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# 2STON NVR Dev Guide

11.10.2019 ~

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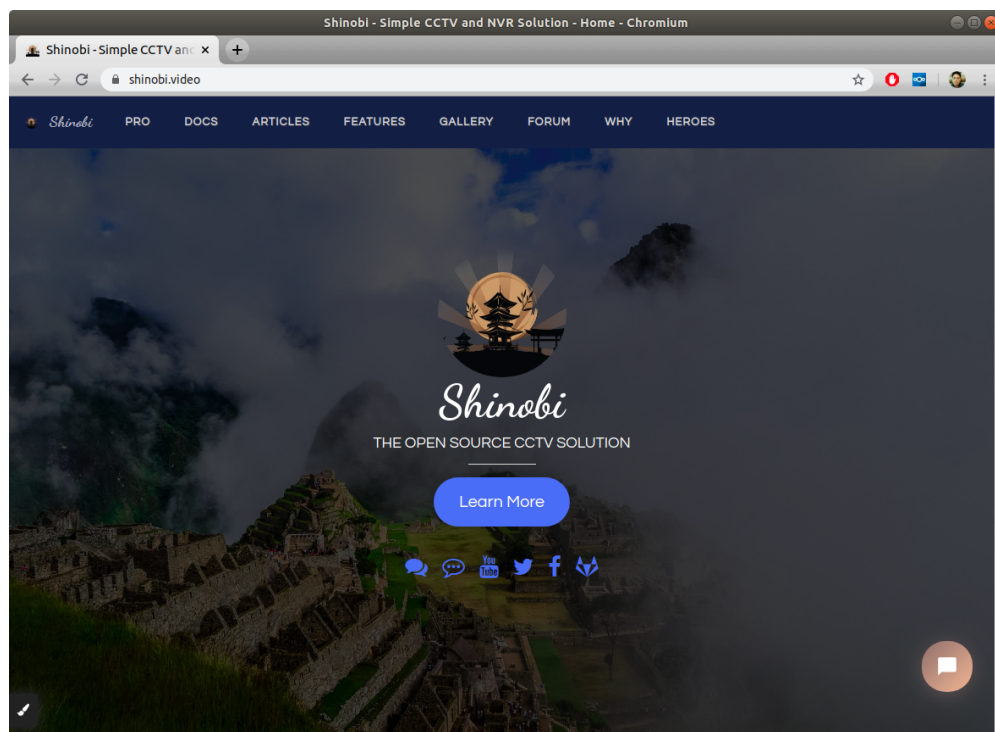
2ip, Inc.

Seoul Korea

NVR 시스템을 직접 만들 수는 없을까? 직접 만들 수 있다면, 아예 NVR에 SPN을 탑재하는 형태는 어떨까? 본 문서는 이러한 질문에 대한 답을 얻기 위해 작성하였다. **[결과론이지만] Intel CPU를 사용하는 경우라면 CPU 성능이 매우 좋아야만 할 것 같다. 제대로된 NVR 장비라면 전용 H/W Decoder가 포함되어 있어 빠른 처리(decoding)가 가능할 텐데, CPU에서 직접 처리(S/W decoding)하는 방식의 경우, CPU 성능이 우수해야 delay가 줄어들 것이다.**

## 1. Shinobi Open Source CCTV Solution

이번절에서는 Shinobi CCTV solution을 소개해 보기로 하겠다.



[그림 1.1] <https://shinobi.video/>

### 1) Shinobi 설치하기

지금 부터는 아래 site의 내용을 참조하여 Ubuntu 18.04 desktop에 Shinobi CCTV solution을 설치해 보도록 하겠다.

*참고: Ubuntu 18.04 server에 설치하는 추후 다시 시도해 보아야 겠다.*

<https://shinobi.video/docs/start>

아래 site도 참조해 보자.

<https://steemit.com/shinobi/@jin5/shinobi-cctv-cctv>

### <The Ninja Way>

\$ **sudo su**

```
root@earth:/home/chyi/workspace/Shinobi# bash <(curl -s  
https://gitlab.com/Shinobi-Systems/Shinobi-Installer/raw/master/shinobi-install.sh)
```

Install Location for Shinobi

\*Note : Default install location is /home

Do you want to install a custom location for Shinobi?

(y)es or (N)o? Default : **No**

Opening Install Location : "/home"

\*-----\*\*-----\*

Install Shinobi CE or Shinobi Pro?

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\*Note : Shinobi Pro is free for personal use.

\*Learn more at <http://shinobi.video/pro>

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(C)E or (P)ro? Default : **Pro**

Install the Development branch?

(y)es or (N)o? Default : **No**

Getting the Master Branch

'Shinobi'에 복제합니다...

remote: Enumerating objects: 5315, done.

remote: Counting objects: 100% (5315/5315), done.

```

remote: Compressing objects: 100% (1658/1658), done.
remote: Total 5315 (delta 3627), reused 5272 (delta 3588)
오브젝트를 받는 중: 100% (5315/5315), 9.55 MiB | 991.00 KiB/s, 완료.
델타를 알아내는 중: 100% (3627/3627), 완료.

-----
----- Shinobi Systems -----
Repository : https://gitlab.com/Shinobi-Systems/Shinobi
Product : Shinobi Professional (Pro)
Branch : master
Version : c943eedddcc441832b82767137816085f5d83443
Date : 2019. 11. 09. (토) 16:36:49 KST

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*-----*

Shinobi Installer
=====
Select your OS
If your OS is not on the list please refer to the docs.
=====
1. Ubuntu
2. CentOS
3. MacOS
4. FreeBSD
5. OpenSUSE
6. CentOS - Quick Install
=====
1
=====
==!! Shinobi : The Open Source CCTV and NVR Solution !!==
=====

To answer yes type the letter (y) in lowercase and press ENTER.
Default is no (N). Skip any components you already have or don't need.
=====
=====

```

Detecting Ubuntu Version

=====

=====

Ubuntu Version: 18

=====

패키지 목록을 읽는 중입니다... 완료

의존성 트리를 만드는 중입니다

상태 정보를 읽는 중입니다... 완료

패키지 sudo는 이미 최신 버전입니다 (1.8.21p2-3ubuntu1.1).

패키지 wget는 이미 최신 버전입니다 (1.19.4-1ubuntu2.2).

다음 패키지가 자동으로 설치되었지만 더 이상 필요하지 않습니다:

libssl-doc

Use 'sudo apt autoremove' to remove it.

0개 업그레이드, 0개 새로 설치, 0개 제거 및 239개 업그레이드 안 함.

패키지 목록을 읽는 중입니다... 완료

의존성 트리를 만드는 중입니다

상태 정보를 읽는 중입니다... 완료

다음 패키지가 자동으로 설치되었지만 더 이상 필요하지 않습니다:

libssl-doc

Use 'sudo apt autoremove' to remove it.

다음의 추가 패키지가 설치될 것입니다 :

python3-dateutil python3-software-properties software-properties-gtk

다음 새 패키지를 설치할 것입니다:

python3-dateutil

다음 패키지를 업그레이드할 것입니다:

python3-software-properties software-properties-common software-properties-gtk

3개 업그레이드, 1개 새로 설치, 0개 제거 및 236개 업그레이드 안 함.

149 k바이트 아카이브를 받아야 합니다.

이 작업 후 316 k바이트의 디스크 공간을 더 사용하게 됩니다.

