

BSP-Level Geometry

(mainly the id Tech 3 engine)

Written in July 2009 by Christian Sebastian Strahl aka [Chrisstrahl](#)

Referring to the player as male human is subject to simplify this tutorial, it is not the intention of the author to be sexism or discriminate the female gender.

INTRODUCTION

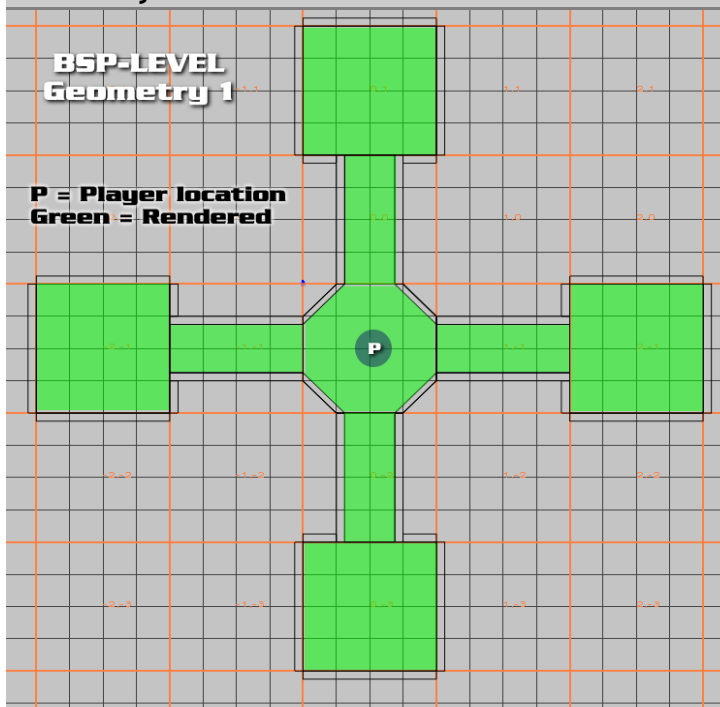
A level which will be Compiled into a BSP needs a logical structure of geometry.
With this tutorial the author intends to visualize this logic structure.

The author can not grantee that the information provided in this tutorial is perfectly correct! The author assumes that the information in this tutorial is correct and the tutorial is written in a casual and non over-tech-termed way.

This tutorial does NOT teach you how to get started with mapping or how to modify a BSP!

This tutorial explains how the geometry of a level is meant to be and now the geometric disadvantages can be avoid or fixed. You need to have very basic mapping skills.

Geometry 1



BSP levels show and hide clustered parts of the level to the player depending on the location of the player.

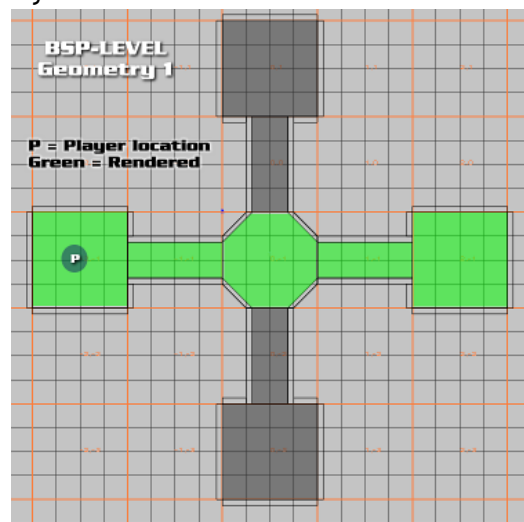
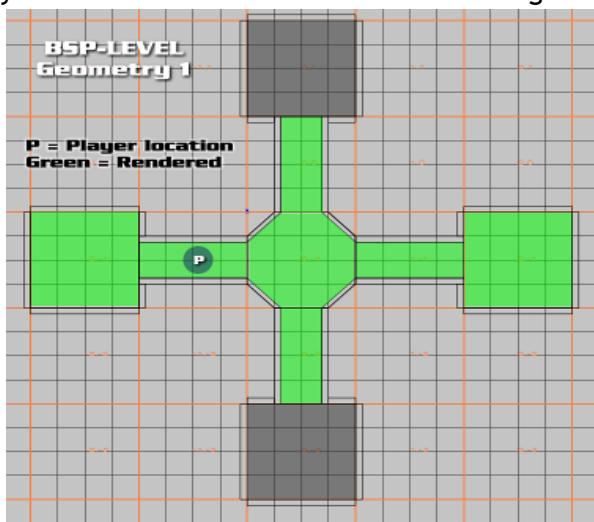
◀ If the player is standing in the middle of this level the entire level will be shown to the player, in techterms: Rendered

In the first example image the worst place to be at is the center of the map.

