# Blender Projects

**Geometry Nodes and the Melting Iceberg**

Dalai Felinto, January 2021

The Eight Step Process of Successful Change

1. Create a Sense of Urgency
2. Pull Together the Guiding Team
3. Develop the Change Vision and Strategy
4. Communicate for Understanding and Buy In
5. Empower Others to Act
6. Produce Short-Term Wins
7. Don't Let Up
8. Create a New Culture
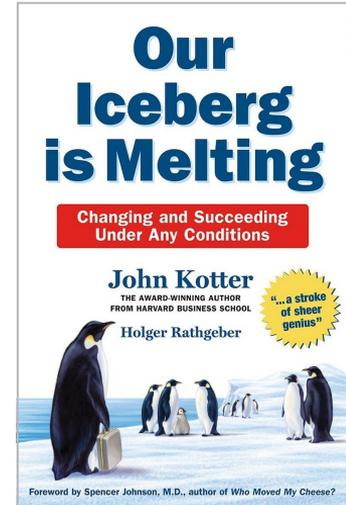
1. Create a Sense of Urgency

- Everything nodes development on hold!
- Workshop in September 2020

2. Pull Together the Guiding Team

- **Lead Developer**: Jacques Lucke
- **Developers**: Hans Goudey, Sebastian
- **Product Owner**/**Manager**: Dalai Felinto
- **Designer Tester**/UI: Pablo Vazquez
- **Designer Features**: Simon Thommes
- **Scrum Master**/**Senior Developer**: Jeroen Bakker

- **Stakeholders**: Ton Roosendaal, Brecht Van Lommel
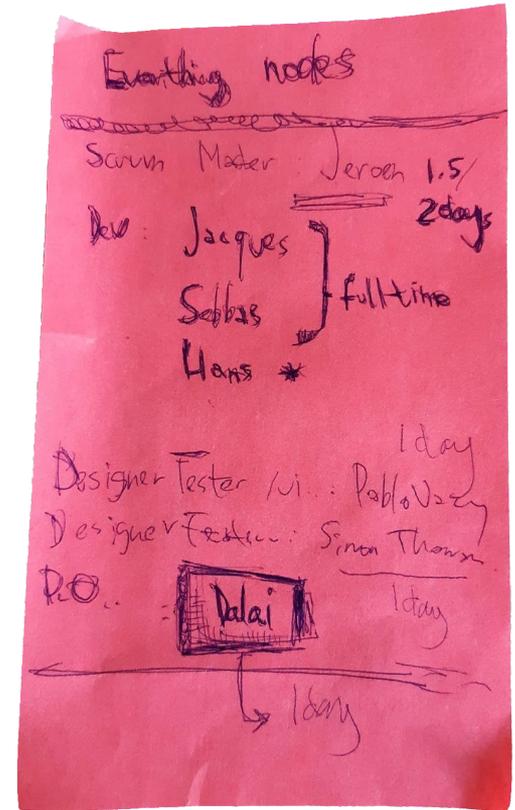
3. Develop the Change Vision and Strategy

- What would the studio love/need the most?
- Set dressing
- "Customer Need Pivot"

User Story-ish

Andy

All-around artist, did VFX with Blender for the most recent open movies:
- Sheep hair for Cosmos Laundromat
- Breath puffing for Spring
- Monolith sparkling in Spring

He is mostly excited about static particle scattering:
- Grass
- Branches
- Trees
- Leaves
- Plants

Limitations of current (scattering) system:
- Objects have to be rotated 90 degrees, which makes it hard to add procedural movement on top of it
  - rotating leaves
  - waving grasses
- There is no way of fine tuning individual elements

For hair he uses all but the smooth tools.
One thing that would be a life changer would be a volume brush, as oppose to the existing projection brush.

