



# WebSense User Guide

For Version 1.0

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# Chapter 1. Introduction

## 1. About this User Guide

This User Guide provides you with an introduction to WebSense, the installations instructions as well as instructions for the main features. If you encounter any problems with WebSense, you may want to take a look at the Troubleshooting chapter. The Table of Contents offers links to each part of the User Guide. If you want to read a section, you can click on it and you go to that part. There is also an index that assists you in finding information to specific terms.

The Help aims to explain WebSense as easy as possible. Most descriptions and instructions are therefore provided in a table format. In addition to that, you will often find graphics that help you understand features and instructions.

## 2. What is WebSense?

WebSense is a lightweight and configurable web-based tool for sensor network researchers. It helps publish the collected data fast and in a usable form. Special features of WebSense are:

- it supports existing models for both physical and domain properties of sensor network data and metadata
- the developer maintains ownership and control of their data
- lightweight protocols for publication and maintenance of data
- a configurable and modular presentation layer that can be readily extended. You can therefore customize the database so that it suits your needs.

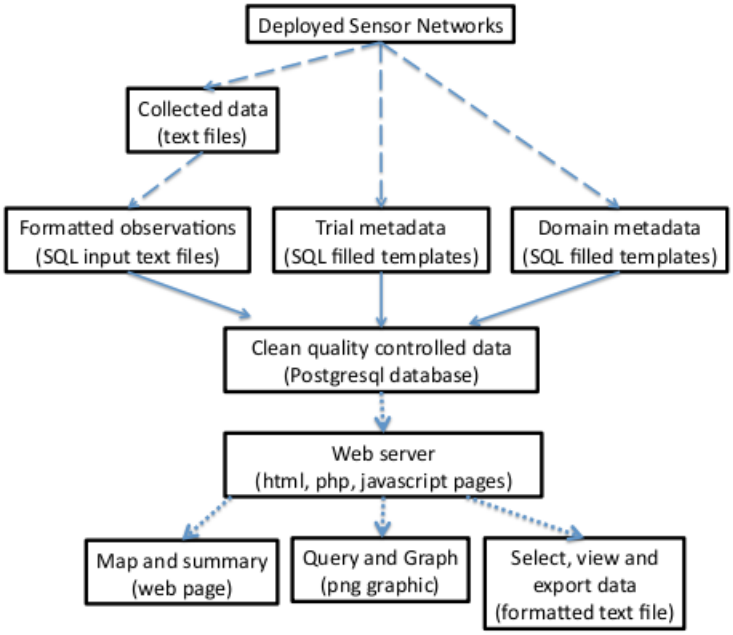
## 3. Requirements

In order to use WebSense you will need:

- a local web server to which only you have access (localhost). WebSense uses the Apache web server for that.
- a data management system to manage you sensor data. You can use it, for example, to insert data into the database. It is provided by the PostgreSQL system.
- a web browser (e.g. Firefox) to display WebSense via the localhost.

## 4. Data Flow in WebSense

WebSense has a database implementation in the open-source PostgreSQL system. Developers are free to extend of modify this data model, since WebSense allows the developer to maintain control over their database. The following figure shows the data flow in WebSense:


Deployed Sensor Networks
Collected data
(text files)
Formatted observations
(SQL input text files)
Trial metadata
(SQL filled templates)
Domain metadata
(SQL filled templates)
Clean quality controlled data
(Postgresql database)
Web server
(html, php, javascript pages)
Map and summary
(web page)
Query and Graph
(png graphic)
Select, view and
export data
(formatted text file)

# Chapter 2. Installation Instructions

### *Tested for Windows Vista 32 Bit with EnterpriseDB Version 9.1.4-1*

#### Note:

Please read the short introduction to understand the whole installation process.

## 1. Introduction

Before you can install WebSense, you need to have the right work environment on your computer. WebSense requires a web server since it is a web-based program. It uses the Apache web server, which you must install during the installation process. In addition to that, you will need a database management system with which you can manage your sensor network data. It is provided by the PostgreSQL system, which you must also install during the installation process.

The installation of WebSense therefore happens in two steps:

- **Step 1:** Installation of Apache and PosgreSQL through EnterpriseDB with Stackbuilder that provides both systems in one package
- **Step 2:** Installation of WebSense

Step 1 has overall three installation steps:

1. Installation of PostgreSQL
2. Installation of the Stackbuilder for Apache/Php
3. Installation of PhppgAdmin, a program that helps you manage your data.

Step 2 also contains three installation steps:

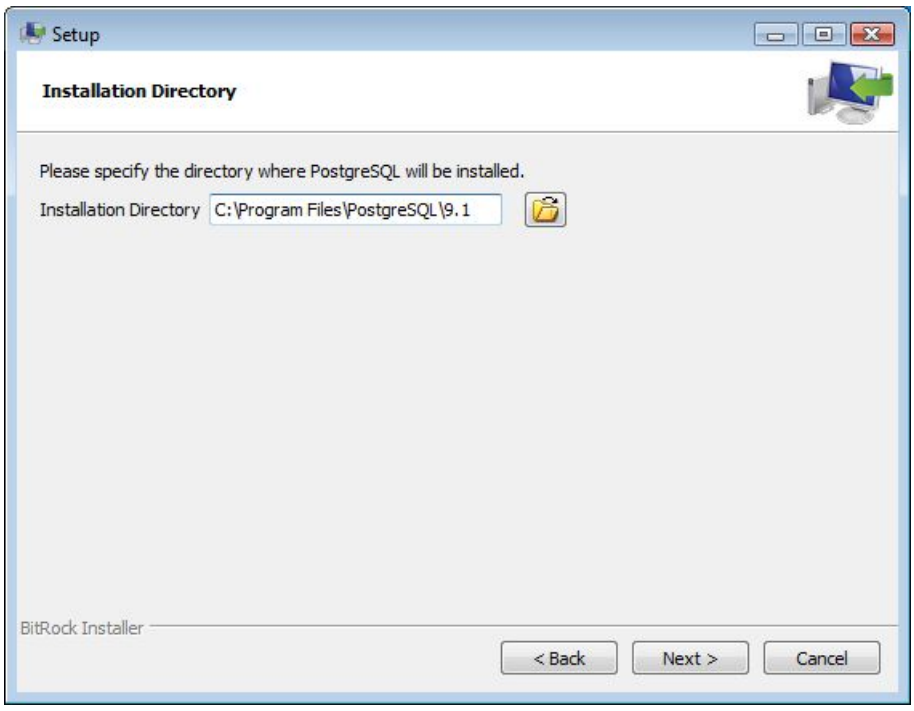
1. Installation of WebSense
2. Creation of the database for WebSense
3. Insertion of data into this database

Please note that the installation process might take some time. The following instructions will guide you through the whole process.

