



Esri CityEngine & Minecraft

- Engaging Citizens in 3D City Planning -

Brought to you by:

Brian de Vogel

- VU Amsterdam -



Safe Software

- Makers of FME -



**A 10 Year Old
City Planner?**

Seeing the Value:

Source: <http://blockbyblock.org/>



UNDUGU PLAYGROUND



“Block by Block involves young people in the planning of urban public spaces. Minecraft has turned out to be the perfect tool to facilitate this process.”



Complex worlds
dreamed up by
kids and created
in Minecraft.

Source: Ulf Masson (SWEKO)

Real-world scenarios



My town - its current look, what if we build/destroy



Lava flow (ie. Hypothetical Mount Rainier eruption)

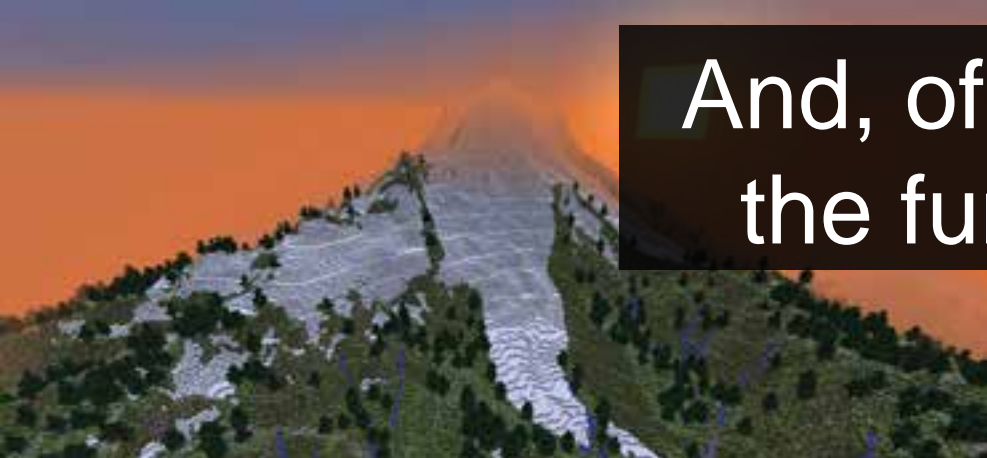


Forest fire (ie. Stanley Park)



Sea levels raising

And, of course,
the fun stuff



Roller coasters in nature



Maze Generating



Racing across Toronto streets



Living in a new world

How we can share our
worlds with theirs.

How 2D data can be leveraged in
3D with Esri CityEngine.



Project Vision:

Leverage Esri CityEngine and Minecraft to increase citizen engagement in neighborhood design & planning in the Netherlands.





Source Materials





Result



GIS and CityEngine to Minecraft

Andrés Nieto Porras

CityEngine is a great tool for transforming data into a realistic city model, which can then be adjusted according to further needs.

Source

An aerial photograph of a city street grid. Overlaid on the image are various colored shapes representing data: orange outlines for building footprints, cyan for water bodies and some roads, and green/yellow for vegetation. A large, dense area of green and orange points is visible in the lower right quadrant, likely representing a 3D point cloud or a detailed 2D dataset.

Goal: Combine 2D & 3D datasets to create a 3D model in CityEngine

City Engine Results

Output (for professionals)



```
version "2011.1"  
  
attr HGT = 0  
attr opacitytint=1  
attr opacityshape=0.6
```

CGA rules

```
##to use for a colorRamp  
#attr maxHGT= 1000  
#attr min = 0  
##Range(0,1)  
#attr colorValue = 1  
#attr x_norm =1 / (maxHGT - min) * (maxHGT - min)
```

Lot -->

```
#Use colorRamp  
#extrude (HGT)  
#color (colorRamp("brownToBlue",x_norm))  
#set (material.opacity, opacity)  
#Volume.
```

```
case HGT < 5 :  
  extrude (30)color ("PCACAC")  
  set (material.opacity, 0.5)Volume.  
Volume.
```

```
case HGT < 100 :  
  #to use (0)color ("brownToBlue",x_norm)  
  set (material.opacity, 0.5)Volume.  
Volume.
```

City Engine Results

The GIS output becomes a canvas of the city in Minecraft, which then offers a gaming style geo design tool that citizens and their children can interact with.

