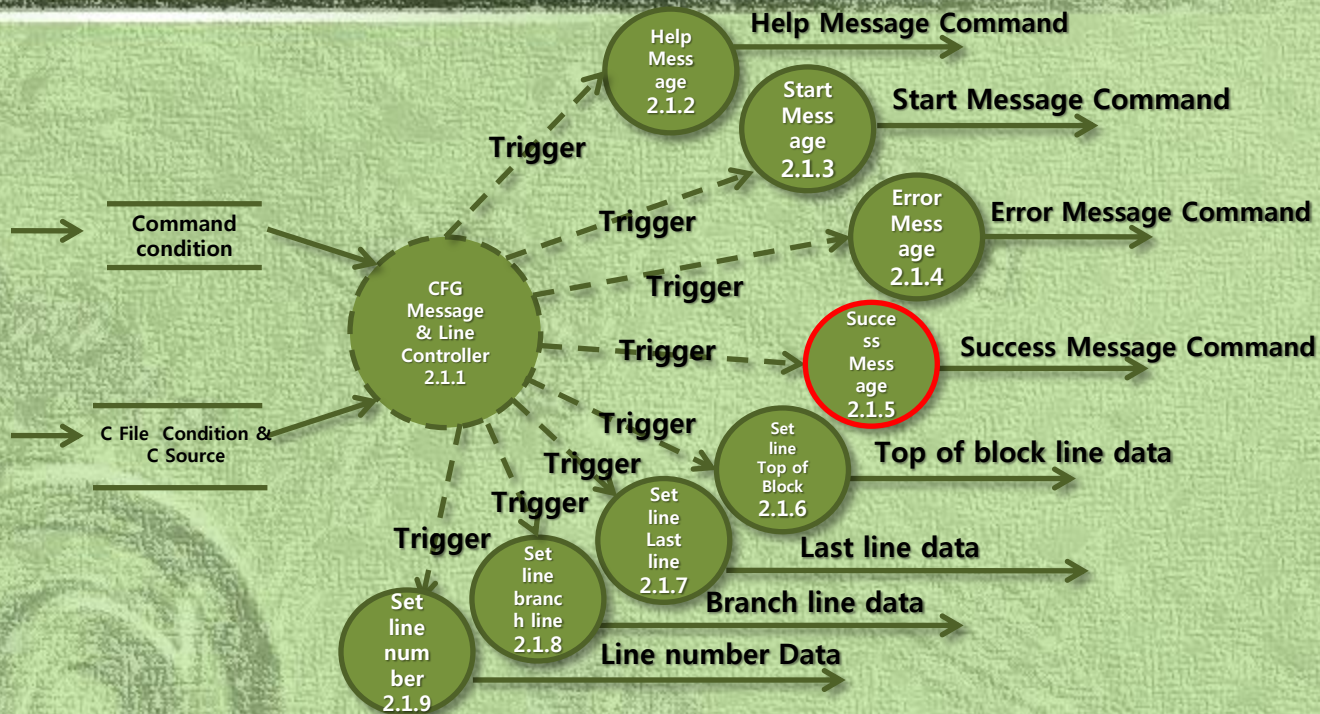
Reference No.	2.1.3
Name	Start Message
Input	Trigger
Output	Start Message Command
Process Description	When Start Message 2.1.2 receives trigger from Main Controller, it will output Start Message Command.

Process Specification (L3)



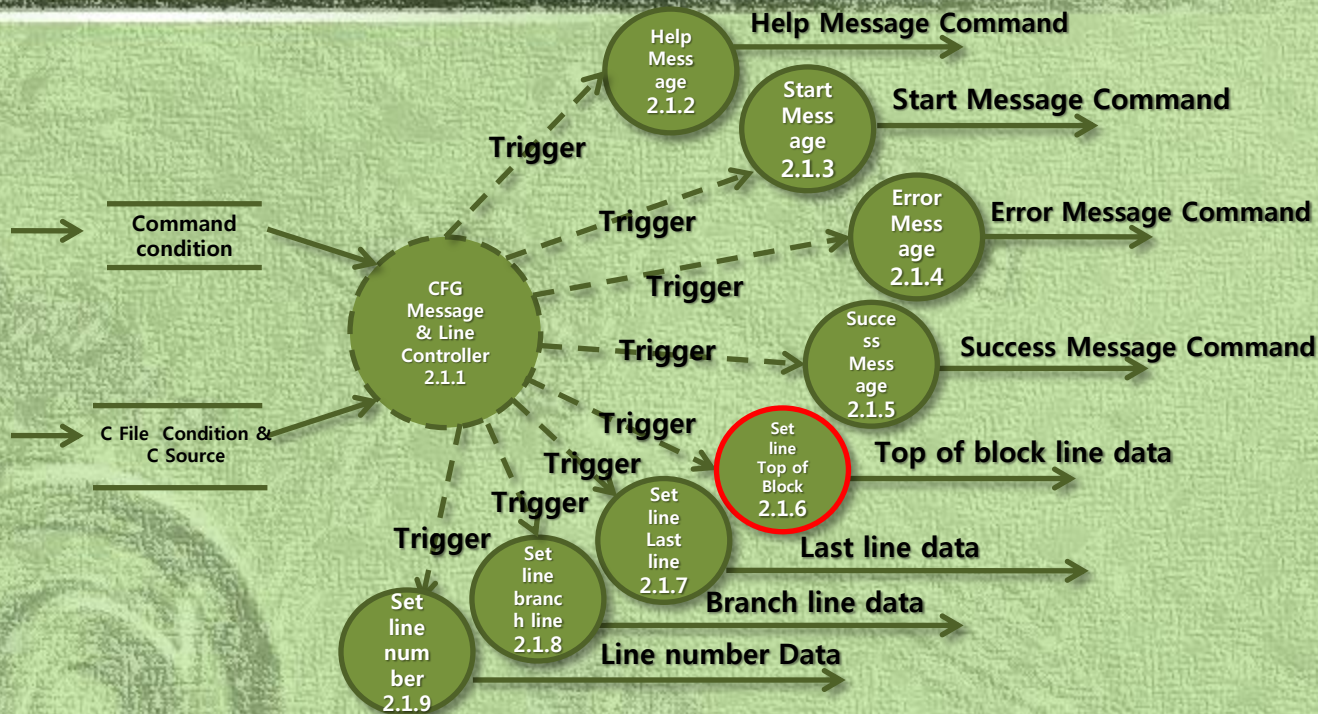
Reference No.	2.1.4
Name	Error Message
Input	Trigger
Output	Error Message Command
Process Description	When error Message 2.1.2 receives trigger from Main Controller, it will output error Message Command.

