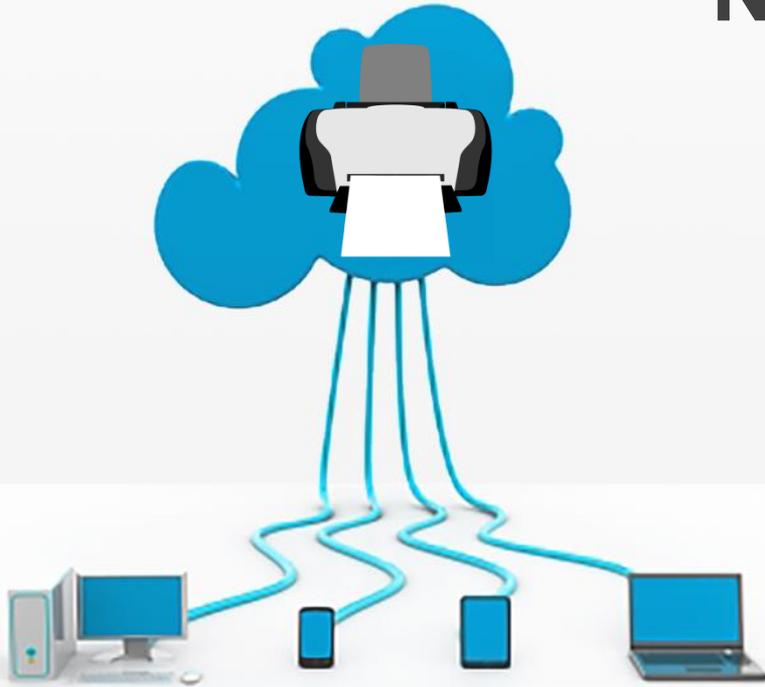


N.P.S

Network Printer System

SA Presentation



201011355 이재상
201012047 신보선
201111396 한재만
201111345 김종우

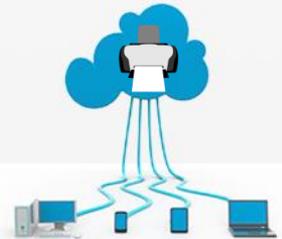
Purpose & Requirements

Context Diagram

Data Flow Diagram

State Transition Diagram

Q&A



Purpose

Software Engineering-Network Printer System

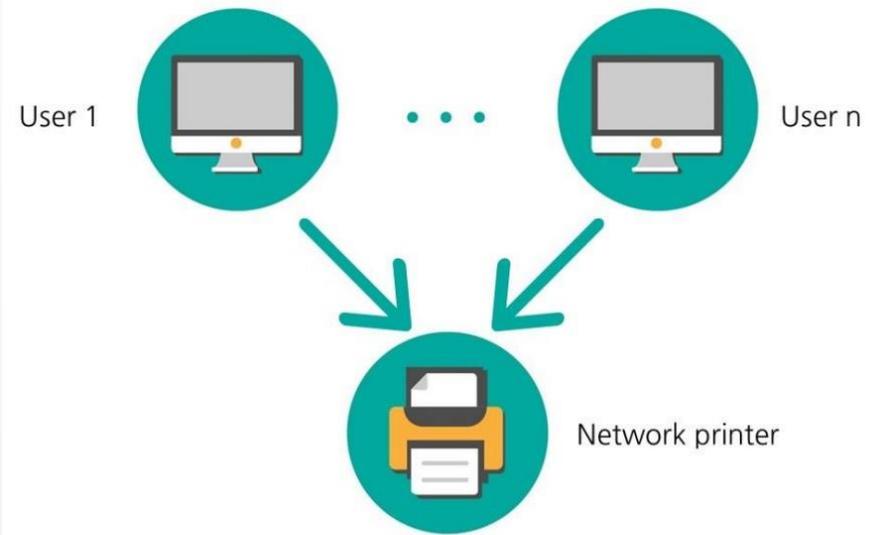
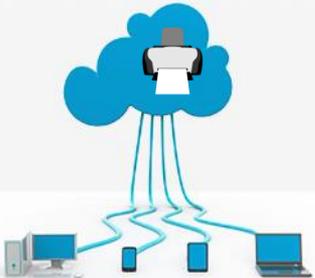


그림 1 일반적인 Network Printer 구성



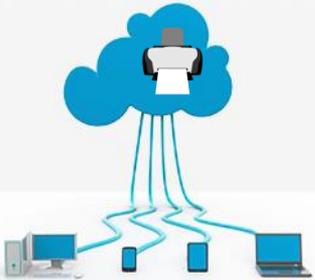
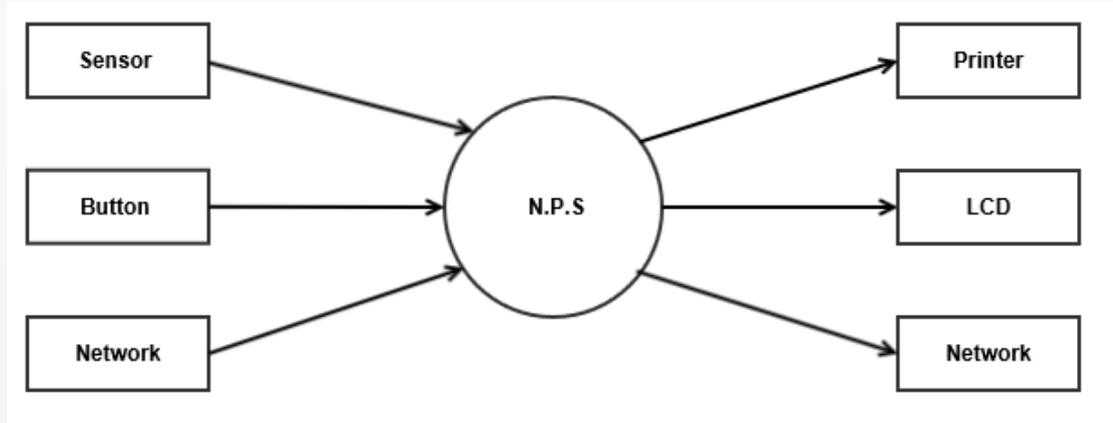
Requirements

SW로 개발하는 가상의 네트워크 프린터 시스템



Context Diagram

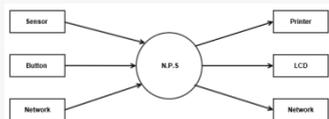
Basic



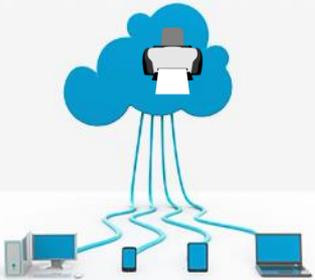
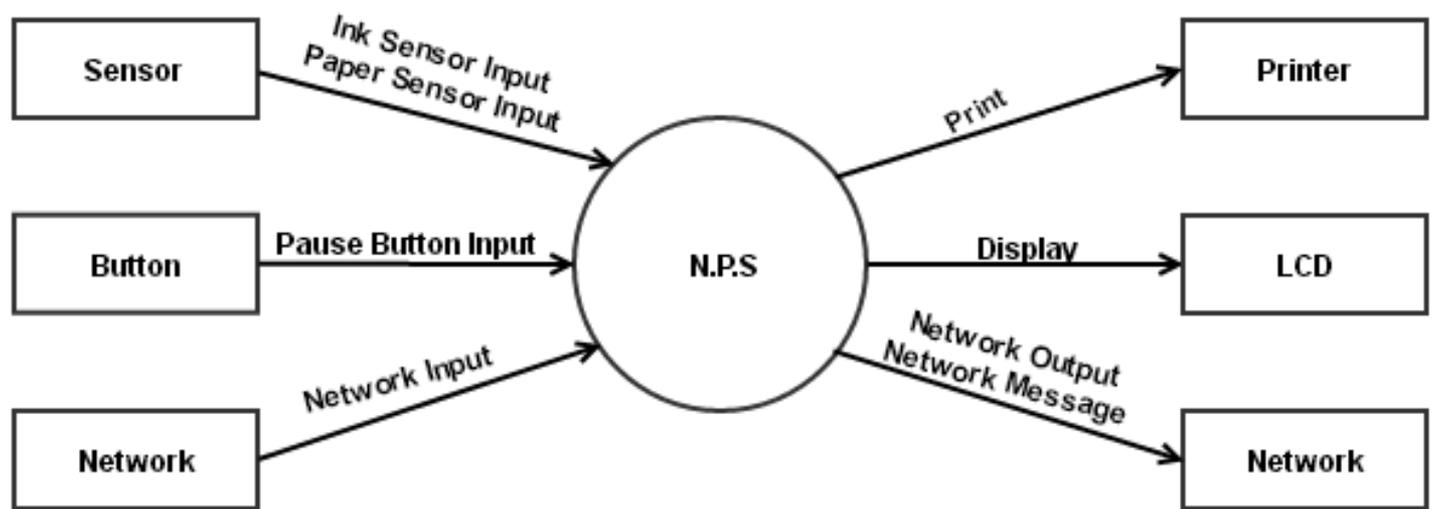
Context Diagram

