Documentation

of version 0.8

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CHANGELOG

Date	Description	Author
'2009-10-25	Fresh start for 0.8 version	Léon van Berlo
'2009-12-21	Updated screenshots	Léon van Berlo
'2009-12-24	Major extension	Léon van Berlo

TABLE OF CONTENTS

1 INTRODUCTION

This is the introduction.

1.1 LICENCE

The open source BIMserver is free and open source. It is licensed under GNU GPL version 3. See gnu.org or opensource.org for the license text. E-mail license@bimserver.org for more information.

This distribution of the open source BIMserver has the IFCEngine library DLL implemented. The ifcengine.DLL file is NOT open source. The ifcengine.dll is not part of the open source bimserver project but a seperate project from the Netherlands Organisation for Applied Scientific Research TNO.

Bimserver.org uses the DLL (with permission of the creater) to compile geometry. We use it because it is the fastest renderer of IFC in the world. The IFCEngine might become open source in the future and is therefor a great way to render geometry server side.

Installation notes: It should run without trouble, but on some systems (when you use tomcat) you should put the DLL files in your windows/system32 directory (or on linux in the system folder) and restart tomcat (or jetty, or whatever you use).

1.2 WIKI

Because the knowledge of the open source BIMserver is constantly evolving, please check our wiki regularly.

The wiki is the best place for the latest documentation on this project.

The adres is **wiki.bimserver.org**

2 UPDATING FROM 0.1

Updating from a previous version is very difficult.

The database structure of the 0.8 version is very different from the 0.1 version. It is possible to write an updatescript, but nobody did so far.

When you want assistance on updating from a previous version to the latest version, please e-mail us at support@bimserver.org

3 INSTALLATION

This chapter will describe two possibilities to install the open source BIMserver software on your own computer/server.

There are two possibilities to install the bimserver: stand alone (with a build-in Jetty server) or deploy the WAR file (for example on a tomcat server).

3.1 STANDALONE VERSION

3.1.1 REQUIREMENTS

Download and install the latest **Java version 6** on http://java.com/

Download the latest **JAR file** on http://download.bimserver.org/

Optional:

Download the client on http://download.bimserver.org/

Download the free IFCviewer on http://www.ifcbrowser.com

3.1.2 STARTING

Open the JAR file in a Java virtual machine (for most PC's the means that you just double click on it).

At some point in this process, you might be warned with a firewall message. Of course you should choose 'do not block'.

You get a small window called 'BIM Server Starter'.

When your computer has a lot of RAM memory (internal memory) you might want to change the memory settings for a better performance. We recommend a heap size of 1600m and a stack size of 1024k.

Choose your options (if you don't know what to do, don't change them) and click start.

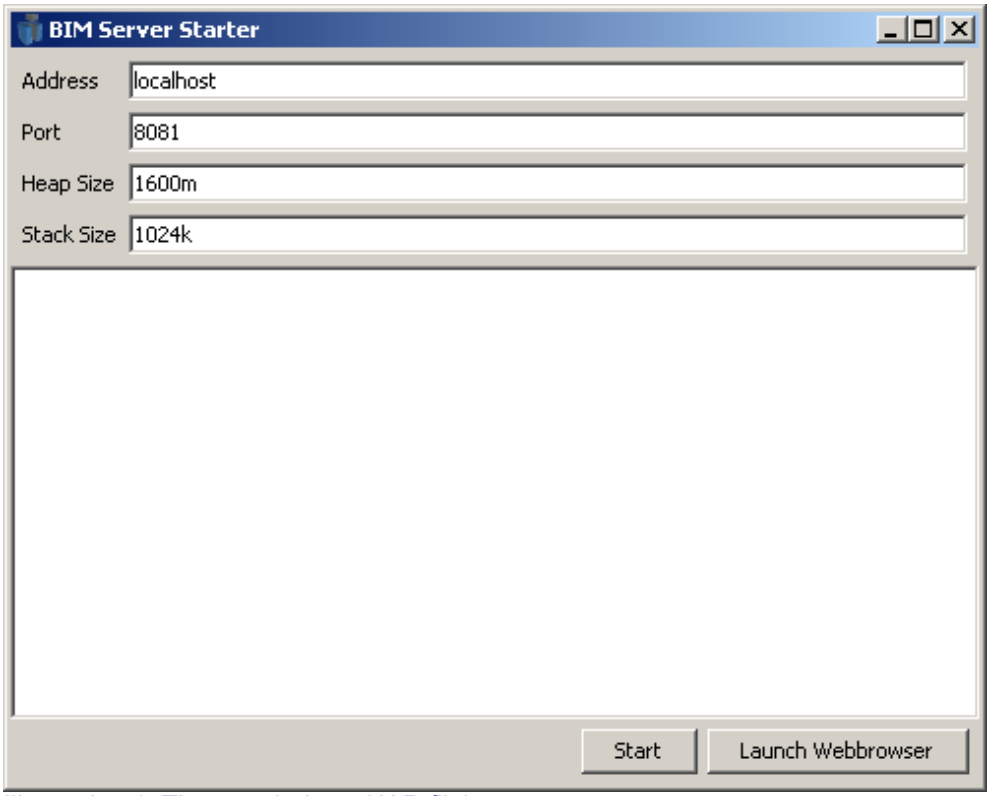


Illustration 1: The stand-alone (JAR file) starter

The server will start the deployment and during this you will see some messages. There will be a database-directory deployed. A directory called 'bimserver-08' will be created. The directory will have several subdirectorys and data in it.

At the end you will see '*org.bimserver.Server - Server started succesfully*'. You are now running your own bimserver!

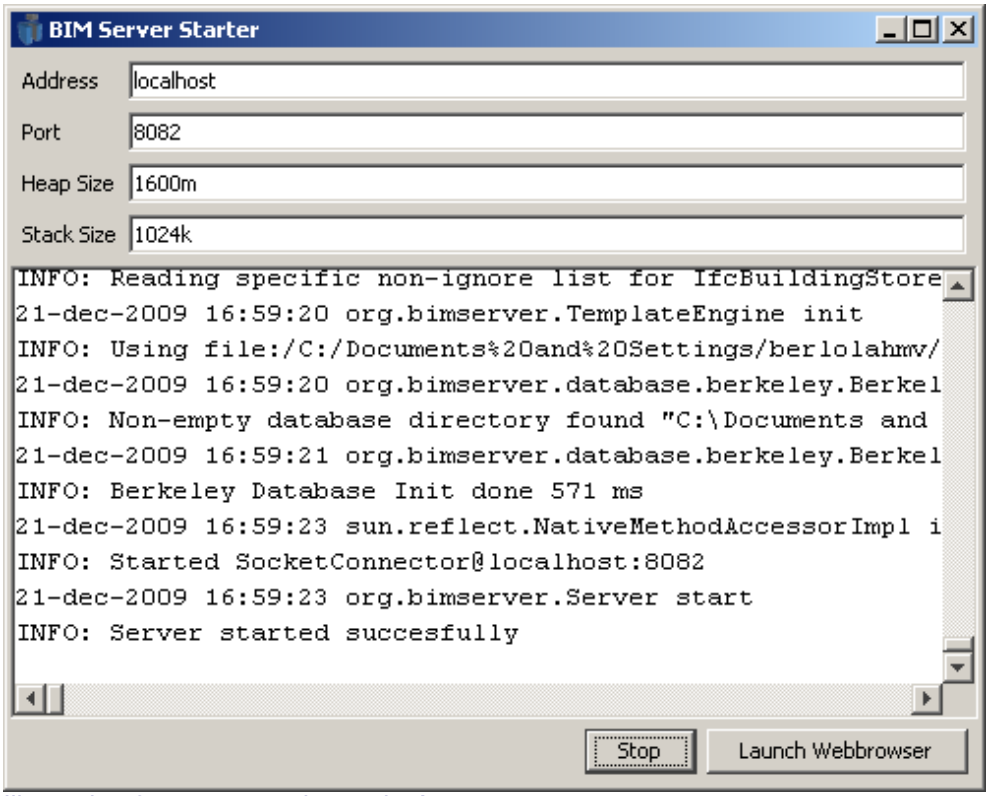


Illustration 2: your server is running!

3.1.3 TESTING THE INSTALLATION

Click on the 'Launch Webbrowser' button (next to the 'Start' button that is now showing 'Stop'). You will get the loginscreen. You can login as the administrator using admin/admin as the username/password.