Process Specification (L3)



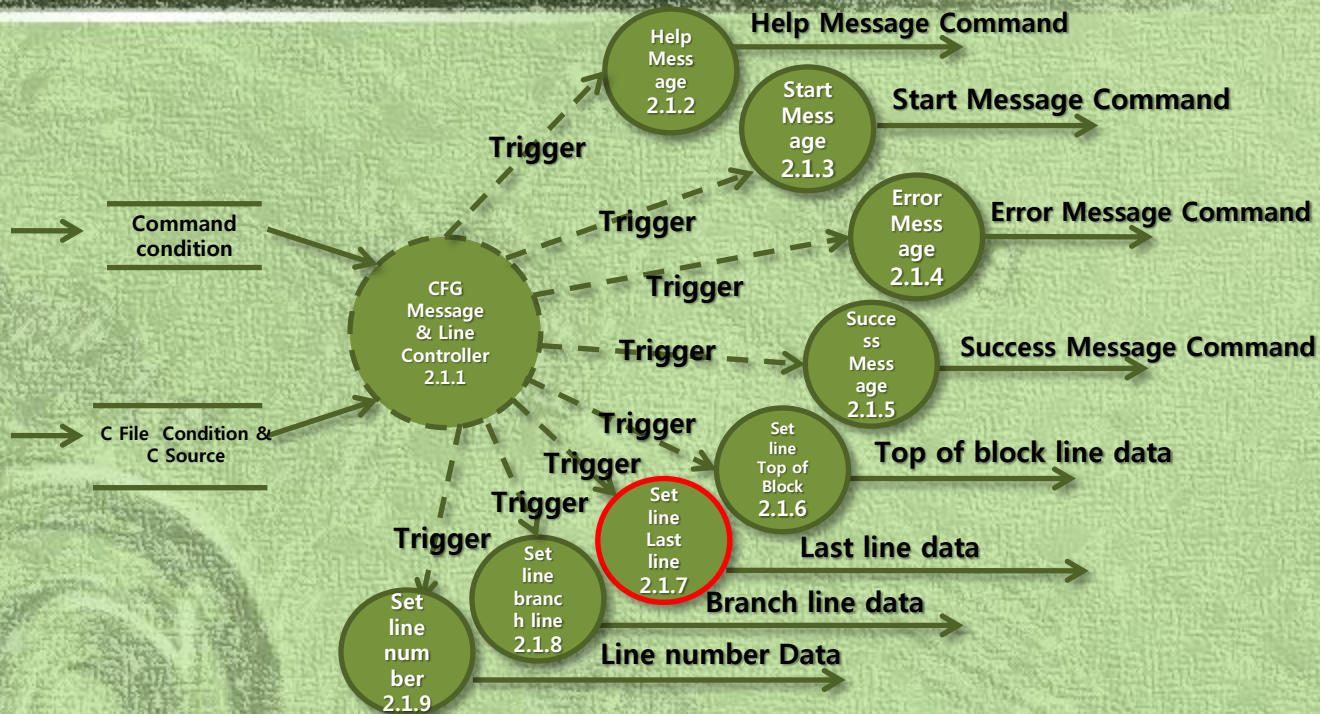
Reference No.	2.1.5
Name	Success Message
Input	Trigger
Output	Success Message Command
Process Description	When Success Message 2.1.2 receives trigger from Main Controller, it will output Success Message Command.

Process Specification (L3)



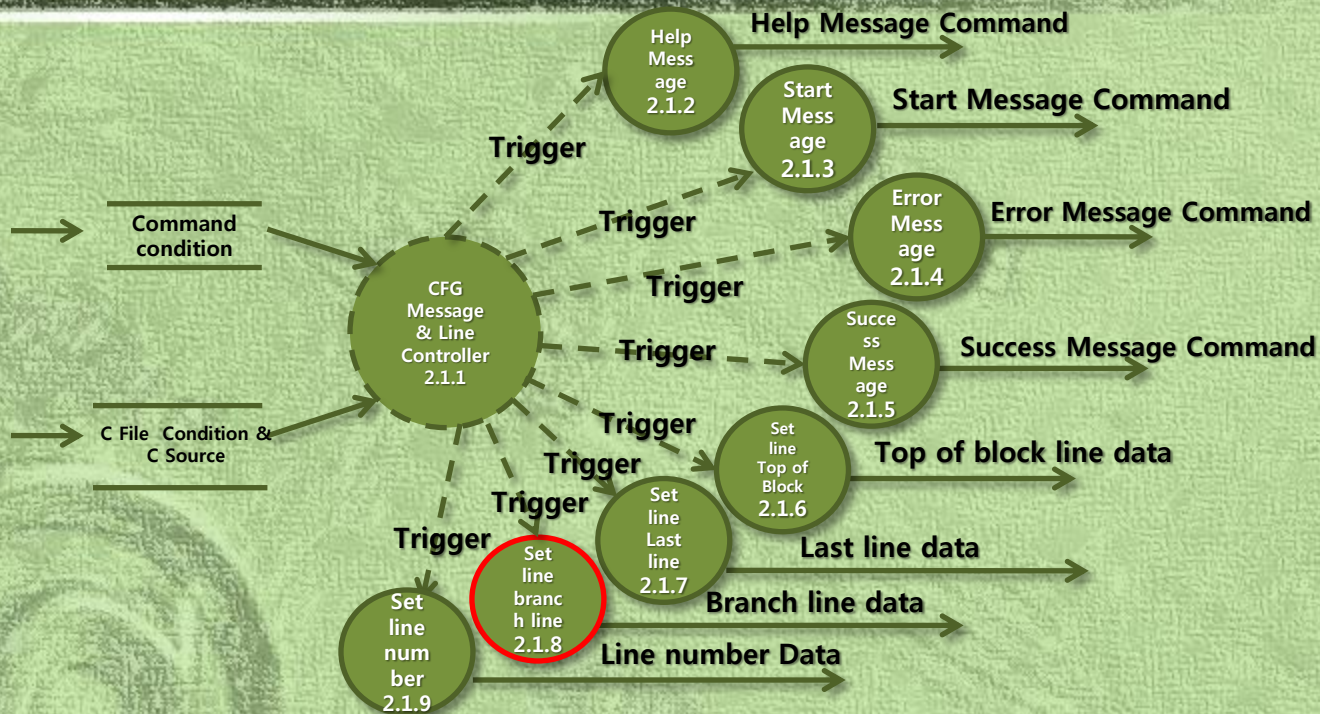
Reference No.	2.1.6
Name	Set line Top of Block
Input	Trigger
Output	Top of block line data
Process Description	When process receives trigger from Main Controller, it will output Top of block line data

