

Welcome to thinkingParticles™ 6

More than 14 Years of Procedural Particle Effects

thinkingParticles™ 6 packs more than 10 years of product development and engineering into one massive procedural dynamics special effects system for 3ds Max and 3ds Max Design

thinkingParticles 6.0 - Subscription Drop 8

Subscription Drop 8 is a major release launching full-fledged support for OpenVDB with a massive additional 30+ new Operators to the thinkingParticles already robust tools arsenal. Users of thinkingParticles will now have tremendous flexibility with massive Volumetric Data Manipulation and Storage on OpenVDB.

6.8 New Features

New Categories - three new categories have been added to the Operator Node menu to facilitate navigation.

- **OpenVDB** - here you find the Operator nodes to visualize, manage, create and store OpenVDB volume grids
- **OpenVDB SDF** - this section gives you access to the collection of Signed Distance Field manipulator Nodes. SDF stores distance in a volume texture to the nearest surface. Positive distance accruing to points on the mesh exterior and a negative distance at points inside the mesh.
- **OpenVDB Grid** - general purpose volume grid manipulation Operator nodes can be found in this section.

LoadVDB - thinkingParticles Drop 8 fully supports loading and saving volume data in OpenVDB file format. It is easier than ever to transfer volumetric data between applications. For example, volume data created in Houdini or Maya can now be easily transferred to thinkingParticles for a much easier and more advanced Visual Effects treatment inside of 3ds Max.

SaveVDB - this node enables the creation of VDB files right out of a thinkingParticles simulation. The saved files can be re-used in the form of cached data or imported into different applications for further processing.

OpenVDB - a new Volume Grid container node that stores multiple Volume Grids for easy and fully procedural access. Similar to the work flows found in APF, Bullet and Flow. OpenVDB acts as a global DynamicSet node which gives you access to named Volume Grids, throughout multiple DynamicSets.

ShowVDB - Debugging volume grids is an important task and helps in finding issues within the Volume Grid data. Sometimes issues could be caused by false scaling or alignment. ShowVDB helps in visualizing the content of named Volume Grids. Visualization of the Grid values are either done as bounding box, points or vectors. In addition to 'just' points to the value of a grid, it can also be shown in the form of a color defined by a gradient.

AdvectVDB - the AdvectVDB node allows you to move distance fields based on another static velocity field. The velocity field is assumed to be constant for the duration of the advection.

BodyforceVDB - this node forces particles to occupy the volume (space) of a shape or object. The base for this effect is a level set distance field.

BooleanVDB - Boolean operations are one of the most powerful functions in 3D modelling and VFX. OpenVDB offers water tight boolean operations on Volume Grids. In contrast to polygonal boolean methods you can be assured that a result will always be there, and if possible, it will be watertight without any issues.

BoundaryVDB - now you can use labeled Volume Grids to repel or bounce off particles created by thinkingParticles. Any distance field or velocity field can be used to define an avoidance zone outside or inside an object.

CompositeVDB - is used to apply mathematical operations on a Volume Grid of any type. Those operations are done by using any or all available values in each Volume Grid. The results can be similar to the ones you can get from a BooleanVDB. And for CompositeVDB, in contrast to BooleanVDB, this supports all other types of non-Signed Distance Fields Volume Grids as well.

FilterVDB - filtering or smoothing out Volume Grids is a useful feature in getting smoother results, for example, when creating a surface. Several methods and options are now provided to allow for intricate control of the final result.

FractureVDB - Volume Grids can be manipulated or worked on in many ways. FractureVDB splits level set Volume Grids into multiple fragments. This node is great for destruction effects.

MorphVDB - morphing or shape-shifting effects are widely used in both film and commercial post-production. Creating morphing effects based on Volume Grids brings superior control and the benefits of water-tight results. This node needs one distance field as an input and another one to act as the target morph volume. Deeper flexibility and multiple methods offer you maximum control for the transition from one volume to another.

PartToVolumeVDB - helps in turning particles into a volume. The great thing about this operator is that it does a lot of the heavy lifting for you. The output is a clean and ready to use Volume Grid that can be used for further processing or surfacing.

PotentialFlowVDB - is a special purpose VDB node which computes how air will flow around obstacles by solving for the closest divergent free velocity field. It is a great operator to make particles avoid objects and "flow around" them.