받기:1 [http://kr.archive.ubuntu.com/ubuntu bionic/main amd64 python3-dateutil all 2.6.1-1 \[52.3 kB\]](http://kr.archive.ubuntu.com/ubuntu bionic/main amd64 python3-dateutil all 2.6.1-1 [52.3 kB])

받기:2 [http://kr.archive.ubuntu.com/ubuntu bionic-updates/main amd64 software-properties-common all 0.96.24.32.11 \[9,996 B\]](http://kr.archive.ubuntu.com/ubuntu bionic-updates/main amd64 software-properties-common all 0.96.24.32.11 [9,996 B])

받기:3 [http://kr.archive.ubuntu.com/ubuntu bionic-updates/main amd64 software-properties-gtk all 0.96.24.32.11 \[62.7 kB\]](http://kr.archive.ubuntu.com/ubuntu bionic-updates/main amd64 software-properties-gtk all 0.96.24.32.11 [62.7 kB])

받기:4 http://kr.archive.ubuntu.com/ubuntu bionic-updates/main amd64 python3-software-properties all  
0.96.24.32.11 [23.6 kB]

내려받기 149 k바이트, 소요시간 4초 (36.0 k바이트/초)

Selecting previously unselected package python3-dateutil.

(데이터베이스 읽는 중 ...현재 251940개의 파일과 디렉터리가 설치되어 있습니다.)

Preparing to unpack .../python3-dateutil\_2.6.1-1\_all.deb ...

Unpacking python3-dateutil (2.6.1-1) ...

Preparing to unpack .../software-properties-common\_0.96.24.32.11\_all.deb ...

Unpacking software-properties-common (0.96.24.32.11) over (0.96.24.32.7) ...

Preparing to unpack .../software-properties-gtk\_0.96.24.32.11\_all.deb ...

Unpacking software-properties-gtk (0.96.24.32.11) over (0.96.24.32.7) ...

Preparing to unpack .../python3-software-properties\_0.96.24.32.11\_all.deb ...

Unpacking python3-software-properties (0.96.24.32.11) over (0.96.24.32.7) ...

Processing triggers for mime-support (3.60ubuntu1) ...

Processing triggers for desktop-file-utils (0.23-1ubuntu3.18.04.2) ...

Processing triggers for libglib2.0-0:amd64 (2.56.4-0ubuntu0.18.04.4) ...

Processing triggers for man-db (2.8.3-2ubuntu0.1) ...

Processing triggers for shared-mime-info (1.9-2) ...

python3-software-properties (0.96.24.32.11) 설정하는 중입니다 ...

Processing triggers for gnome-menus (3.13.3-11ubuntu1.1) ...

Processing triggers for dbus (1.12.2-1ubuntu1.1) ...

Processing triggers for hicolor-icon-theme (0.17-2) ...

python3-dateutil (2.6.1-1) 설정하는 중입니다 ...

software-properties-common (0.96.24.32.11) 설정하는 중입니다 ...

software-properties-gtk (0.96.24.32.11) 설정하는 중입니다 ...

배포판 구성 요소 'universe'은(는) 이미 모든 소스에서 사용할 수 있도록 설정했습니다.

=====

Default Superuser : admin@shinobi.video

Default Password : admin

\* You can edit these settings in "super.json" located in the Shinobi directory.

Node.js Found...

Version : v8.10.0

패키지 목록을 읽는 중입니다... 완료

의존성 트리를 만드는 중입니다

상태 정보를 읽는 중입니다... 완료

패키지 make는 이미 최신 버전입니다 (4.1-9.1ubuntu1).

패키지 zip는 이미 최신 버전입니다 (3.0-11build1).

다음 패키지가 자동으로 설치되었지만 더 이상 필요하지 않습니다:

libssl-doc

Use 'sudo apt autoremove' to remove it.

0개 업그레이드, 0개 새로 설치, 0개 제거 및 236개 업그레이드 안 함.

INSTALL/ubuntu.sh: 57: INSTALL/ubuntu.sh: cannot open 16: No such file

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Shinobi - Installing FFMPEG

패키지 목록을 읽는 중입니다... 완료

의존성 트리를 만드는 중입니다

상태 정보를 읽는 중입니다... 완료

다음 패키지가 자동으로 설치되었지만 더 이상 필요하지 않습니다:

libssl-doc

Use 'sudo apt autoremove' to remove it.

다음의 추가 패키지가 설치될 것입니다 :

libavdevice57 libdc1394-22 libopenal-data libopenal1 libsndl2-2.0-0 libsndio6.1

제안하는 패키지:

ffmpeg-doc libportaudio2 sndiod

다음 새 패키지를 설치할 것입니다:

ffmpeg libavdevice57 libdc1394-22 libopenal-data libopenal1 libsndl2-2.0-0 libsndio6.1

0개 업그레이드, 7개 새로 설치, 0개 제거 및 236개 업그레이드 안 함.

2,512 k바이트 아카이브를 받아야 합니다.

이 작업 후 4,994 k바이트의 디스크 공간을 더 사용하게 됩니다.

받기:1 <http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libdc1394-22 amd64 2.2.5-1> [77.5 kB]

받기:2 <http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libopenal-data all 1:1.18.2-2> [102 kB]

받기:3 <http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libsndio6.1 amd64 1.1.0-3> [23.4 kB]

받기:4 <http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libopenal1 amd64 1:1.18.2-2> [266 kB]

받기:5 <http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 libsndl2-2.0-0 amd64 2.0.8+dfsg1-1ubuntu1.18.04.4> [382 kB]

받기:6 <http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 libavdevice57 amd64 7:3.4.6-0ubuntu0.18.04.1> [75.1 kB]

받기:7 <http://kr.archive.ubuntu.com/ubuntu/bionic-updates/universe/amd64/ffmpeg/amd64/7:3.4.6-0ubuntu0.18.04.1> [1,587 kB]

내려받기 2,512 바이트, 소요시간 12초 (218 바이트/초)

Selecting previously unselected package libdc1394-22:amd64.

(데이터베이스 읽는 중 ...현재 251975개의 파일과 디렉터리가 설치되어 있습니다.)

Preparing to unpack .../0-libdc1394-22\_2.2.5-1\_amd64.deb ...

Unpacking libdc1394-22:amd64 (2.2.5-1) ...

Selecting previously unselected package libopenal-data.

Preparing to unpack .../1-libopenal-data\_1%3a1.18.2-2\_all.deb ...

Unpacking libopenal-data (1:1.18.2-2) ...

Selecting previously unselected package libsndio6.1:amd64.

Preparing to unpack .../2-libsndio6.1\_1.1.0-3\_amd64.deb ...

Unpacking libsndio6.1:amd64 (1.1.0-3) ...

Selecting previously unselected package libopenal1:amd64.

Preparing to unpack .../3-libopenal1\_1%3a1.18.2-2\_amd64.deb ...

Unpacking libopenal1:amd64 (1:1.18.2-2) ...

Selecting previously unselected package libSDL2-2.0-0:amd64.

Preparing to unpack .../4-libSDL2-2.0-0\_2.0.8+dfsg1-1ubuntu1.18.04.4\_amd64.deb ...

Unpacking libSDL2-2.0-0:amd64 (2.0.8+dfsg1-1ubuntu1.18.04.4) ...

Selecting previously unselected package libavdevice57:amd64.

Preparing to unpack .../5-libavdevice57\_7%3a3.4.6-0ubuntu0.18.04.1\_amd64.deb ...

Unpacking libavdevice57:amd64 (7:3.4.6-0ubuntu0.18.04.1) ...

Selecting previously unselected package ffmpeg.

Preparing to unpack .../6-ffmpeg\_7%3a3.4.6-0ubuntu0.18.04.1\_amd64.deb ...

Unpacking ffmpeg (7:3.4.6-0ubuntu0.18.04.1) ...

libdc1394-22:amd64 (2.2.5-1) 설정하는 중입니다 ...

libopenal-data (1:1.18.2-2) 설정하는 중입니다 ...

Processing triggers for libc-bin (2.27-3ubuntu1) ...

