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SensorServer Application

Installation Guide for CentOS Linux

Version Date: October 2017

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Introduction

There are three main components within our modular EvolvePlus Wireless People Counter solution:

1. Wireless People Counter Sensors - Either Infrared or Thermal Overhead
2. Sensor Network Gateway (SNG)
3. SensorServer™ Software Application

The SensorServer application allows organisations to analyse count data by hour, day, week, month, and year in table or graph form. This valuable information reveals peak traffic periods to determine optimal operating hours and staffing requirements, and helps calculate peak visitor times.

The SensorServer application is optimised to handle multiple locations and/or people counters for easy viewing and overall analysis. The SensorServer™ software is scalable so that additional Sensor Network Gateway's (SNG) and/or door counters can be added at any time.

SensorServer can either be installed on your own server or our secure cloud hosting environment for zero management/maintenance.

Whilst SensorServer has been designed for implementation on a Windows operating system, this guide describes how to install on CentOS 7 and above.

Installation Components on CentOS Linux

SensorServer requires the following components for installation on CentOS:

- CentOS version 7 and above with:
  - Fixed IP address or DNS address accessible across the network
  - TCP Ports 55555 and 55554 for communication to the Sensor Network Gateway
- LAMP Stack Server Components
  - Apache httpd
  - MySQL
  - PHP
- Mono Framework version 5.0.1

Sensor Network Gateway (SNG) Configuration

The SNG Tool application for configuring the Sensor Network Gateway (SNG) is not supported on Linux. Configuration of the SNG will require the use of a Windows PC or pre-configuration by EvolvePlus prior to delivery.

LAMP Stack Installation & Configuration

You will need to install the LAMP Stack components which consists of

- Apache httpd web server (v2.4)
- MySQL (v5.6)
- PHP (v5.4)

The following are brief notes on installing Apache httpd Web Server, MySQL and PHP v5.4 on CentOS, using CentOS's package manager, yum. A package manager allows us to install most software pain-free from a repository maintained by CentOS.

Install Apache Web Server

To install the Apache Web Server run the following command in the terminal:

```
sudo yum install httpd
```

Since we are using a sudo command, these operations get executed with root privileges. It will ask you for your regular user's password to verify your intentions.

Once it installs, you can start Apache:

```
sudo systemctl start httpd.service
```

You verify that Apache installed correctly went as planned by visiting your server's IP address (or using localhost in your web browser)

```
http://localhost/
```

You will see the default CentOS 7 Apache web page, which is there for informational and testing purposes. If you see this page, then your web server is now correctly installed.

To enable Apache to start on boot use the following command:

```
sudo systemctl enable httpd.service
```

Install MySQL

MySQL is a popular database management system used for SensorServer. However, MySQL is no longer in CentOS's repositories and MariaDB has become the default database system offered. The following will introduce how to install MySQL running CentOS 7 from the community repository.

Before using wget below you may need to install it. If so, you can install by running:

```
sudo yum install wget
```

Download and add the repository, then update:

```
wget http://repo.mysql.com/mysql-community-release-el7-5.noarch.rpm

sudo rpm -ivh mysql-community-release-el7-5.noarch.rpm

yum update

sudo yum install mysql-server
```

Once it installs, you can start MySQL:

```
sudo systemctl start mysqld
```

Note: MySQL will bind to localhost (127.0.0.1) by default. After SensorServer has been installed and running we recommend using `mysql_secure_installation` to secure a default MySQL installation on a public web server.

To enable Apache to start on boot use the following command:

```
sudo systemctl enable mysqld
```

Install PHP

PHP is the component of our web server that will be used by the SensorServer EasyReports and CentralManagement web application to display dynamic content.

We use the yum package manager to install our components, including the php-mysql package as well:

```
sudo yum install php php-mysql
sudo yum install gd gd-devel php-gd
```