Appeal to a wider audience

3 Keys:

Make it **easy**.
Make it **cheap**.
Make it **fun**.

MINECRAFT

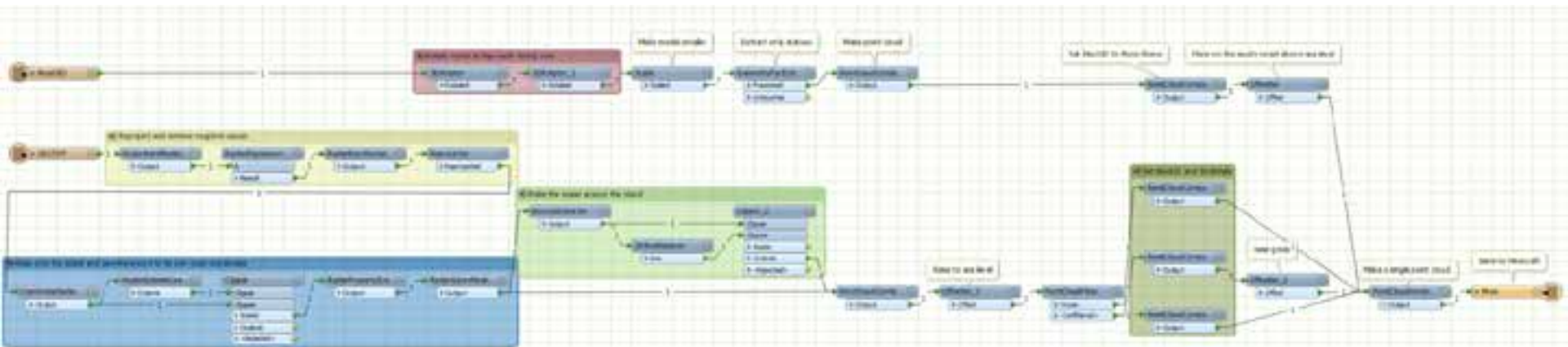
A young man with a short haircut, wearing a purple and black plaid shirt, is leaning forward in a focused expression. He is in a room with colorful graffiti on the walls. In the background, other people are visible, including a man in a blue shirt. The word "MINECRAFT" is written in large, 3D block letters at the bottom of the image.

How it's done


- Create CGA Rules to Create a 3D World
- Classify created 3D objects in CityEngine
- Set block ids from 3D Object classification on way to Minecraft

The path from CityEngine to Minecraft

- Export the model to a 3D format for further work in FME (Esri Data Interoperability Extension)
- CityEngine rules for can prepare for conversion to Minecraft
- Data Interop / FME Workbench creates the transformation to Minecraft