Renormalize - iteratively adjusts the voxel values to properly respect the distance to the zero crossing line. Keep in mind Renormalize requires proper signed distance fields to create usable results. This operator should be used whenever a signed distance field is somehow modified by external means and has the potential to lose its integrity or show erratic values.

ResizeVDB - resizing or shrinking Volume Grids can come in very handy for many reasons. Use this operator to move a signed distance field in or out along its normals. The result of this operation is either an enlarged or shrunken signed distance field.

SegmentVDB - is a versatile operator used to find isolated volumes within a bigger volume. Every sub-volume within a volume is output as its own field or particle with a volume attached.

ShapeToVolumeVDB - turns any 3ds Max mesh into its volume representation. This operator does a lot of the heavy lifting for you, as its output is a clean and ready-to-use Volume Grid for further processing or surfacing.

SignedFloodFillVDB - sets new values to all inactive voxels and tiles of a narrow-band level. Setting outside values to +background and inside values to -background.

VolumeToShapeVDB - turns any proper signed distance field into an editable mesh. Usually this is the last step of a Volume Grid modification. Keep in mind to place this node at the very end of the DynamicSet tree after all modifications have been done to a Volume Grid.

VolumeToSpheresVDB - fills any signed distance Volume Grid with spheres of varying radius and amount. It is a highly optimized 3D packing method which is easy to setup and thanks to thinkingParticles it is fully procedural at all times.

AccumulateVDB - AccumulateVDB is used to fill cells (voxels) in a Volume Grid with data. This operator allows for a fully procedural approach to create volumetric fields that can be used to manipulate particles in space.

CellIteratorVDB - iterating over the cells/voxels in a Volume Grid is an essential function when working with volumes in general. The CellIteratorVDB operator allows you to just do that; accessing all existing, active or inactive cells in a volume Grid.

ConvertVDB - Volume Grids exist in many forms, in most situations it is imperative to create a duplicate of a Volume Grid, but with different data types. For example, you want to have a distance field and a matching color field as well - to define surface colors of an object created by the Volume Grid. In such a case you want to have the same voxel layout for your color Volume Grid as the signed distance field. ConvertVDB does exactly this! ConvertVDB has an option you will like call, CurlVDB.

DilateVDB - Volume Grids can be dilated with DilateVDB, it is an efficient way to work with volumes and make them wider. Several advanced options let you control the amount and method of dilation of a volume Grid.

ErodeVDB - Volume Grids can be eroded (shrunk) with ErodeVDB, it is an efficient way to modify volumes and make them tighter. Several options let you control the amount and method to erode a volume Grid.

GetGridVDB - accessing Volume Grids is key in setting up and handling visual effects shots based on volumetric data structures. thinkingParticles allows you to access Volume Grids in a fully procedural way at any time. Once a Volume Grid is created this operator gives you access, in a DynamicSet wide manner, for further processing of volumes with different nodes.

InitiatorVDB - thinkingParticles offers many ways to control and generate Volume Grids. There are methods and functions that will automatically create a Volume Grid based on templates or mesh data. However, with InitiatorVDB you take full control of the Volume Grid generation down to the level of individual voxels.

InputFromVDB - Creating a volume grid and preparing it to receive actual data is usually done by an InitiatorVDB node. The InputFromVDB operator is a great and fast way to fill voxels with data derived from the particles itself. Any particle specific data can be easily transferred into voxels at the same or near a particle's position.

InterpolateVDB - InterpolateVDB reads voxel data from a Volume Grid and feeds it back into another operator for further processing. One can either get the voxel content from supplying any world position or directly addressing a voxel in space through its voxel index position in memory. This operator takes care of optional motion inheritance of the field particle, as well.

OutputToVDB -OutputToVDB is the counterpart of InputFromVDB, instead of reading data from particles OutputToVDB writes data to particles in a very efficient and easy to setup way. Any named Volume Grid voxel data can be used to affect or influence particles.

PruneVDB - Volume Grids consume a lot of data; imagine a simple 10x10x10 grid, that's a 1000 values to be stored somehow in memory. Depending on the type of data, it can easily add up to hundreds of megabytes or even several terabytes. Even though many VDB functions already optimize everything along the way, there are times when a manual pruning and memory optimization can not hurt. PruneVDB is made to help in reducing the memory footprint whenever possible, so make good use of it!