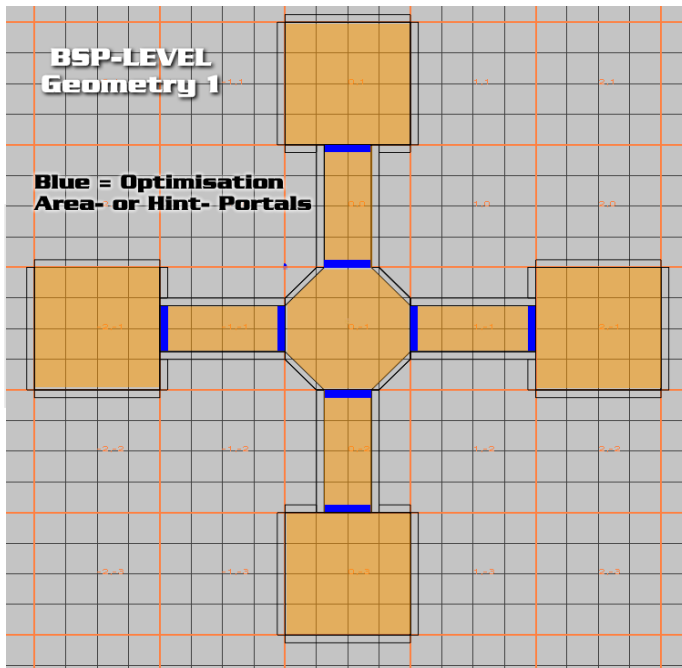
The entire map is rendered and this does not mean only the geometry. It means all models and textures, which means:

- EVERY
- ITEM
- PLAYER
- WALL
- CEILING
- FLOOR
- WEAPON-EFFECT
- VEHICLE
- EVIROMENT

The following images will show you what will be rendered if the player changes his position. Grey sections will not be rendered according to the player his current location.



The level structure of Geometry 1 makes it difficult for bsp structure to minimize the rendered sectors of the level. The Geometry 1 level needs optimisation! The blue marked locations offer them self for a ideal optimisation.

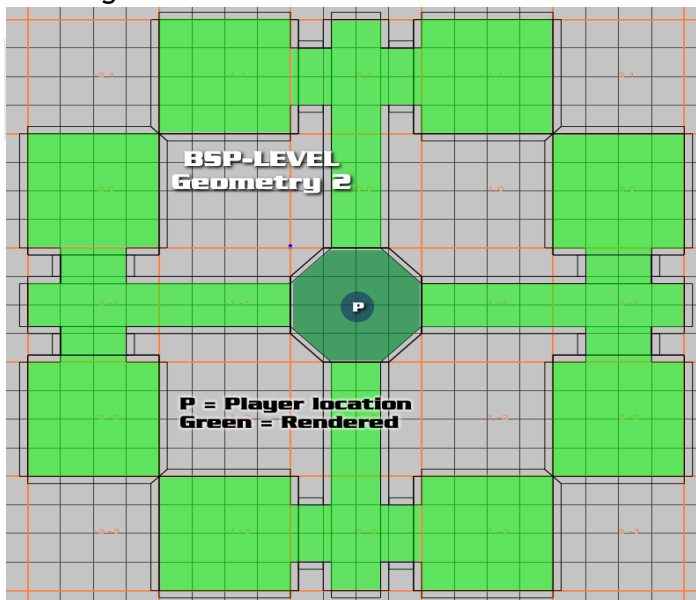


The best way would be to use doors combined with area-portals. Using hint-portals would be not a good choice for this level architecture!