Event List

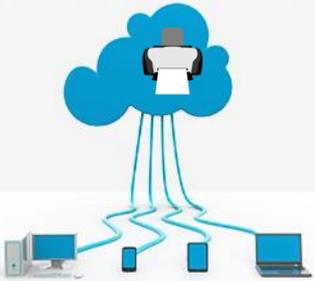
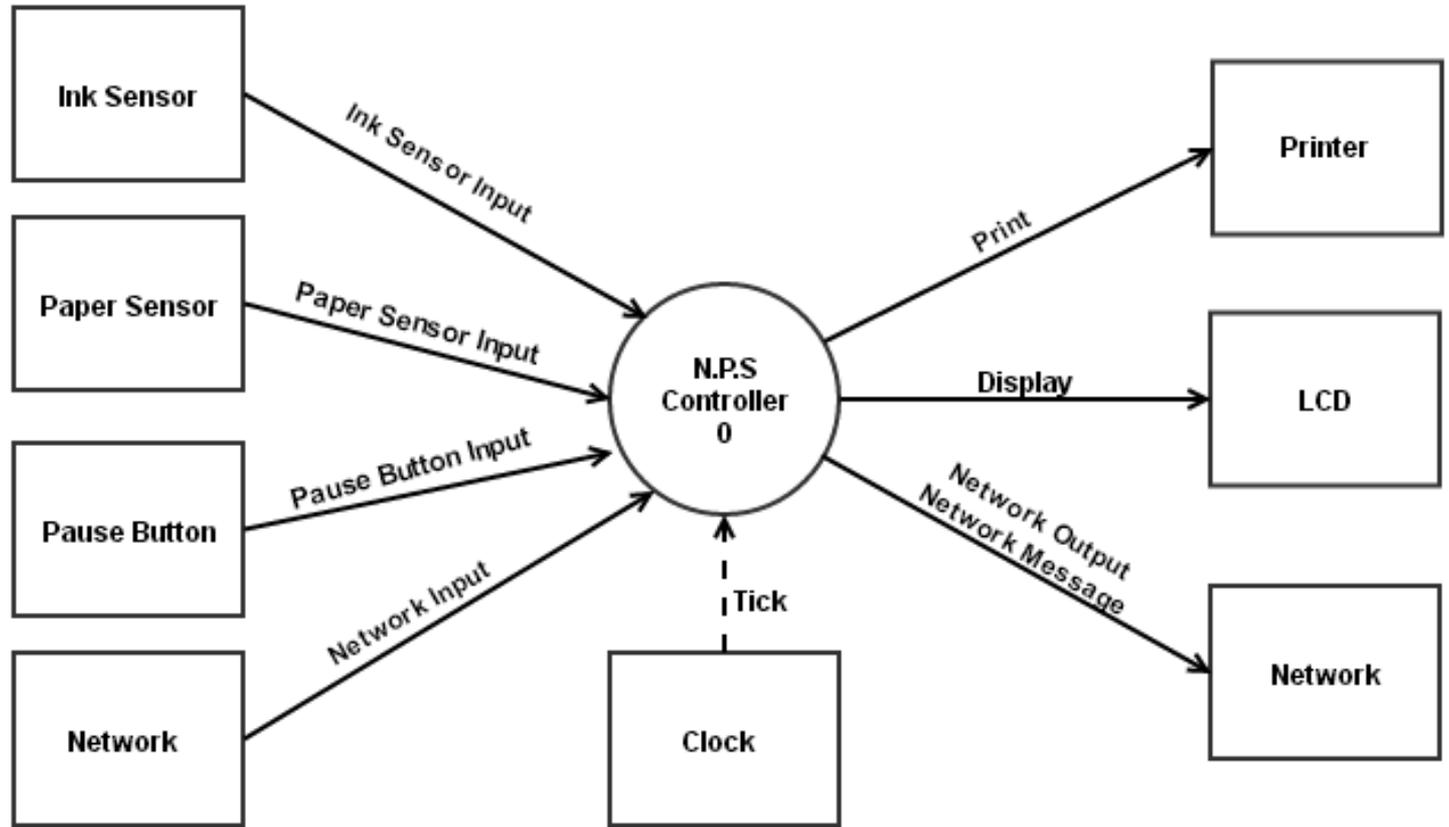
Input/Output Event	Description
Ink Sensor Input	잉크의 잔량 정보
Paper Sensor Input	용지의 잔량 정보
Pause Button Input	정지버튼에 관한 정보
Network Input	네트워크 프린터 사용자들 및 관리자의 요청 정보
Network Output	네트워크 콘솔에 출력할 정보
Display	LCD화면 출력 정보
Print	Print할 파일의 정보



Context Diagram

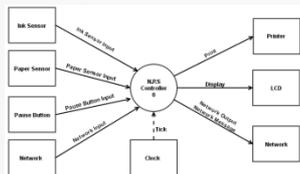


Data Flow Diagram



Data Flow Diagram

Process Specification-Level 0



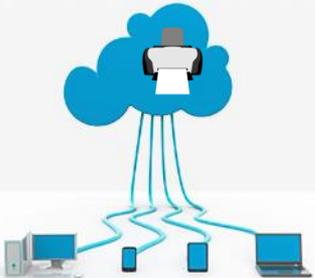
Reference No.	0
Name	Network Printer System Controller
Input	Ink Sensor Input, Paper Sensor Input, Pause Button Input, Network Input
Output	Print, Display, Network Output, Network Message
Process Description	각종 센서 및 버튼의 정보와 데이터 흐름 신호들을 받아 N.P.S 컨트롤러에서 처리한 후 프린트할 정보들은 프린터로 보내고 다양한 출력 정보들은 LCD로 보내고 출력불가, 사용자 리스트 등은 Network 콘솔창으로 보낸다.



Data Flow Diagram

Data Dictionary-Level 0

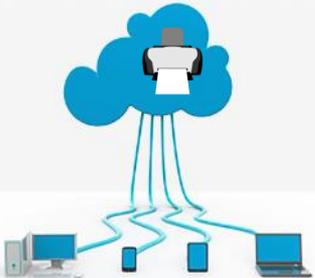
Input/Output Event	Description	Format / Type
Ink Sensor Input	잉크의 잔량 정보	Int / Periodic
Paper Sensor Input	용지의 잔량 정보	Int / Periodic
Pause Button Input	정지버튼에 관한 정보	True, False / Interrupt
Display	LCD화면 출력 정보	
Print	Print할 파일의 정보	