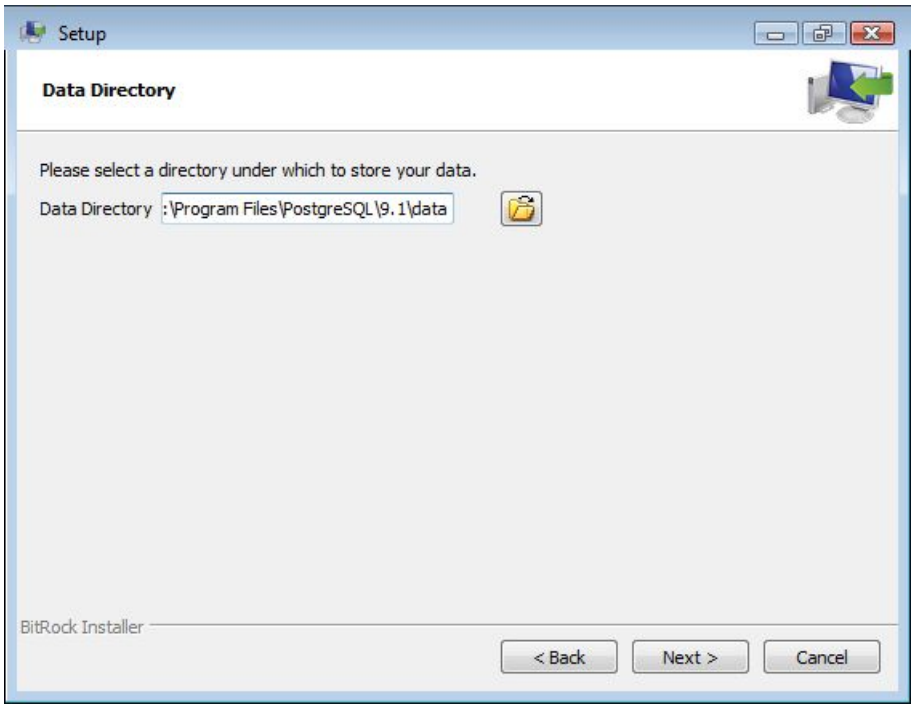
## 2. Step 1: How to install EnterpriseDB with Stackbuilder

### 2.1. Installation of PostgreSQL

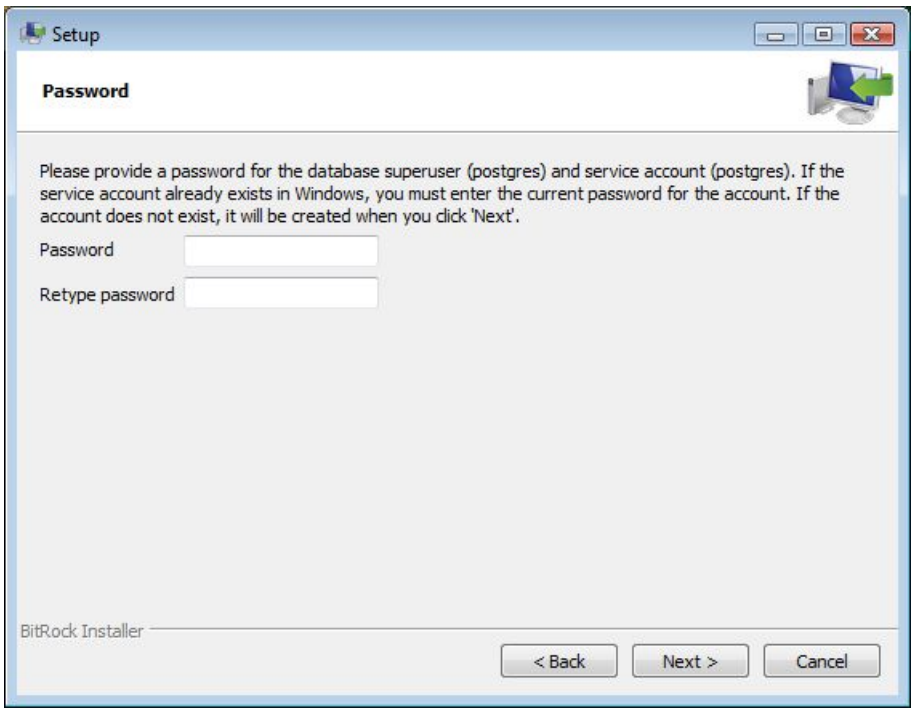
- Double click on the downloaded .exe file. An installation setup starts.
- It is recommended to use the path the setup suggests so that the installation process works smoothly:




- Then select the directory into which you want to save your data. It is again recommended to use the path the program suggests:

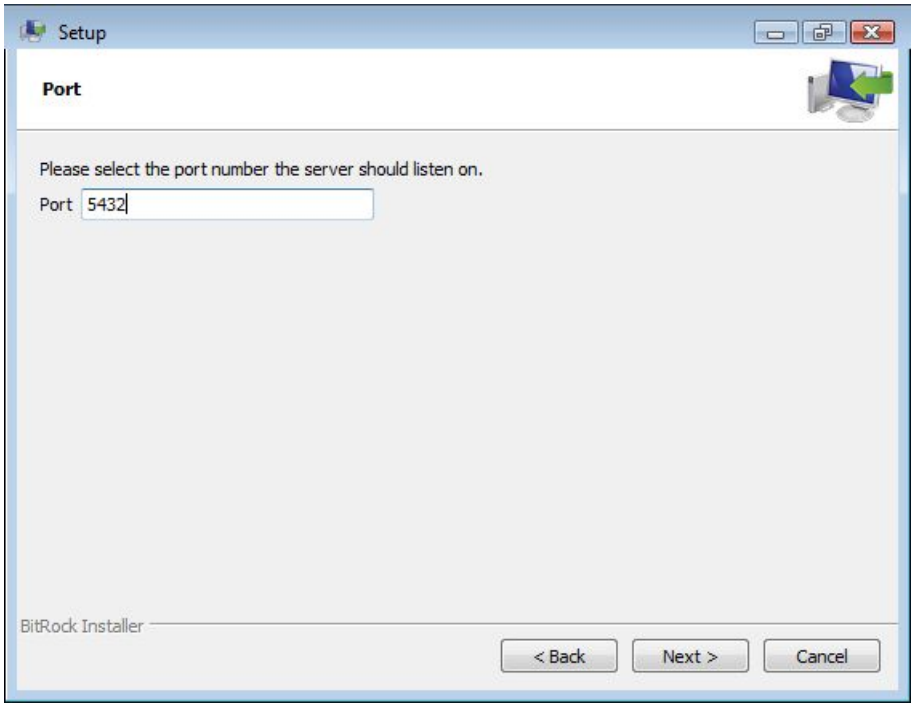



- Click on "Next >" and you will see the following window:

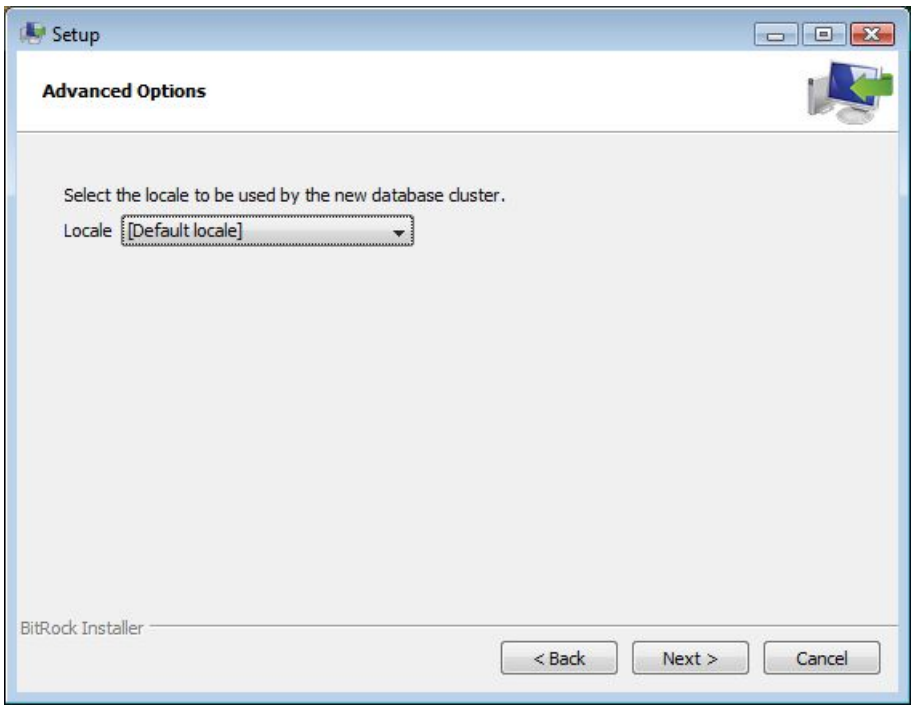



- Enter "testuser" (without quotes) as password for the superuser (postgres) and click then on "Next >" The installation starts.

- You must now enter the port that is needed to communicate with the server. Keep the port 5432 and click on "Enter >":




- You must now set the language for the database cluster. Keep "[Default locale]“ and click on "Next >“:

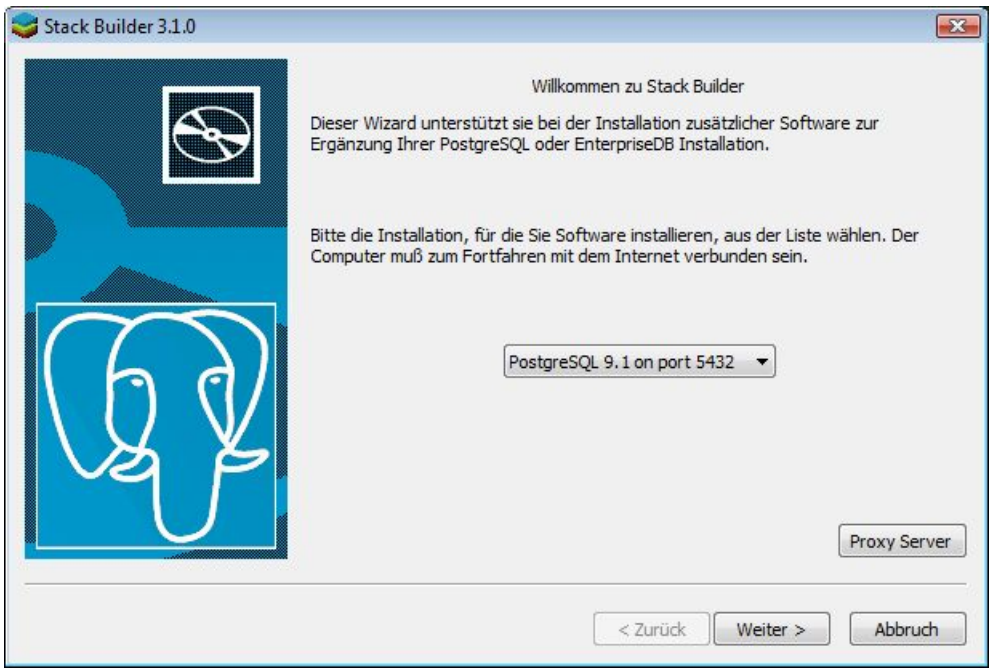



- Click on "Next >" to start the installation. The first installation step finishes with the following window:


The check box needs to be checked to begin the next installation step. Then click on "Finish".

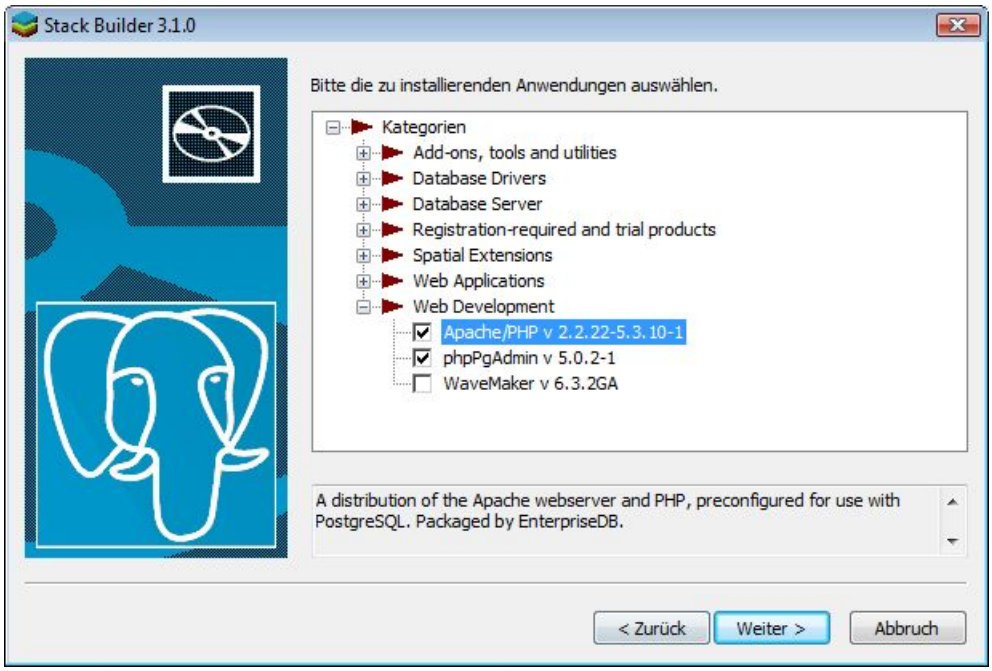
## 2.2. Installation of the Stackbuilder for Apache/PHP