Process Specification (L3)



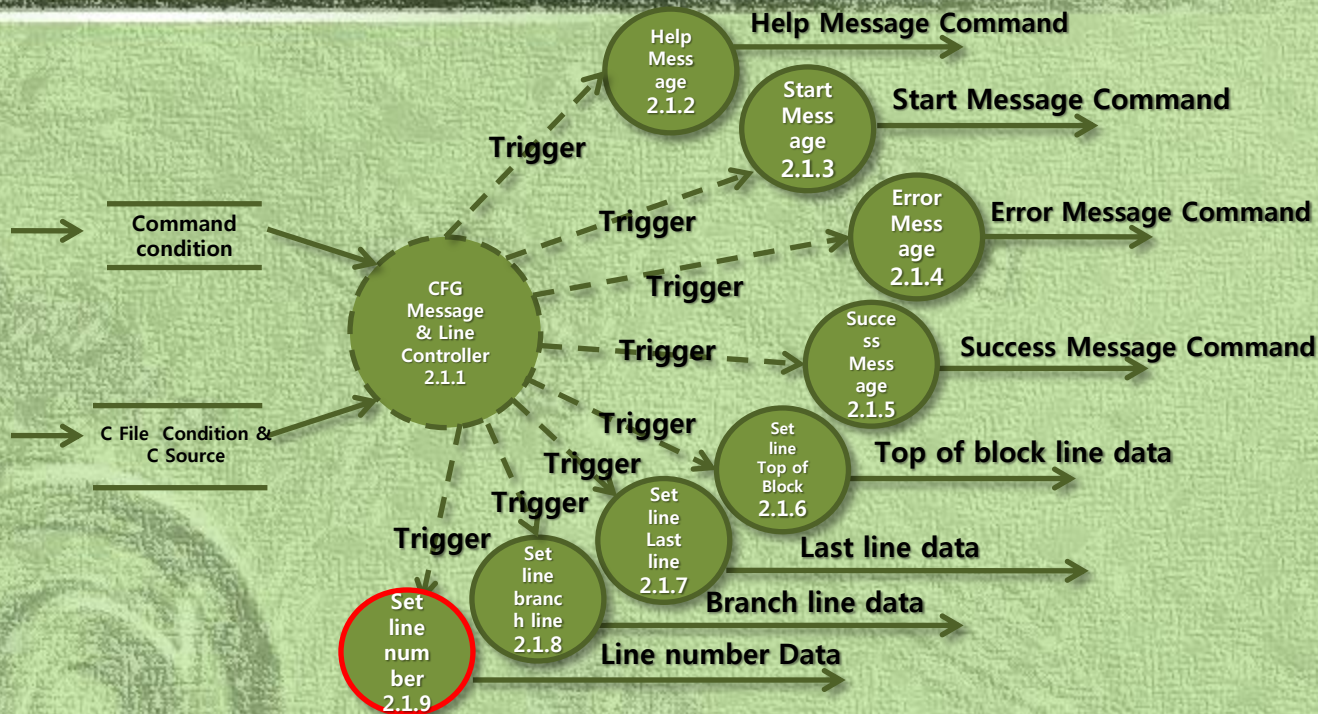
Reference No.	2.1.7
Name	Set line last line
Input	Trigger
Output	Last line data
Process Description	When process receives trigger from Main Controller, it will output last line data

Process Specification (L3)