Data Flow Diagram

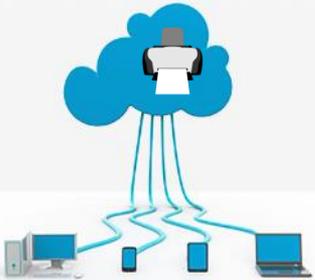
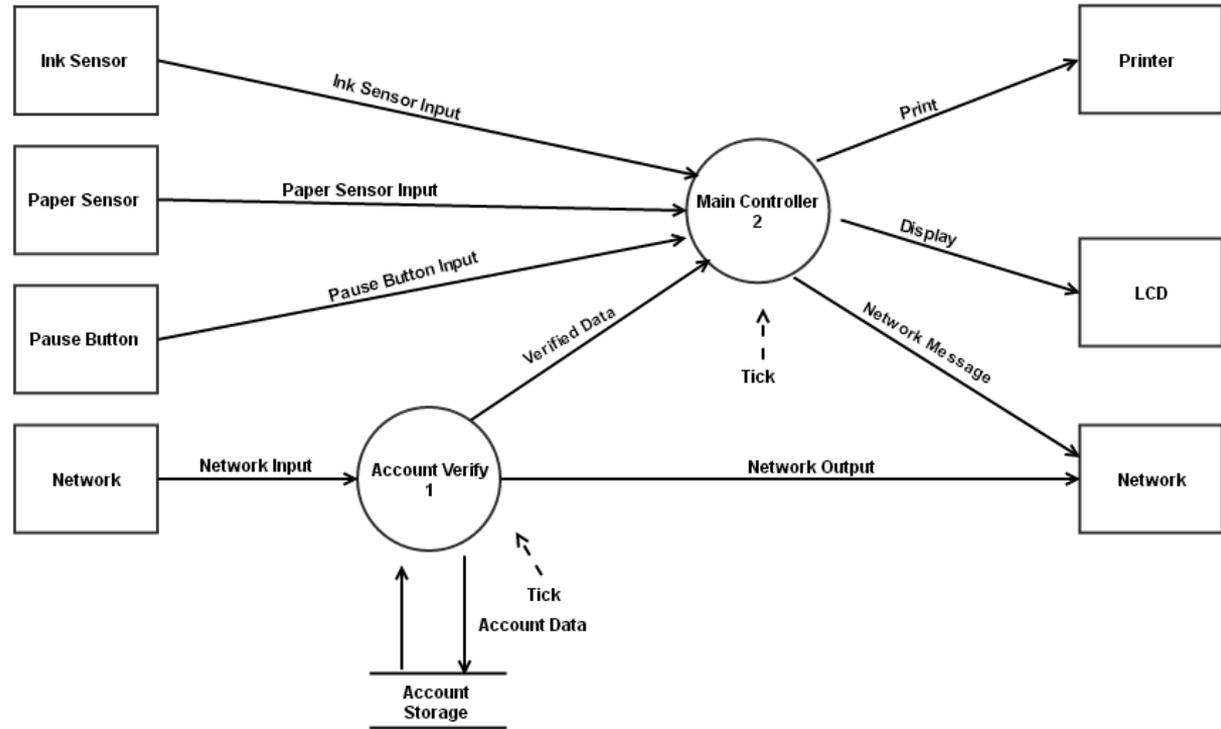
Data Dictionary-Level 0

Input/Output Event	Description	Format / Type
Network Input	네트워크 프린터 사용자들 및 관리자의 요청 정보	
Network Message	잉크 또는 종이가 부족하거나 대기열이 5를 초과할 경우의 인쇄불가 메시지를 출력한다	
Network Output	네트워크에 유저목록을 출력하거나 승인되지 않은 사용자의 경우 "승인되지 않은 사용자라는 메시지"를 출력	



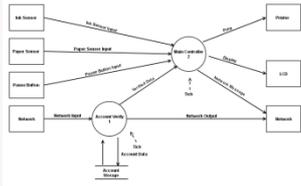
Data Flow Diagram

Level 1

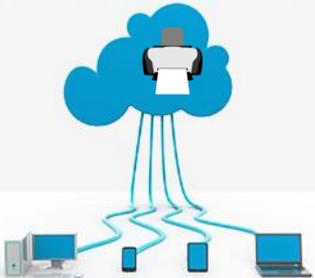


Data Flow Diagram

Process Specification-Level 1

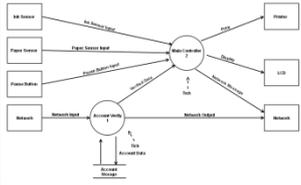


Reference No.	1
Name	Account Verifier
Input	Network Input, Account Data
Output	Verified Order, Account Data, Network Output
Process Description	Network입력을 받아 관리자인지 사용자인지 검증되지 않은 사용자인지를 판단하여 검증된 경우 출력정보를 Main Controller로 보낸다. 유효하지 않은 명령이 들어올 경우 콘솔 창에 메시지를 띄워준다

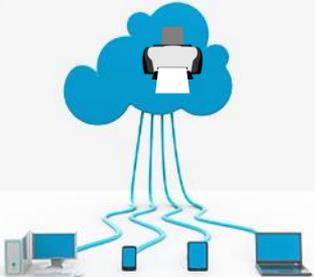


Data Flow Diagram

Process Specification-Level 1



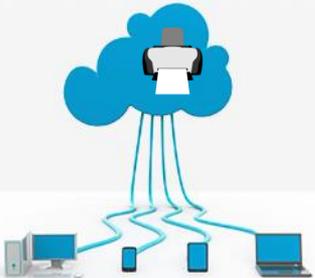
Reference No.	2
Name	Main Controller
Input	Ink Sensor Input, Paper Sensor Input, Pause Button Input, Verified data
Output	Print, Display, Network Message
Process Description	Ink 잔량정보와 Paper잔량정보 정지버튼의 입력여부 및 출력물의 정보를 받은 뒤 Main Controller에서 계산하여 Print할 정보를 Printer로 보내고 Display할 정보를 LCD로 보내고 Network Message를 Network로 보낸다.



Data Flow Diagram

Data Dictionary-Level 1

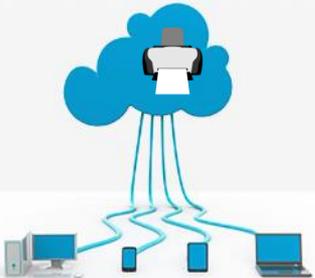
Input/Output Event	Description	Format / Type
Verified Data	인쇄정보, 다양한 Network 명령어들	Structure
	Username(Character):유저이름 Filename(Character):파일명 Command(Character):명령어	
Account Data	추가 또는 삭제할 사용자 아이디에 관한 정보, 유저목록 확인의 경우 유저들의 목 록배열	Chracter
	Username(Character) : 계정정보	
Account Storage	Account Data들의 모임	



Data Flow Diagram

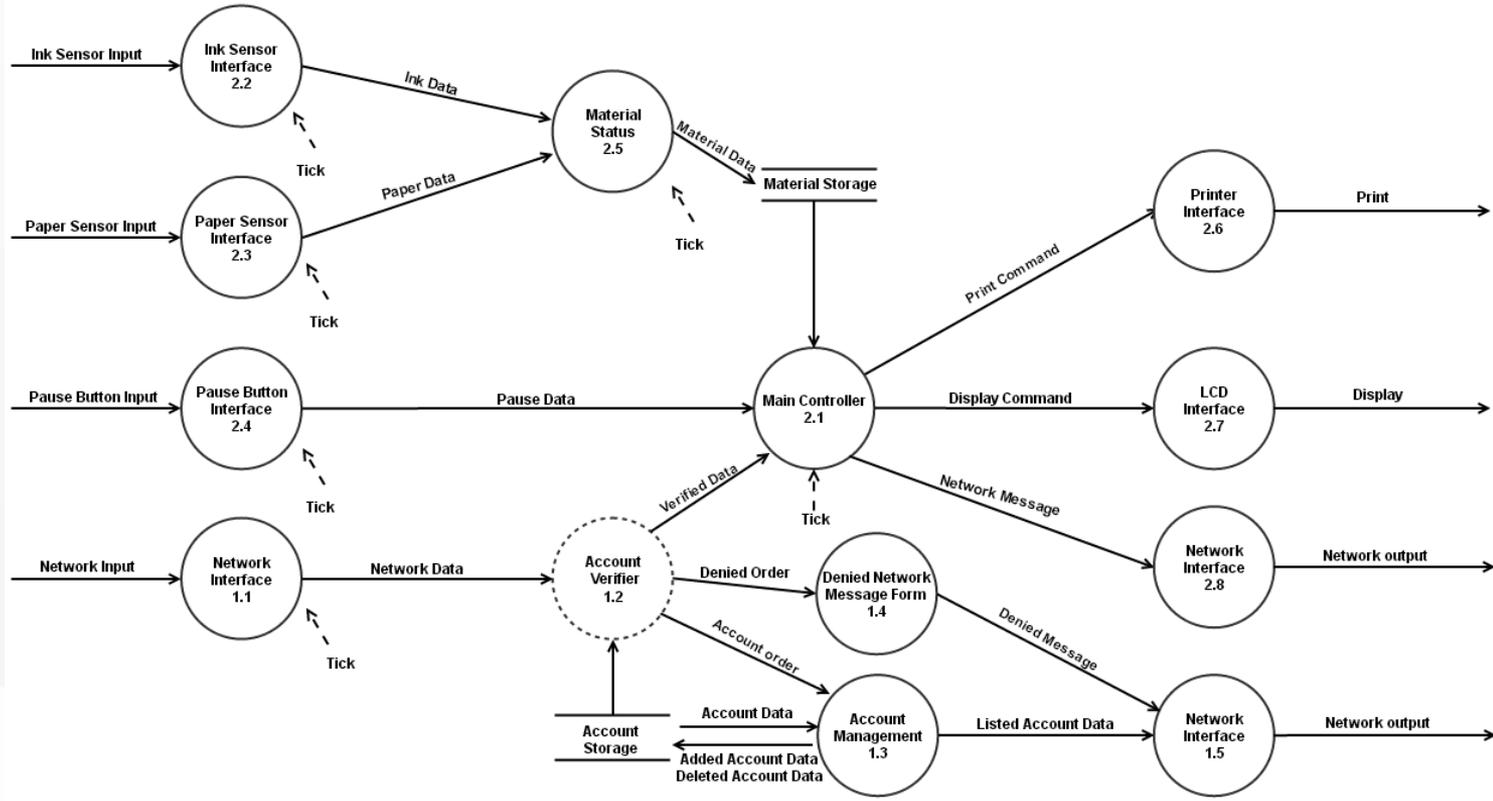
Data Dictionary-Level 1

Input/Output Event	Description	Format / Type
Network Message	잉크나 종이 등이부족하거나 대기열이 5를 초과할 경우의 출력불가 메시지	