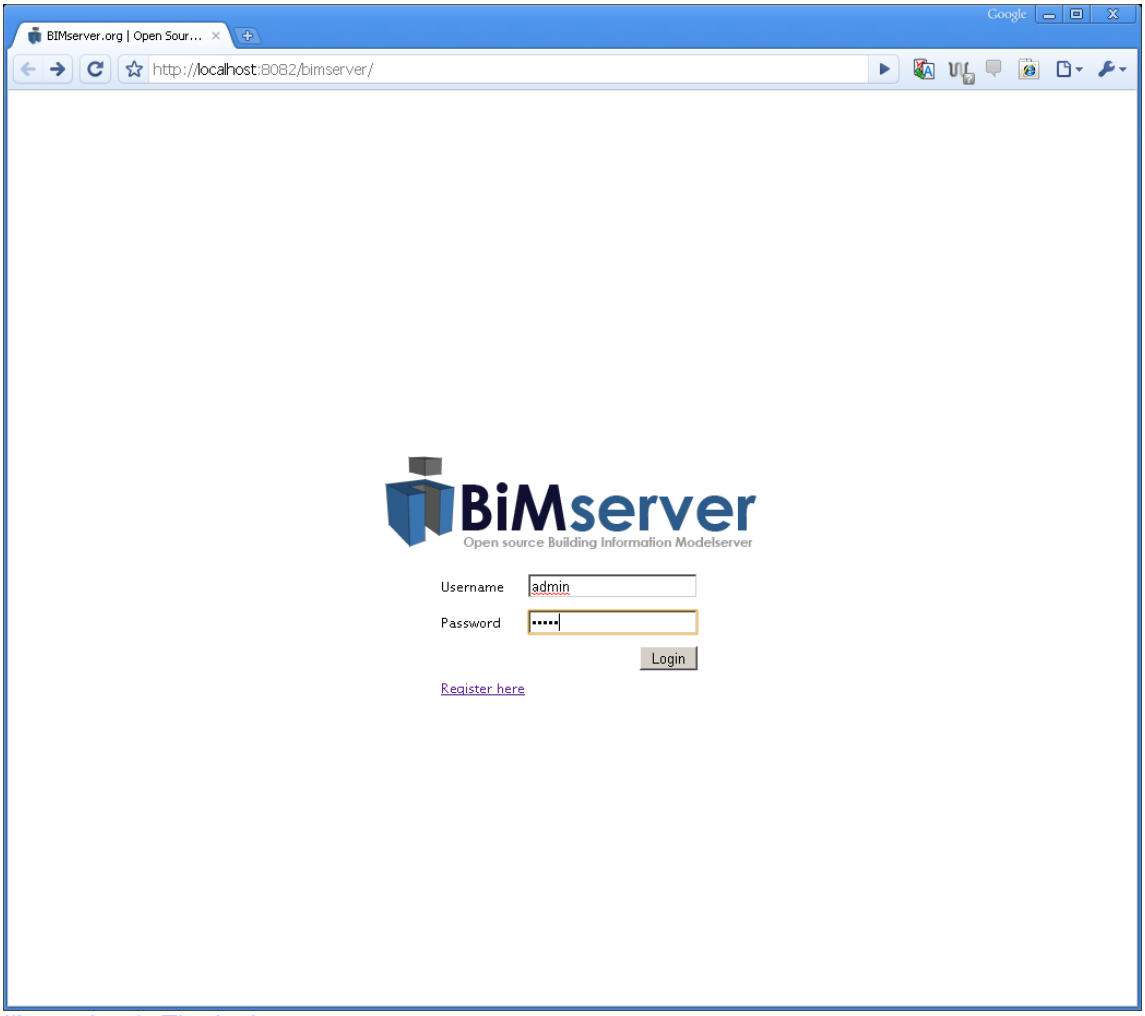


Illustration 3: The login screen

You are now logged into your own BIMserver. It will look something like this:

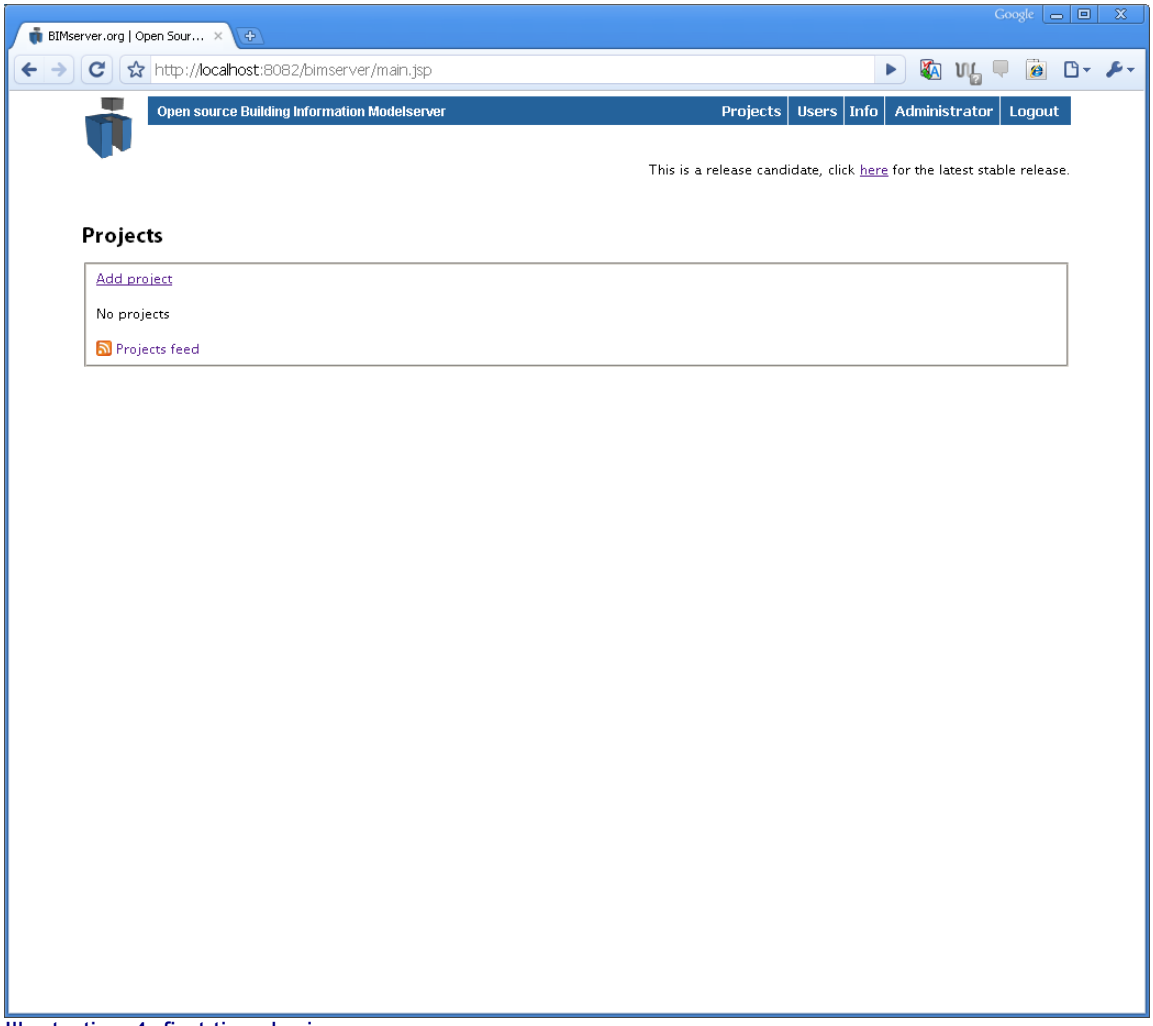


Illustration 4: first time login

After your first login, make sure to change the default password into something else!

3.2 WAR INSTALLATION

3.2.1 REQUIREMENTS

Download and install the latest **Java version 6** on http://java.com/

Download and install the latest **Tomcat** on http://tomcat.apache.org/

Download the latest BIMserver **WAR file** on http://download.bimserver.org/

Optional:

Download the client on http://download.bimserver.org/

Download the free IFCviewer on http://www.ifcbrowser.com

3.2.2 STARTING

Make sure your tomcat JVM has enough memory to run BIMserver. We recommend a heap size of 1600m and a stack size of 1024k.

Deploy the WAR file in tomcat (if you don't know howto, read the tomcat instructions).

The starting of the bimserver takes about 20 seconds. There will be a directory deployed called 'database'.

3.2.3 TESTING THE INSTALLATION

Open your favorite webbrowser and go to http://localhost:8080/bimserver-0.8/

Attention: when you run tomcat on a different port you should go to the other port. When you deploy a different filename (like *bimserver-x.xxx)* you should also use a different URL depending on the filename you deployed.

You will get the loginscreen. The loginscreen looks like Illustration 3. You can login as the administrator using admin/admin as the username/password.

You are now logged into your own BIMserver. It will look something like Illustration 4.

After your first login, make sure to change the default password into something else!

3.3 INSTALLATION-ISSUES

My standalone server won't start (testing the installation doesn't give results). What's wrong?

When you are using windows (try ubuntu and/or) make sure the firewall isn't blocking the bimserver software and the port you run the software.