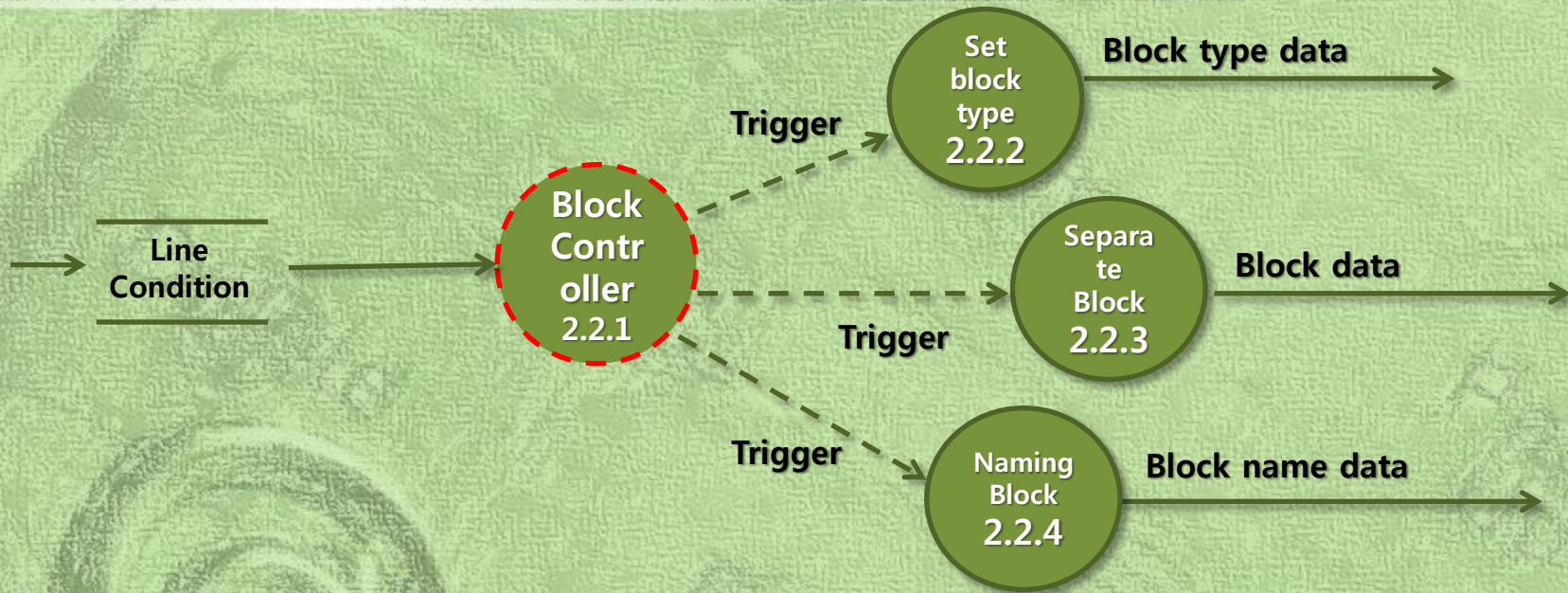
Reference No.	2.1.8
Name	Set line branch line
Input	Trigger
Output	Branch line data
Process Description	When process receives trigger from Main Controller, it will output branch line data

Process Specification (L3)



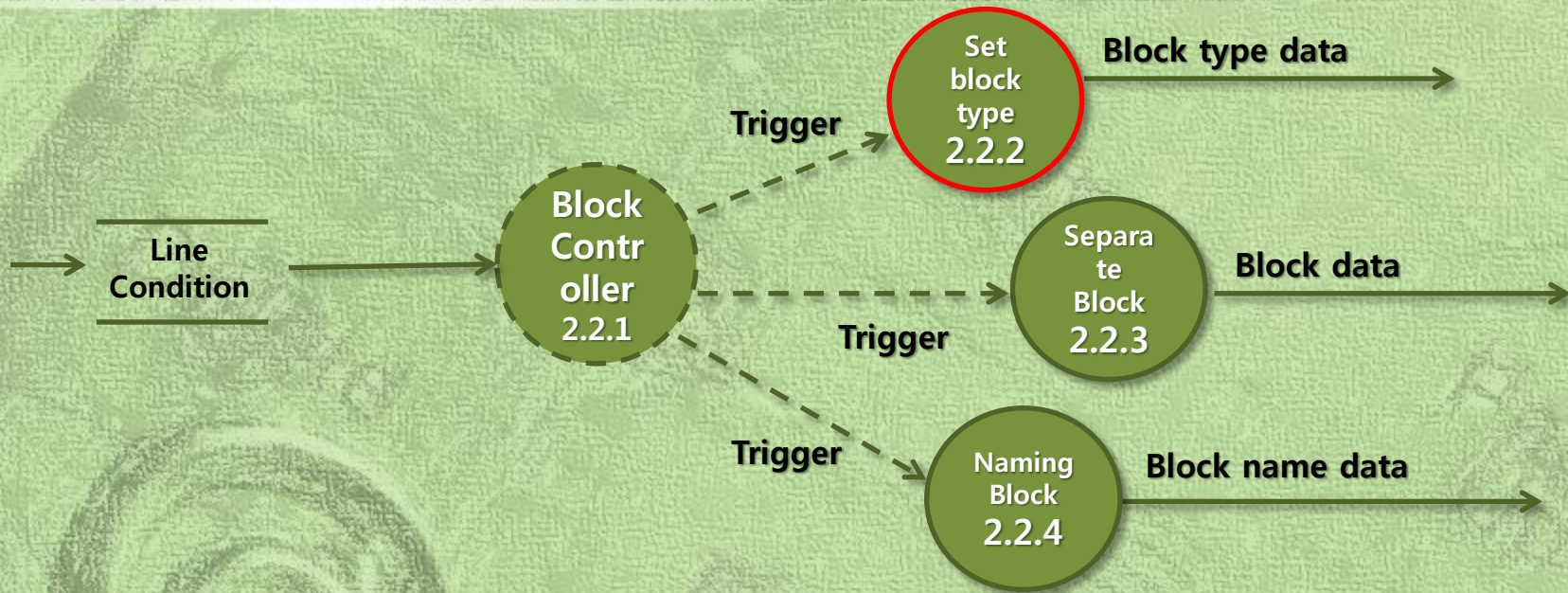
Reference No.	2.1.9
Name	Set line number
Input	Trigger
Output	Line number data
Process Description	When process receives trigger from Main Controller, it will output line number data

Process Specification (L3)