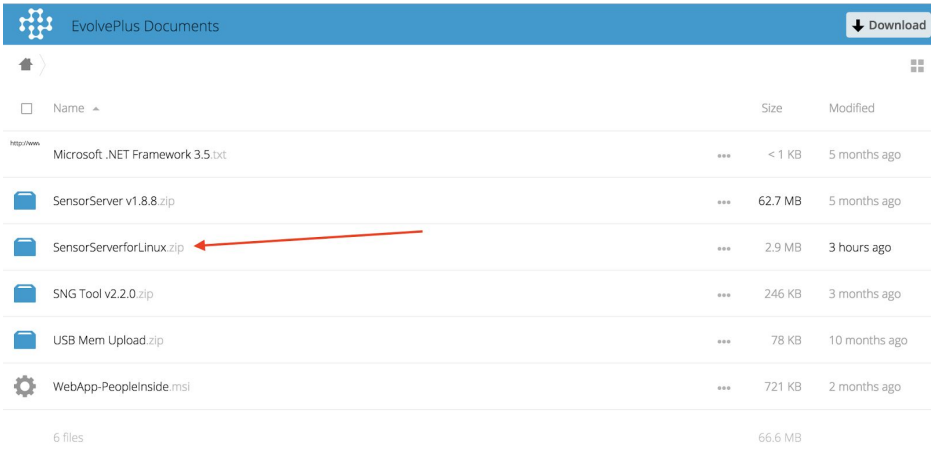
You will need to restart the Apache web server in order for it to work with PHP.

```
sudo systemctl restart httpd.service
```

Download & Install SensorServer for Linux

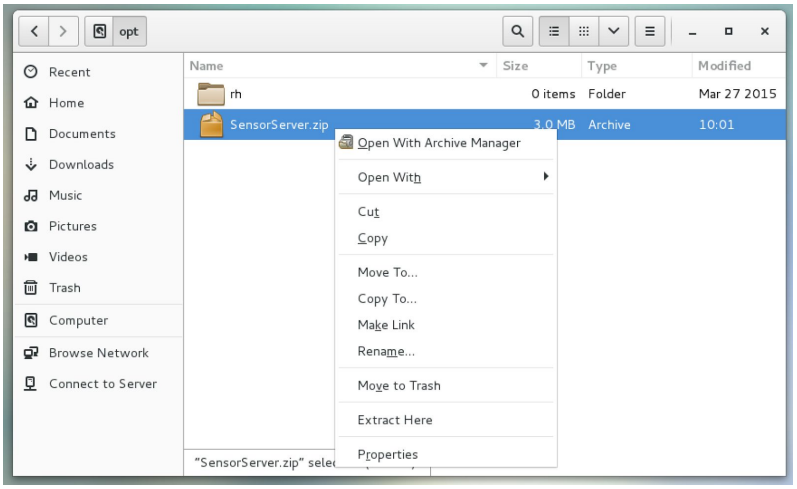
Download the SensorServerforLinux.zip from the EvolvePlus Document Portal. A direct link to the Software folder is:
https://documents.evolveplus.com.au/s/XRybVYETf7V3aL5

Download the archive *SensorServerforLinux.zip*

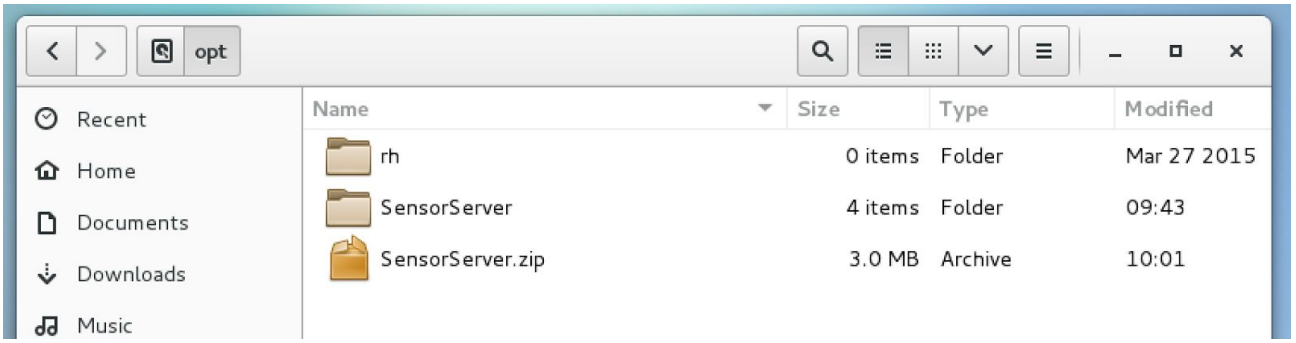


The following notes are based on installing SensorServer for Linux in the */opt* folder on CentOS 7, and configuring the Apache document root as */opt/SensorServer/WebApp*

Copy the downloaded archive *SensorServerforLinux.zip* to the /opt folder on Linux, and extract the contents of the archive.