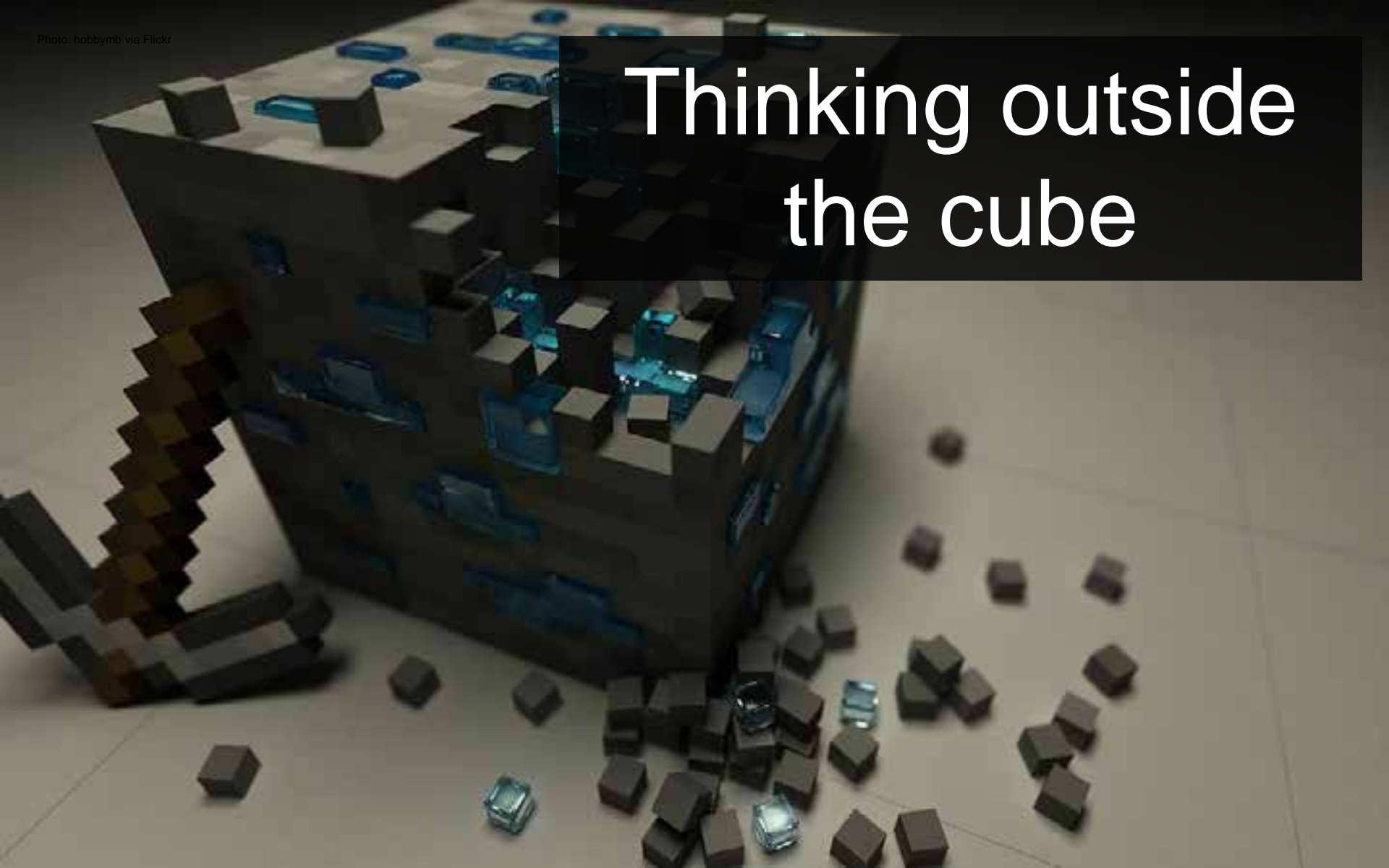


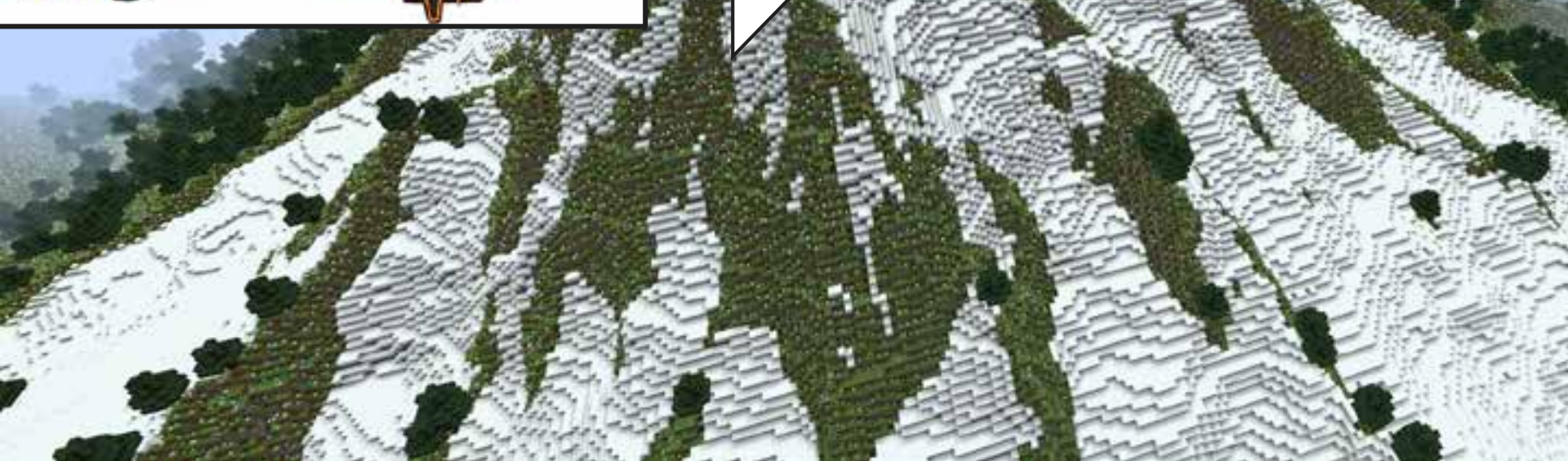