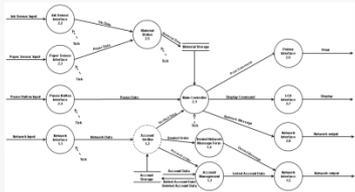
Data Flow Diagram

Level 2

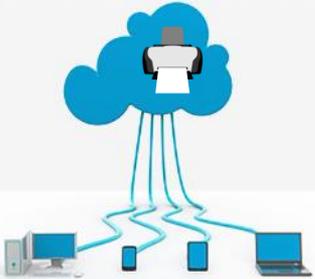


Data Flow Diagram

Process Specification-Level 2

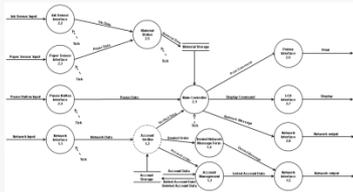


Reference No.	1.1
Name	Network Interface
Input	Network Input
Output	Network Data
Process Description	단말 Network에서 Network Input을 받아 Network Data로 변환하여 전달한다.

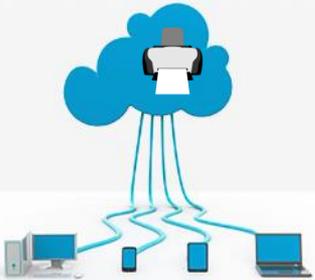


Data Flow Diagram

Process Specification-Level 2

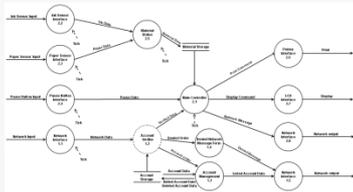


Reference No.	1.2
Name	Account Verifier
Input	Network Data, Account Data
Output	Account order, Verified Data, Denied Order
Process Description	Network Data를 받아 관리자명령어일 경우 Account Order를 전달하고 등록되지 않은 사용자일 경우 Denied Order를 전달한다 . 검증된 사용자일 경우 Verified Data를 Main Controller에 전달한다.

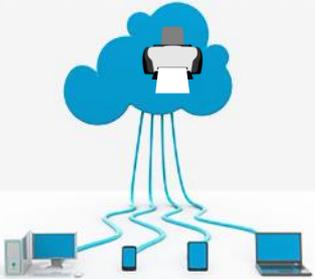


Data Flow Diagram

Process Specification-Level 2

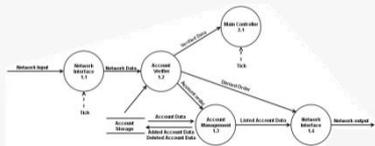


Reference No.	1.3
Name	Account Management
Input	Account order, Account Data
Output	Listed Account Data, Added Account Data, Deleted Account Data
Process Description	Account Order에 따라 유저등록명령의 경우에는 Added Account Data를 Accounted Storage로 보내고 유저삭제명령의 경우에는 Deleted Account Data를 Account Storage로 보내고 User Check 명령의 경우에는 Account Storage에서 확인된 유저목록(Account Data)를 Listed Account data형태로 Network Interface로 보낸다.

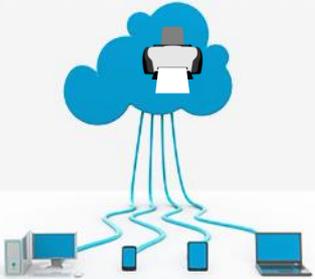


Data Flow Diagram

Process Specification-Level 2

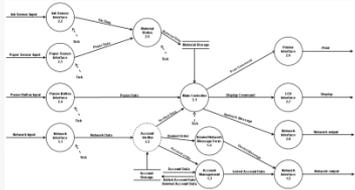


Reference No.	1.4
Name	Denied Network Message Form
Input	Denied Order
Output	Denied Message
Process Description	Denied Order 명령어를 받으면 Denied Message를 Network Interface로 보낸다.

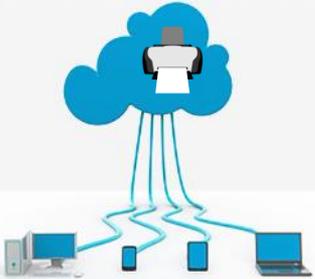


Data Flow Diagram

Process Specification-Level 2

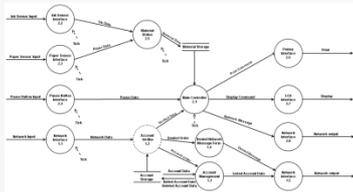


Reference No.	1.5
Name	Network Interface
Input	Listed Account Data, Denied Message
Output	Network Output
Process Description	사용자 계정 목록(Listed Account Data)을 받아 Network Console에 출력한다. 승인되지 않은 사용자의 경우 "승인되지 않은 사용자"라는 글자 Denied Message 형태로 출력한다.

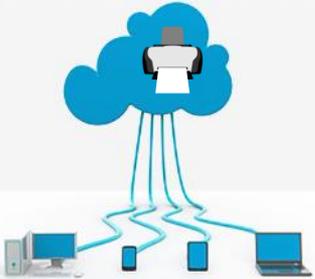


Data Flow Diagram

Process Specification-Level 2

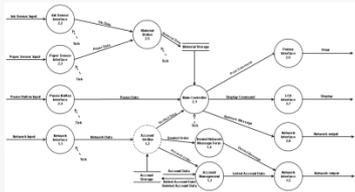


Reference No.	2.1
Name	Main Controller
Input	Material Data, Pause Data, Verified Data
Output	Print Command, Display Command, Network Message
Process Description	Material Data, Pause Data, Verified Data를 받아 출력가능 불가능여부 , 정지, 리필 여부를 판단하고 Print, Display Command, Network Message를 보낸다.

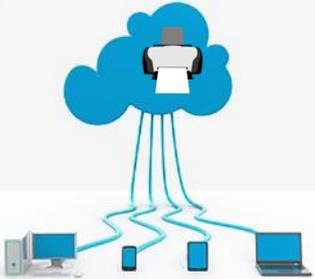


Data Flow Diagram

Process Specification-Level 2

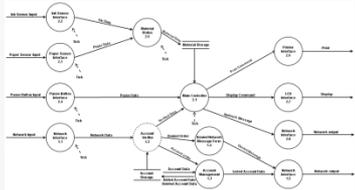


Reference No.	2.2
Name	Ink Sensor Interface
Input	Ink Sensor Input
Output	Ink Data
Process Description	Ink Sensor Input을 Ink Data로 변환하여 Material Status로 전달한다.

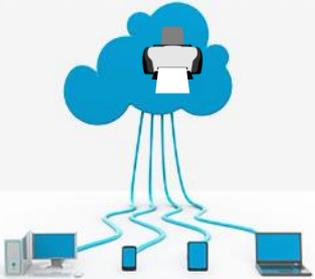


Data Flow Diagram

Process Specification-Level 2

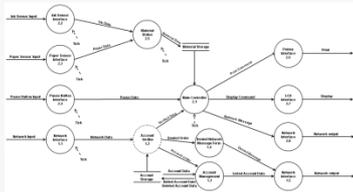


Reference No.	2.3
Name	Paper Sensor Interface
Input	Paper Sensor Input
Output	Paper Data
Process Description	Paper Sensor Input을 Paper Data로 변환하여 Material Status로 전달한다.