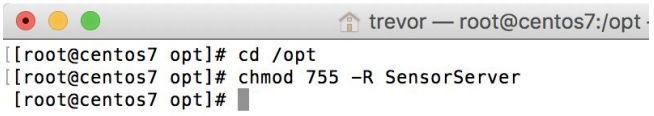
This should create the SensorServer subfolder - so SensorServer will be installed in */opt/SensorServer*



If SensorServer is installed in */opt/SensorServer* you will need to set the Unix permissions to enabling the Apache httpd Web Server to access the */opt/SensorServer/WebApp*root folder.

The following example is based on being logged on CentOS as a “root” user

```
cd /opt
chmod 755 -R SensorServer
```



Change Default Apache 'DocumentRoot' Directory

This installation guide is based on SensorServer being the only web application on your CentOS Linux server, so we will modify the default *DocumentRoot* directive of the Apache Web Server.

If you plan to install other web applications on your Apache Web Server then we recommend creating a separate Virtual Host for SensorServer and not changing the *DocumentRoot* directive.

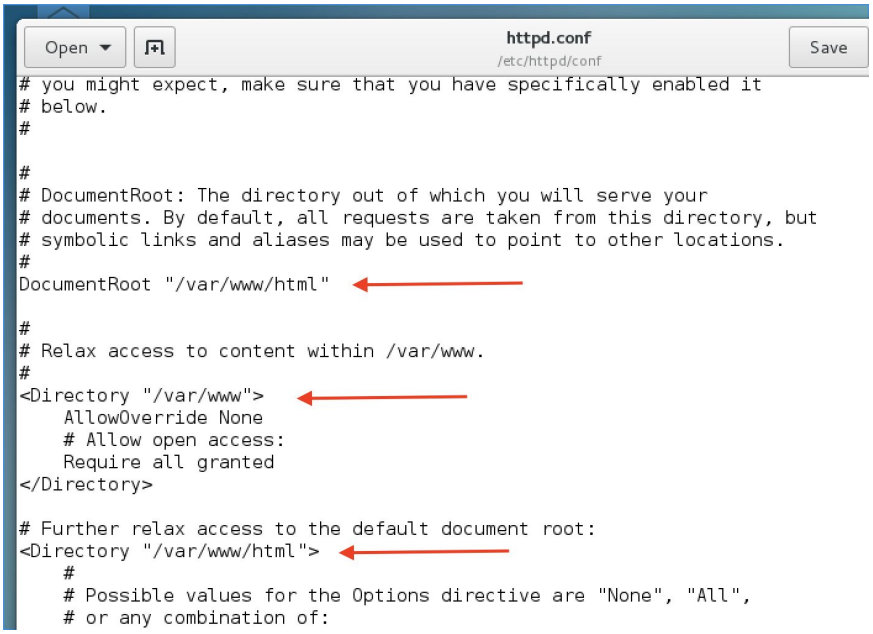
To change the *DocumentRoot* for the Apache Web Server open the following file with your favourite text editor

```
/etc/httpd/conf/httpd.conf
```

Change the following sections in httpd.conf

`DocumentRoot "/var/www/html"` to `DocumentRoot "/opt/SensorServer/WebApp"`

`<Directory "/var/www/html">` to `<Directory "/opt/SensorServer/WebApp">`



Install Mono Framework

For details on using Mono Framework, you can visit www.mono-project.com

Add the Mono repository to your CentOS system
The package repository hosts the packages you need, add it with the following commands in a root shell.

```
yum install yum-utils

rpm --import
    "http://keyserver.ubuntu.com/pks/lookup?op=get&search=0x3FA7E0328081BFF6A14DA2
    9AA6A19B38D3D831EF"

yum-config-manager --add-repo http://download.mono-project.com/repo/centos7/
```

The following will install the complete Mono package

```
yum install mono-complete
```

Install and Configure Database

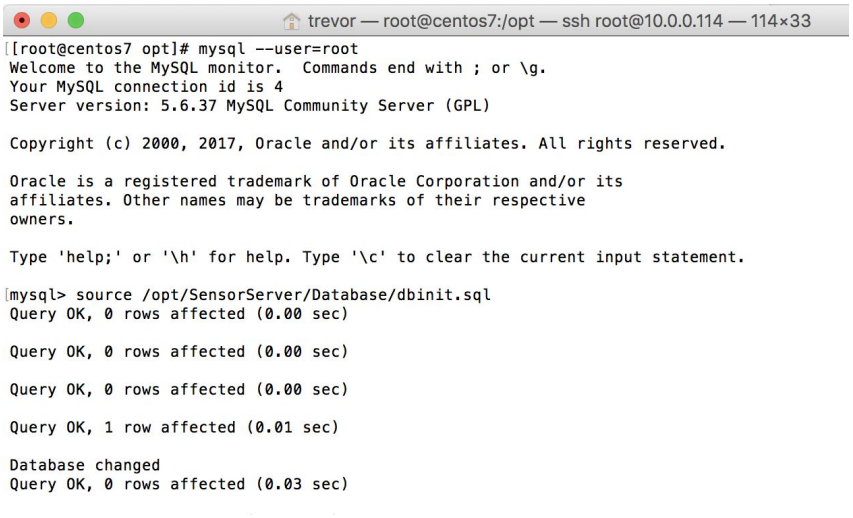
To install and configure the SensorServer for MySQL:

Start the MySQL command line tool as connect as the root user
(Note: you will also need to supply the password if this has been configured for MySQL)

```
mysql -u root
```

To create the SensorServer database “data” with associated tables and settings you will need to process the following SQL script in the MySQL command line tool:

```
source /opt/SensorServer/Database/dbinit.sql
```



On completion you can exit the MySQL command line tool by typing

```
quit
```

Configure & Run SensorServer

If SensorServer is not installed in the */opt/SensorServer/* folder or MySQL is not listening on the default port you will need to update the following files located in the */opt/SensorServer/Apps* folder:

- SensorServer.exe.config
- CSVExport.exe.config
- Mailer.exe.config
- Scheduler.exe.config

For example: *SensorServer.exe.config* for CentOS is usually configured with:

```
<?xml version="1.0" encoding="us-ascii" ?>
<configuration>
      <appSettings>
            <add key="ConnectionString" value="server=localhost;User
Id=sensor;database=data; Max Pool Size=75" />
            <add key="logfile"
value="/opt/SensorServer/Apps/Logs/SensorServer.log" />
      </appSettings>
</configuration>
```

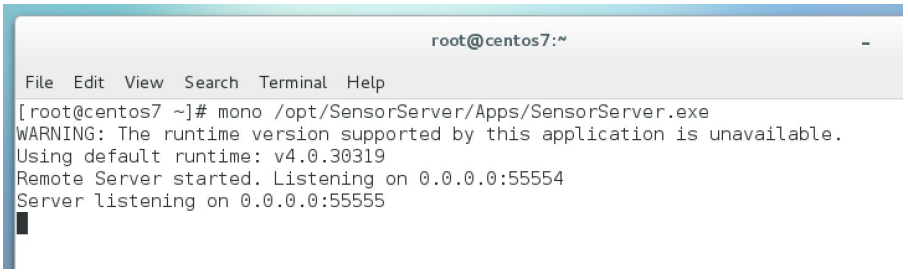
Important: the SensorServer App should be running continuously to collect data from the Wireless People Counters.

Start SensorServer.exe

(**Note**: it is important that Apache and MySQL are running)
Open the Terminal app
Run the command

```
mono /opt/SensorServer/Apps/SensorServer.exe
```

The SensorServer console should display together with any connection messages.



Backup SensorServer MySQL Database

It is important that you backup your SensorServer MySQL database (called “data”) on a regular basis.

All the collected SensorServer data and settings are stored in this database. In this section we describe how to create a database backup using the MySQL command line utilities. You can also install third party utilities which enable easy backup of the MySQL database via a Graphical User Interface or your Web Browser.

Create backup

To create a live backup from the database execute the following command.

mysqldump.exe -u sensor -q --single-transaction data > destination_file
where *destination_file* is the path and filename for the backup file. An existing file will be overwritten.

Note: Be sure that the user who is executing the backup has the sufficient rights to create a file on the desired location.

Example:

```
/usr/bin/mysqldump -u sensor -q --single-transaction data >
/opt/SensorServer/Database/backup.sql
```

Example using date and time as the backup filename

```
/usr/bin/mysqldump -u sensor -q --single-transaction data >
/opt/SensorServer/Database/backup-$(date "+%b_%d_%Y_%H_%M_%S").sql
```

Note: Changes made in the database during the backup process are not included in the backup.

EasyReports Application

EasyReports is the web based reporting app which allows organisations to analyse count data by hour, day, week, month, and year in table or graph form.

To open the EasyReports app using the following URL in your web browser:
http://localhost/EasyReports

CentralManagement Application

CentralManagement is the web based app from to manage your People Counter settings.