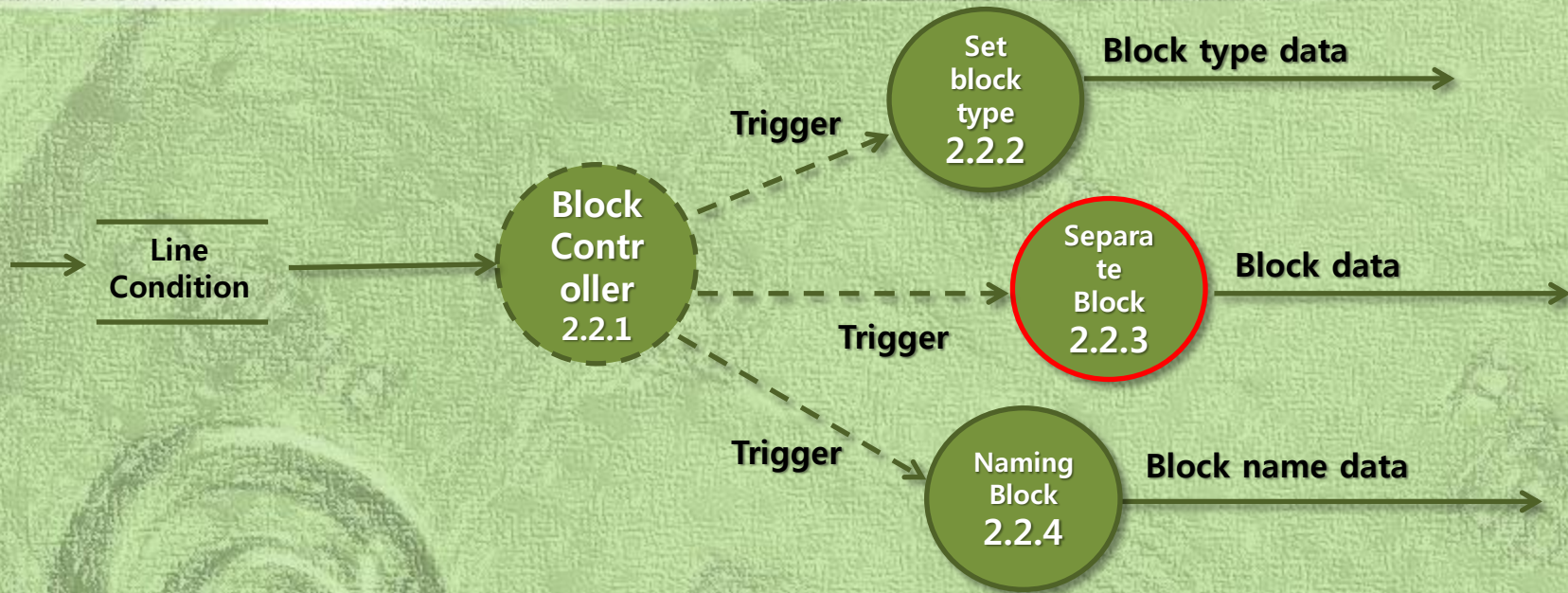
Reference No.	2.2.1
Name	Block Controller
Input	Line Condition
Output	Trigger
Process Description	It would trigger inner process depending on the situation and keep outer process that will be triggered and send out data under control.

Process Specification (L3)



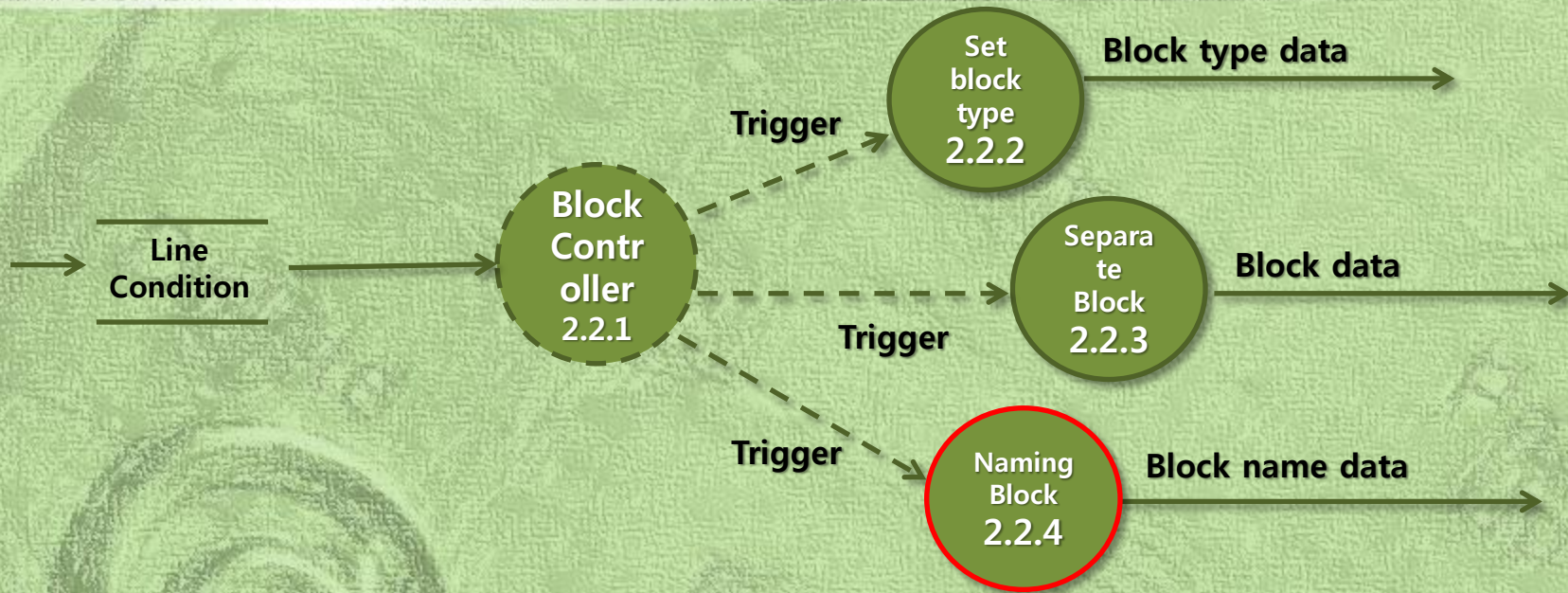
Reference No.	2.2.2
Name	Set block type
Input	Trigger
Output	Block type data
Process Description	When process receives trigger from Main Controller, it will output block type data

Process Specification (L3)