I get some strange errors when I try this new version. How about that?

You should delete the database of the old version, before deploying (starting) the new one.

There are some other strange errors... What's this all about?

Make sure you have enough memory available for your JVM. We recommend a heap size of 1600m and a stack size of 1024k.

4 GETTING STARTED

Now that you are running your own BIMserver, you can get start using it. In this chapter we will guide you through the first steps of using it.

4.1 CHANGING PASSWORD

First of all, you should change the administrator password to something nog so default.

After login you should click on 'Administrator' in the top right corner of the screen. You will get the userdetails for the 'Administrator'-user. It will look like Illustration 5.

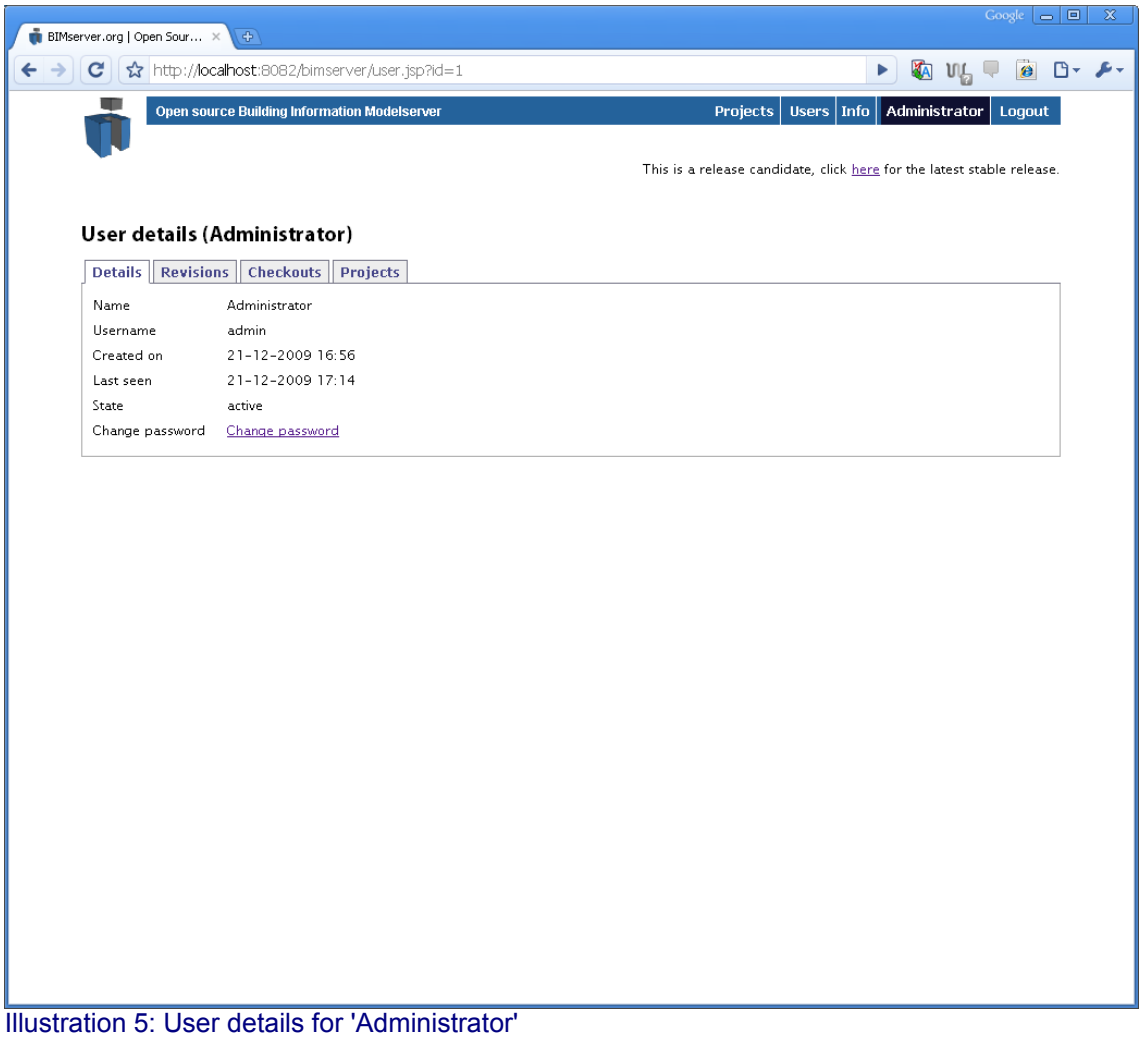


Illustration 5: User details for 'Administrator'

Now click on 'Change password' and you will get another screen with 3 boxes. Fill in the old password ('admin') and your own chosen new password twice (to make sure you don't mistype) .

After this you will return to the Userdetails page again, and you will see a message "Password succesfully changed"

After doing this, click on the BIMserver logo on the topleft and you will return to the main page (looking like Illustration 4).

4.2 STARTING A PROJECT

As you can see, there are no projects in your BIMserver so far. You can start a new project by clicking 'Add project'. After clicking this you will be asked a project name. Give your project a name (for example 'first use').

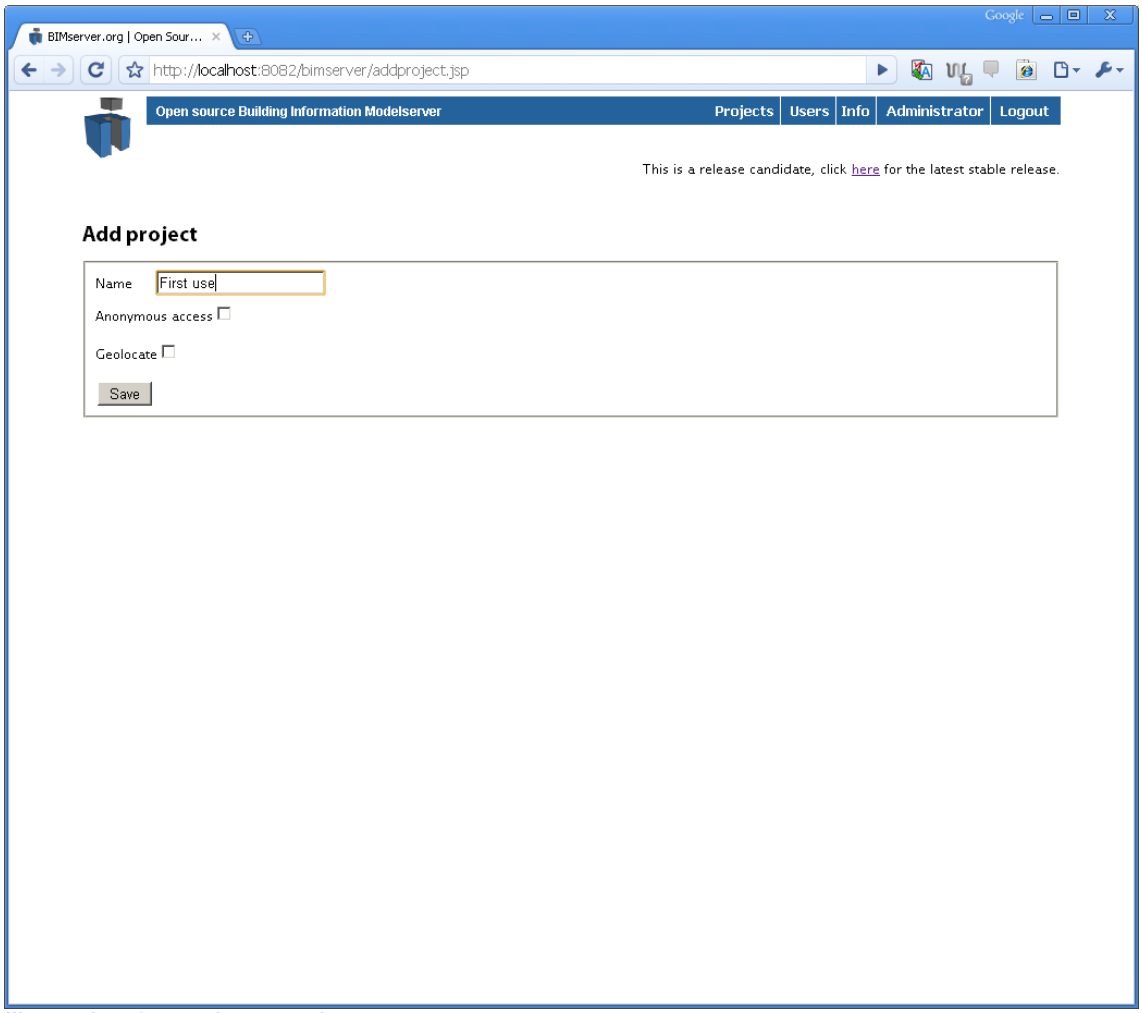


Illustration 6: starting a project

Furthermore you can give your project 'anonymous access' and 'geolocate'.