- The second installation step starts with the following window:




Select "PostgreSQL 9.1 on port 5432" in the field and click on "Next >".

- Additional programs need to be installed. Select them as shown in the following window:



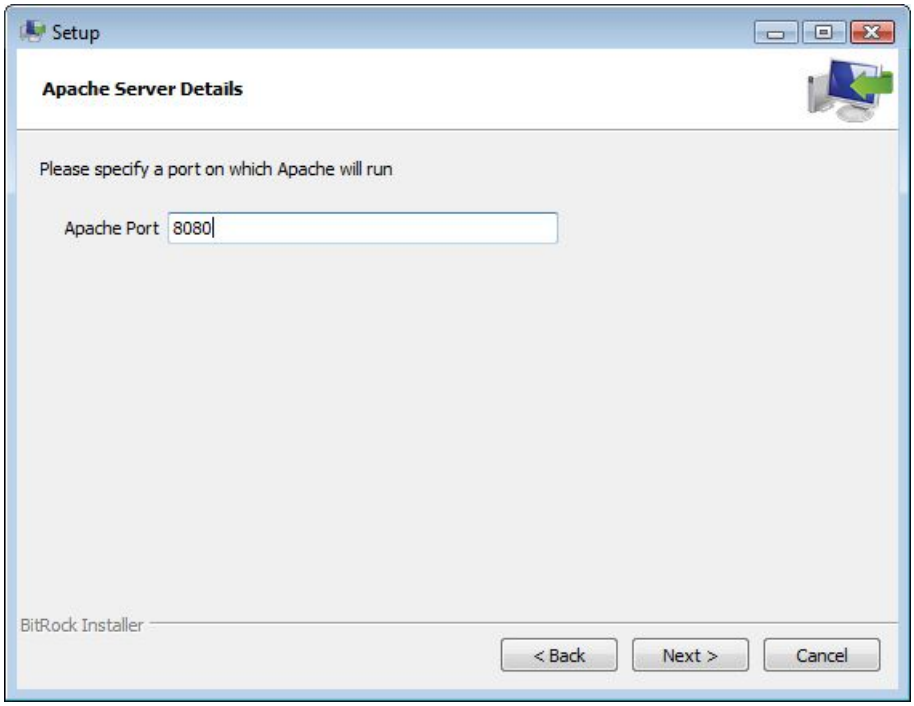

Then click on "Finish".

- Choose now the folder into which you want to save these programs. Please keep the default directory as suggested at the beginning of the installation instructions. Then click on "Next".

- Click on "Next" in the following window and a second setup will open.


You will now install Apache/PHP. Click on "Next >".

- Select the folder into which you want to install Apache/PHP. Please keep the default directory as suggested at the beginning of the installation instructions. Then click on "Next".
- The setup will ask you about the port for your localhost (a server that runs only on your computer). Keep the port 8080.




Click on "Next >“ and you can start the installation.

### Note:

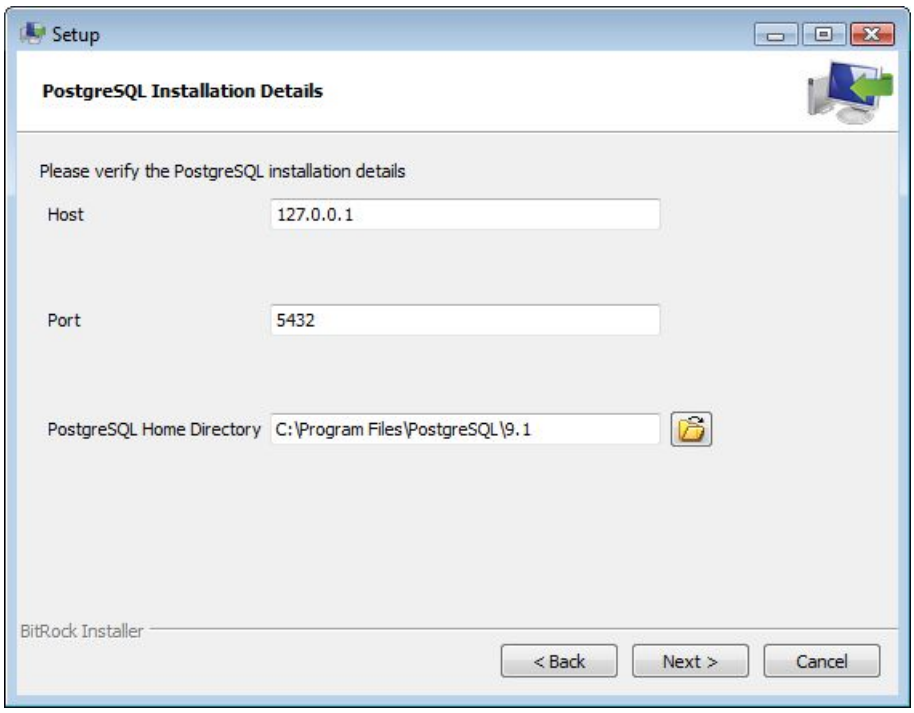
Your Firewall may want to block communications that are needed . Click on "?“ to allow the communication.

- Click on "Finish“ and the second installation step is finished. The next setup starts.

## 2.3. Installation of PhpPgAdmin

- The next installation step starts with the following window:


- Click on "Next >“ and check the PosgreSQL installation. If you followed the previous steps correctly, you will see the following window:




Click on "Next >“ and you can start the installation.

- Click on "Finish“ and in the remaining window on "?“ to finish the last installation step of Step 1: Installation of the Stackbuilder.