SetGridVDB - This operator is usually the last one in the chain of volume Grid operations you might have in your DynamicSets. It is the actual commit to a change in a volumeGrid or it can be used to duplicate a volumeGrid and store it's values in another volumeGrid. In general, after a Volume Grid manipulation e.g. by using a FilterVDB node you would use then SetGridVDB to actually commit those changes to the original Grid by writing those modified values back.

UFilterVDB - Filtering all types of Volume Grid types can be done with this universal filter. However, filtering signed distance fields with this filter, while possible, it is not recommended unless you fix the level set with a renormalize afterwards. For all other types of Volume Grids, this operator represents a powerful feature especially when used with the alpha mask input which will allow you to exclude areas in the volume from this filter.

UBoolean - Boolean operations are one of the most powerful functions in 3D modelling and VFX. OpenVDB offers water tight boolean operations on Volume Grids. The possibility to work with boolean operations on any type of Volume Grid is very important and opens up so much more possibilities for visual effects.

thinkingParticles 6.0 - Subscription Drop 7

Subscription Drop 7 released in October 2018 is offered as an inclusive update to all Subscription users in good standing. The following are the updated powerful new features, workflow and operator enhancements, plus Bug Fixes, in Drop 7.

New Features

SurfaceForce

Drop 7 new SurfaceForce Operator allows you to create a force field to continuously displace particles. This new Force Operator is perfect for creating waves and other particle effects with greater ease and amazing flexibility.

WaterLevel

More ways to create particles from the Generator is always good news! This new particle generator offers many creative ways to spawn particles. A simple mouse click to fill a whole landscape with puddles or lakes - how much faster can you get.

FlowSolver 6.7 - New

Fluid solver 6.7 is the best fluid solver offered by thinkingParticles so far. It has always been one of the fastest and most stable particle based SPH solvers in the industry, but it got even better. More stability, more predictable and faster results than ever.

OpenVDBShape

Industry standard OpenVDB brings many more new toys! The new OpenVDBShape operator is a lightning fast surfer offering an optimized multi-threaded approach to surface generation with great flexibility and filtering options.

ShapeDeform

This operator offers a fully procedural approach to deforming objects right within thinkingParticles. Similar to a particle skinner approach, particles 'attach' themselves to the nearest vertex and influence it.

VolumeDiffusion

Simulating true volume diffusion is a tough one, but it can be done in thinkingParticles. Any value attached to a particle can now diffuse within a volume in a physically accurate and fully procedural way. Spreading color, heat or whatever value is fast and simple to achieve.

PSelCollect

PSelCollect operator combines with PSelection operator to collect particles into a pool of accessible particles than can be easily accessed later on in a simulation.

PSelection

A new Collect mode has been added to this operator. This new mode works in conjunction with the PSelCollect node.

ShapeCutter

Boolean operations re-invented. ShapeCutter is more than just a simple cutter operator, it's a true 3D boolean operator! Any mesh can be procedurally bool-ed - it is automatically turned into a true 3D volume, before any boolean operation is applied, and creates watertight results.

APFInputFrom 2

A new weight Data Channel parameter has been added for the All Purpose Fields. This data channel contains a factor per particle, defining the strength of dissipation within a volume. Existing data channels can now be used as a source of values to feed the cells in the grid.

APFOutputTo 2

Powerful new controls and functionality has been added to the AP-Fields. A new transmission time value along with a weight data channel selector is available to create enhanced volumetric diffusion effects for various parameters in a simulation.

Workflow and Operator Enhancements

- ❑ A new Operator Category has been added to the main menu: Force. In this category, you will find existing and new force operators offered by thinkingParticles.
- ❑ Unique ID - thinkingParticles now uses a Unique ID concept. A particle ID assigned at birth will stay the same throughout the animation and once killed it will not be recycled. As long as the amount and order of particle generation is not changed 'in between' Dynamic sets.
- ❑ Flow Operator Enhancements - new visualization types for fluid parameters are available now.
- ❑ There is now a new dedicated write to data channel rollup menu has been added; many fluid specific data can now be easily transferred and used to render or control certain effects.
- ❑ Drop 7 added 'white water' effects fully supported by the solver.
- ❑ Use Sub Group is now available as an option for PPass and PPassAB.
- ❑ Drop 7 also gives a much faster reaction time on cancel of a simulation, better response time when resetting back to Frame '0'.