To open the CentralManagement app using the following URL in your web browser:
http://localhost/CentralManagement

Firewall Notes: Remote Access to Web Apps

In many cases the default firewall settings for CentOS will disable remote access to port 80, which will prevent access to the EasyReports and CentralManagement web apps described above.

If you are unable to access the EasyReports and CentralManagement web apps from a remote web browser you can temporarily turn off the CentOS firewall to see if it enables access from your remote device.

On CentOS you will need to run the following command:

```
systemctl stop firewalld
```

To restart the firewall:

```
systemctl start firewalld
```

For suggested documentation on how to configure the firewall:
https://www.linode.com/docs/security/firewalls/introduction-to-firewalld-on-centos

Technical Notes on EasyReports and CentralManagement

The following is a list of changes to standard Windows versions of the EasyReports and CentralManagement apps for macOS and Linux.

WebApp: CentralManagement
Files to Change:

- Index.php
- locations.php
- csv_export.php
- monitoring.php
- options.php
- scheduler.php
- setup.php
- users.php

Change include_once("lang\default.php");
To include_once("lang/default.php");

WebApp: EasyReports
Files to Change:

- Index.php
- report.php

Change include_once("lang\default.php");
To include_once("lang/default.php");

Files to Change:

- /lang/default.php

Change require_once("lang\en.php”);

Technical Notes on dbinit.sql

The following is a list of changes to standard Windows versions of the dbinit.sql database creation script for Linux.

Change all references of `*data*`.`*Position*` to `*data*`.`*position*`

(This is because MySQL table names are case sensitive for Linux)

Installing SensorServer as a Service

Note: the following section is provided for information purposes and requires further testing before using in Production.

This section provides an example on how to install SensorServer as a Service, which enable it to automatically run when CentOS starts.

You will need to be logged in as root or use sudo.

Step 1 - Create Script to Start SensorServer

Go to the /opt/SensorServer folder and create a script file startsensor.sh using nano or another text editor

```
su root
cd /opt/SensorServer
nano startsensor.sh
```

```
#! /bin/bash
mono /opt/SensorServer/Apps/SensorServer.exe
```

After saving the file change the file permissions to enable execution

```
chmod 755 startsensor.sh
```

Step 2 - Create SensorService Service Definition

Go to the /opt/SensorServer folder and create a script file startsensor.sh

```
cd /etc/systemd/system
nano sensorserver.service
```

```
[Unit]
Description=sensorserver service
After=network.target

[Service]
Type=simple
ExecStart=/opt/SensorServer/startsensor.sh
Restart=on-abort
RemainAfterExit=yes

[Install]
WantedBy=multi-user.target
```

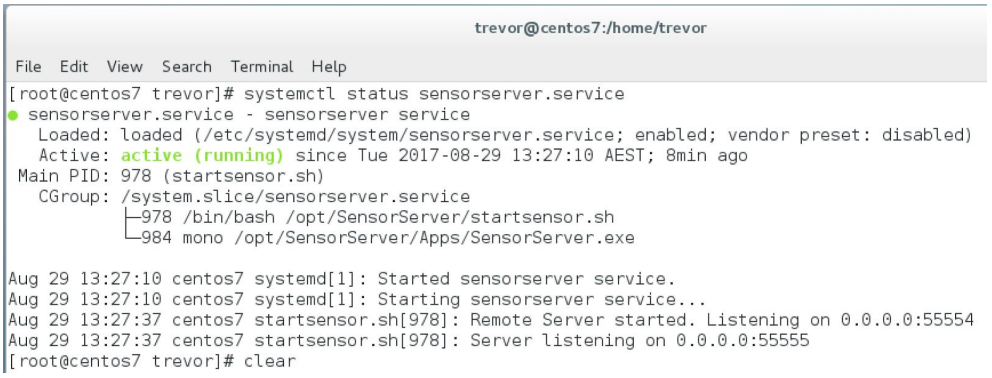
Step 3 - Start SensorService Service
To test that the SensorService Service will start correctly
```
systemctl start sensorserver.service
```

To check that SensorServer is running you can query port 55555 to verify SensorServer is listening

Note: to stop that the SensorService Service:
```
systemctl stop sensorserver.service
```

To configure the SensorService Service to automatically start the operating system starts:
```
systemctl enable sensorserver.service
```

Step 4 - Check the SensorService Service Status
To check the status of the SensorService Service:
```
systemctl status sensorserver.service
```



Hint: sometimes some of the information from above command is suppressed. In this case add the -l switch at the end of the command:
```
systemctl status sensorserver.service -l
```