Processing triggers for man-db (2.8.3-2ubuntu0.1) ...

libsndio6.1:amd64 (1.1.0-3) 설정하는 중입니다 ...

libSDL2-2.0-0:amd64 (2.0.8+dfsg1-1ubuntu1.18.04.4) 설정하는 중입니다 ...

libopenal1:amd64 (1:1.18.2-2) 설정하는 중입니다 ...

libavdevice57:amd64 (7:3.4.6-0ubuntu0.18.04.1) 설정하는 중입니다 ...

ffmpeg (7:3.4.6-0ubuntu0.18.04.1) 설정하는 중입니다 ...



Processing triggers for libc-bin (2.27-3ubuntu1) ...

=====

Shinobi - Do you want to Install MariaDB? Choose No if you already have it.

(y)es or (N)o

**y**

Shinobi - Installing MariaDB

Password for root SQL user, If you are installing SQL now then you may put anything:

**chy1234**

패키지 목록을 읽는 중입니다... 완료

의존성 트리를 만드는 중입니다

상태 정보를 읽는 중입니다... 완료

다음 패키지가 자동으로 설치되었지만 더 이상 필요하지 않습니다:

libssl-doc

Use 'sudo apt autoremove' to remove it.

다음의 추가 패키지가 설치될 것입니다 :

galera-3 libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libhtml-template-perl libjemalloc1

libreadline5 libterm-readkey-perl mariadb-client-10.1 mariadb-client-core-10.1 mariadb-common

mariadb-server-10.1 mariadb-server-core-10.1 socat

제안하는 패키지:

libmldbm-perl libnet-daemon-perl libsql-statement-perl libipc-sharedcache-perl mailx mariadb-test

tinyca

다음 새 패키지를 설치할 것입니다:

galera-3 libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libhtml-template-perl libjemalloc1

libreadline5 libterm-readkey-perl mariadb-client-10.1 mariadb-client-core-10.1 mariadb-common

mariadb-server mariadb-server-10.1 mariadb-server-core-10.1 socat

0개 업그레이드, 15개 새로 설치, 0개 제거 및 236개 업그레이드 안 함.

22.9 M바이트 아카이브를 받아야 합니다.

이 작업 후 179 M바이트의 디스크 공간을 더 사용하게 됩니다.

받기:1 <http://kr.archive.ubuntu.com/ubuntu/bionic-updates/universe/amd64/mariadb-common/all>  
1:10.1.41-0ubuntu0.18.04.1 [16.1 kB]

받기:2 <http://kr.archive.ubuntu.com/ubuntu/bionic/universe/amd64/galera-3/amd64/25.3.20-1> [947 kB]

받기:3 <http://kr.archive.ubuntu.com/ubuntu/bionic/main/amd64/libdbi-perl/amd64/1.640-1> [724 kB]

받기:4 <http://kr.archive.ubuntu.com/ubuntu/bionic/main/amd64/libconfig-inifiles-perl/all/2.94-1> [40.4 kB]

```

받기:5 http://kr.archive.ubuntu.com/ubuntu bionic/main amd64 libreadline5 amd64 5.2+dfsg-3build1 [99.5
kB]
받기:6 http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 mariadb-client-core-10.1 amd64
1:10.1.41-0ubuntu0.18.04.1 [4,764 kB]
받기:7 http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libjemalloc1 amd64 3.6.0-11 [82.4 kB]
받기:8 http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 mariadb-client-10.1 amd64
1:10.1.41-0ubuntu0.18.04.1 [5,637 kB]
받기:9 http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 mariadb-server-core-10.1
amd64 1:10.1.41-0ubuntu0.18.04.1 [4,948 kB]
받기:10 http://kr.archive.ubuntu.com/ubuntu bionic/main amd64 socat amd64 1.7.3.2-2ubuntu2 [342 kB]
받기:11 http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 mariadb-server-10.1 amd64
1:10.1.41-0ubuntu0.18.04.1 [5,097 kB]
받기:12 http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libdbd-mysql-perl amd64 4.046-1 [82.0
kB]
받기:13 http://kr.archive.ubuntu.com/ubuntu bionic/main amd64 libhtml-template-perl all 2.97-1 [59.0 kB]
받기:14 http://kr.archive.ubuntu.com/ubuntu bionic/universe amd64 libterm-readkey-perl amd64
2.37-1build1 [24.4 kB]
받기:15 http://kr.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 mariadb-server all
1:10.1.41-0ubuntu0.18.04.1 [12.9 kB]
내려받기 22.9 M바이트, 소요 시간 27초 (845 k바이트/초)
패키지를 미리 설정하는 중입니다...
Selecting previously unselected package mariadb-common.
(데이터베이스 읽는중 ...현재 252050개의 파일과 디렉터리가 설치되어 있습니다.)
Preparing to unpack .../0-mariadb-common_1%3a10.1.41-0ubuntu0.18.04.1_all.deb ...
Unpacking mariadb-common (1:10.1.41-0ubuntu0.18.04.1) ...
Selecting previously unselected package galera-3.
Preparing to unpack .../1-galera-3_25.3.20-1_amd64.deb ...
Unpacking galera-3 (25.3.20-1) ...
Selecting previously unselected package libdbi-perl.
Preparing to unpack .../2-libdbi-perl_1.640-1_amd64.deb ...
Unpacking libdbi-perl (1.640-1) ...
Selecting previously unselected package libconfig-inifiles-perl.
Preparing to unpack .../3-libconfig-inifiles-perl_2.94-1_all.deb ...
Unpacking libconfig-inifiles-perl (2.94-1) ...
Selecting previously unselected package libreadline5:amd64.
Preparing to unpack .../4-libreadline5_5.2+dfsg-3build1_amd64.deb ...