4. Communicate for Understanding and Buy In

Modifier Nodes

Geometry Nodes Modifier

The "Geometry Nodes Modifier", or "Nodes Modifier" for short, is a a modifier to handle more complex behavior. Its logic is built with a node group owned by the modifier. The geometry node group which can be used by multiple modifiers on different objects, or shared for different projects, just like a shader node group. High level settings are exposed in the modifier stack.
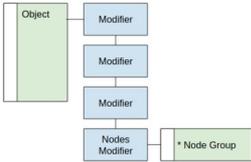
Any of the existent modifiers can be ported to nodes, though they may need small adjustments on a per-case basis.

Geometry Node Editor

The modifier's node group is edited in the node editor. The editor is context sensitive, showing the modifier node group of the active modifier of the active object.

High Level Abstraction

Modifiers are black boxes with geometry as the main input and output. External dependencies are possible on ID level. Users should be able to use the system in a high level. More general nodes contain several lower level building block nodes, with certain parameters exposed.

The building blocks of the system are kept inside the main node groups, abstracted away but tweak-able for advanced usage. Properties connected to the node group input are exposed in the modifier stack.

---
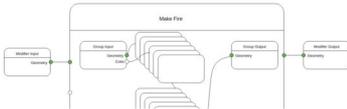
a clear flow of data. This means that each node ..., then passes the resulting data to its output

...s around multiple types of data

...esh objects can be passed around in the ... It is possible for the system to handle implicit ...ttings required in some cases. Often, the ...t input and output geometry types. For example, ...e nozzle as input, and outputs foam particles. ... output.)
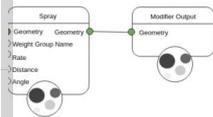
...eometry Types?

...s why one socket is used for all geometry data ...ch socket type. There are arguments in both ...ocket makes much more sense.

...etry type one is working with at any point. ...e to another is displayed visually.

...otherwise we might need socket types for mesh, ... point clouds, hair, grease pencil). ...ple different geometry types (e.g. Transform). Those

---

Nodes Modifier Part I: Sprites

NOVEMBER 9TH, 2020   BRANCHES, CODE DESIGN, GENERAL DEVELOPMENT, GENERAL UPDATES   DALAI FELINTO

This initial milestone of the *Everything Nodes Project* will focus on the features that can be used by the Blender Studio. Now that the *Sprite Fright* short film has been officially announced, the use cases can finally be discussed publicly.

The *Everything Nodes Project* was started in 2019 with the *Particles Nodes Project*. The focus at the time was dynamic particles simulation. Around August it was decided to put the project on hold to make sure the design was on point. This was followed by a particle workshop in September where the groundwork for the design was laid.

Moving forward, the focus shifted to tangible use cases that could be validated in production. The priority then shifted to work on geometry nodes, more specifically particle scattering for set dressing. Those were the features the Blender Studio artists were looking forward to the most.

Design

The geometry nodes follow the design of the particle system projects, but its focus is more narrow, and it addresses only static particles.

The underlying design is still the same as for the particle system, with a well-defined integration in the modifier stack as well as a clear dataflow.

The modifier's input and output are directly connected to the non-node based modifiers. It also contains a node group that can be shared across different objects and Blender files.

Sprints and Agile

The team is working in a squad following the *Scrum* methodology. The project has two-week periods (sprints) where the team aims to achieve tangible results.

The initial sprint, October 19 to 30, was a mix of preparing the ground work as well as organizing the backlog for the upcoming sprints.

...des and the ...Stone

...AL UPDATES   DALAI FELINTO   0

...e everything nodes projects is ...corporated in the upcoming

...required for the "scattering ...dress their scenes by randomly ...ty of parameters for full artistic ...ially, and more will come.