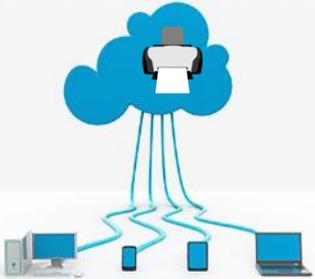


Data Flow Diagram

Process Specification-Level 2

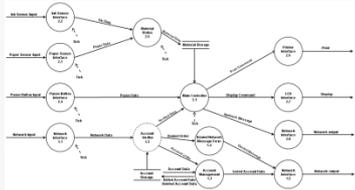


Reference No.	2.4
Name	Pause Button Interface
Input	Pause Button Input
Output	Pause Data
Process Description	Pause Button Input을 Pause Data로 변환하여 Main Controller로 전달한다.

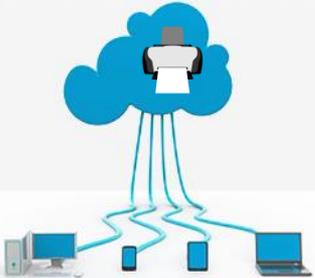


Data Flow Diagram

Process Specification-Level 2

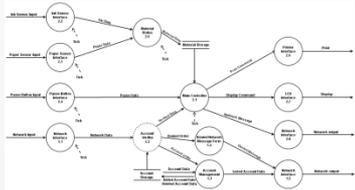


Reference No.	2.5
Name	Material Status
Input	Ink Data, Paper Data
Output	Material Data
Process Description	Ink Data와 Paper Data를 받아 취합하여 Material Data로 변환하여 전달한다.

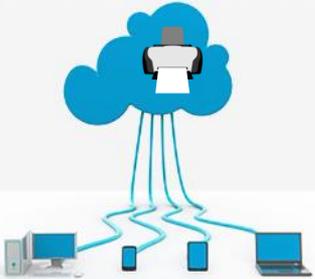


Data Flow Diagram

Process Specification-Level 2

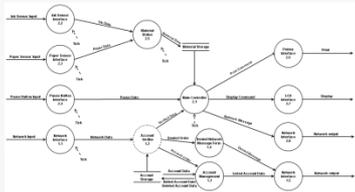


Reference No.	2.6
Name	Printer Interface
Input	Printer Command
Output	Print
Process Description	Printer Command를 받아 하드웨어적 신호 Print로 변환하여 전달한다.

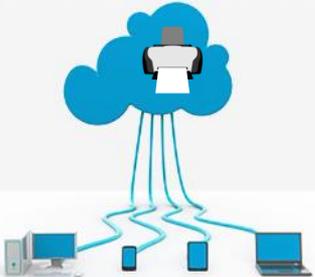


Data Flow Diagram

Process Specification-Level 2

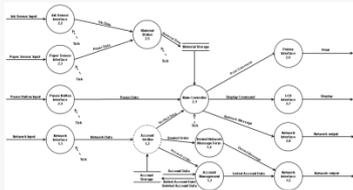


Reference No.	2.7
Name	LCD Interface
Input	Display Command
Output	Display
Process Description	Display Command를 받아 하드웨어적 신호 Display 로 변환하여 전달한다.

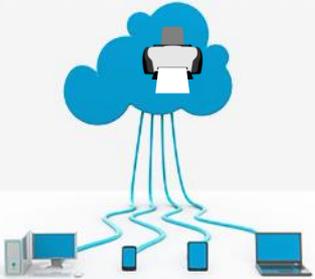


Data Flow Diagram

Process Specification-Level 2



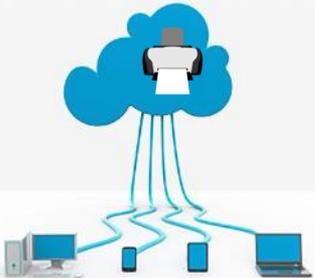
Reference No.	2.8
Name	Network Interface
Input	Network Message
Output	Network Output
Process Description	Network Message를 받아 하드웨어적 신호 Network Output으로 변환하여 전달한다.



Data Flow Diagram

Data Dictionary-Level 2

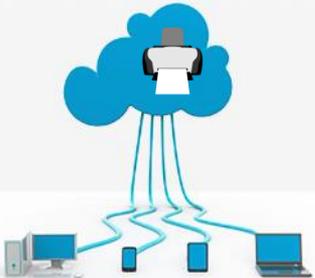
Input/Output Event	Description	Format / Type
Pause Data	Pause 버튼의 상태	pauseinput(Boolean): 정지여부
Ink Data	Ink의 양	Ink(Int):잉크량
Paper Data	Paper 의 양	Paper(Int):종이량
Material Data	Ink, Paper의 양을 취합한 것	Ink(Int):잉크량 Paper(Int):종이량 /Structure
Material Storage	Material Data의 저장소	Ink(Int):잉크량 Paper(Int):종이량 /Structure



Data Flow Diagram

Data Dictionary-Level 2

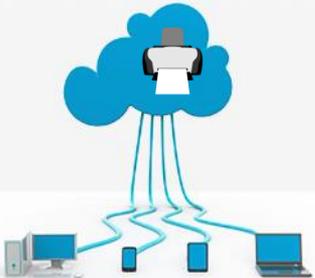
Input/Output Event	Description	Format / Type
Network Data	네트워크 요청과, 프린트 할 데이터.	Username(Character) : 계정명 Command(Character) : 명령어 Filename(Character) : 파일명 TargetUsername (Character): 추가,삭제할 계정명 Structure
Print Command	Main Controller에서 Printer Interface로 이동할 정 보	Structure



Data Flow Diagram

Data Dictionary-Level 2

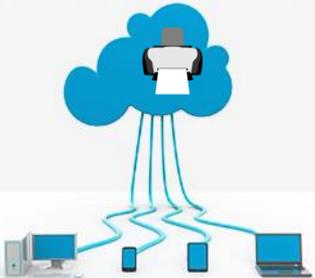
Input/Output Event	Description	Format / Type
Display Command	프린터의 상태, 잉크와 용지의 상태를 Main Controller 에서 받아 LCD interface로 이동할 데이터	Structure
Verified Data	인쇄정보, 다양한 Network명령어들	Structure
	Username(Character):유저이름 Filename(Character):파일명 Command(Character):명령어	
Account Data	사용자 계정에 관한 정보	Character
	Username(Character) : 계정정보	



Data Flow Diagram

Data Dictionary-Level 2 Part.2

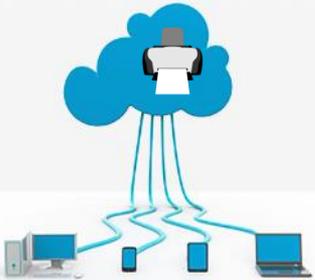
Input/Output Event	Description	Format / Type
Account Storage	Account Data들의 모임	
Listed Account Data	Account Storage에 있는 사용자들의 목록	Structure
Account Order	관리자만이 할 수 있는 명령	Structure
	Command(Character): 명령어 TargetUsername(Character): 추가,삭제할 계정명	