```

Unpacking libreadline5:amd64 (5.2+dfsg-3build1) ...  
Selecting previously unselected package mariadb-client-core-10.1.  
Preparing to unpack .../5-mariadb-client-core-10.1\_1%3a10.1.41-0ubuntu0.18.04.1\_amd64.deb ...  
Unpacking mariadb-client-core-10.1 (1:10.1.41-0ubuntu0.18.04.1) ...  
Selecting previously unselected package libjemalloc1.  
Preparing to unpack .../6-libjemalloc1\_3.6.0-11\_amd64.deb ...  
Unpacking libjemalloc1 (3.6.0-11) ...  
Selecting previously unselected package mariadb-client-10.1.  
Preparing to unpack .../7-mariadb-client-10.1\_1%3a10.1.41-0ubuntu0.18.04.1\_amd64.deb ...  
Unpacking mariadb-client-10.1 (1:10.1.41-0ubuntu0.18.04.1) ...  
Selecting previously unselected package mariadb-server-core-10.1.  
Preparing to unpack .../8-mariadb-server-core-10.1\_1%3a10.1.41-0ubuntu0.18.04.1\_amd64.deb ...  
Unpacking mariadb-server-core-10.1 (1:10.1.41-0ubuntu0.18.04.1) ...  
Selecting previously unselected package socat.  
Preparing to unpack .../9-socat\_1.7.3.2-2ubuntu2\_amd64.deb ...  
Unpacking socat (1.7.3.2-2ubuntu2) ...  
mariadb-common (1:10.1.41-0ubuntu0.18.04.1) 설정하는 중입니다 ...  
update-alternatives: using /etc/mysql/mariadb.cnf to provide /etc/mysql/my.cnf (my.cnf) in auto mode  
Selecting previously unselected package mariadb-server-10.1.  
(데이터베이스 읽는 중 ...현재 252421개의 파일과 디렉터리가 설치되어 있습니다.)  
Preparing to unpack .../mariadb-server-10.1\_1%3a10.1.41-0ubuntu0.18.04.1\_amd64.deb ...  
Unpacking mariadb-server-10.1 (1:10.1.41-0ubuntu0.18.04.1) ...  
Selecting previously unselected package libdbd-mysql-perl.  
Preparing to unpack .../libdbd-mysql-perl\_4.046-1\_amd64.deb ...  
Unpacking libdbd-mysql-perl (4.046-1) ...  
Selecting previously unselected package libhtml-template-perl.  
Preparing to unpack .../libhtml-template-perl\_2.97-1\_all.deb ...  
Unpacking libhtml-template-perl (2.97-1) ...  
Selecting previously unselected package libterm-readkey-perl.  
Preparing to unpack .../libterm-readkey-perl\_2.37-1build1\_amd64.deb ...  
Unpacking libterm-readkey-perl (2.37-1build1) ...  
Selecting previously unselected package mariadb-server.  
Preparing to unpack .../mariadb-server\_1%3a10.1.41-0ubuntu0.18.04.1\_all.deb ...  
Unpacking mariadb-server (1:10.1.41-0ubuntu0.18.04.1) ...


```

libconfig-inifiles-perl (2.94-1) 설정하는 중입니다 ...
libhtml-template-perl (2.97-1) 설정하는 중입니다 ...
Processing triggers for ureadahead (0.100.0-20) ...
libjemalloc1 (3.6.0-11) 설정하는 중입니다 ...
socat (1.7.3.2-2ubuntu2) 설정하는 중입니다 ...
libterm-readkey-perl (2.37-1build1) 설정하는 중입니다 ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
galera-3 (25.3.20-1) 설정하는 중입니다 ...
Processing triggers for systemd (237-3ubuntu10.29) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
libreadline5:amd64 (5.2+dfsg-3build1) 설정하는 중입니다 ...
libdbi-perl (1.640-1) 설정하는 중입니다 ...
mariadb-server-core-10.1 (1:10.1.41-0ubuntu0.18.04.1) 설정하는 중입니다 ...
mariadb-client-core-10.1 (1:10.1.41-0ubuntu0.18.04.1) 설정하는 중입니다 ...
libdbd-mysql-perl (4.046-1) 설정하는 중입니다 ...
mariadb-client-10.1 (1:10.1.41-0ubuntu0.18.04.1) 설정하는 중입니다 ...
mariadb-server-10.1 (1:10.1.41-0ubuntu0.18.04.1) 설정하는 중입니다 ...
Created symlink /etc/systemd/system/mysql.service → /lib/systemd/system/mariadb.service.
Created symlink /etc/systemd/system/mysqld.service → /lib/systemd/system/mariadb.service.
Created symlink /etc/systemd/system/multi-user.target.wants/mariadb.service →
/lib/systemd/system/mariadb.service.
mariadb-server (1:10.1.41-0ubuntu0.18.04.1) 설정하는 중입니다 ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
Processing triggers for systemd (237-3ubuntu10.29) ...
Processing triggers for ureadahead (0.100.0-20) ...
=====

Shinobi - Database Installation
(y)es or (N)o
y
=====

Shinobi - Install NPM Libraries
/usr/local/bin/npx -> /usr/local/lib/node_modules/npm/bin/npx-cli.js
/usr/local/bin/npm -> /usr/local/lib/node_modules/npm/bin/npm-cli.js
/usr/local/lib