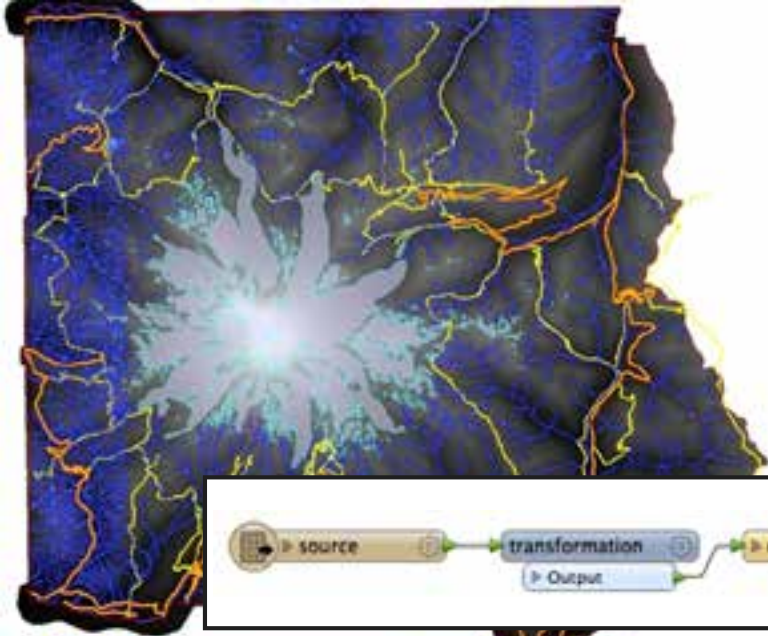
Project Summary