# 3. Step 2: How to install WebSense and create your Database

## 3.1. Installation of WebSense

- Test your Apache server by opening your Browser and pointing to http://localhost:8080/index.php. You must see the following message:


**Apache - version 2.2.22**
**PHP - version 5.3.10**
Server is up and running
The default Apache context is *www* in the Apache installation folder

- Go into the EnterpriseDB installation directory.
- Copy the WebSense folder into the `www` folder. If you did not change the default installation path you will find the folder in:

```
C:/Program Files/PostgreSQL/EnterpriseDB-ApachePHP/apache
```

### Note:

You need to be administrator to copy the folder.

## 3.2. Creating the WebSense Database

- Open your web browser and point to http://localhost:8080/phpPgAdmin/.
- Click in the left menu under "Server" on „PostgreSQL":


- Now you can log into the server:


User name: postgres (Password: testuser)

- Click on "Create database". You will see a formula into which you copy the settings as shown in the following figure:


Click on "?" to create the WebSense database.

- Now click in the left menu under "Server" on "PostgreSQL" and then on the "Roles" tab.
- Click on "?" and create two roles as shown in the following figures:

1st User "mo" (Password: "mo"):


2nd User: "webreader" (Password: "webreader"):


- Sign off of phpPgAdmin.

## 3.3. Inserting Data into the Database

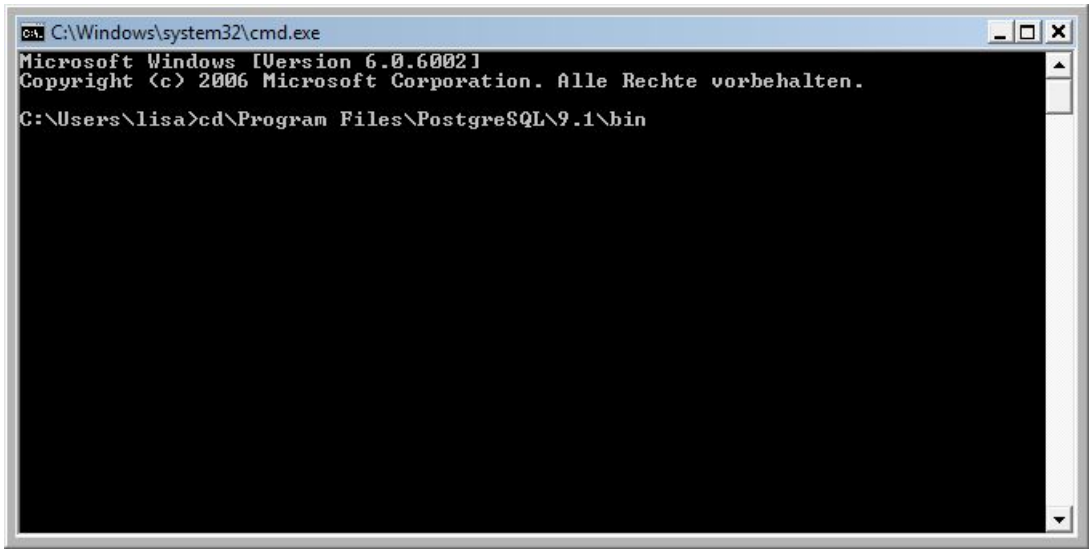
- Go into the EnterpriseDB installation directory.
- Copy your database (a .sql file) into the folder `bin` folder. If you used the default installation path, you will find the folder in:

  ```
  C:/Program Files/PostgreSQL/9.1/bin
  ```

  ### Note:

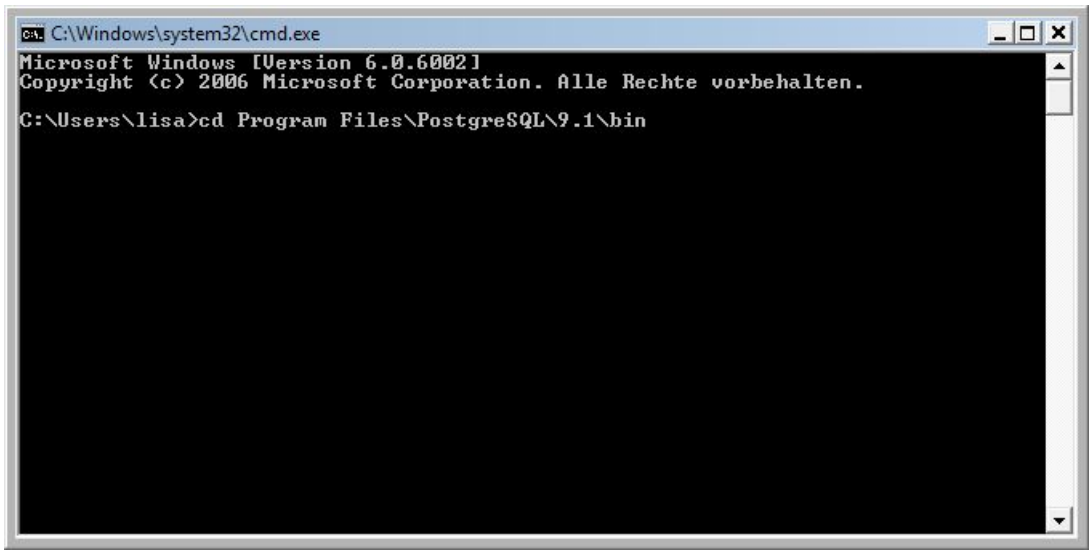
  You need to be administrator to copy the folder.

- Click in Windows on "Start" and enter "cmd" (without quotes) into the input field. The command-line interface will open.