◀ When using Hint-portals, they would be placed best right at the entrance of each of the 4 rooms, but not in the center of the level, since this could have a negative effect, unlike area-portals which would be placed at all blue marked locations.

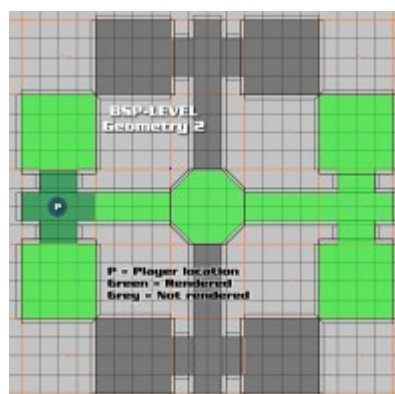
Geometry 2

Geometry 2 is slightly more complex and also a bad constructed level in terms of geometric bsp-level logics.

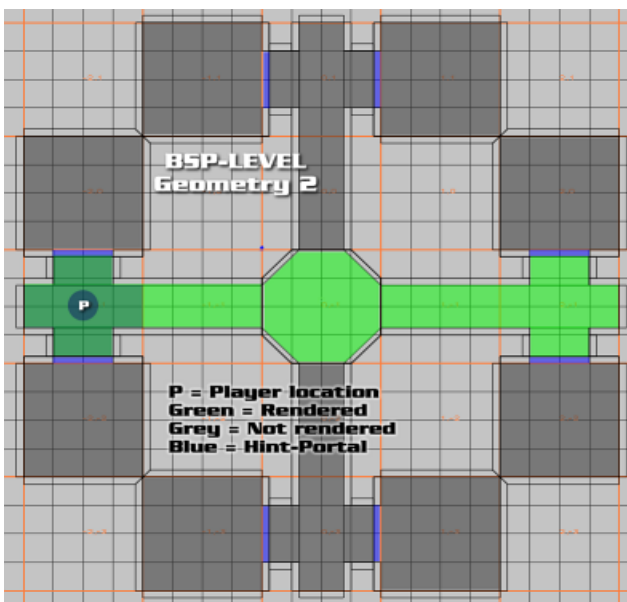
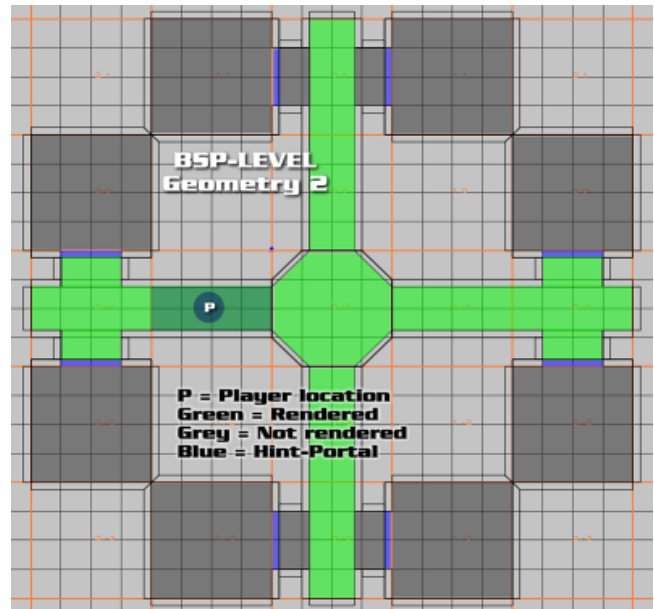
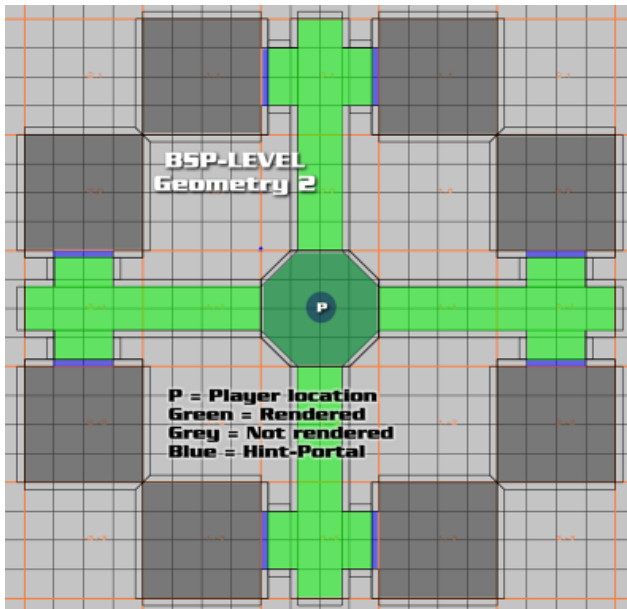