When you check 'anonymous access' you give anonymous users the ability to view (parts of) your model. This can be handy to give people the KMZ-networklink for example to view the latest status of your project on google earth (without having to login). Advanced users can use the BIMserver as an object library by giving anonymous access. More info on the 'Anonymous access' option can be found at chapter 4.7.1: 'Anonymous access to (sub)projects'.

When you click on 'Geolocate' some x,y,z fields appear. To geolocate your project, fill in in the x,y,z fields. These numbers are the real world placement coordinates of the

building you are modeling. But just forget about them for a moment.

Click 'Save' to send your data.

The project is now being created in the database. After this is done you will get a screen that looks like Illustration 7.

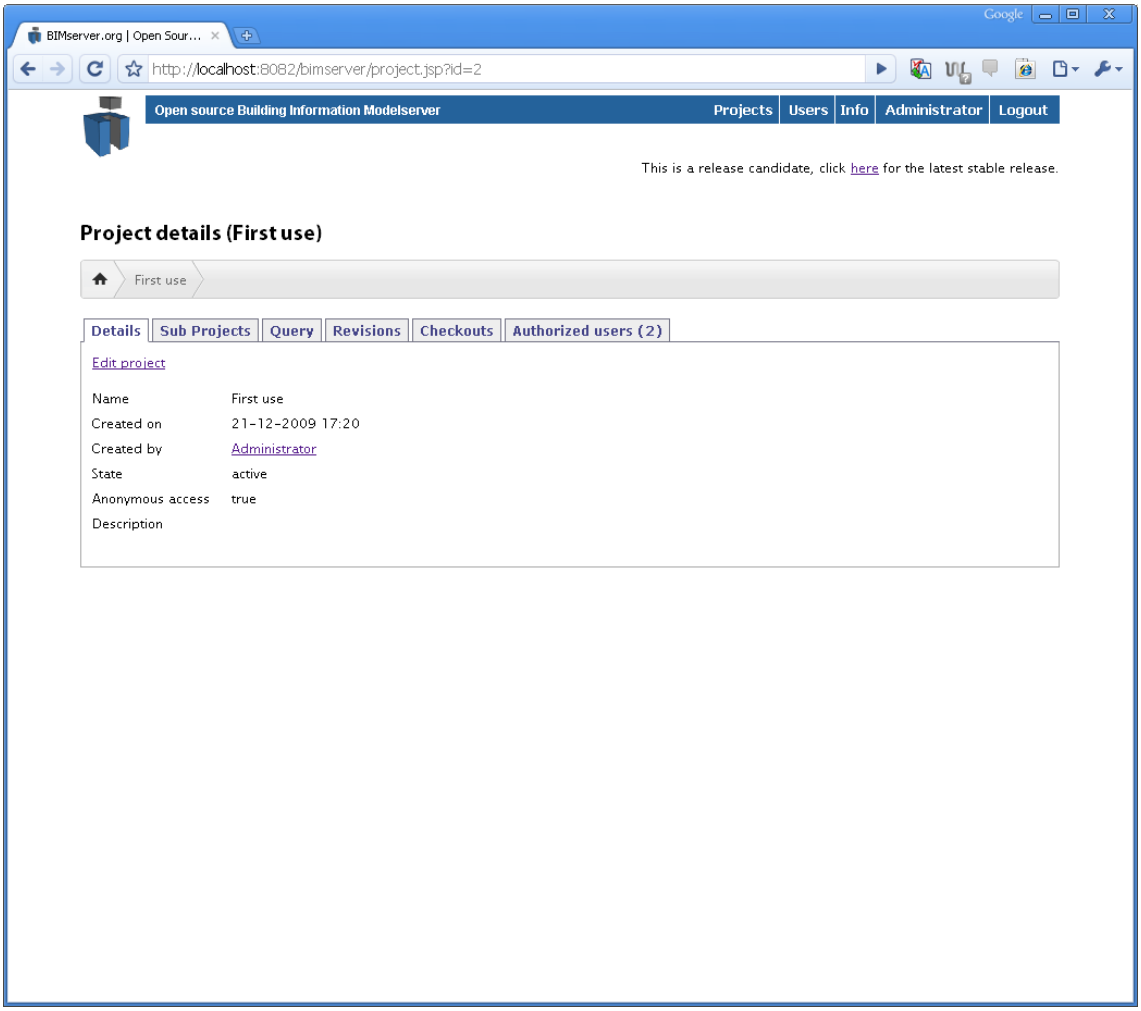


Illustration 7: First project created

Your can see the name, the date and time it was created, the user that created it, it's status (active), whether your project has anonymous acces and a description.

To change this data, click on 'Edit project'.

This screen has six tabs. You can explore the tabs by clicking on them. When you click on 'Revisions' you will see that there are no revision, same goes for 'Checkouts'. In the tab 'Authorized users' you can find the list of users that have authorization on this project. For now this is only one (the Administrator).

4.3 UPLOADING YOUR FIRST MODEL

Your project is still empty. You have to make an initial upload of a model first. The most common way to do this is to upload an IFC file.

Do this by clicking on the 'Revisions' tab.

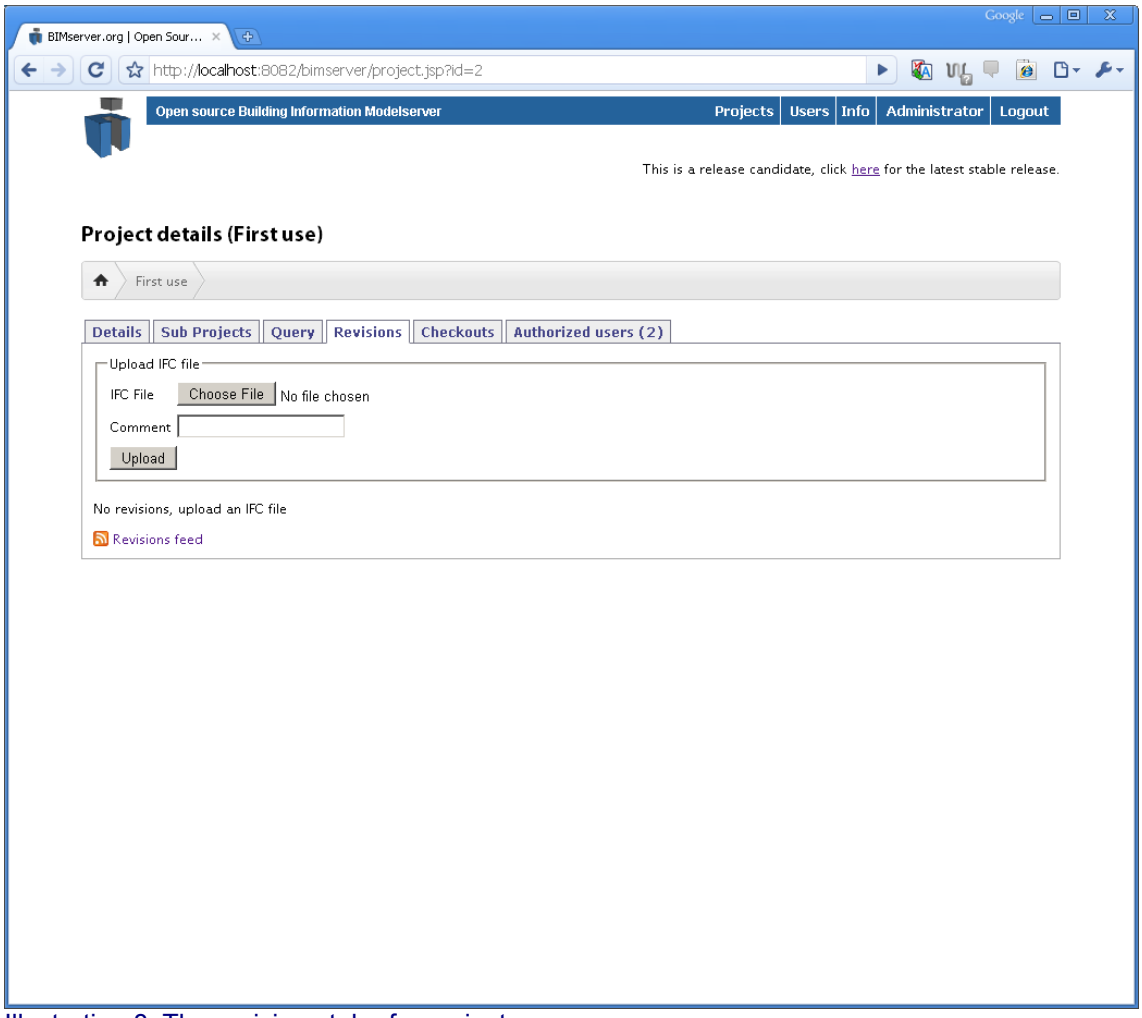


Illustration 8: The revisions tab of a project.