- Go into the `bin` directory of your EnterpriseDB installation. If you used the default installation path in Step 1 you enter the following command line via your keyboard:

  **cd \Program Files\PostgreSQL\9.1\bin**



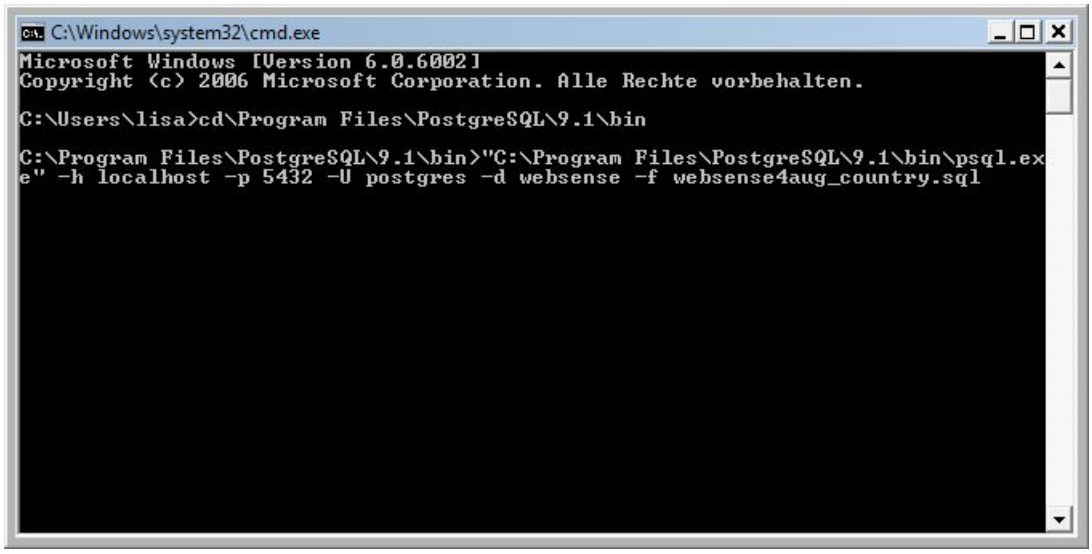

- Now, type in the following command line to upload the SQL file:

  **"C:\Program Files\PostgreSQL\9.1\bin\psql.exe" -h localhost -p 5432 -U postgres -d websense -f „Datenbank.sql"**

  ## Note:

  For "Database.sql" enter the name of your SQL file (without quotes)

  Example:

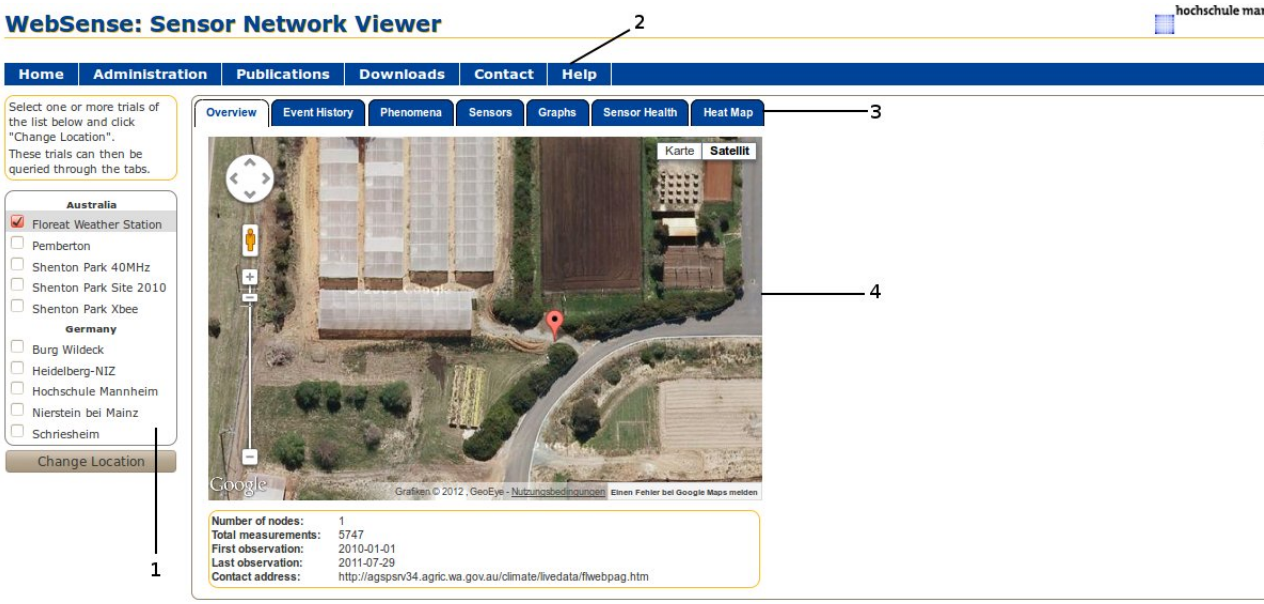



- It will ask for your password. Type in „testuser" (without quotes) and press enter. The data in your database will be uploaded. This might take a some time.
- It is finished when you can type in a command line again.
- Start WebSense by opening your web browser and pointing to http://localhost:8080/websense.

# Chapter 2. User Interface of WebSense

Read this chapter to learn something about the main features of WebSense such as the menus.

## 1. Overview




| | |
|---|---|
| List: | With the *List* on the left side you can select the locations you want to view. Click on "Change location" and use *Menu 2* to gain a detailed view on your sensors. |
| Main Menu: | The *Main Menu* allows you to use WebSense as well as to do administrative work such as inserting sensor data into the database. You will also find the help documentation here. |
| Menu 2: | With *Menu 2*above the Google Maps image you can view your sensor nodes in detail and create graphs or heat maps. It is your main working tool after selecting a trial in the *List*. |
| Map: | The *Map* is created via Google Maps and shows you an overview of your sensors after you have selected a trial in the *List*. Underneath the *Map* you will find a summary about the sensor nodes. It shows you the number of sensor nodes, the total measurements as well as the dates of the first and last observations. There is also a contact address which you can use to contact the researcher that is responsible for the sensor network. |

## 2. Main Menu

| | |
|---|---|
| Home: | The *Home* tab is basically the WebSense application that allows you to view your sensor nodes. Use this tab if you do not have to do administrative work such as adding sensor data. |
| Administration: | Click on *Administration* if you have sensor data that you want to insert into the WebSense database.<br>**Note:**<br>You can only upload a *CSV file* (Comma Separated Values File). Read Chapter 4: Instructions - Section 6, “How to Write a CSV File” [20] to see how you write a CSV File. |

| | |
|---|---|
| Publications: | The *Publications* tab contains information about the developers' further work concerning sensor networks. |
| Downloads: | In the *Downloads* tab you find the used 3rd party software, the database skeleton as well as the Web application code. |
| Contact: | Click on the *Contact* tab to see the people who have contributed to versions of the WebSense system and its database. |
| Hilfe: | In the *Help* tab you find the Online Help as well as a user guide you can download as a PDF. |