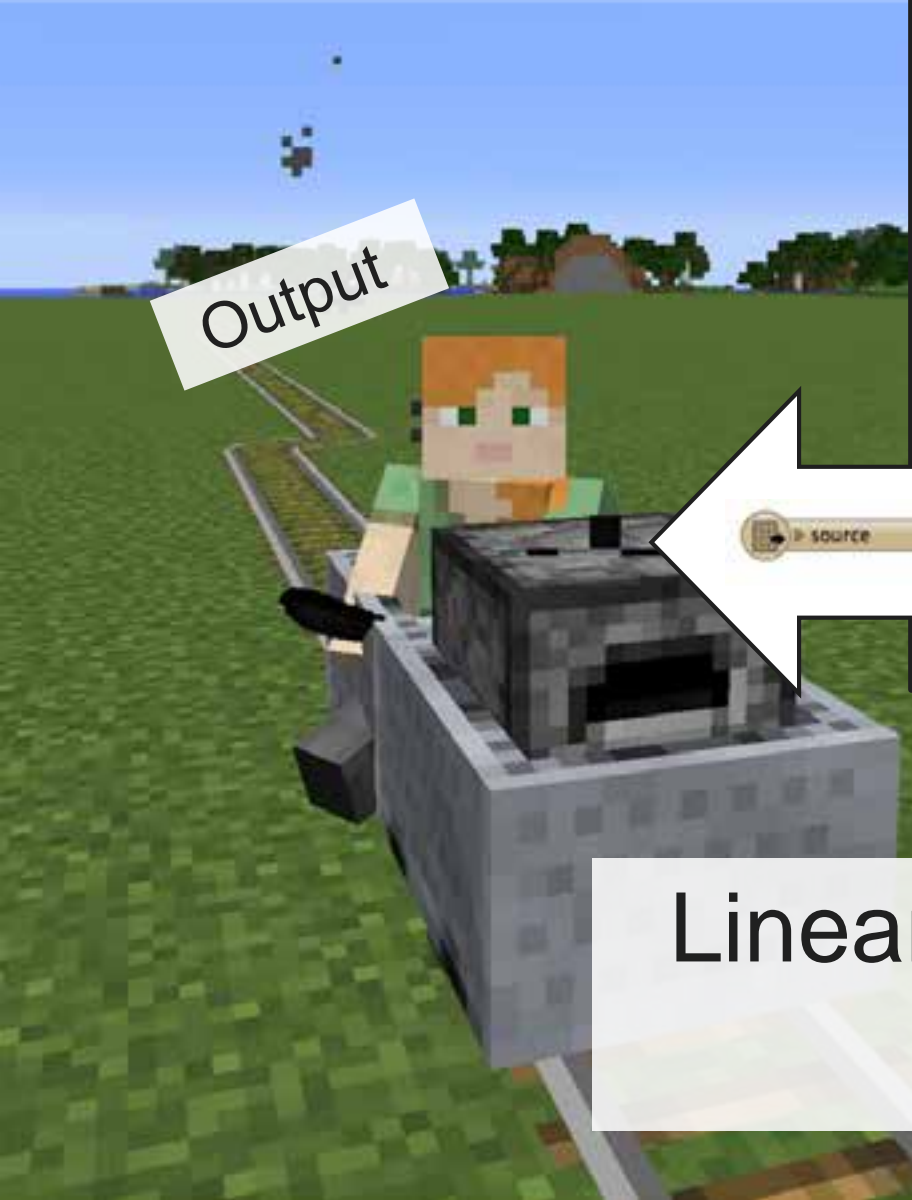
A 3D rendered city street scene. The view is from a low angle on a road with yellow double lines. On the left, there's a sidewalk and a building with a red sign. In the center, a tall, modern skyscraper stands behind some trees. On the right, there's a large, multi-story brick building with many windows, and further right, a taller, more modern building with a grid-like facade. The sky is blue with some clouds.

CityEngine is a powerful tool for combining 2D & 3D datasets. The 3D model output is realistic and puts the data in a perfect position to be converted to Minecraft.