Click on 'Choose File' after the 'IFC File' attribute. Now find a STEP file of an IFC model (normally recognizable by the .ifc extension). If you don't have such a file you can download some on www.ifcwiki.org or on download.bimserver.org.

Optionally you may fill in a comment in the 'Comment'-field. For example the text 'initial upload'.

After this click on 'Upload'. This may take a while, and your browser will give the notice that it is 'working' or 'in progress'.

After this is done your BIMserver will return a screen that looks like Illustration 9.

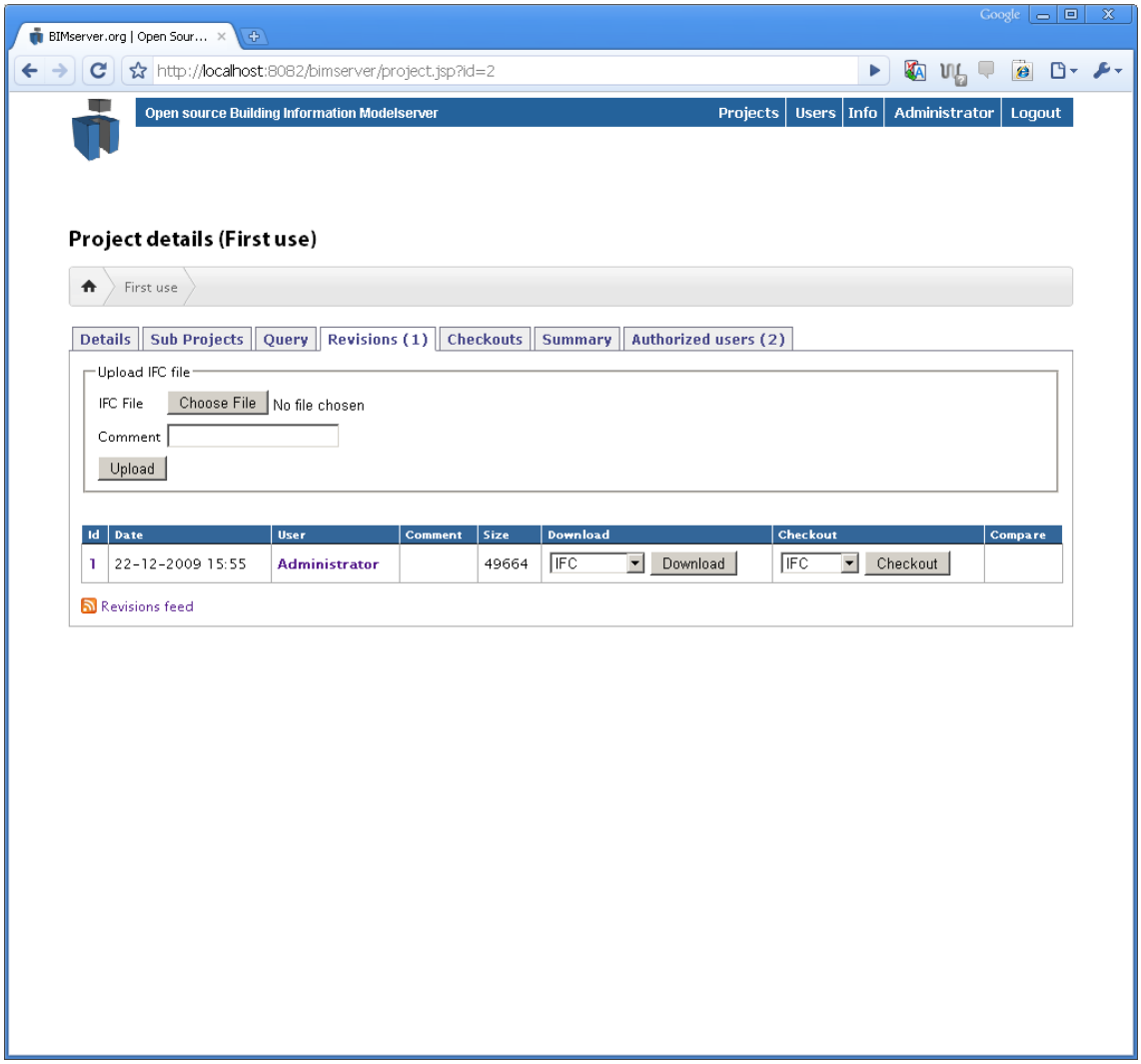


Illustration 9: Project revisions (after first upload of an IFC file)

This screen shows you the revisions (which is only one for the moment) of the project. You see the revision ID, the date and time of the creation, the user that created it, the comment, the size (in Kb) and possibilities to download and checkout the revision.

Your first model is now in the database of your BIMserver!

4.4 QUERY YOUR MODEL

In your project click on the 'Query' tab. You will get a screen that looks like Illustration 10. This tab gives you three possibilities to query your model.

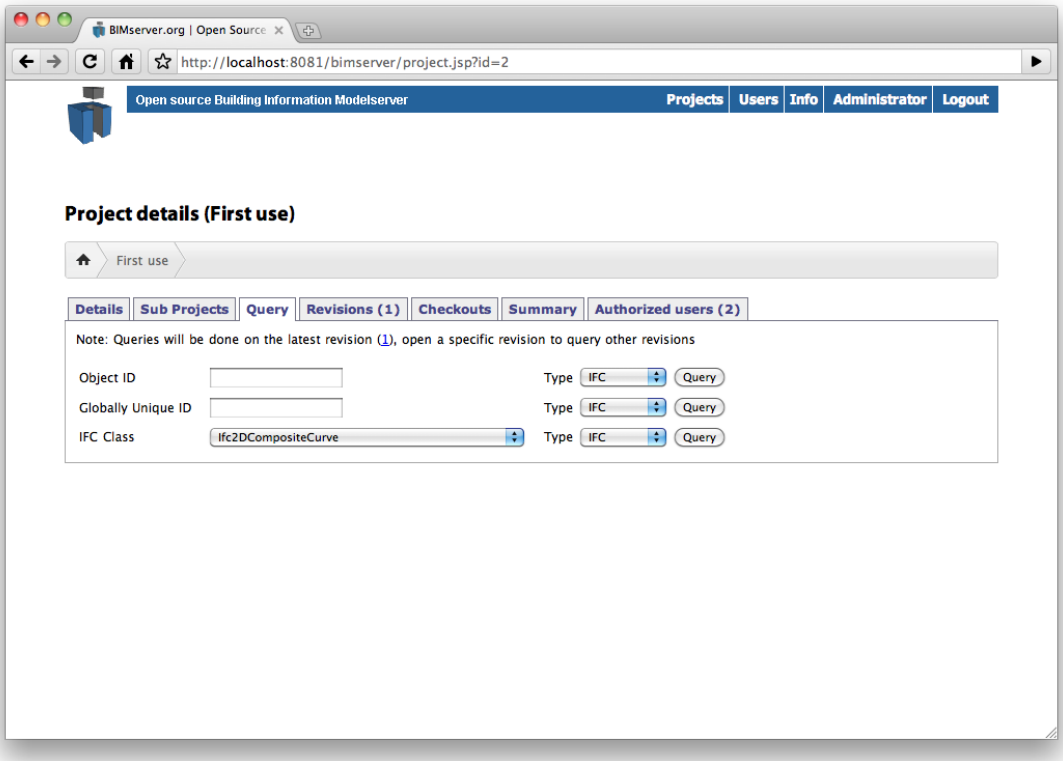


Illustration 10: The Query tab

You can query the BIMserver objectID; the IFC Global Unique ID (GUID) or per objectclass.

These query-possibilities work separate from each other. You can not combine them in the webuserinterface.

Because you have to know the GUID up front tis feature is 'kind of for expert users'. The beauty is that it works (just like al the other webinterface features) in the SOAP interface as well. This way your software supplier can connect to your installation of the modelserver.

After filling in on of the fields (for example an IFC GUID in the Globally Unique ID filed) you can choose in which data format you wish to receive the result. The options are IFC, ifxXML (beta), Collada, and KMZ. You will get the result in a download file of your chosen option.

4.4.1 USING REST LINKS TO QUERY YOUR MODEL

It is also possible to link to the query result using a static (or dynamic) REST link. This way you can always link to the latest query result without having to download it manually.