```




```
|— ansi-regex@2.1.1
|— aproba@2.0.0
|— aws4@1.8.0
|— bin-links@1.1.3
|— bluebird@3.5.5
|— byte-size@5.0.1
|—T cacache@12.0.3
|  |— y18n@4.0.0
|— call-limit@1.1.1
|— chownr@1.1.3
|— ci-info@2.0.0
|—T cli-table3@0.5.1
|  |— colors@1.3.3
|  |— object-assign@4.1.1
|  |—T string-width@2.1.1
|    |— is-fullwidth-code-point@2.0.0
|    |—T strip-ansi@4.0.0
|      |— ansi-regex@3.0.0
|— cmd-shim@3.0.3
|—T config-chain@1.1.12
|  |— proto-list@1.2.4
|— extend@3.0.2
|— figgy-pudding@3.5.1
|—T gentle-fs@2.2.1
|  |— aproba@1.2.0
|  |— iferr@0.1.5
|—T get-stream@4.1.0
|  |— pump@3.0.0
|—T glob@7.1.4
|  |— fs.realpath@1.0.0
|  |—T minimatch@3.0.4
|    |—T brace-expansion@1.1.11
|    |  |— balanced-match@1.0.0
|    |  |— concat-map@0.0.1
```



```
|   └── path-is-absolute@1.0.1
|── graceful-fs@4.2.3
|── hosted-git-info@2.8.5
|── iferr@1.0.2
|── infer-owner@1.0.4
|── inherits@2.0.4
|── is-cidr@3.0.0
|   └── cidr-regex@2.0.10
|   └── ip-regex@2.1.0
|── is-fullwidth-code-point@1.0.0
|   └── number-is-nan@1.0.1
|── JSONStream@1.3.5
|   └── jsonparse@1.3.1
|   └── through@2.3.8
|── libcipm@4.0.7
|   └── npm-logical-tree@1.2.1
|── libnpm@3.0.1
|   └── libnpmconfig@1.2.1
|       └── find-up@3.0.0
|           └── locate-path@3.0.0
|               └── p-locate@3.0.0
|                   └── p-limit@2.2.0
|                       └── p-try@2.2.0
|                   └── path-exists@3.0.0
|       └── libnpmpublish@1.1.2
|── libnpmaccess@3.0.2
|── libnpmhook@5.0.3
|── libnpmorg@1.0.1
|── libnpmsearch@2.0.2
|── libnpmteam@1.0.2
|── lock-verify@2.1.0
|── lru-cache@5.1.1
|   └── yallist@3.0.3
|── make-fetch-happen@5.0.0
```



```
| ├── agentkeepalive@3.5.2
| | └── humanize-ms@1.2.1
| |   └── ms@2.1.1
| ├── http-cache-semantics@3.8.1
| ├── http-proxy-agent@2.1.0
| | ├── agent-base@4.3.0
| | | └── es6-promisify@5.0.0
| | |   └── es6-promise@4.2.8
| | └── debug@3.1.0
| |   └── ms@2.0.0
| ├── https-proxy-agent@2.2.2
| ├── node-fetch-npm@2.0.2
| | └── encoding@0.1.12
| |   └── iconv-lite@0.4.23
| ├── promise-retry@1.1.1
| | ├── err-code@1.1.2
| | └── retry@0.10.1
| └── socks-proxy-agent@4.0.2
|   ├── agent-base@4.2.1
|   └── socks@2.3.2
|     ├── ip@1.1.5
|     └── smart-buffer@4.0.2
└── mime-types@2.1.19
  └── mime-db@1.35.0
└── node-gyp@5.0.5
  ├── env-paths@1.0.0
  ├── nopt@3.0.6
  └── semver@5.3.0
└── normalize-package-data@2.5.0
  ├── resolve@1.10.0
  └── path-parse@1.0.6
└── npm@6.13.0
  ├── abbrev@1.1.1
  └── ansicolors@0.3.2
```




```
| |—— ansistyles@0.1.3
| |—— archy@1.0.0
| |—— cli-columns@3.1.2
| |——┐ columnify@1.5.4
| |  └┐ wcwidth@1.0.1
| |  └┐ defaults@1.0.3
| |    └—— clone@1.0.4
| |—— debuglog@1.0.1
| |—— detect-indent@5.0.0
| |—— detect-newline@2.1.0
| |——┐ dezaigo@1.0.3
| |  |——┐ asap@2.0.6
| |  └——┐ wrappy@1.0.2
| |—— editor@1.0.0
| |—— find-npm-prefix@1.0.2
| |—— fs-vacuum@1.2.10
| |——┐ fs-write-stream-atomic@1.0.10
| |  |——┐ iferr@0.1.5
| |  └┐ readable-stream@2.3.6
| |  |——┐ core-util-is@1.0.2
| |  |——┐ isarray@1.0.0
| |  |——┐ process-nextick-args@2.0.0
| |  └┐ string_decoder@1.1.1
| |—— has-unicode@2.0.1
| |—— imurmurhash@0.1.4
| |—— inflight@1.0.6
| |—— ini@1.3.5
| |——┐ init-package-json@1.10.3
| |  └┐ promzard@0.3.0
| |—— json-parse-better-errors@1.0.2
| |—— lazy-property@1.0.0
| |——┐ libnpx@10.2.0
| |  |——┐ dotenv@5.0.1
| |  └┐ yargs@11.0.0
```







```
| | └─ cliui@4.1.0
| | └─ strip-ansi@4.0.0
| | └─ ansi-regex@3.0.0
| | └─ wrap-ansi@2.1.0
| | └─ string-width@1.0.2
| | └─ decamelize@1.2.0
| | └─ find-up@2.1.0
| | └─ locate-path@2.0.0
| | └─ p-locate@2.0.0
| | └─ p-limit@1.2.0
| | └─ p-try@1.0.0
| | └─ get-caller-file@1.0.2
| | └─ os-locale@2.1.0
| | └─ execa@0.7.0
| | └─ cross-spawn@5.1.0
| | └─ lru-cache@4.1.5
| | └─ pseudomap@1.0.2
| | └─ yallist@2.1.2
| | └─ shebang-command@1.2.0
| | └─ shebang-regex@1.0.0
| | └─ get-stream@3.0.0
| | └─ is-stream@1.1.0
| | └─ npm-run-path@2.0.2
| | └─ path-key@2.0.1
| | └─ p-finally@1.0.0
| | └─ strip-eof@1.0.0
| | └─ lcid@1.0.0
| | └─ invert-kv@1.0.0
| | └─ mem@1.1.0
| | └─ mimic-fn@1.2.0
| | └─ require-directory@2.1.1
| | └─ require-main-filename@1.0.1
| | └─ which-module@2.0.0
| | └─ y18n@3.2.1
```



```
| | └─ yargs-parser@9.0.2
| └─ lockfile@1.0.4
| └─ lodash._baseindexof@3.1.0
| └─ lodash._baseuniq@4.6.0
| | └─ lodash._createset@4.0.3
| | └─ lodash._root@3.0.1
| └─ lodash._bindcallback@3.0.1
| └─ lodash._cacheindexof@3.0.2
| └─ lodash._createcache@3.1.2
| └─ lodash._getnative@3.9.1
| └─ lodash.clonedeep@4.5.0
| └─ lodash.restparam@3.6.1
| └─ lodash.union@4.6.0
| └─ lodash.uniq@4.5.0
| └─ lodash.without@4.4.0
| └─ meant@1.0.1
| └─ mississippi@3.0.0
| | └─ concat-stream@1.6.2
| | | └─ buffer-from@1.0.0
| | | └─ readable-stream@2.3.6
| | | | └─ string_decoder@1.1.1
| | | └─ typedarray@0.0.6
| | └─ duplexify@3.6.0
| | | └─ readable-stream@2.3.6
| | | | └─ string_decoder@1.1.1
| | | └─ stream-shift@1.0.0
| | └─ end-of-stream@1.4.1
| | └─ flush-write-stream@1.0.3
| | | └─ readable-stream@2.3.6
| | | └─ string_decoder@1.1.1
| | └─ from2@2.3.0
| | | └─ readable-stream@2.3.6
| | | └─ string_decoder@1.1.1
| | └─ parallel-transform@1.1.0
```




```
| | | └── cyclist@0.2.2
| | | └── readable-stream@2.3.6
| | | └── string_decoder@1.1.1
| | └── pumpify@1.5.1
| | | └── pump@2.0.1
| | └── stream-each@1.2.2
| | └── through2@2.0.3
| | └── readable-stream@2.3.6
| | | └── string_decoder@1.1.1
| | └── xtend@4.0.1
| └── mkdirp@0.5.1
| | └── minimist@0.0.8
| └── move-concurrently@1.0.1
| | └── aproba@1.2.0
| | └── copy-concurrently@1.0.5
| | | └── aproba@1.2.0
| | | └── iferr@0.1.5
| | └── run-queue@1.0.3
| | └── aproba@1.2.0
| └── nopt@4.0.1
| └── npm-cache-filename@1.0.2
| └── npm-user-validate@1.0.0
| └── npmlog@4.1.2
| | └── are-we-there-yet@1.1.4
| | | └── delegates@1.0.0
| | | └── readable-stream@2.3.6
| | | └── string_decoder@1.1.1
| | └── gauge@2.7.4
| | | └── aproba@1.2.0
| | | └── string-width@1.0.2
| | | | └── code-point-at@1.1.0
| | | └── wide-align@1.1.2
| | | └── string-width@1.0.2
| | └── set-blocking@2.0.0
```




```
| |—— once@1.4.0
| |——┐ osenv@0.1.5
| | |—— os-homedir@1.0.2
| | |——┐ os-tmpdir@1.0.2
| |—— path-is-inside@1.0.2
| |—— promise-inflight@1.0.1
| |—— qrcode-terminal@0.12.0
| |—— qw@1.0.1
| |——┐ read@1.0.7
| | |——┐ mute-stream@0.0.7
| |——┐ read-installed@4.0.3
| | |——┐ util-extend@1.0.3
| |—— retry@0.12.0
| |—— safe-buffer@5.1.2
| |—— slide@1.1.6
| |—— sorted-object@2.0.1
| |——┐ sorted-union-stream@2.1.3
| | |——┐ from2@1.3.0
| | | |——┐ readable-stream@1.1.14
| | | |——┐ isarray@0.0.1
| | | |——┐ string_decoder@0.10.31
| | |——┐ stream-iterate@1.2.0
| | |——┐ readable-stream@2.3.6
| | |——┐ string_decoder@1.1.1
| |—— text-table@0.2.0
| |—— tiny-relative-date@1.3.0
| |—— uid-number@0.0.6
| |—— umask@1.1.0
| |—— unpipe@1.0.0
| |——┐ update-notifier@2.5.0
| | |——┐ boxen@1.3.0
| | | |——┐ ansi-align@2.0.0
| | | |——┐ camelcase@4.1.0
| | | |——┐ cli-boxes@1.0.0
```




```
| | | └── term-size@1.2.0
| | | └── widest-line@2.0.0
| | └── chalk@2.4.1
| | └── ansi-styles@3.2.1
| | | └── color-convert@1.9.1
| | | └── color-name@1.1.3
| | └── escape-string-regexp@1.0.5
| | └── supports-color@5.4.0
| | └── has-flag@3.0.0
| └── configstore@3.1.2
| └── dot-prop@4.2.0
| | └── is-obj@1.0.1
| └── make-dir@1.3.0
| | └── pify@3.0.0
| └── unique-string@1.0.0
| └── crypto-random-string@1.0.0
| └── import-lazy@2.1.0
| └── is-ci@1.1.0
| | └── ci-info@1.6.0
| └── is-installed-globally@0.1.0
| └── global-dirs@0.1.1
| └── is-path-inside@1.0.1
| └── is-npm@1.0.0
| └── latest-version@3.1.0
| └── package-json@4.0.1
| └── got@6.7.1
| | └── create-error-class@3.0.2
| | | └── capture-stack-trace@1.0.0
| | └── duplexer3@0.1.4
| | └── get-stream@3.0.0
| | └── is-redirect@1.0.0
| | └── is-retry-allowed@1.1.0
| | └── lowercase-keys@1.0.1
| | └── timed-out@4.0.1
```



```
| | | | |—— unzip-response@2.0.1
| | | | |—— url-parse-lax@1.0.0
| | | | |—— prepend-http@1.0.4
| | | |—— registry-auth-token@3.3.2
| | | | |—— rc@1.2.7
| | | | |—— deep-extend@0.5.1
| | | | |—— minimist@1.2.0
| | | | |—— strip-json-comments@2.0.1
| | | |—— registry-url@3.1.0
| | |—— semver-diff@2.1.0
| | |—— xdg-basedir@3.0.0
| |—— validate-npm-package-name@3.0.0
| |—— builtins@1.0.3
|—— npm-audit-report@1.3.2
| |—— console-control-strings@1.1.0
|—— npm-install-checks@3.0.2
|—— npm-lifecycle@3.1.4
| |—— byline@5.0.0
| |—— resolve-from@4.0.0
|—— npm-package-arg@6.1.1
|—— npm-packlist@1.4.6
| |—— ignore-walk@3.0.3
| |—— npm-bundled@1.0.6
|—— npm-pick-manifest@3.0.2
|—— npm-profile@4.0.2
|—— npm-registry-fetch@4.0.2
| |—— safe-buffer@5.2.0
|—— opener@1.5.1
|—— pacote@9.5.9
| |—— minipass@2.9.0
| |—— protoduck@5.0.1
| |—— genfun@5.0.0
|—— query-string@6.8.2
|—— decode-uri-component@0.2.0
```



```
| |─── split-on-first@1.1.0
| |─── strict-uri-encode@2.0.0
|─── read-cmd-shim@1.0.5
|─── read-package-json@2.1.0
| |─── slash@1.0.0
|─── read-package-tree@5.3.1
| |─── util-promisify@2.1.0
| |─── object.getownpropertydescriptors@2.0.3
| |─── define-properties@1.1.3
| | |─── object-keys@1.0.12
| | |─── es-abstract@1.12.0
| | |─── es-to-primitive@1.2.0
| | | |─── is-date-object@1.0.1
| | | |─── is-symbol@1.0.2
| | | |─── has-symbols@1.0.0
| | |─── function-bind@1.1.1
| | |─── has@1.0.3
| | |─── is-callable@1.1.4
| | |─── is-regex@1.0.4
|─── readable-stream@3.4.0
| |─── string_decoder@1.2.0
| |─── util-deprecate@1.0.2
|─── readdir-scoped-modules@1.1.0
|─── request@2.88.0
| |─── aws-sign2@0.7.0
| |─── caseless@0.12.0
| |─── combined-stream@1.0.6
| | |─── delayed-stream@1.0.0
| |─── forever-agent@0.6.1
| |─── form-data@2.3.2
| | |─── asynckit@0.4.0
| |─── har-validator@5.1.0
| | |─── ajv@5.5.2
| | | |─── co@4.6.0
```



```
| | | |— fast-deep-equal@1.1.0
| | | |— fast-json-stable-stringify@2.0.0
| | | |— json-schema-traverse@0.3.1
| | |— har-schema@2.0.0
| |— http-signature@1.2.0
| | |— assert-plus@1.0.0
| | |— jsprim@1.4.1
| | | |— extsprintf@1.3.0
| | | |— json-schema@0.2.3
| | | |— verror@1.10.0
| | |— sshpk@1.14.2
| | |— asn1@0.2.4
| | |— bcrypt-pbkdf@1.0.2
| | |— dashdash@1.14.1
| | |— ecc-jsbn@0.1.2
| | |— getpass@0.1.7
| | |— jsbn@0.1.1
| | |— safer-buffer@2.1.2
| | |— tweetnacl@0.14.5
| |— is-typedarray@1.0.0
| |— isstream@0.1.2
| |— json-stringify-safe@5.0.1
| |— oauth-sign@0.9.0
| |— performance-now@2.1.0
| |— qs@6.5.2
| |— tough-cookie@2.4.3
| | |— psl@1.1.29
| | |— punycode@1.4.1
| |— tunnel-agent@0.6.0
|— rimraf@2.6.3
|— semver@5.7.1
|— sha@3.0.0
|— spdx-license-ids@3.0.3
|— ssri@6.0.1
```



```

├── stringify-package@1.0.1
├── strip-ansi@3.0.1
├── tar@4.4.13
│   ├── fs-minipass@1.2.7
│   │   └── minipass@2.9.0
│   ├── minipass@2.9.0
│   │   └── minizlib@1.3.3
│   └── minipass@2.9.0
├── unique-filename@1.1.1
│   └── unique-slug@2.0.0
├── uuid@3.3.3
├── validate-npm-package-license@3.0.4
│   ├── spdx-correct@3.0.0
│   └── spdx-expression-parse@3.0.0
│       └── spdx-exceptions@2.1.0
├── which@1.3.1
│   └── isexe@2.0.0
├── worker-farm@1.7.0
│   ├── errno@0.1.7
│   └── prr@1.0.1
├── write-file-atomic@2.4.3
└── signal-exit@3.0.2