Data Flow Diagram

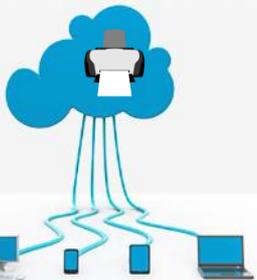
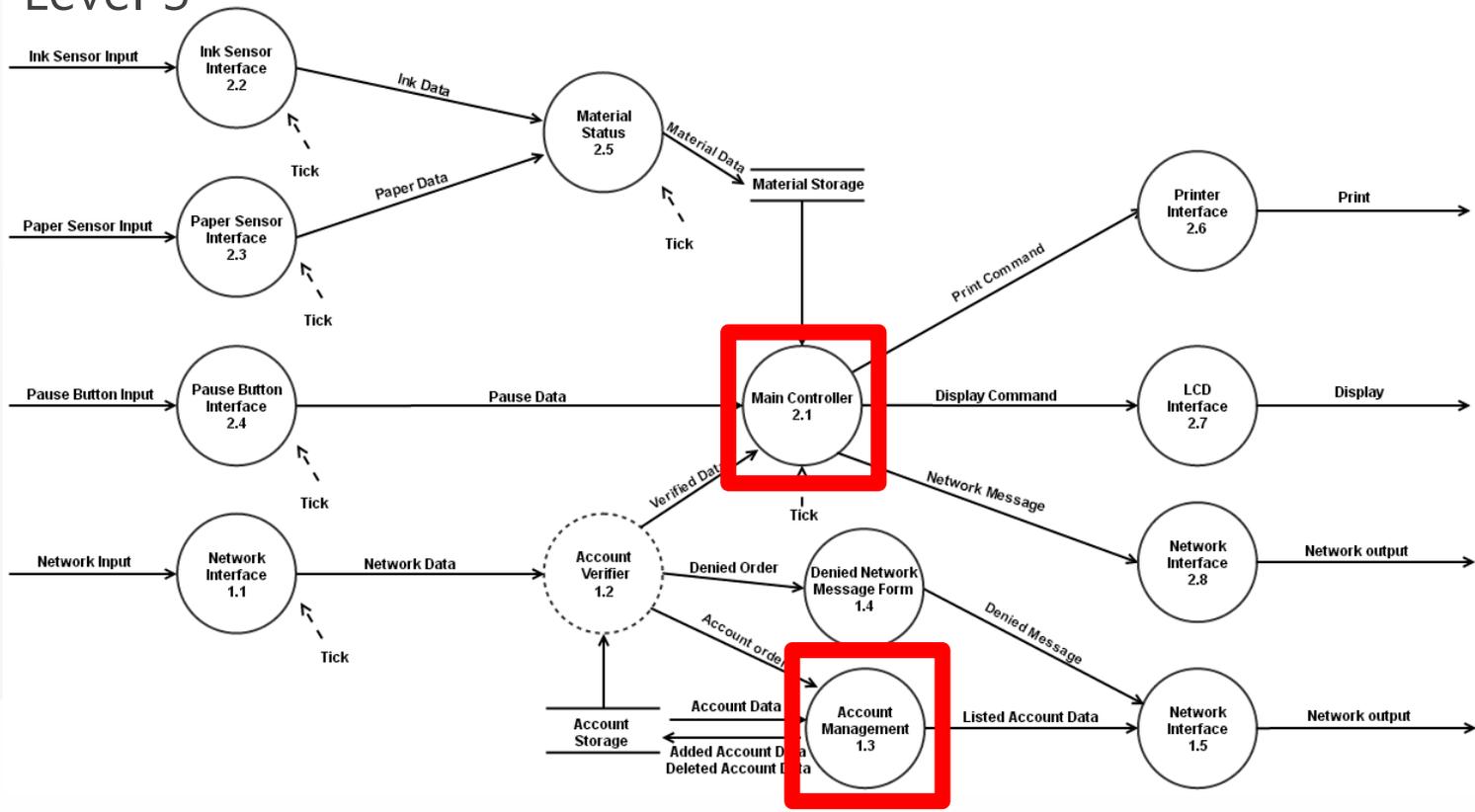
Data Dictionary-Level 2 Part.2

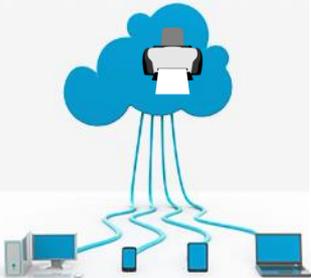
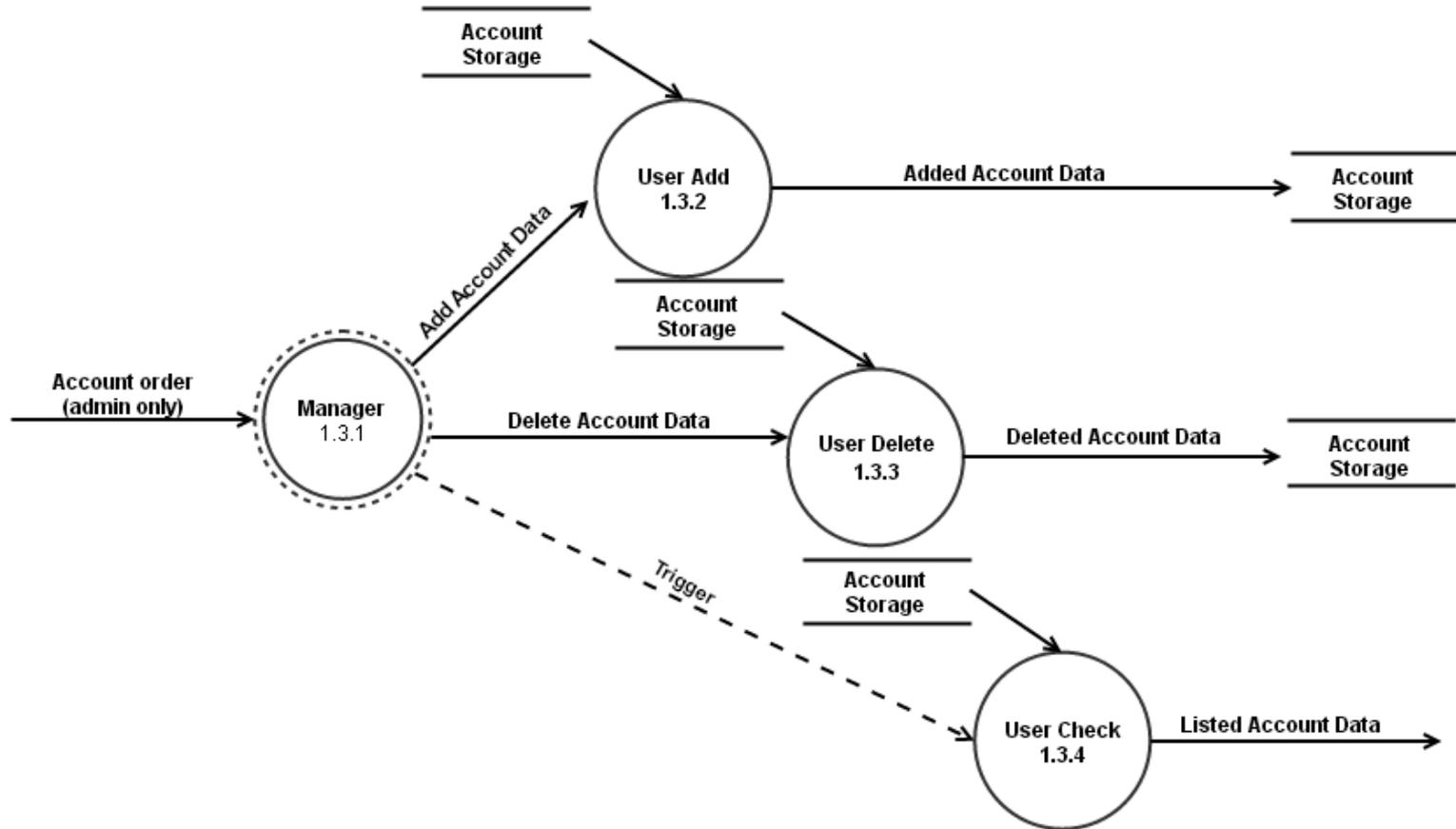
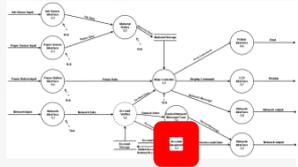
Input/Output Event	Description	Format / Type
Account Storage	Account Data들의 모임	
Denied Order	승인되지 않은 사용자의 명령	Structure
Add Account Data	추가할 사용자의 Data	Character
Delete Account Data	삭제할 사용자의 Data	Character
Added Account Data	추가된 사용자의 Data	Character
Deleted Account Data	삭제된 사용자의 Data	Character



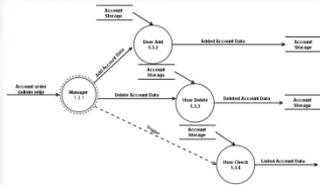
Data Flow Diagram

Level 3

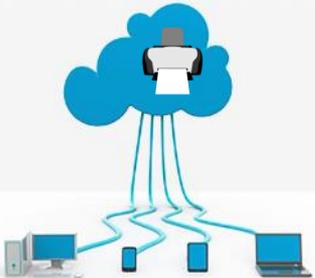




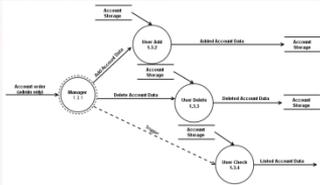
Process Specification-Account Management



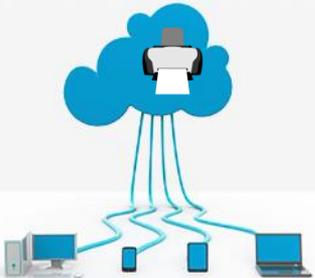
Reference No.	1.3.1
Name	Manager
Input	Account Order
Output	Add account data, Delete account data, trigger
Process Description	<p>Account data로부터 유저 데이터를 받아 Account Order.Command가 "usradd"일 경우 Add account data를 User Add로 보내고 Account Order.Command 가 "usrdel"일 경우 Delete account data를 User Delete로 보내고 Account Order.Command가 "usrcheck"일 경우 trigger를 발생시킨다.</p>



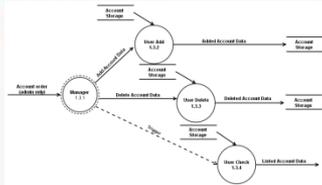
Process Specification-Account Management



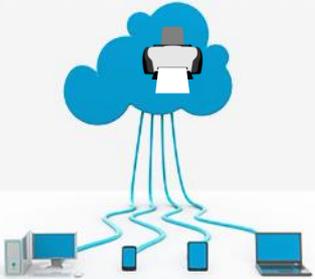
Reference No.	1.3.2
Name	User Add
Input	Add account data, Account data
Output	Added account data
Process Description	추가할 데이터(Added account data)와 Account Data 전부를 받아 병합한 후 Account Storage에 다시 저장한다.