...wers". In this case different assets ...combined. As well as scattering of

...File is also available in the ...project page. For more details on the working process check the recent post

---

5. Empower Others to Act
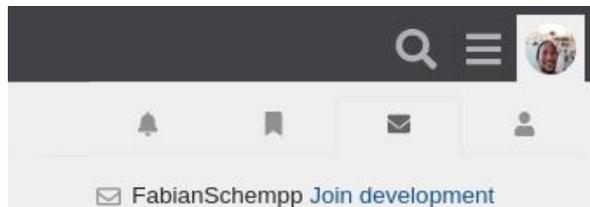
Contributor reaching out to be involved in the project.
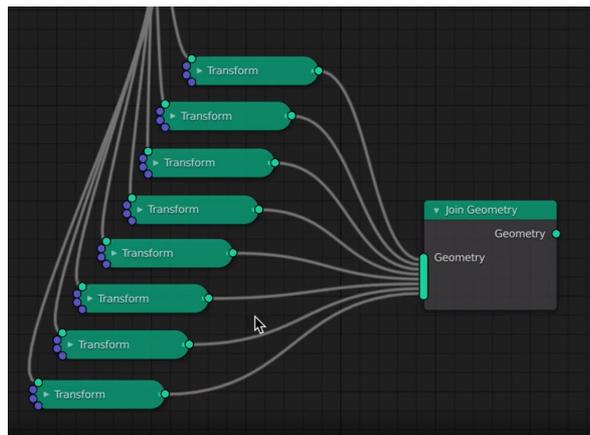
Multi Input Sockets patch by Fabian Schempp

Patches contributions by multiple community members

6. Produce Short-Term Wins
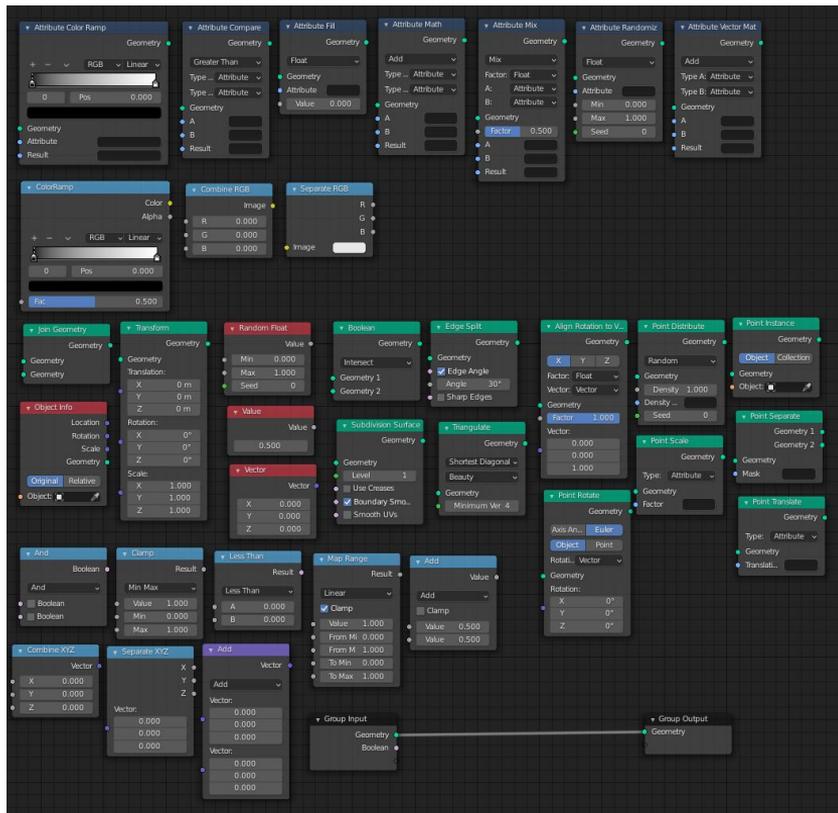
All the nodes that will be part of 2.92.
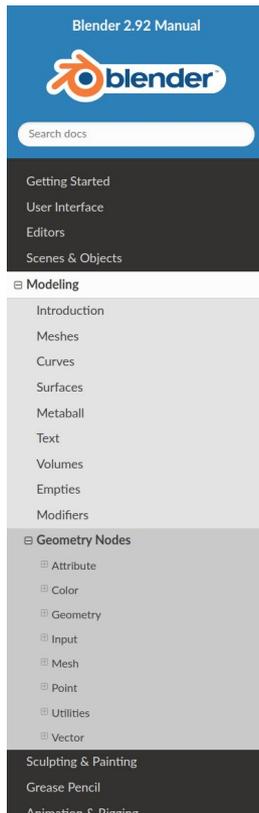
Documentation of the nodes.
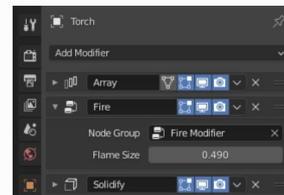
6. Produce Short-Term Wins