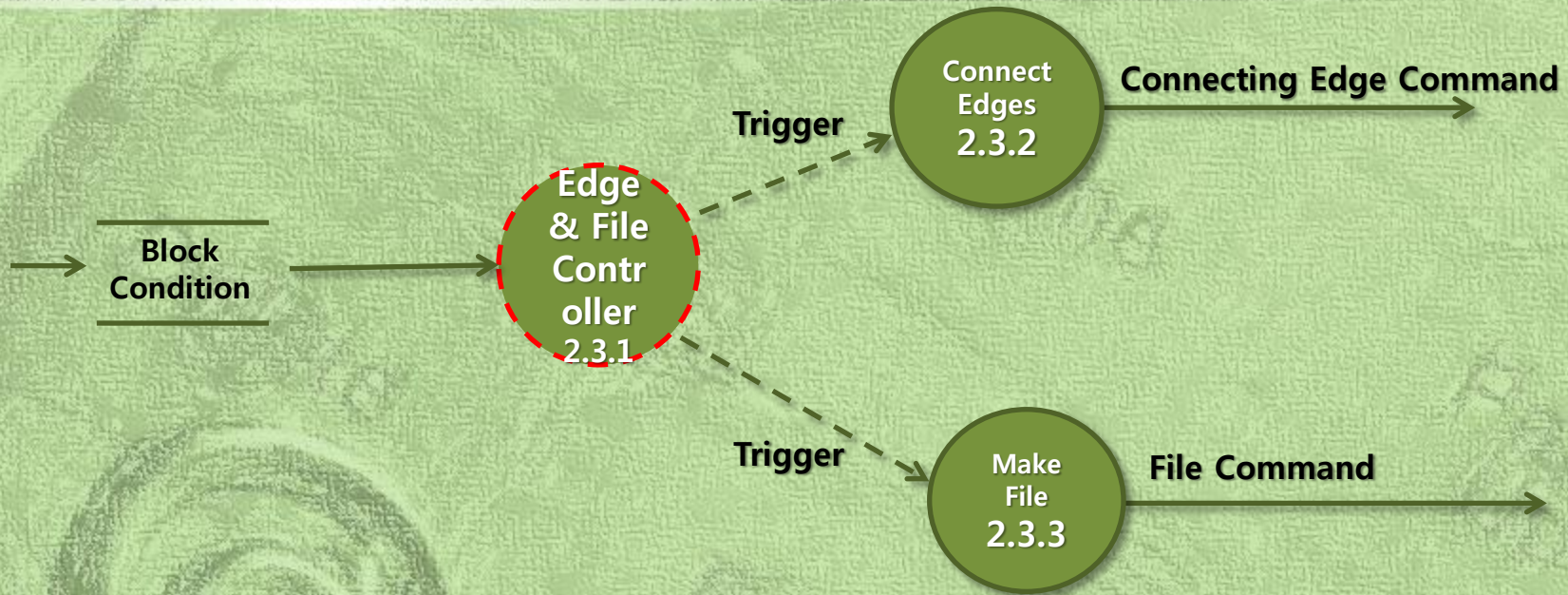
Reference No.	2.2.3
Name	Separate Block
Input	Trigger
Output	Block data
Process Description	When process receives trigger from Main Controller, it will output block data

Process Specification (L3)



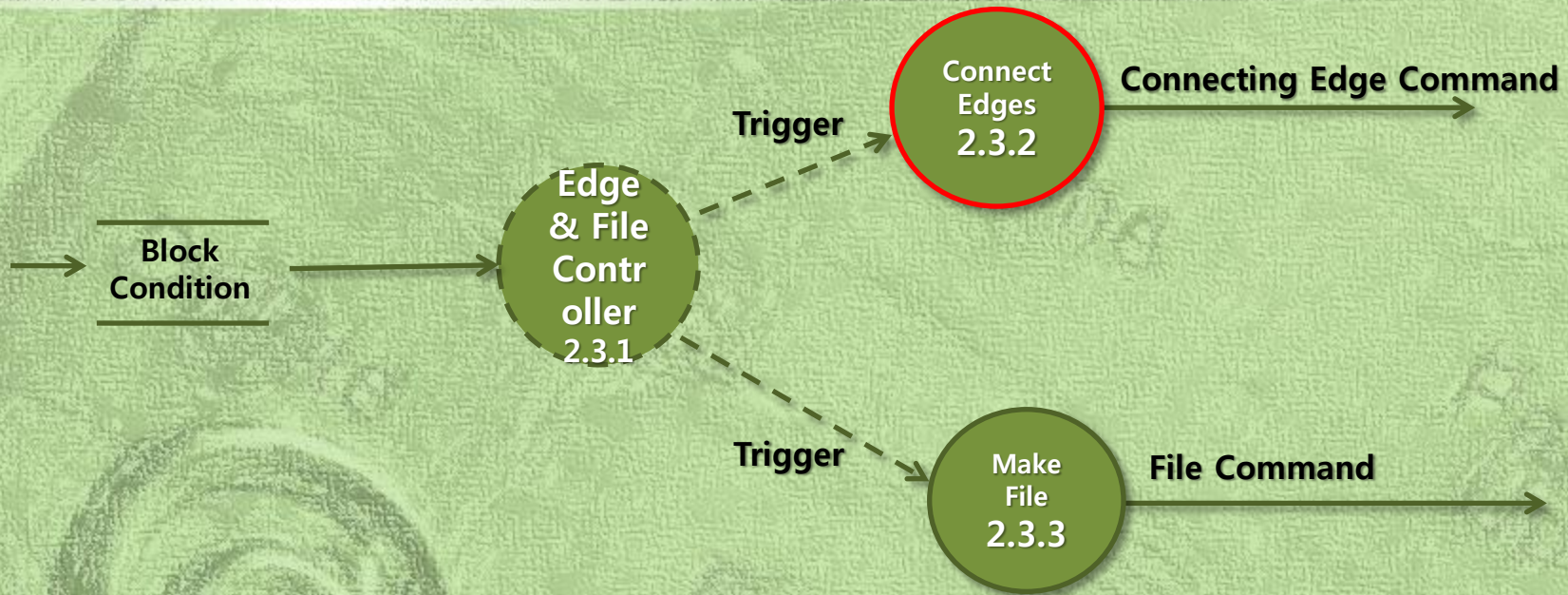
Reference No.	2.2.4
Name	Naming Block
Input	Trigger
Output	Block name data
Process Description	When process receives trigger from Main Controller, it will output Block name data