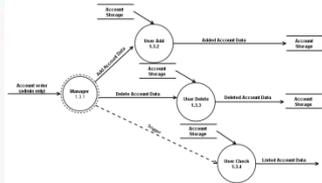
Process Specification-Account Management



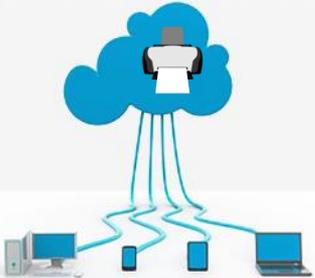
Reference No.	1.3.3
Name	User Delete
Input	Delete Account Data, Account Data
Output	Deleted Account Data
Process Description	삭제할 데이터(Delete Account Data)와 Account Data를 받아 확인한 후 데이터를 삭제하고 삭제된 Account Data를 Account Storage에 다시 저장시킨다.

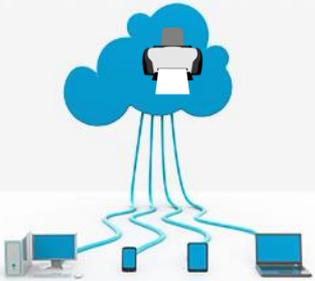
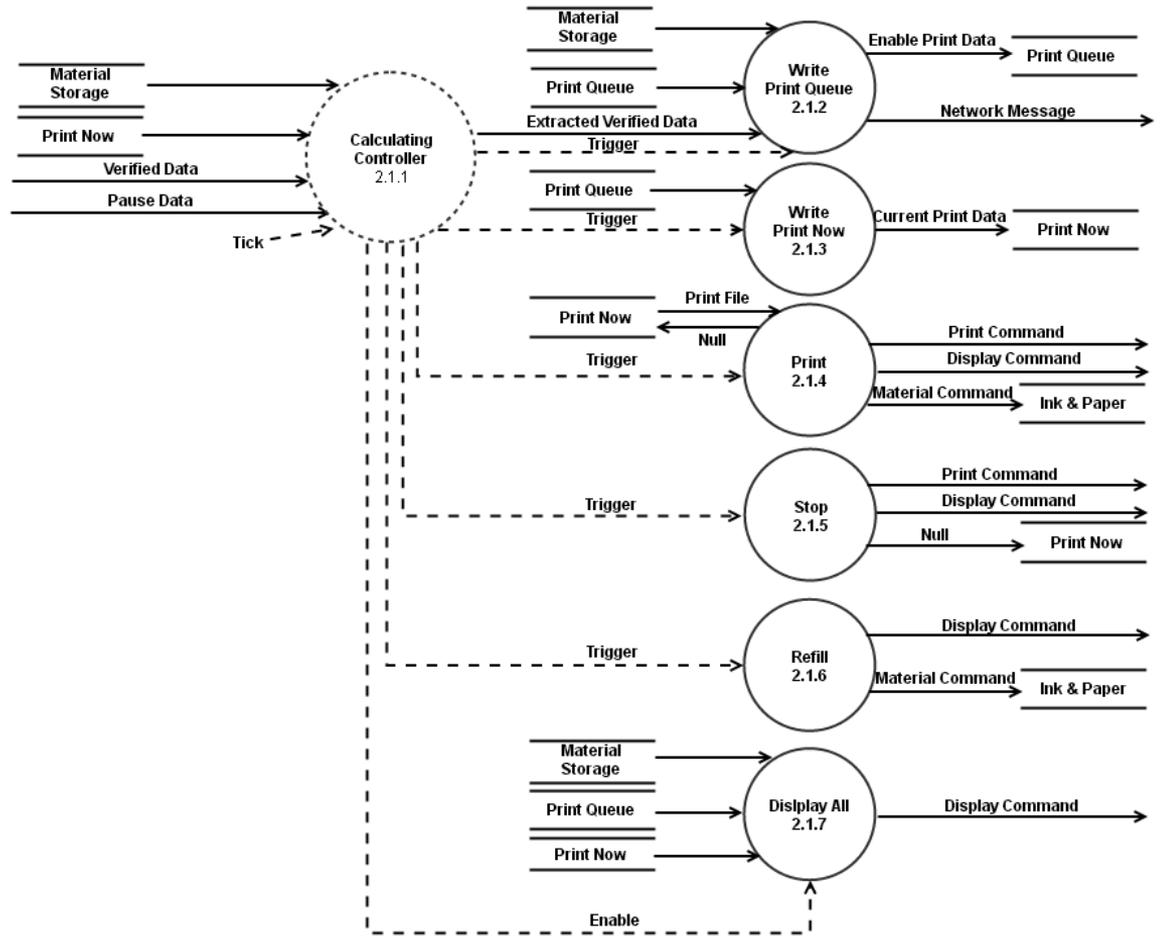
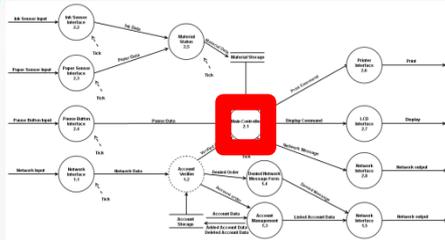


Process Specification-Account Management



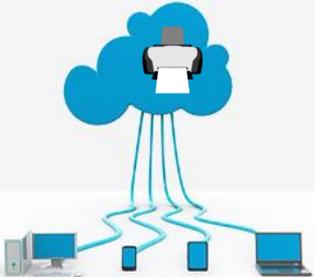
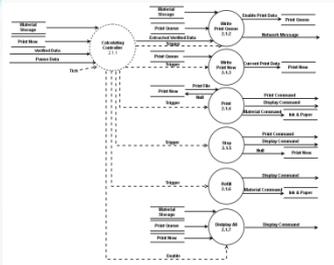
Reference No.	1.3.4
Name	User check
Input	Trigger, Account Data
Output	Listed Account data
Process Description	usercheck라는 명령어를 받으면 Account Storage에 있는 계정목록들을 Network Interface로 보내준다.



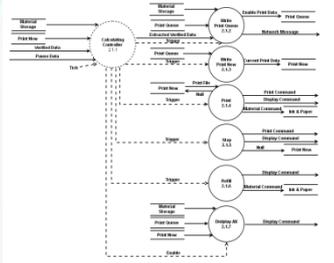


Process Specification-Main Controller 2.1.1

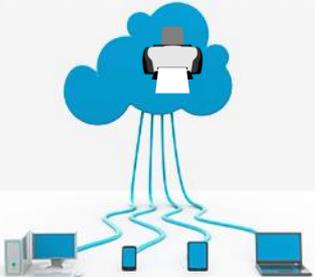
Reference No.	2.1.1
Name	CalculatingController
Input	Material Storage, Verified data, Pause Data, Printing Now, Print Queue, tick
Output	Trigger, Extracted Verified Data
Process Description	Verified Data를 받아 프린트할 파일은 Extracted Verified Data로 만들어 Write Print Queue로 전달한다. Verified Data 내부의 Command 종류와 Print Now의 상태에 따라 각각의 Trigger를 발생시킨다.