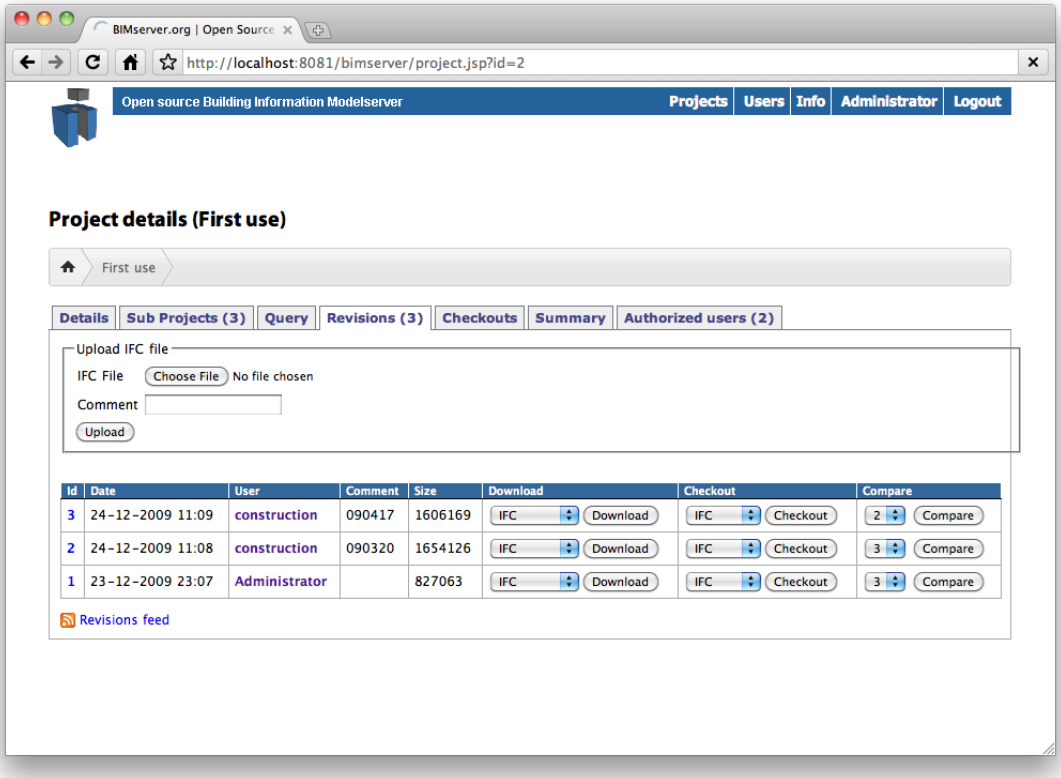
The REST links look a bit like: http://bimserverinstall/

When you use the REST links, there is another data format[1] in which you can get the result: O3D (by Google). More on using the O3D REST links in 6.4.2: 'Using the O3D REST links'.

1 O3D is not really a file format. See http://code.google.com/O3D/ for more information.

4.5 GET CHANGES BETWEEN REVISIONS

It is possible to let the BIMserver calculate the differences between two revisions of a (sub)project. This feature is new and still in beta mode. It is not optimized yest so it will require a lot of memory usage from your server.



How it works: go to the revision list of the (sub)model you want to compare revisions. Behind each revision (when there are more then two) there is a column called 'Compare' . You can compare every revision with each other. Choose a revision number you want to compare the revision with and click on the 'compare' button behind it.

Because this function is still in 'demo' mode it is not optimized for performance. In other words: it will take a long time before you get a result (if you even get a result, because it will need a lot of your computer memory).

For the nerds: What this feature does is compare the IFC GUID's of both revisions with each other. You will get a list of IFC elements that are added or deleted. For now you will NOT get 'changed' objects. This function will evolve in the future development of the open source BIMserver. We intent to list al deleted, added and changed IFC objects. The changed object will be scanned for property-changes, relation changes (to other objects) and geometry changes.

When you have a feature request or other sort of feedback on this function, please

contact us through www.bimserver.org.

4.6 GET A SUMMARY OF YOUR MODEL

The open source BIMserver gives you the ability to get a summary of your model. In you (sub)project go to the tab ' Summary'. You will find a screen that looks like Illustration 11.

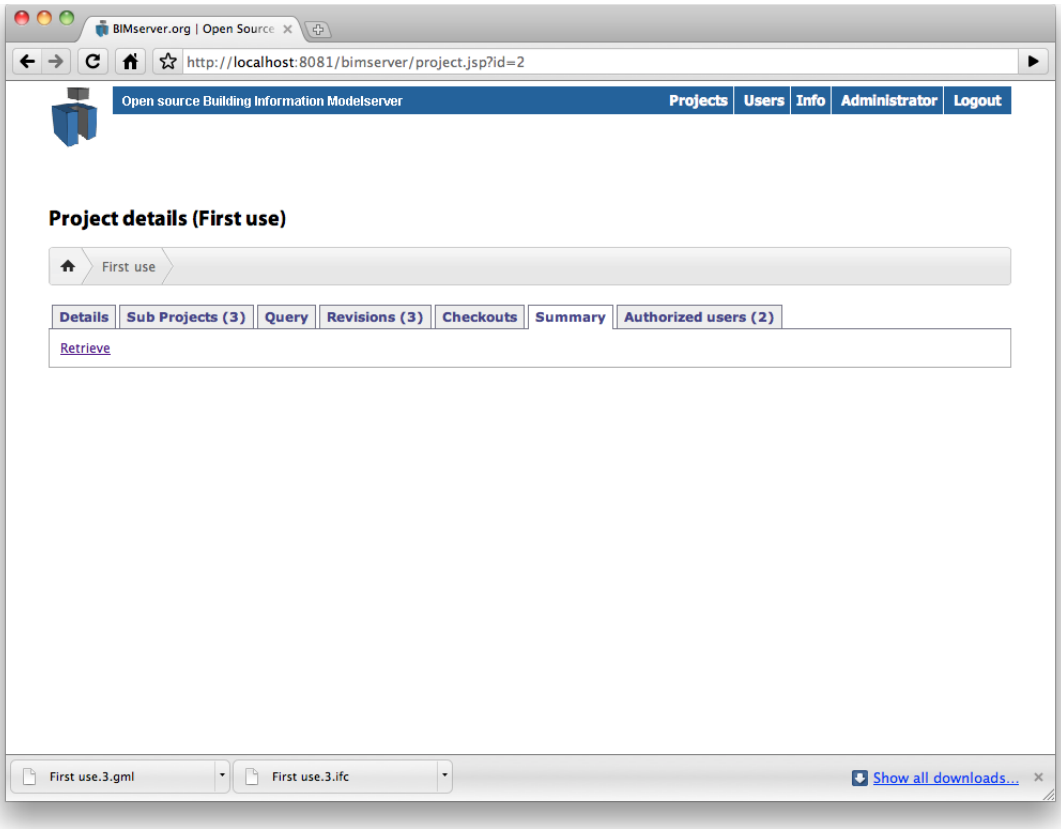


Illustration 11: The summary tab

After you click 'Retrieve' a status icon will appear. Your server is now retrieving the latest model summary. After a while (not too long) you will get the result in a nice table. It will look a bit like Illustration 12.

The result will list the IFC entities; the IFC Primitives; the IFC Relations and Rest as the miscellaneous.

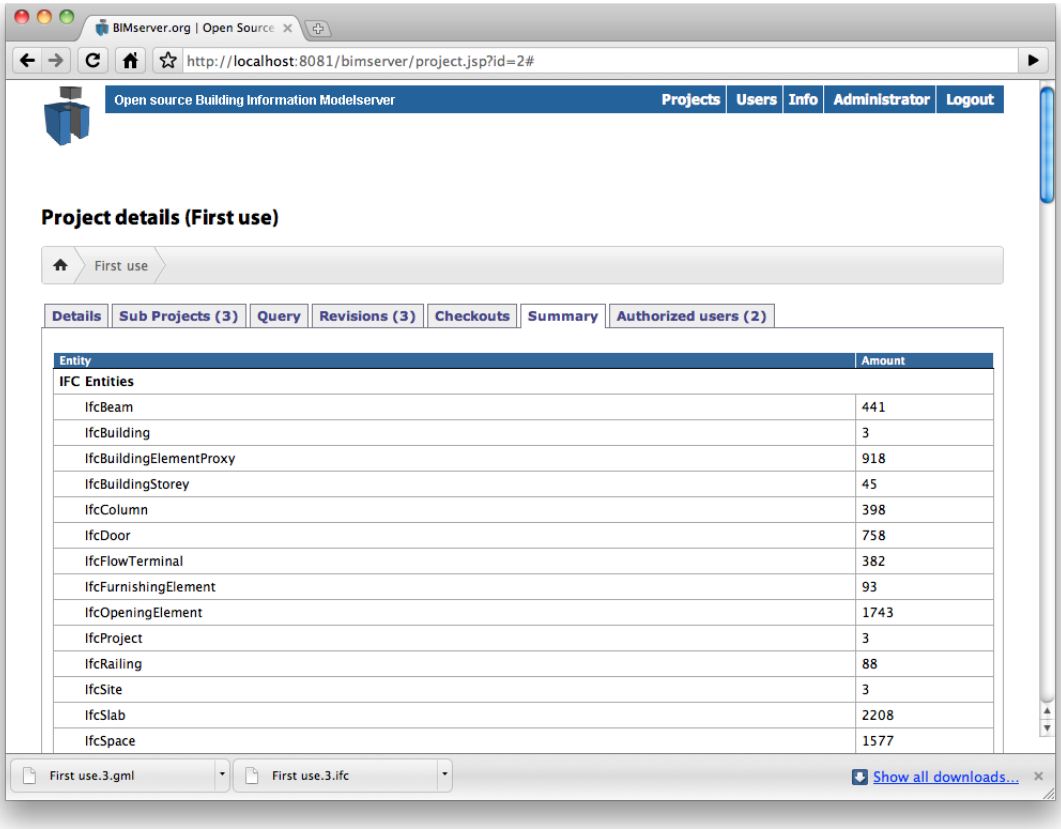


Illustration 12: Result of the model summary

4.7 EDIT PROJECTDETAILS

After creating a project, some data, like the project name, cannot be changed anymore. However, it is possible to change some information of the project details. To do this, go to the (sub)project you wish to edit.