Process Specification (L3)



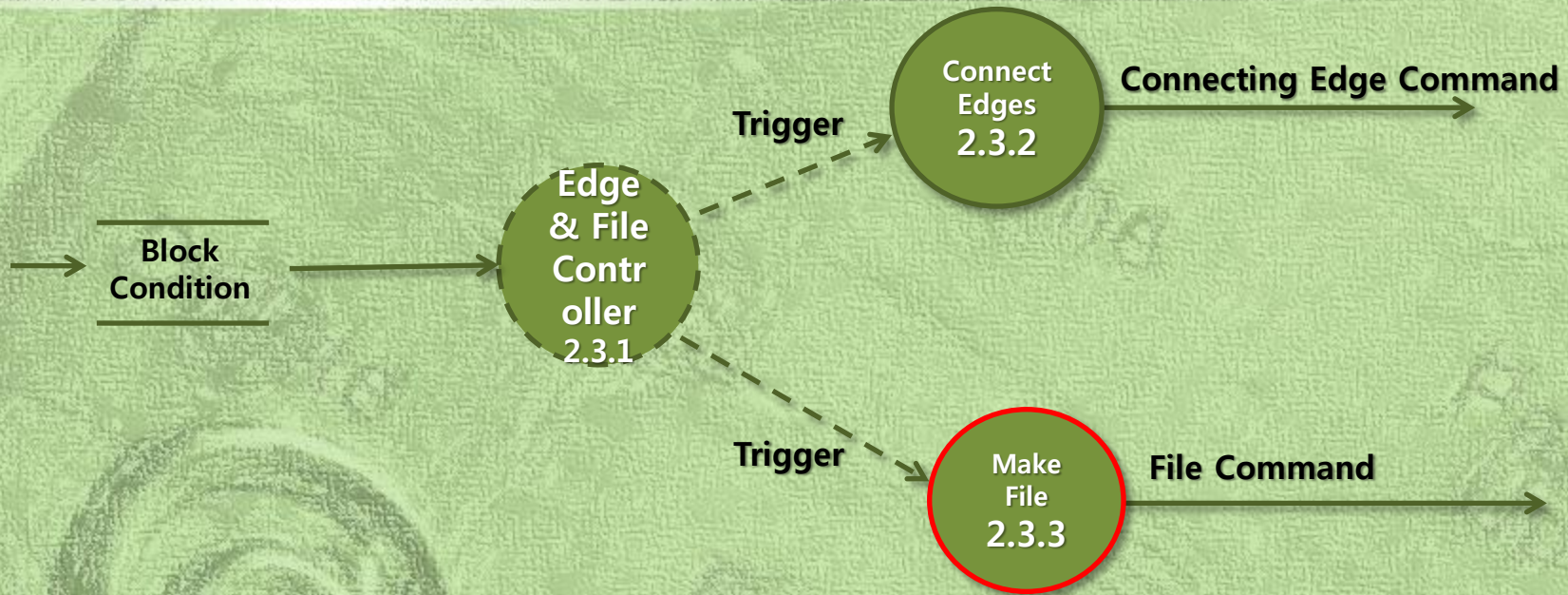
Reference No.	2.3.1
Name	Edge & File Controller
Input	Block Condition
Output	Trigger
Process Description	It would trigger inner process depending on the situation and keep outer process that will be triggered and send out data under control.

Process Specification (L3)



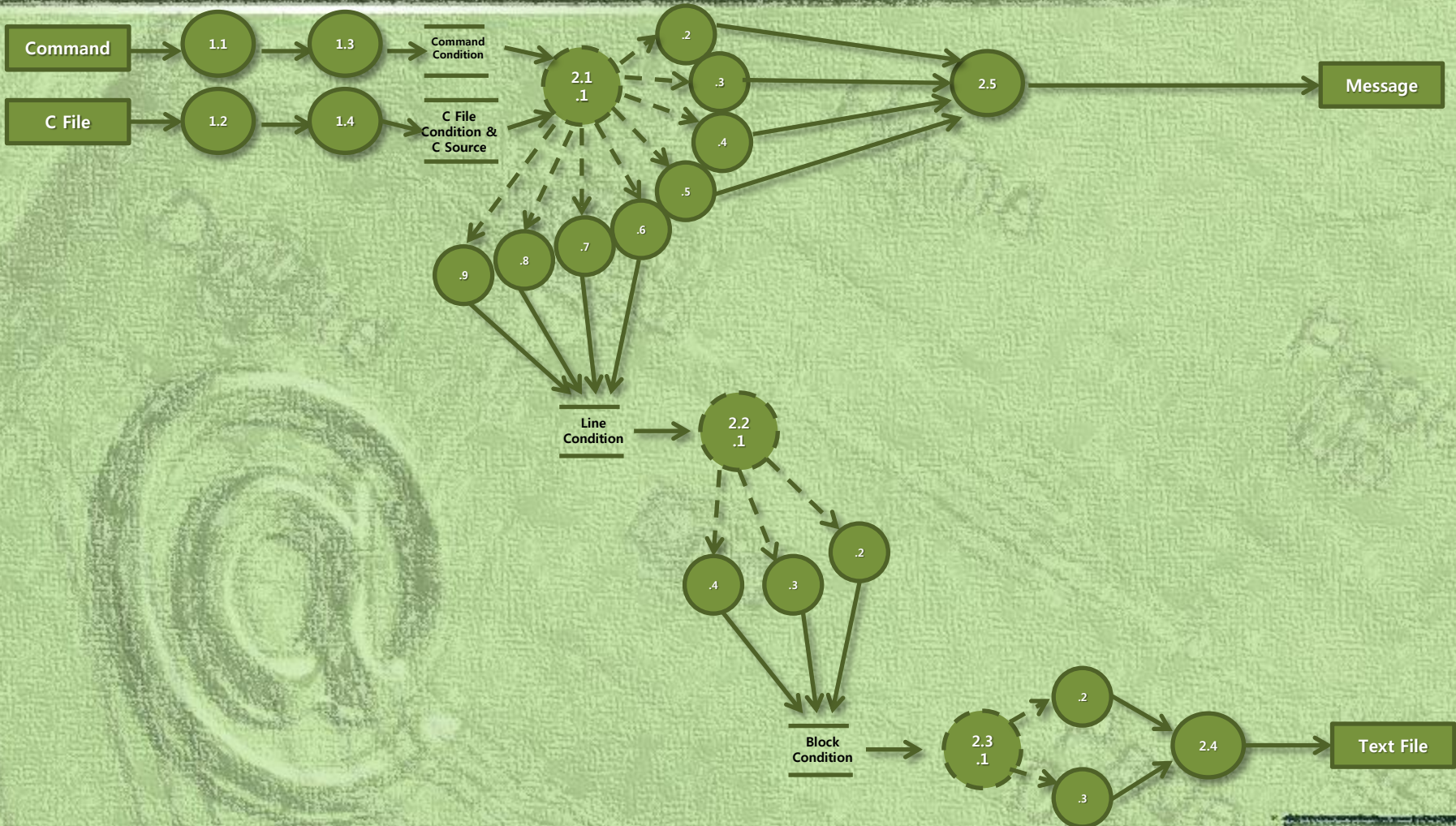
Reference No.	2.3.2
Name	Connect Edges
Input	Trigger
Output	Connecting Edge Command
Process Description	When process receives trigger from Main Controller, it will output connecting edge command