Fluid and Rigid Body Enhancements

Fluid and rigid body interactions have been enhanced a lot in Drop 7.

Multi-Physics - is a complex beast in need of taming. thinkingParticles is one step closer to the holy grail of combining all natural phenomena calculated in one simulation step. Drop 7 brings you a much more refined and controllable integration of all physics solvers it offers. Rigid bodies now shows much better buoyancy and interaction with fluid simulations. Transfer of momentum between fluid particles and rigid bodies is resolved much faster and more accurate. Objects engulfed within a fluid will start to rise or sink depending on their specific physical properties.

Other Enhancements

HydroField - wave height, choppiness and time scale can now be fully animated.

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thinkingParticles 6.0 - Subscription Drop 6

Subscription Drop 6 released in December 2017 is offered as an inclusive update to all Subscription users in good standing. The following are the updated powerful new features, plus Bug Fixes, in Drop 6.

New Features and Fixes in Drop 6

ALL PURPOSE FIELDS (APF)

A major new addition to thinkingParticles' already powerful tool set is the introduction of APF, the 'All Purpose Fields' Operators in Subscription Drop 6. APF operators introduce a powerful new way to art-direct and affect particle motions through custom created and fully procedural grid-based force fields. APF greatly expands the FX artists repertoire of skills in articulating simulations fast and efficiently.

APFields are powerful volumetric operators allowing you to create and manipulate forces in 3D space that will affect particles in multiple ways, as they move through such fields. While developing these new set of operators, our main focus has been to offer easy-to-use tools for delving and manipulating vector fields right within thinkingParticles. However, as those operators deal with 3D space and specifically vector fields, a basic understanding of vectors and the related math is expected.

This new set of field operators can be found in the Operators → APField menu. The following new operators are now available: [To learn more click HERE](#)

APFAccumulate - is an operator used to fill cells (voxels) in a 3D field with data. This operator allows for a fully procedural approach to create volumetric fields that can be used to manipulate particles in space.

APFData - like so many other Data Operators that you find in thinkingParticles, this data operator allows you to gather information for further processing All Purpose Field structures in a fully procedural way.

APFInitiator - this is one of the easiest and most straightforward operators to create a Volume Voxel field. It is easy to use and helps in setting up the most common field types with just a few clicks and adjustments!

APFInputFrom 1 - offers one of the more unique ways to create and fill fields with data from actual particles in the scene. There is just no easier methods to feed cell (voxel) data into a field.

APFInterpolate - this operator is used to read the field data at a specific position and return the interpolated result. It is a simple, yet powerful way to handle volumetric data in a fully procedural way.

APFOutputTo 1 - assigning field values to particles is performed with the APFOutputTo operator. The volumetric field data is automatically interpolated and applied to the selected particle group. There is no simpler way to procedural manipulation of particle motion through complex 3D volume fields.

APField - is an advanced "satellite" like operator that can be used across multiple dynamic sets. Other APF operators depend on this operator. The philosophy is to apply this new APF operator similar to the one found in the new physics or flow solvers. This container holds all the data and core settings while other Operators feeds into it - or is fed from it.

thinkingParticles allows you to cache volumetric field data, stored in an AP-Field, linked to the hard disk for faster process or network-wide access. The file format used to store and manage 3D volume data within thinkingParticles is based on the industry standard [Open VDB](#).

OpenVDB is an Academy Award-Winning open-source C++ Library comprising of a novel hierarchical data structure and a suite of tools for the efficient storage and manipulation of sparse volumetric data discretized on three-dimensional grids. It is developed and maintained by DreamWorks Animation for use in volumetric applications typically encountered in feature film production.

Sum Helper - this new math helper node has been added. The Sum Helper allows you to create a summation of multiple values of the same type.

Math Helper - InitialState - this new operator acts as a particle generator which allows you to "freeze" any particle simulation state at a specific time. All particle data at that specific time can be written to the disk drive for later continuation of a simulation or any particle effect.

Workflow and Operator Enhancements

Offline Help - thinkingParticles, now uses by default an online help file that is accessed through the internet and your selected web browser in Windows. If no internet access is possible or available, then the option is to use the installed help file.

Math Helper 1 - when created, the Math Helper Node now automatically renames itself according to the mathematical operation it performs.

Math Helper 2 - new mathematical functions have been added to the Math helper node. The following functions are now supported: Deg2Rad, Rad2Deg and for vector operations Collide and CollideDeflection has been added. For Vector/Float operations, a RollMatrix operation has been added.