## 3. Menu 2

| | |
|---|---|
| Overview: | With the *Overview* tab you can see a map that shows you the locations of your sensor nodes, It changes when you select one or more trials in the *List* and click on "Change location". The tab is automatically selected |
| Event History: | The *Event History* tab lists all the important events that happened after your sensor installation. You see the exact date with the event right beside. Example:<br><br>2010-11-26: Sep and Nov data added with local BOM rain |
| Phenomena: | The *Phenomena* tab shows you a table with the phenomena measured by your sensors, in which unit it is measured as well as the sensor calibration. Example: |

| Phenomenon | Unit | Calibration |
|---|---|---|
| Temperatur | deg. C | Range: temperature set to (-15,85) for Germany and Australia |
| Total Daily Rainfall | mm | Range: daily rainfall set to (0,500) where 62 is highest Perth but 500 recorded in Australia |
| Wassergehalt | vol. % | Range: observable water contents in soil |

| | |
|---|---|
| Sensors: | In the *Sensors* tab you see a list that shows the specific sensor types you have used for a trial. |
| Graphs: | With the *Graphs* tab you can create a graph for one or more sensors. You can also or download a *CSV file* that contains the data. Read Chapter 4: Instructions - Section 2, “How to Create a Graph’[18] to learn how you can create a graph. |
| Sensor Health: | The *Sensor Health* tab will give you an overview about the condition of the sensors. You can easily detect a broken sensor by color. If the sensor is colored in green, then it works correctly. When you see it is colored in red, it does not work anymore. |
| Heat Map: | With the *Heat Map* tab you can see the temperatures measured by your sensors, displayed by an OpenStreet Map. Read Chapter 4: Instructions - Section 1, “How to create a Heat Map” [17] to learn how you can create a Heat Map. |

# Chapter 4. Instructions

Read this chapter to learn how you can use the features of WebSense. Jede Anleitung ist nach demselben Prinzip aufgebaut: Als erstes finden Sie eine Anleitung, die die grundlegende Vorgehensweise erläutert. Danach werden die Einstellungsmöglichkeiten der Funktion (falls vorhanden) beschrieben. Zuletzt sehen Sie ein bildhaftes Beispiel, wie das Ergebnis dieser Anleitung aussehen soll (falls möglich).

## 1. How to create a Heat Map

In this section you learn how to create a Heat Map from your sensor nodes.

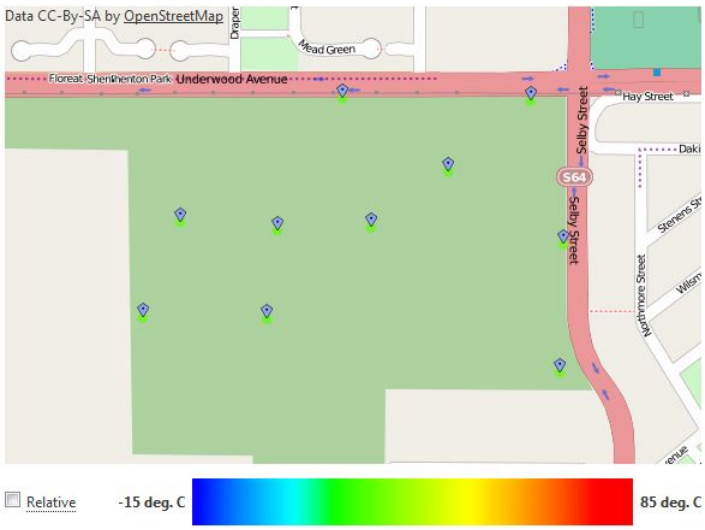
### 1.1. Instruction

| Step | Action |
|---|---|
| 1 | Select one or more trials in the *List* and click on "Change Location". |
| 2 | Click in *Menu 2* on the *Heatmap* tab.<br><br>**Result:** You will see a formula with which you can create a Graph. The following actions are available:<br><br>• Time of Measurement<br><br>• Phenomenon<br><br>• Depth in Centimeters |
| 3 | Click on "Graph" to create a Graph. Sie können Ihre Auswahl rückgängig machen, indem Sie auf„Zurücksetzen" klicken.<br><br>**Result:** You see the Heat Map right beside the formula. |

### 1.2. Heat Map Options

| Option | Function |
|---|---|
| Time of Measurement | Date: *Startdate* is the date of the sensor's implementation. You can specify the time range by entering an end date into the input field or by clicking on the calendar symbol beside the input field.<br><br>Hour of Day:<br><br>Mit Hilfe dieser Option können Sie genau angeben, welche Stunden Sie für die Heatmap mit einbeziehen wollen. Nutzen Sie diese Option, wenn z.B. nicht der gesamte Tag des Enddatums in der Heatmap einfließen soll.<br><br>Including following minutes:<br><br>Diese Option ermöglicht eine noch genauere Angabe des Zeitbereichs. |
| Phenomenon: | Sie können die Arten der Messung durch ein Drop-Down-Menü auswählen. Sie sind abhängig von den eingesetzten Sensoren, beispielsweise steht dort Temperatur, Wassergehalt oder Spannung. |
| Depth in Centimeters | You can see the different depths of the sensors with. The number of sensors in the specific depths is in brackets. |

## 1.3. Example of a Heat Map




### Note:

Es wird ein absolute Heatmap erzeugt. Wenn Sie „Relative" auswählen, können Sie die Temperaturen der einzelnen Sensoren relativ zu den anderen Sensoren sehen. Damit lassen sich die Temperaturen der Sensoren am jeweiligen Standpunkt miteinander vergleichen.

## 1.4. Weiterführene Informationen

Eine Erklärung zur Liste finden Sie in Chapter 2, *User Interface of WebSense* [15]

Eine Erklärung zur Heatmap finden Sie in Kapitel 2, *Section 3, “Menu 2” [16]*

# 2. How to Create a Graph

In diesem Abschnitt erfahren Sie, wie Sie einen Graphen von einem oder mehreren Sensoren erzeugen können.