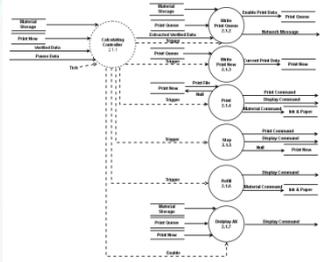
Process Specification-Print 2.1.2



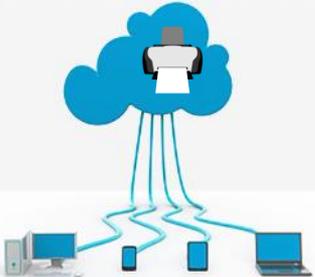
Reference No.	2.1.2
Name	Write Print Queue
Input	Extracted Print Data, Material Storage Data, Print Queue, Trigger
Output	Enable Print Data, Network Message
Process Description	Extracted Print File데이터를 받아 프린트에 사용될 소모품 (종이, 잉크)이 충분한지, 대기열의 대기자수가 얼마만큼 있는지를 파악하여 출력이 가능할 경우 Print Queue에 저장한다. 출력이 불가능할 경우 출력불가 메시지를 Network Message로 전달한다.



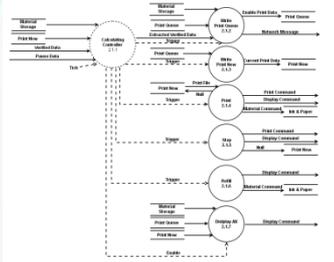
Process Specification-Sliced Main Controller Part.2



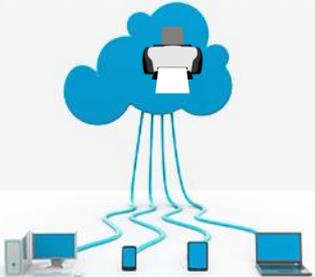
Reference No.	2.1.3
Name	Write Print Now
Input	Print Queue
Output	Current Print File
Process Description	Print Now를 확인하여 Null일 경우 Print Queue의 맨 앞 파일을 가져와 Print Now에 저장한다. 대기열의 파일을 인쇄할 큐로 옮기면서 문자열 Chracter형태로 바꾸어 주는 과정



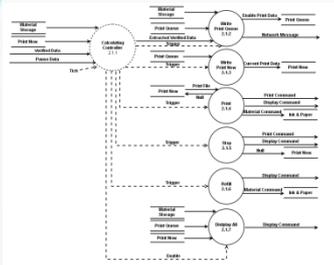
Process Specification-Sliced Main Controller Part.2



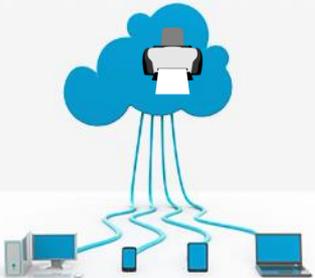
Reference No.	2.1.4
Name	Print
Input	Trigger, Print File
Output	Print command, Display command, Material command, null
Process Description	Printing now에서 출력물데이터를 참조하여 출력 명령을 보내고, 출력 중 상태를 display command로 보낸다. 현재 까지 사용한 잉크 양과 종이 양을 보여주기 위해서 material command 를 보낸다.



Process Specification-Sliced Main Controller Part.2



Reference No.	2.1.5
Name	Stop
Input	Trigger
Output	Print command, Display command, null
Process Description	pause버튼이 눌리거나 stop명령이 들어왔을 때 display command를 보내 대기 중 상태를 표시하고, 멈춤 명령을 Print command로 보내고 null값을 Print Now에 쓴다.



Input/Output Event	Description	Format / Type
Print Queue	유저네임,파일명,명령 등을 저장하고 있는 큐 저장소 .출력할 대기열이다	Structure
	Username(Chracter):유저명 Filename(Chracter):파일명 Command(character):명령어	
Network command	네트워크 명령들을 저장하고 있는 저장소	Chracter
null	stop명령이 들어왔을 경우 현재 인쇄중인 파일 대신 큐에 들어가는 명령어	Chracter
Material Command	잉크를 리필 할 경우나 현재 잔량을 파악 하기 위한 명령	Chracter
Print File	프린트할 데이터	Chracter



Input/Output Event	Description	Format / Type
Deleted Account Data	삭제할 사용자의 이름이 삭제된 Account Data	Array
Added Account Data	추가할 사용자의 이름이 추가된 Account Data	Array
Extracted Verified Data	여러 가지 명령어 들이 걸러진 단순 프린트할 파일	File
Enable Print Data	잉크,종이,대기자 모든 것이 만족한다는 것이 검증된 프린트 데이터	File
Current Print Data	Print Queue에 있는 파일을 Chracter형태로 만들어 Print가 바로 출력할 수 있게 바꾼 파일	Chracter
Printing now	현재 프린트중인 문서를 저장하고 있는 저장소	File

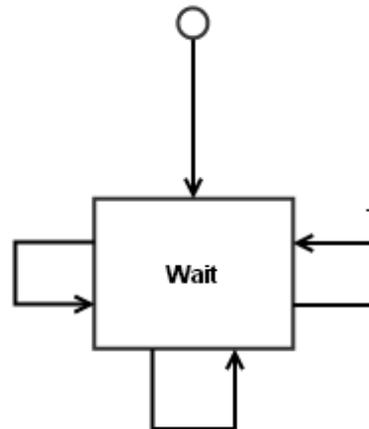


State Transition Diagram

Verifier 1.2

ND = Network Data
AS=Account Storage

Tick[(ND.Username in AS &&
ND.Command == "print || stop") ||
(ND.Username == "Admin" &&
ND.Command == "refill")]
/ Send "Verified Data" To "Main Controller"



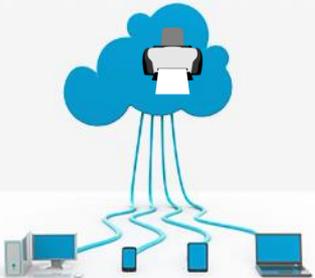
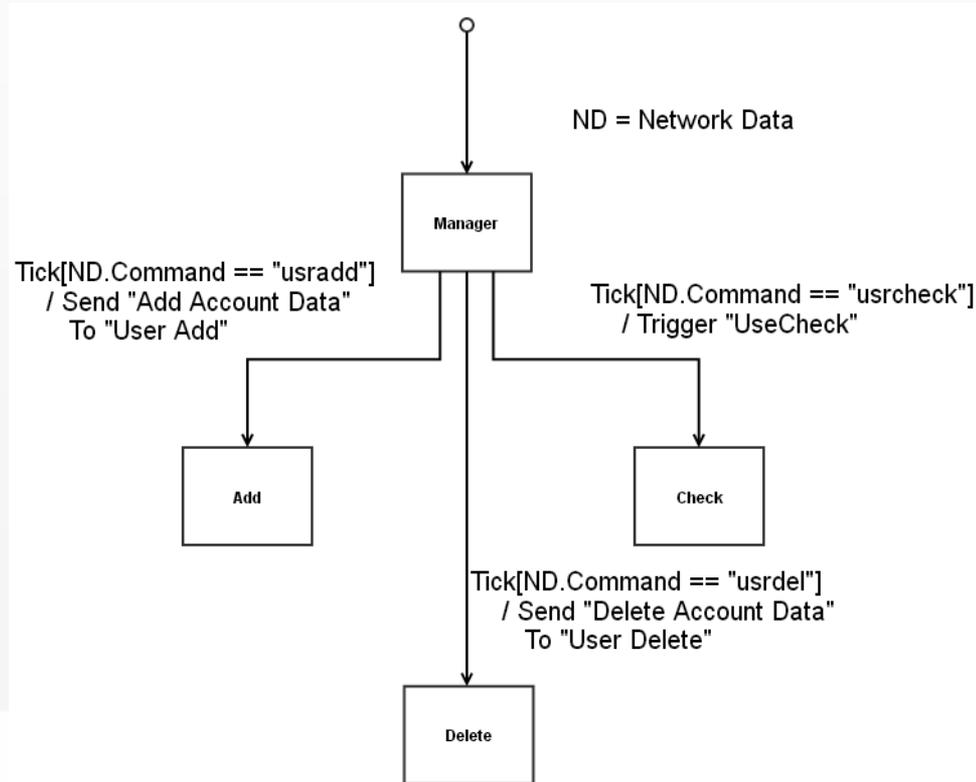
Tick[ND.Username == Admin &&
ND.Command == "usradd" || "usrdel" || "usercheck"]
/ Send "Account Oder" To "Account Management"

Tick[ND.Username not in AS || (ND.Username in AS && ND.Command == "refill" || "usradd" || "usrdel" || "usrcheck")]
/ Send "Denied Order" To "Denied Network Message Form"



State Transition Diagram

Manager-1.3.1



State Transition Diagram

Calculating Controller-2.1.1