◀ When the player stands in the middle of this level all rooms are rendered, the performance of the level is very bad.

The following images will show you again what will be rendered if the player changes his position, remember that grey sections will not be rendered according to the player's current location.



What will change when optimize with Hint-Portals, will the following images show you.



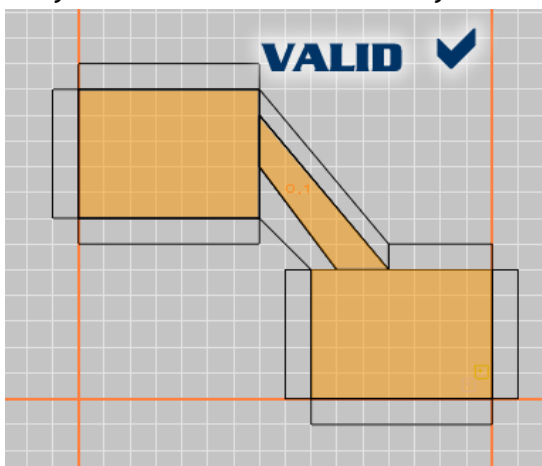
The optimisation with Hint-portals at the Geometry 2 level allows you to minimize the rendered rooms and their contents significantly.

But it is not always good to use Hint-Portals, sometimes they can have a negative effect on the level its performance.

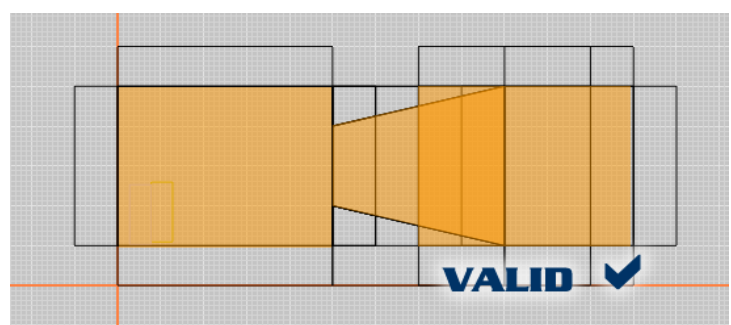
If you build a level try to leave some walls caulked, vis-compile the level and check the level in-game to get a clue where and how to optimize your level.

Possible Valid Geometry

There are many ways to design the geometry of a level, but some ways seem to be valid but they aren't while some other ways seem to be not valid, but they are valid in terms of performance and functionality.

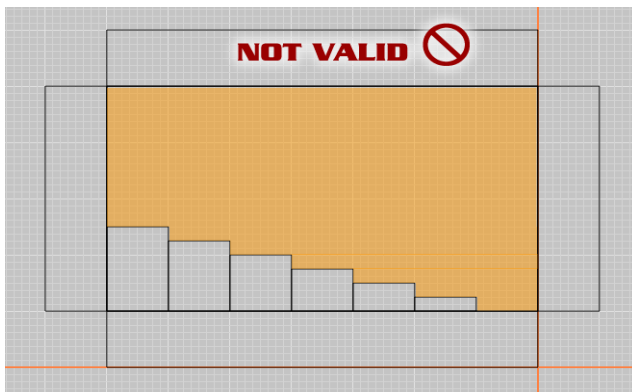


The following image-series will show you strange, but valid level geometry...



More is about to follow, but i want to take a brake for now, enough tutorial for today...

Not Valid and bad Geometry



Thanks for your intrest, the Tutorial ends here!