Counter Helper - this helper node has a new Input that enables you to reset its value for each sub-frame sample step.

GeomPoint Helper - a new Input and Output connection has been added to this helper node. Radial Alignment on a specified "Up" vector can now be easily calculated around a given surface point.

GeomParticle Helper - a new Position input connection has been added to acquire the closest geometry information in relation to the exact position.

Shape Helper - a new Position input has been added to this helper node which allows the gathering of information about nearest points.

AlembicExport - A new export option has been added, objects can now be exported by material. This new option is to avoid any issues resulting in reordering material IDs when combining multiple objects in a particle system.

Fluid and Rigid Body Enhancements

Fluid and Rigid Body interactions have been enhanced a lot. Rigid bodies do now show much better buoyancy and interaction with fluid simulations. Transfer of momentum between fluid particles and rigid bodies is resolved much faster and more accurate in Drop 6. Objects engulfed within a fluid will start to rise or sink depending on their specific physical properties.

Other Enhancements

Broad support of vertex velocities has been added throughout thinkingParticles operators. Now, object space modifications (deformations) and modifiers on objects are properly tracked by ObjToParticle, LayerToParticle, Bullet Softbodies, ImplicitShape and many more! Exported Alembic meshes also supports vertex velocities now.

When using standard 3ds Max force fields (space warps), it is no longer necessary to bind the spacewarp to the thinkingParticles helper object. All standard forces in the 3D scene will automatically show up in the list of available forces when using the StdForce or StdCollision Helper.



thinkingParticles 6.0 - Subscription Drop 5

Subscription Drop 5 released in April 2017 and is offered for free to all full Subscription users in good standing. Cebas Visual Technology keeps its promise of delivering continual upgrades and enhancements to valued users.

Powerful New Operators and Enhancement in Drop 5

FlowEmitter - an altogether new **particle generator** in itself, FlowEmitter is dedicated specifically to enhance fluid simulations. FlowEmitter not only offer one of a kind feature in the visual effects software market for simulating fluids pouring and 'glucking', it is also a great all purpose particle generator!

ParticleLight (PLight) - controlling lights is key to an all round impressive visual effects. thinkingParticles Subscription Drop 5 delivers this in new ways of controlling lights and illumination in a 3d scene; the PLight operator easily transforms any particle you choose into a real Omni light type along with proper shadow casting.

VolumeBreaker Cluster - now you can add procedural clustering to the volumeBreak operator and this opens up a new world of destruction visual effects. Never before was it possible to actually define in a fully procedural way clumping or clustering of volume fragments. Now you can.

ShapeNoise - a deformation operator able to act on all particles with a shape (mesh). What was known as the former roughness rollout menu in volumeBreak has now become its own operator with all the benefits of the full procedural power thinkingParticles has to offer.

Multi-Physics enhanced - fluid and rigid body interactions are true multi-physics simulations. It is not a trivial task to achieve these type of effects, especially when buoyancy is involved. Subscription Drop 5 offers up a new enhancement in multi-physics that achieves those interactive effects.

Hydrofield enhanced - fast and efficient large scale water body simulation is achieved with thinkingParticle's Hydrofield operator. This ultra fast voxel based shallow water simulation system has the ability to handle sizes ranging from a small puddle up to an ocean of water surface. Interaction with the Flow solver has been enhanced as well

Check out the features reels : www.cebas.com/thinkingparticles.



thinkingParticles 6.0 - Subscription Drop 4

ThinkingParticles 6.4 released on June 2016 will now be fully compatible to support 3ds Max 2017 users. Once again a user-driven new release for thinkingParticles Subscription Drop 4 brings powerful features to the VFX Artist's toolkit.