Thinking outside the cube

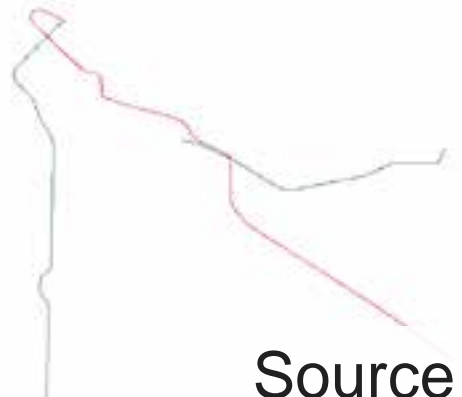




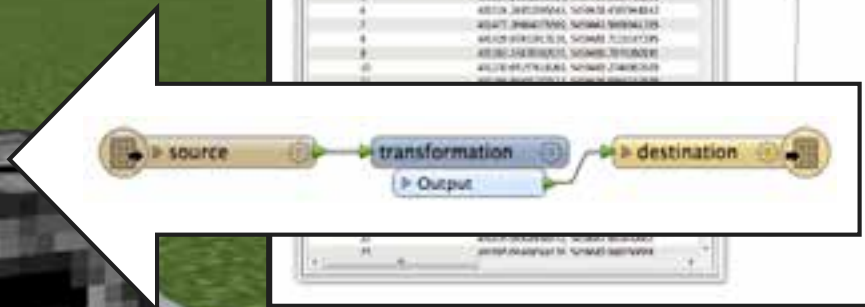


Output

Property	Value
Feature Type	Input (Vector) Line
Coordinate System	UTM/Zone 18
Dimension	2D
Number of Vertices	10
Min X-Coord	45222.123456789, 54230.987654321
Max X-Coord	45678.901234567, 50000.123456789
Attributes (0)	
Line Geometry (string)	Line_Single
Line Type (string)	Line_Single
LINESTRING (string)	LINESTRING
SHAPE COORDINATES (string)	SHAPE_SRS
LINESTRING (M) (Coordinate)	
Coord	10
Coordinates (M)	Coordinate Dimension: 2
0	45222.123456789, 54230.987654321
1	45230.987654321, 54230.987654321
2	45230.987654321, 54230.987654321
3	45230.987654321, 54230.987654321
4	45230.987654321, 54230.987654321
5	45230.987654321, 54230.987654321
6	45230.987654321, 54230.987654321
7	45230.987654321, 54230.987654321
8	45230.987654321, 54230.987654321
9	45230.987654321, 54230.987654321
10	45230.987654321, 54230.987654321



Source



Vancouver Skytrain
Shapefile

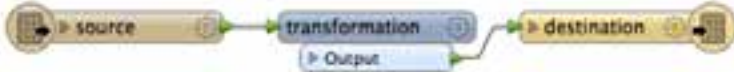
Linear Network to Minecraft (Railway)



BIM to Minecraft
is fun and easy!

Input (IFC)

Output

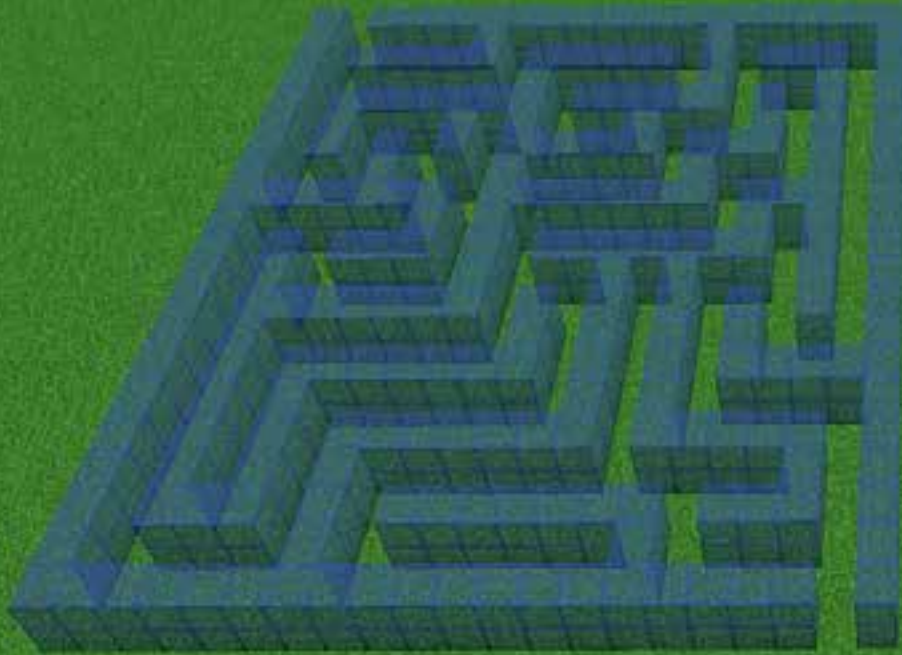


- Map IFC objects to Minecraft block types
- Convert each IFC object to Point Cloud
- Consider scaling depending on use case
- Watch $x/y/z$ position for multiple building worlds



Maze Runner Generator

fme.ly/MazeGenerator



How to Make Minecraft Worlds

fme.ly/MinecraftWorlds





Thank you!

www.safe.com