Make sure you are on the 'Details' tab (your screen will look a bit like Illustration 7). Click on the 'Edit project' link. You will get a new screen that looks like Illustration 13.

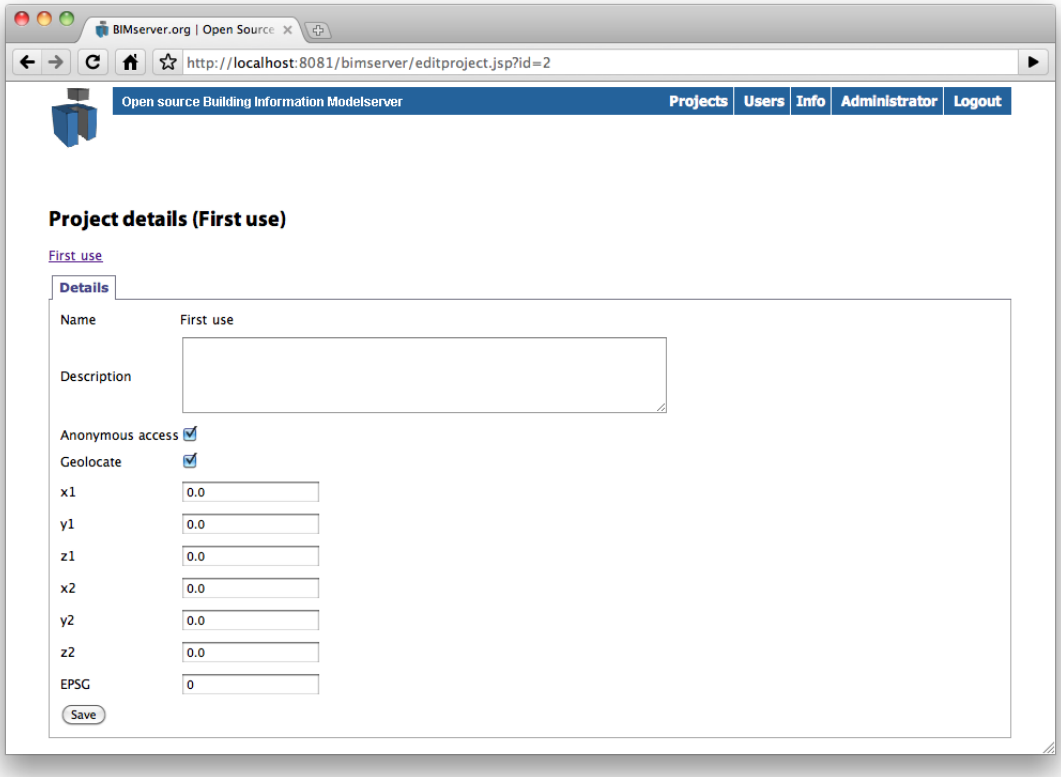


Illustration 13: Edit project details

This screen give you the possibility to edit some details. The project name can not be edited.

You can edit the description and the geolocation. The checkboxes make it possible to turn the 'Anonymous access' and 'Geolocation' on or off.

Geolocating your project means that you can place your project on a specific place on the earth. The geolocation is given in x,y,z coordinates. The x1,y1 and z1 specifies the 0.0.0 coordinate of your BIM model. The x2, x2 and z2 represents the direction of the X-axis in your BIM model[1]. This is done so you can rotate your model the correct way. Using the EPSG box makes it possible to give the coordinates in any given EPSG system you prefer. The most common is '4326' (the standard lat lon coordinates) with coordinates in decimals (hours).

4.7.1 ANONYMOUS ACCESS TO (SUB)PROJECTS

The checkbox 'Anonymous access' needs some explanation. Obviously when the box is checked your project allows anonymous access, and if not checked it doesn't.

Anonymous access in this context means that users do not have to be logged in to download or query your model! In other words: every (webbrowser) user can view your model if he/she has the link to it.

This gives some advantages. First of all you can give your clients the link to the (always) latest revision of your model in KMZ format. This way they can follow the progress of the model in Google Earth. More advanced clients can have the IFC link

1 Not yet implemented in the 0.8 release.

and download the latest version of a (sub)project at any given time when they prefer.

The RSS feeds for update changes only work for projects that have anonymous access (because your RSS reader is not a logged in user). In some upcomming release we will implement authorization options for the RSS feeds but for now you have to work with this option.

The original reason why we implemented the 'anonymous access' was the ability to use your BIM model as a object library. Using the REST links (see 4.4.1: 'Using REST links to query your model') to specific query results creates dynamic (or static as you choose) links to specific objects in your model (for instance a door, or a window). A REST link will give the IFC data (or other data format as you choose) of a specific object in your model. Using this link in another application gives a lot of possibilities. This is done in the COINS[1] project for example. When your object updates in your model, all other users linking to the latest version automatic get the latest updated model (all users linking to a specific revision do not get an update of course).

Smart use of the REST links when using the 'Anonymous access' option can create a rich object library of your BIM models. This creates possibilities to re-use the knowledge and data of previous projects!

1 More info on www.coinsweb.nl or the COINS wiki.

5 THE CONCEPT OP SUB-PROJECTS

Subprojects and the automatic merging between them is what makes a BIMserver being a BIMserver.....

5.1 THE CONCEPT

Multiple users, multiple parts of the model, updates, read access, consistency checks, checkouts and of course..... automatic merging.

5.2 AUTOMATIC MERGING OF SUBPROJECTS

This is cool....

5.3 DOWNLOAD AND/OR CHECKOUT

You can now 'download' or 'checkout' your model in the format of your choice (IFC, or ifcXML for example).

5.4 AUTHORIZE OTHER USERS ON YOUR PROJECT

To authorize other users on your project.....

5.5 CHECKOUT AND UPDATEWARNINGS

To keep your model consistent.....

6 ADVANCED FEATURES

Now that you know the basics, it's time to step up.

6.1 GETTING CHANGE NOTIFICATIONS (ON UPDATES)

This is the RSS feed....

6.2 USING XML-LINK AND IFC-LINK

This is cool....

6.3 GEOLOCATE YOUR PROJECT (AND USE GOOGLE EARTH)

KMZ network link for google earth...

6.4 EXPORTING TO DIFFERENT FORMATS

Collada, etcetera....

6.4.1 THE CITYGML EXTENSION FOR BIM & IFC

Reference implementation....

6.4.2 USING THE O3D REST LINKS

Very, very beta....

6.5 USING YOUR BIMSERVER AS A PRODUCT CATALOG

This is cool....

6.6 HOW TO USE CHANGESETS

This is difficult....

7 CONFIGURING YOUR SERVER

When the BIMserver does something you do not expect, there is always a way to configure it!

7.1 ADDING OR DELETING DOWNLOAD FORMATS

This can be done by....

7.2 CONFIGURING THE REGISTRATION SETTINGS

This can be done by....