```

npm WARN deprecated snekfetch@3.6.4: use node-fetch instead

> dtrace-provider@0.8.8 install /home/Shinobi/node\_modules/dtrace-provider

> node-gyp rebuild || node suppress-error.js

make: 디렉터리 '/home/Shinobi/node\_modules/dtrace-provider/build' 들어감

TOUCH Release/obj.target/DTraceProviderStub.stamp

make: 디렉터리 '/home/Shinobi/node\_modules/dtrace-provider/build' 나감

npm notice created a lockfile as package-lock.json. You should commit this file.

npm WARN notsup Unsupported engine for backblaze-b2@1.5.0: wanted: {"node": ">=10.0"} (current: {"node": "8.10.0", "npm": "6.13.0"})

```
npm WARN notsup Not compatible with your version of node/npm: backblaze-b2@1.5.0
npm WARN discord.js@11.5.1 requires a peer of @discordjs/ua@^10.149.0 but none is installed. You must
install peer dependencies yourself.
npm WARN shinobi@2.0.0 No license field.

added 503 packages from 474 contributors and audited 1724 packages in 14.858s

2 packages are looking for funding.
Run "npm fund" to find out more.
npm WARN using --force I sure hope you know what you are doing.
npm WARN discord.js@11.5.1 requires a peer of @discordjs/ua@^10.149.0 but none is installed. You must
install peer dependencies yourself.
npm WARN shinobi@2.0.0 No license field.

up to date in 1.444s

2 packages are looking for funding.
Run "npm fund" to find out more.
fixed 0 of 0 vulnerabilities in 1724 scanned packages
=====
Shinobi - Install PM2
npm WARN deprecated coffee-script@1.12.7: CoffeeScript on NPM has moved to "coffeescript" (no hyphen)
npm WARN deprecated fsevents@1.2.9: One of your dependencies needs to upgrade to fsevents v2: 1)
Proper nodejs v10+ support 2) No more fetching binaries from AWS, smaller package size
/usr/local/bin/pm2-dev -> /usr/local/lib/node_modules/pm2/bin/pm2-dev
/usr/local/bin/pm2 -> /usr/local/lib/node_modules/pm2/bin/pm2
/usr/local/bin/pm2-docker -> /usr/local/lib/node_modules/pm2/bin/pm2-docker
/usr/local/bin/pm2-runtime -> /usr/local/lib/node_modules/pm2/bin/pm2-runtime
npm WARN optional SKIPPING OPTIONAL DEPENDENCY: fsevents@1.2.9
(node_modules/pm2/node_modules/fsevents):
npm WARN notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@1.2.9: wanted
{"os":"darwin","arch":"any"} (current: {"os":"linux","arch":"x64"})

+ pm2@3.0.0
added 310 packages from 252 contributors in 10.869s
```

```

Shinobi - Finished
INSTALL/ubuntu.sh: 112: INSTALL/ubuntu.sh: dos2unix: not found
Shinobi - Start Shinobi and set to start on boot?
(y)es or (N)o
n ← 애는 다음 번에는 y를 선택하도록 하자.
=====
| |==== Install Completed ====| |
=====
| | Login with the Superuser and create a new user!!
| |=====
| | Open http://172.30.1.14:8080/super in your web browser.
| |=====
| | Default Superuser : admin@shinobi.video
| | Default Password : admin
=====
=====

```

참고: "Ubuntu : The Easier Way"를 사용하면 Ubuntu 18.04 server에서도 설치 가능할 것으로 보인다. 추후 시도해 보기로 하자.