Faaaaarck! @faaaaarck · Jan 23

#b3d #geometrynodes #crowdsim - Performance is really good - frame took 1 minute to render. Fireflys have to go... some armatures rotate slightly "uncanny", i animated things in the geometrynode-tree. overall i am happy. Lets get some more random people.#cgi #history #Salute

0:08 5K views

💬 3   ↻ 26   ♥ 250

Early work by the community.

Faaaaarck! @faaaaarck · Jan 17

growy stuff #geometrynodes #b3d

33.7K views   0:05 / 0:30

💬 15   ↻ 363   ♥ 2.7K

Show this thread

eric schubert @3d_eric · Dec 30, 2020

Could not find a way to get the attribute color ramp of #geometryNodes in the shader. But random colors per object work on the instances. I just mapped these to a gradient ramp.

Show this thread

Faaaaarck! @faaaaarck

#procedural tree using #geometrynodes #b3d

0:01 106.9K views

8:16 PM · Jan 2, 2021 · Twitter Web App

848 Retweets **59** Quote Tweets **6.7K** Likes

6. Produce Short-Term Wins
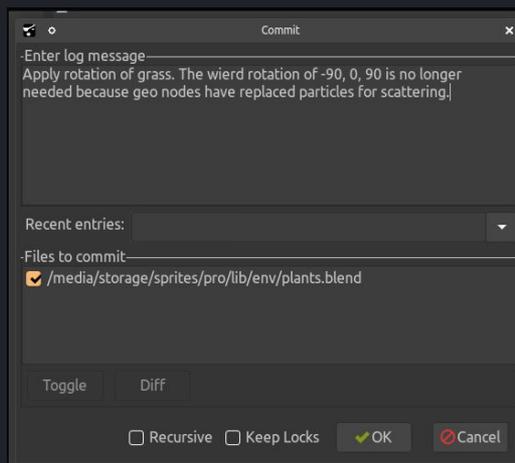
Sprite Fright production repository log.

7. Don't Let Up

Epic Waves

Set dressing

Procedural Modeling

Dynamic Particles

set dresser adding rocks

Moss on trees

Hair spray

flowers and trees

Tree barks

Animated creature duplication paths over animated body

Point cloud editing

Tree leaves

Particles edit mode polishing

Feedback by Andy Goralczyk - Jan 25, 2021

Instancing collections with object count

Current workarounds may suffice, but for future cases may/will be a problem.

Attributes discoverability

* Name of built-in attributes
* Keep track of added attributes

Alignment

* Normal interpolation [x]
* World space without reference object

Texture Sampling

* Generated mapping coordinates
* No way of going into the texture

- Polishing
  - Instance objects
  - Modifiers integration
  - ...
- "Debugging"
  - Spreadsheet
  - Socket inspector
  - Viewport overlay
  - Mesh preview
- Studio core requirements
  - Moss on trees
  - Tree leaves
  - Viewport/render quality
- User interface
  - Node Groups and Layers
  - Attribute search
- Everything nodes design
- ¿Attribute painting?