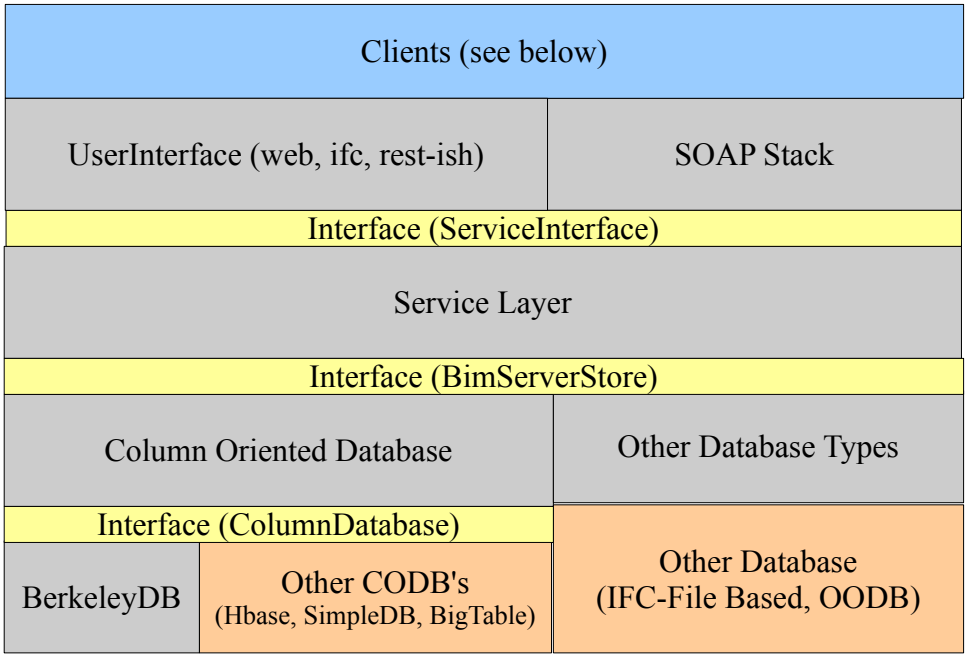
7.3 CONFIGURING QUERY SETTINGS (IGNORE FILE)

This can be done by...

8 ARCHITECTURE

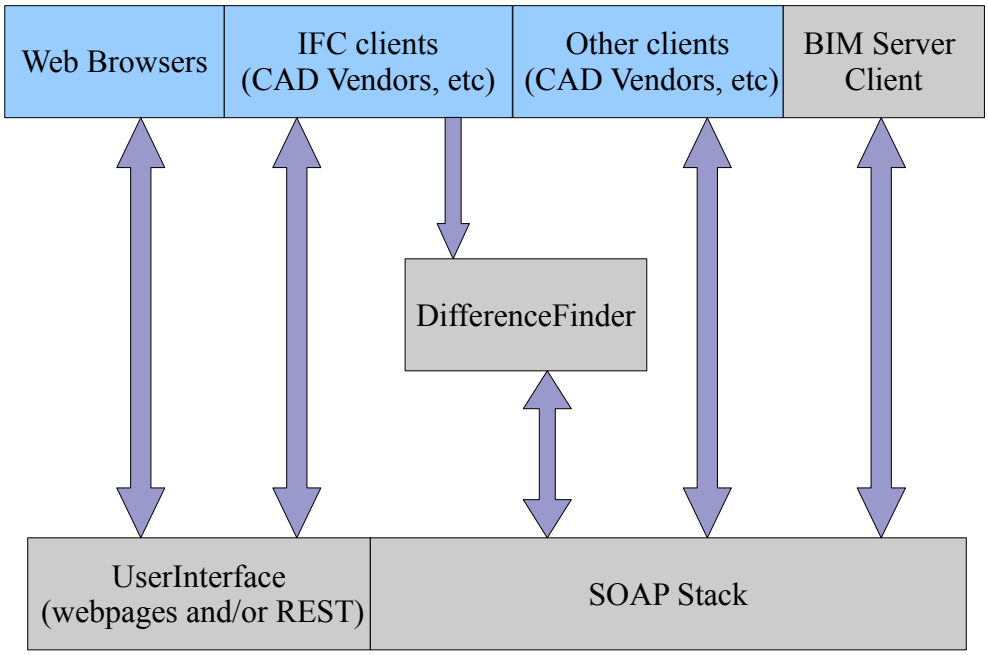
This chapter will describe the global architecture of the software. To get a complete inside view of the technique please read the developer documentation of the wiki.

The global architecture looks something like this:

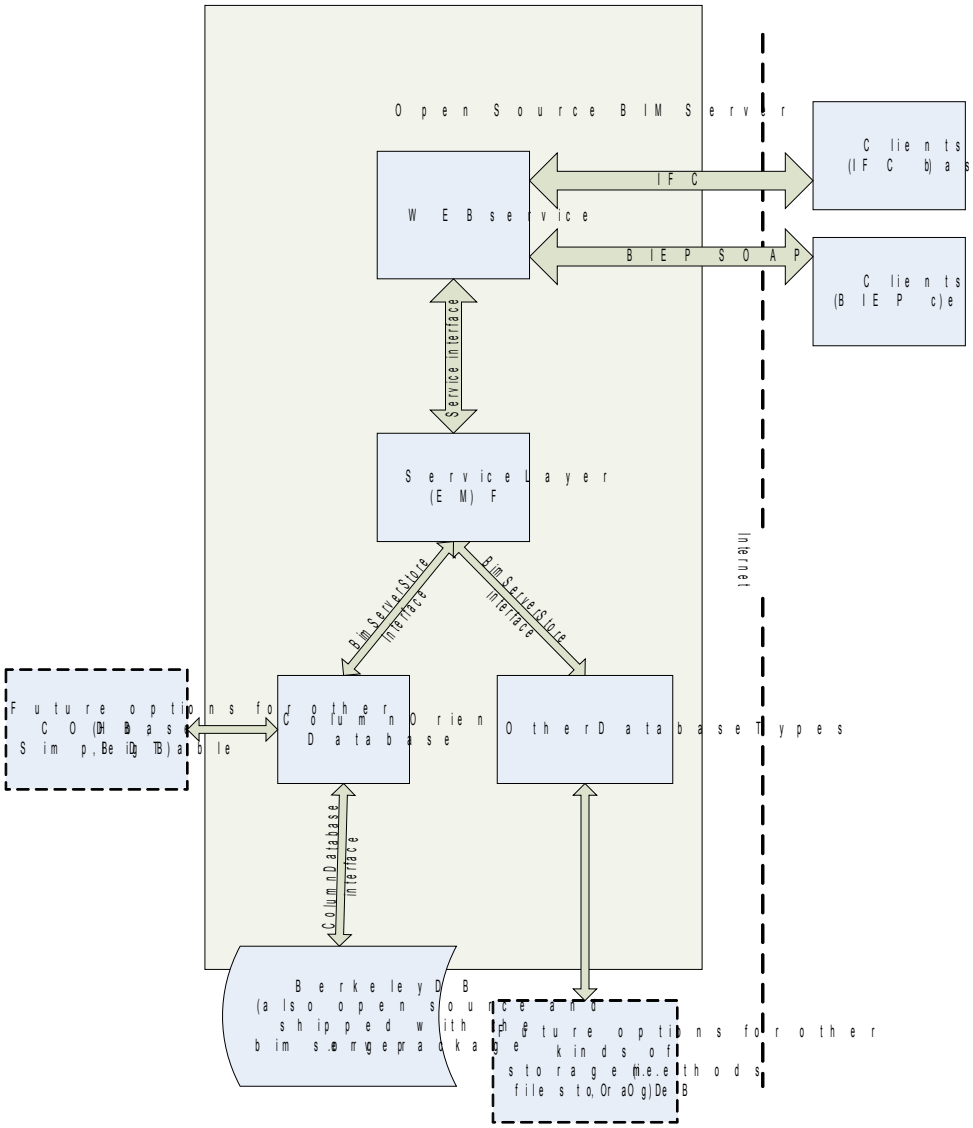


Architecture

There are some different clients to interface with the bimserver:



A different view on the architecture (but basically the same):


Open Source BIM Server
Clients (IFC based)
IFC
WEB service
BIEP SOAP
Clients (BIEP ce)
Service interface
Service Layer (EMF)
BimServerStore interface
BimServerStore interface
Internet
Future options for other Column Oriented Database Simple, BerkeleyDB, Table)
Other Database Types
ColumnDatabase interface
BerkeleyDB (also open source and shipped with the bimserver package)
Future options for other kinds of storage methods (i.e. file store, OrientDB)

9 EXTRA STUFF

Extra stuff for enthusiastic users.

9.1 USING THE SOAP CLIENT

Besides the Web-user interface, the BIMserver software also has a SOAP interface. You can explore this SOAP interface by using the special client.

Download the client from http://download.bimserver.org/

It will be a .jar file.

9.2 USING THE IFC ENGINE VIEWER

tbc

9.3 USING THE CLASH DETECTION TOOL

tbc

10 WHAT DOESN'T WORK

The stuff that doesn't work is listed on the bugtracker at sourceforge:

http://sourceforge.net/tracker/?group_id=224353&atid=1061305

When you find bugs, please report them using the link above.

We have known issues on:

- **Memory management**

The server runs out of stack size on large models. This is the main issue why this version is not a 1.0 release.

- **O3D rendering has issues on multiple objects**

Could be a bug of O3D. We are working on a fix (or workaround).

- **JVM stops when IFCEngine.dll crashes**

The Java Virtual Machine stops running when the IFCEngine library throws an exception. There are several ways to solve this and we are looking for the best one.