## 2) Shinobi 시작하기

주의: 설치 시, 자동으로 시작하도록 한 경우에는 아래 명령을 수행할 필요가 없다.

**\$ cd /home/Shinobi**

chyi@earth:/home/Shinobi\$ **sudo pm2 start camera.js**

```

[PM2] Starting /home/Shinobi/camera.js in fork_mode (1 instance)
[PM2] Done.

```

App name	id	mode	pid	status	restart	uptime	cpu	mem	user	watching
camera	0	fork	5210	online	0	0s	0%	15.9 MB	root	disabled

Use `pm2 show <id|name>` to get more details about an app

**\$ sudo pm2 start cron.js**

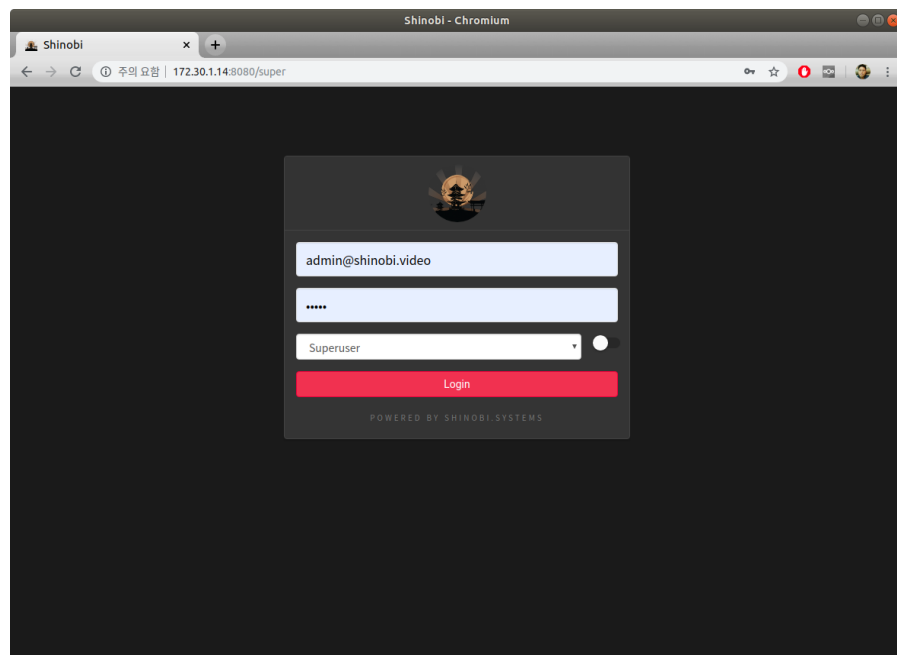
[PM2] Starting /home/Shinobi/cron.js in fork\_mode (1 instance)  
[PM2] Done.

App name	id	mode	pid	status	restart	uptime	cpu	mem	user	watching
camera	0	fork	5210	online	0	15s	0%	63.1 MB	root	disabled
cron	1	fork	5272	online	0	0s	0%	14.7 MB	root	disabled

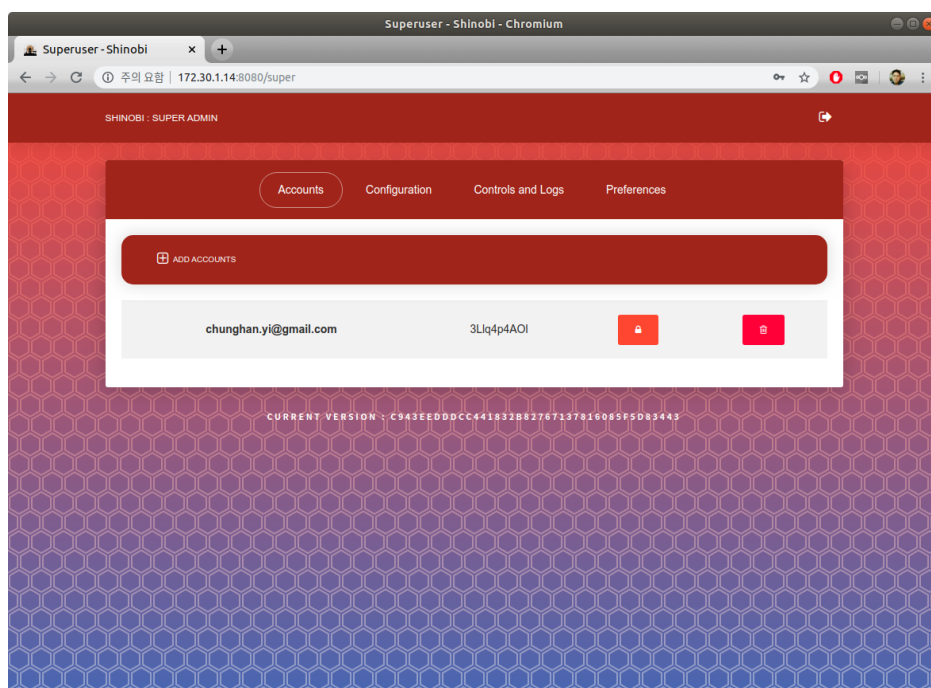
Use `pm2 show <id|name>` to get more details about an app

chyi@earth:/home/Shinobi\$ **ps aux|grep node**

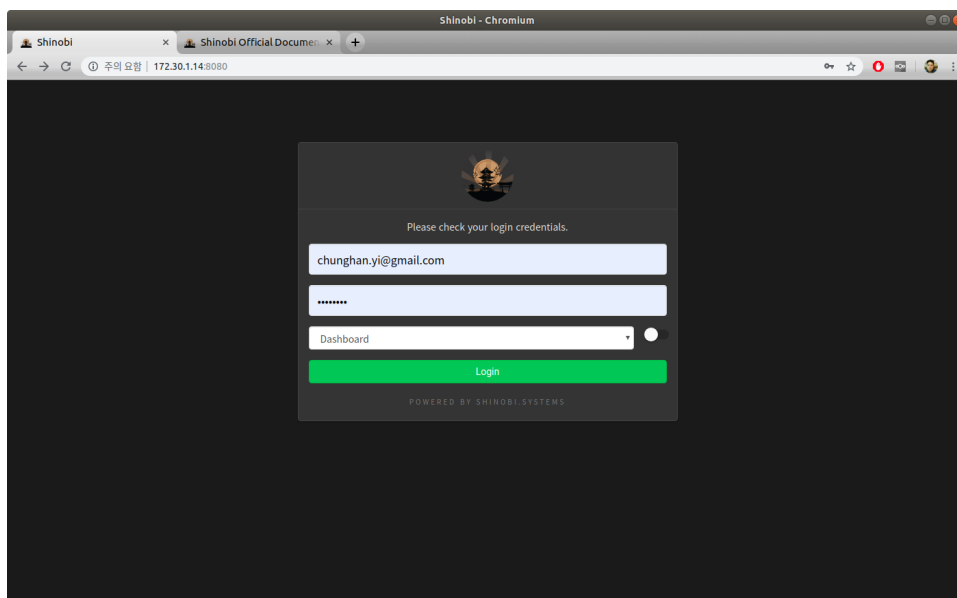
```
root    5210  7.7  0.8 1082564 64860 ?        Ssl  16:03   0:01 node /home/Shinobi/camera.js
root    5272 57.0  0.6 1046692 49112 ?        Ssl  16:03   0:00 node /home/Shinobi/cron.js
chyi    5306  0.0  0.0 22820 1104 pts/0    S+   16:03   0:00 grep --color=auto node
```