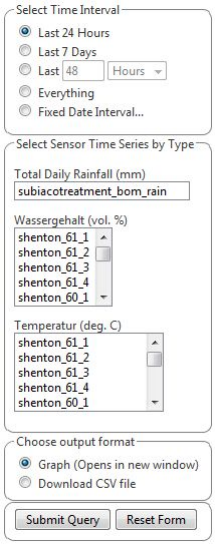
## 2.1. Instruction

| Step | Action |
|---|---|
| 1 | Select one or more trials in the *List* and click on "Change Location". |
| 2 | Click in *Menu 2* on the *Graphs* tab.<br><br>**Result:** You will see a formula with which you can create a Graph. The following actions are available:<br><br>• Time Interval<br><br>• Sensor Time Series by Type<br><br>• Output Format |
| 3 | Click on "Graph" to create a Graph. Sie können Ihre Auswahl rückgängig machen, indem Sie auf „Zurücksetzen" klicken.<br><br>**Result:** A new window with the Graph opens. |

## 2.2. Graphs Options

| Option | Function |
|---|---|
| Time Interval | Clicking on “Fixed Date Interval” will open a calendar in which you can enter a start and end date. |
| Sensor Time Series by Type | The sensors are automatically arranged according to their type of measurement. To select more than one sensor under a type of measurement, press ctrl while clicking on the sensors. |
| Output Format | View the graph immediately by selecting *Graph*. It opens in a new window.<br><br>You can also Download a *CSV file* in which the measured values of the sensors are separated by commas. This makes an easy data exchange possible.<br><br>**Tip:**<br><br>You can copy the the Graph's URL and send it someone else. In this way, he can also see the Graph. |

## 2.3. Example of a Graph




## 2.4. Further information

Weitere Informationen zur Liste finden Sie in Chapter 2, *User Interface of WebSense* [15]

Weitere Informationen zum Graphen finden Sie in Kapitel 2, *Section 3, “Menu 2” [16]*

# 3. How to insert new Data into the Database

In diesem Abschnitt erfahren Sie, wie Sie eigene Sensordaten in die WebSense-Datenbank hochladen können.

## 3.1. Requirements

You must have a CSV file with data. Read Chapter 4: Instructions- Section 6, “How to Write a CSV File” [20] to learn how you write a CSV File.

# 4. How to Back Up your Data

In diesem Abschnitt erfahren Sie, wie Sie ein Back-Up Ihrer Daten durchführen können.

> **Note:**
>
> You can only back up your data via a command-line interface such as cmd.exe in Windows. The following command lines depend on your installation path. If WebSense is not installed in the default path (see Installation Instructions), you must type in your own path.

## 4.1. Instruction

| Step | Action |
|---|---|
| 1 | Click in Windows on "Start" and enter "cmd" (without quotes) into the input field.<br><br>**Result:**A black window (the command-line interface) will open and you can type in command lines. |
| 2 | Go into the `bin` directory of your EnterpriseDB installation. If you did not change the default installation path, type the following command line into the interface via your keyboard:<br><br>**cd\Program Files\PostgreSQL\9.1\bin**<br><br>**Result:** You are now in the `bin` directory and can enter a new command line. |
| 3 | Now, type in the following command line:<br><br>**"C:\Programme\EnterpriseDB\bin\pg_dump.exe" -f WebSenseDATE.sql -p 5432 -U postgres WebSense**<br><br>It will ask for your password. Type in „testuser" (without quotes) and press enter.<br><br>**Result:** After a short moment, you can enter a new command line. This means that the Back Up was successful. You will find the back up file in the `bin` directory. |

## 4.2. Further information

Lesen Sie Kapitel: Konsole für weitere Informationen zur Arbeit mit der Konsole.

# 5. How to Delete Data

In this section you learn how to delete sensor data in the database.

# 6. How to Write a CSV File

In this section you learn how to write a CSV File in the correct way to be uploaed into the database. It must have specific information in order to be inserted into the database. .

# 7. How to Uninstall WebSense and EnterpriseDB PostgreSQL with Stackbuilder

In this section you learn how you can either uninstall WebSense alone or the whole PostgreSQL package.

## 7.1. How to uninstall WebSense

- Go into the `PostgreSQL\EnterpriseDB-ApachePHP\apache\www` directory and delete the `WebSense` directory

## 7.2. How to uninstall EnterpriseDB with Stackbuilder

| Step | Action |
|---|---|
| 1 | Go into the EnterpriseDB installation directory and start "uninstall-postgresql.exe". You will be asked if you want to uninstall PostgreSQL and its modules. Click on "Yes".<br><br>**Result:** You will see a message that the `data` directory and the "postgres" account was not deleted. You can do this later (see Step 4). |
| 2 | Go into the EnterpriseDB installation directory and start "uninstall-apachephp.exe". You will be asked if you want to uninstall Apache/PHP and its modules. Click on "Yes".<br><br>**Result:** You will see a message that Apache/PHP ant its modules were deleted. |
| 3 | Go into the EnterpriseDB installation directory and start "uninstall-phppgadmin.exe". You will be asked if you want to uninstall phppgAdmin and its modules. Click on "Yes".<br><br>**Result:** You will see a message that phppgAdmin ant its modules were deleted. |
| 4 | Delete the installation directory (and with that the `Data` directory). |

# Chapter 5. Troubleshooting

Read this chapter if you encounter any problems with WebSense.

**I can't see Websense. There is only an empty window.**

- Check if your Apache server is running. You can check this with the ApacheMonitor tool. It is located in the `apache/bin` directoryand opens in your toolbar.
- Click on "Start" to start the Apache webserver.

> ## Note:
>
> It is possible that another program (e.g. Skype) uses your localhost port. If this is the case, you can't start the Apache server by hand - You have to locate the specific program and end it. Then you start the Apache server again. Eine Anleitung, wie Sie dies feststellen und beheben können, finden Sie `hier` (Achtung: Sie benötigen eine Internetverbindung, da es sich um eine Anleitung aus dem Internet handelt).

**WebSense isn't displayed correctly (e.g. there is no GoogleMaps image and the menus are not in correct place)**

- Your browser is probably too old to display WebSense correctly. Please update your browser to use WebSense.

**I can't see the Google Maps image.**

- It sometimes takes a longer time to load the Google Maps image. Wait a moment or refresh the application (e.g. by clicking F5). If this does not help, check your Internet connection. You need to be connected to the Internet in order to see the Google Maps image.

# Chapter 6. FAQ

Read this chapter if you have a question about WebSense.

**Q:** Where can I see the health of my sensors?

**A:** To see the health of your sensors, click in *Menu 2* on the *Sensor Health* tab. Note that you must select one or more trials in the *List* first (see Chapter 2, *User Interface of WebSense* [15]).

**Q:** Where can I see recorded events for my trials, e.g., when they were implemented?

**A:** You can see the recorded for your trial in *Menu 2*, when you click on the *Event History* tab.. Note that you must select one or more trials in the *List* first (see Chapter 2, *User Interface of WebSense* [15]).

**Q:** Where can I see the sensor types of a trial and their calibration?

**A:** You can see the sensor types of a trial in *Menu 2*, when you click on the *Phenomena* tab.. Note that you must select one or more trials in the *List* first (see Chapter 2, *User Interface of WebSense* [15]).

**Q:** Where can I see the exact names of the Sensor types I used for a trial?

**A:** You can see the sensor types of a trial in *Menu 2*, when you click on the *Sensors* tab.

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