Houdini 13.0 Particles

POPs in DOPs

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Overview

- Why new Particles?
- How they work

– Streams
– Drag vs Forces
– Building a POP

- Particles

– VEXpressions
– Sources
– Collisions
– Facing/Instancing

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New Particles

- Goals
  - Scalable: Multithreaded and Memory Efficient
  - Artist Control: Embrace VOPs
  - Integrated: Fewer Network Transitions
- Approach
  - Build out of VOPs
  - Move POPs into DOPs
    - Conceptually Heterogeneous Networks
    - Still Called “POPs”

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DOP Improvements

- Vertical Wiring of Microsolvers
- Improved MMB info
- Spreadsheet... option
- Hidden Flag

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Streams

- Particles Flow Down the Graph
- Groups Refer to a Subset
- Particles **CAN** be in multiple streams!
- Consider making streams rather than groups

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Drag vs Forces

- Forces default as Accelerations
  - Ignore Mass is Default
- Wind vs Force
  - Drag Exponent
  - Air Resistance
  - Compositing of Winds

Building a POP

- Simple Axis Force
- Attribute From Volume

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VEXpressions

- Local Variables Were
  - Fast to Write
  - Powerful in Scope
  - Slow
  - Single-threaded

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VEXpressions

- Wrangle Nodes come from VEXpression work
- Meant to augment, not replace, VOPs
- Built on careful naming conventions

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VEXpressions

- Per-particle post-process of parameters
- Read/write from all parameters at once and by name
- Easy to refer to attributes in an ad-hoc manner

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VEXpressions

- @ syntax
  - Type Prefixes: v@, i@, s@
  - Debugging: export float @inspect = 0;
  - Groups: @group_name
  - Global: @Frame, @TimeInc, @Time
  - Inputs: @OpInput1..4
  - Virtual: @nage

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Hscript Functions

- rand()
- point(), npoints()
- smooth()

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Sources

- SOP Sourcing
  - Per Point
  - By Attribute
  - By Volume Paint
- DOP Sourcing
- Subframe Sources
  - Negative Age
  - Positive Age

Collisions

- Detection vs Response
- Collision Ignore

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Facing

- Use orient! Avoid up!
- Instancing
- Look At

– Instant, Turn, Spin

- Drag Center

Source Code Available

- Dive into POPs to see how they work

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POPs Everywhere

- FLIP
- Cloth and Solids
- RBD

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