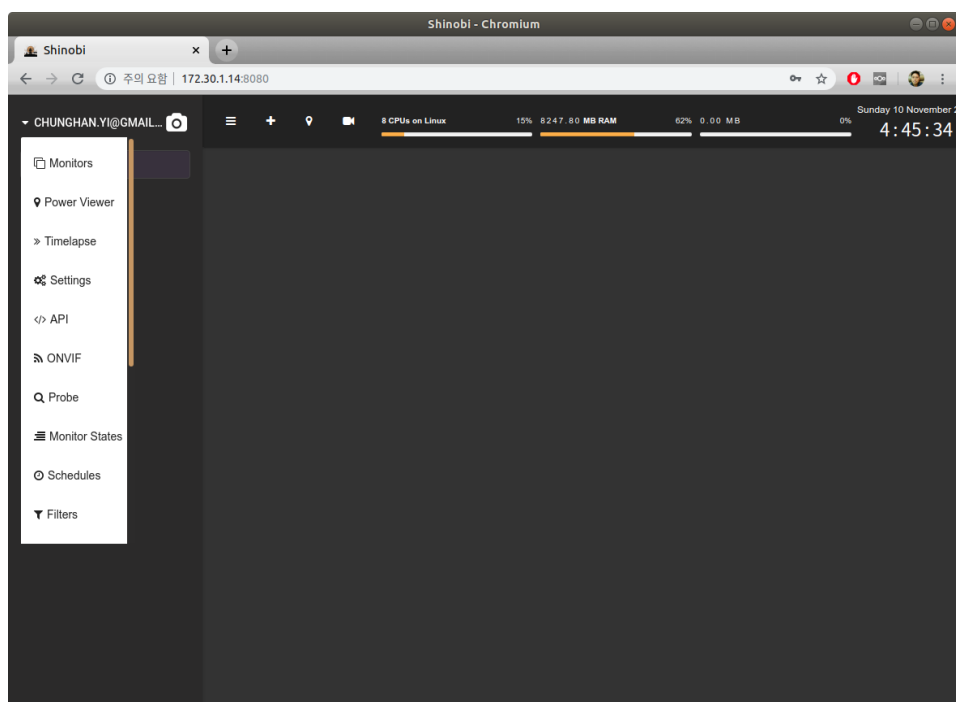
[그림 1.2] Shinobi 초기 화면



[그림 1.3] Shinobi 사용자 추가 화면



[그림 1.4] Shinobi 사용자 로그인 화면 - Dashboard(1)



[그림 1.5] Shinobi 사용자 로그인 화면 - Dashboard(2)

### 3) IP Camera 연결하기

IP 카메라를 연결하고, [그림 1.5] 좌측의 ONVIF 메뉴를 선택하여 아래 정보를 입력하도록 하자(화면 capture는 나중에 하기로 함).

ip : **192.168.8.243**

Onvif port : **62003** ⇐ 이걸 IP camera 설정을 참조해야 함.

User: **admin**

Password: **\*\*\*\*\*** ⇐ ex) qwer1234

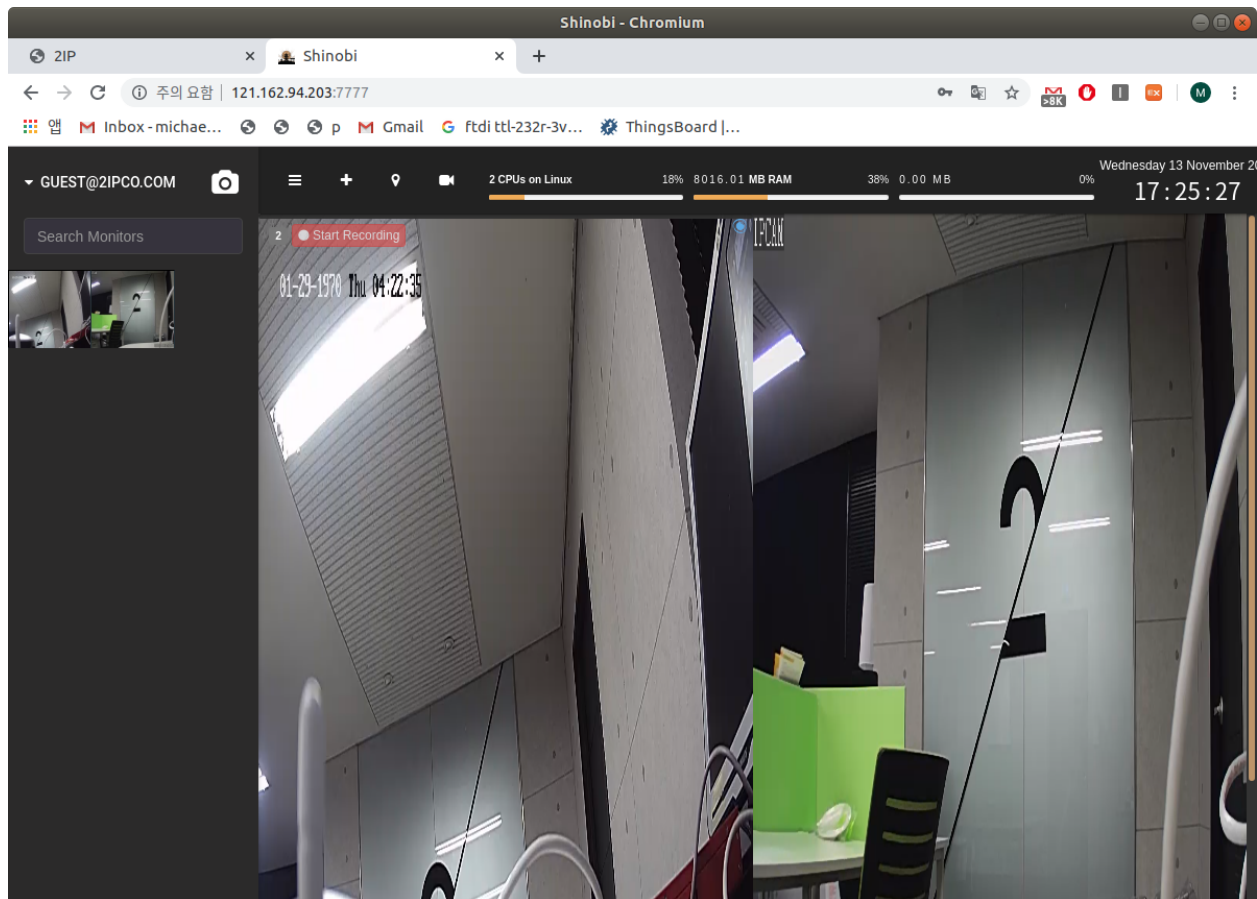
이후, Search 버튼을 누르면, ONVIF 검색이 시작되고, 우측에 RTSP 연결 정보 등이 출력될 것이다.

이 상태에서 해당 내용(우측 정보)을 선택하면 영상이 출력되게 된다.

<RTSP 연결 정보 예>

rtsp://admin:qwer1234@192.168.8.243:10554/Streaming/Channels/101

<TBD> 위의 내용에 해당하는 화면을 capture해야 함.



[그림 1.6] Shinobi를 이용한 IP Camera Demo

#### 4) 문제점

정상 동작한다. 어라, **근데 좀 느리다**. CPU 사용량을 살펴 보니, 100%를 넘어간다. 왜 그럴까 ? 이유는 간단하다. H.264 or H.265 Codec으로 encoding된 내용을 RTSP를 통해 내려 받은 후, decoding하는 과정에서 H/W decoder를 이용하는게 아니라, 전적으로 CPU power에 의존하여 S/W 적으로 decoding하기 때문이다. 테스트에 사용한 NVR 장비(spnbox-1200)의 CPU는 Intel Celeron이다. 따라서 Shinobi를 사용하여 제대로된 NVR 장비로 동작하기 위해서는 CPU가 보다 뽕뽕해야 할 것 같다.

## 2. NVRBox 만들기

Intel NUC Hades(Intel Core i7)를 기반으로 NVRBox를 만들어 보기로 하자.

### 1) NVR Box

<TBD>

### 2) SPN 탑재

<TBD>