7. Don't Let Up

perceived value

Modeling

Tools

Hair

Rigging

risk

Dynamic Particles

Fluids
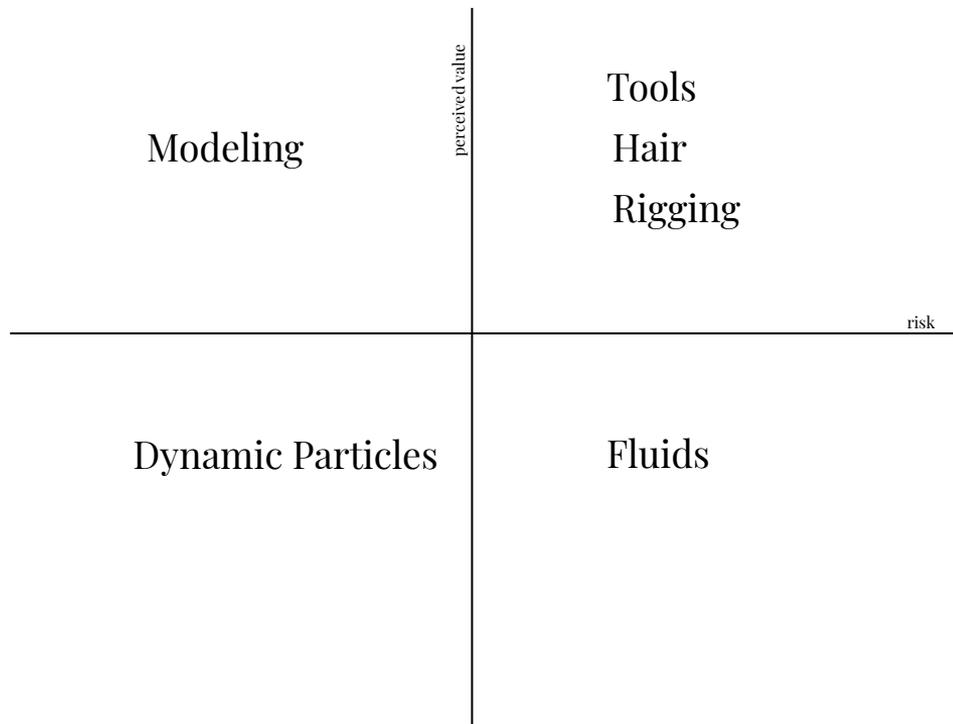
8. ~~Create a New Culture~~ What We Learned

- Close collaboration between designers, engineers and users
- Robust demos for testing and also validation
- Communication and quick iteration cycles saves time
- Design can easily become the bottleneck
- Focus and shared priorities are essential for team work
- Product over process – improvise, cut sprints short, …
- Overcoming distance with collaboration tools

The Eight Step Process of Successful ~~Change~~ Project

1. Create a Sense of Urgency
2. Pull Together the Guiding Team
3. Develop the Change Vision and Strategy
4. Communicate for Understanding and Buy In
5. Empower Others to Act
6. Produce Short-Term Wins
7. Don't Let Up
8. Create a New Culture

1. Define the problem and set the time
2. Assemble a complete team
3. Solve the design first
4. Document and communicate
5. Community involvement
6. Build incrementally / use cases
7. Polishing and wrap up
8. Project retrospective

Thank you

The Eight Step Process of Successful Change

Set the Stage

1. Create a Sense of Urgency.

Help others see the need for change and the importance of acting immediately.

2. Pull Together the Guiding Team.

Make sure there is a powerful group guiding the change—one with leadership skills, credibility, communications ability, authority, analytical skills, and a sense of urgency.

Decide What to Do

3. Develop the Change Vision and Strategy.

Clarify how the future will be different from the past, and how you can make that future a reality.

Make it Happen

4. Communicate for Understanding and Buy In.

Make sure as many others as possible understand and accept the vision and the strategy.

5. Empower Others to Act.

Remove as many barriers as possible so that those who want to make the vision a reality can do so.

6. Produce Short-Term Wins.

Create some visible, unambiguous successes as soon as possible.

7. Don't Let Up.

Press harder and faster after the first successes. Be relentless with initiating change after change until the vision is a reality.

Make It Stick

8. Create a New Culture.

Hold on to the new ways of behaving, and make sure they succeed, until they become strong enough to replace old traditions.

"Our Iceberg is Melting" excerpt by Holger Rathgeber and John Kotter