Process Specification (L3)



Reference No.	2.3.3
Name	Make File
Input	Trigger
Output	File Command
Process Description	When process receives trigger from Main Controller, it will output File Command

Total Data flow diagram

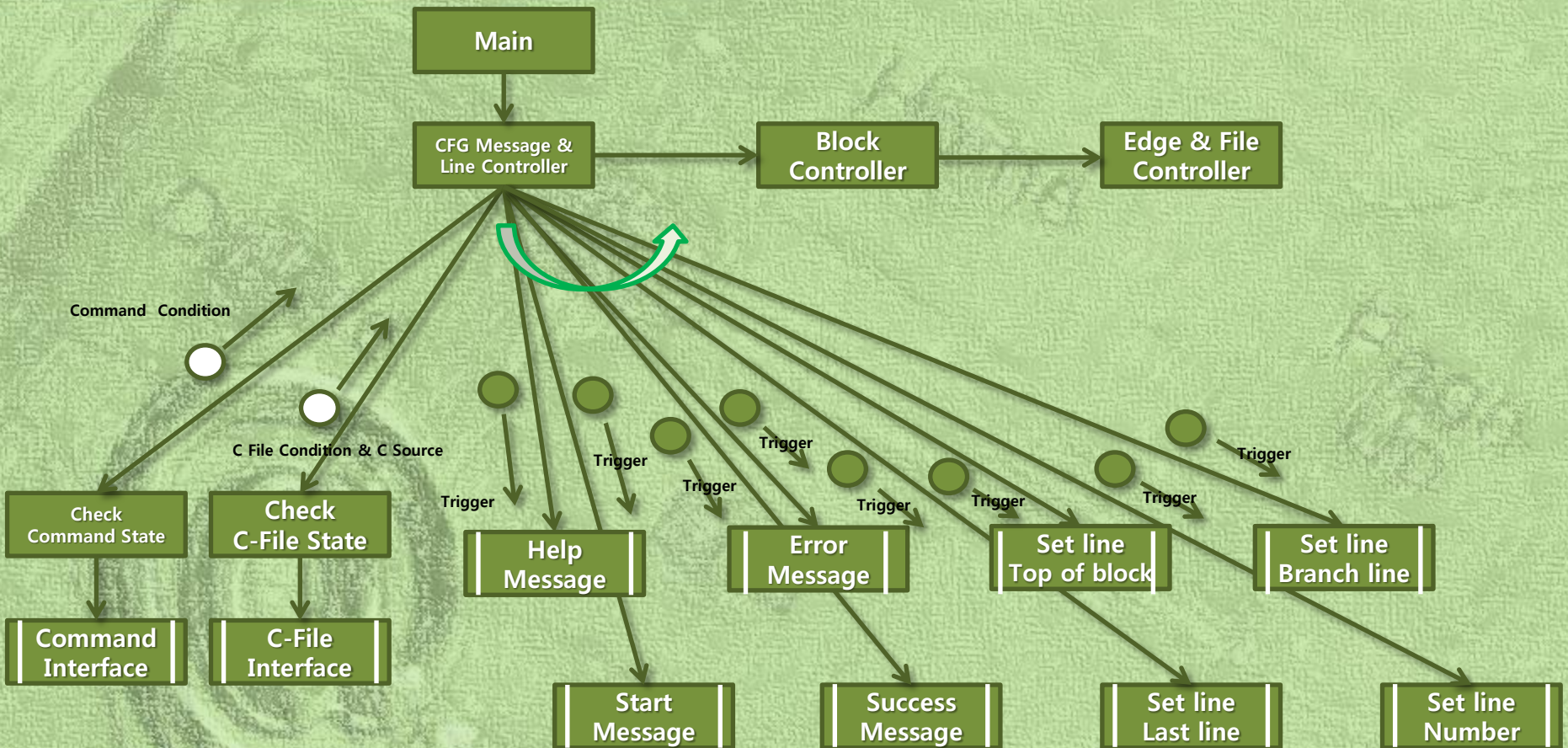




Structured chart



Structured Chart



Structured Chart (cont.)