Powerful New Features and Fixes in Drop 4

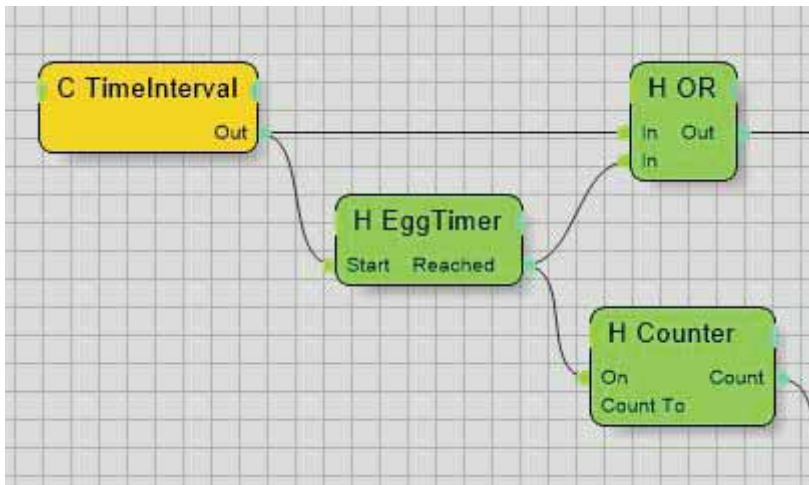
Fluid Solver SPH VE (6.4) - this is a dedicated **viscoelastic solver** that is mainly used to simulate highly viscous fluids. This spring-based SPH solver allows the creation of fluid simulations that can range from liquid honey to goo-like fluids, dough, for example. Even though, this solver is purely SPH based, fluids can become as rigid as soft rubber; if simulation parameters are fine tuned correctly. Thinking Particles, through its fully procedural effects approach, allows the control of viscoelasticity of a fluid, based on an unlimited amount of procedural rules or functions. Fluids can be created to 'harden' over time, they can also become liquid again on proximity to a heat source or any other procedural event you might think of.

ImplicitShape - The Implicit surface 6.3 algorithm has new added functionalities: Materials and Mapping can now be assigned to the generated ISO surface. Material and UV mapping is properly blended between different sets. Captured or free air bubbles can be simulated/created with this new ImplicitShape operator update. With a simple button click, air bubbles are automatically created inside of the ISO surface (an actual boolean ISO surface operation). This option is great for simulating air or foam bubbles flowing within a fluid.

VolumePos - A new reset mode has been added to the VolumePosition Helper. It is now possible to refill a volume based on several conditions of your choice.

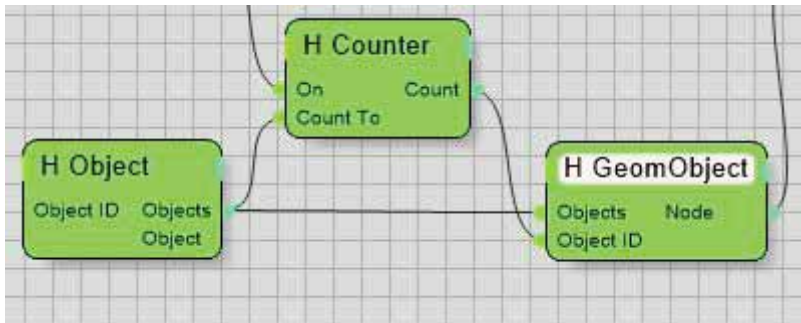
Flow Boundary - Setting a different adhesion value per boundary is now possible with the introduction of an adhesion multiplier inside of the boundary operator.

EggTimer - A new feature has been added to this popular EggTimer node; the boolean flag 'Reached' is kept active after reaching the timer's end. This easily allows for the creation of complex oscillator setups like the one shown below.



In this setup the egg timer, once started, will loop (set to loop) for 20 Frames and then every 20 frames new particles will be created at a constant rate.

Object Helper Node - A new feature has been added to the Object output channel. When connected to an integer input of any kind, the total amount of objects in the object list gets output. This allows for fully procedural and automatic count adjustments based on objects picked. A sample setup can be found below.



As shown in this setup, the Objects Helper node has its Objects connected to the 'Count To' input of the Counter Node. This will give the counter node the amount of objects in the list as a value to count to. This setup allows for picking more objects anytime later, without breaking the fully procedural approach of the effects setup.

MatterWaves - A new option has been added: FLOW. This option allows for the creation of steady particle flows with a well defined fixed spacing. In addition to the Flow option a new texture mapping feature has been added as well; the W coordinate of the UV mapping is automatically animated over time. Every new particle created gets a new continuous timestamp in the W component. This allows for the mapping of ISO surfaces along stream of emission. Check out : www.cebas.com/thinkingparticles for more information.

thinkingParticles 6.0 - Subscription Drop 3

Released on March 2016, Subscription Drop 3 is all about more powerful new features and enhancing the particle cache workflow and structures.

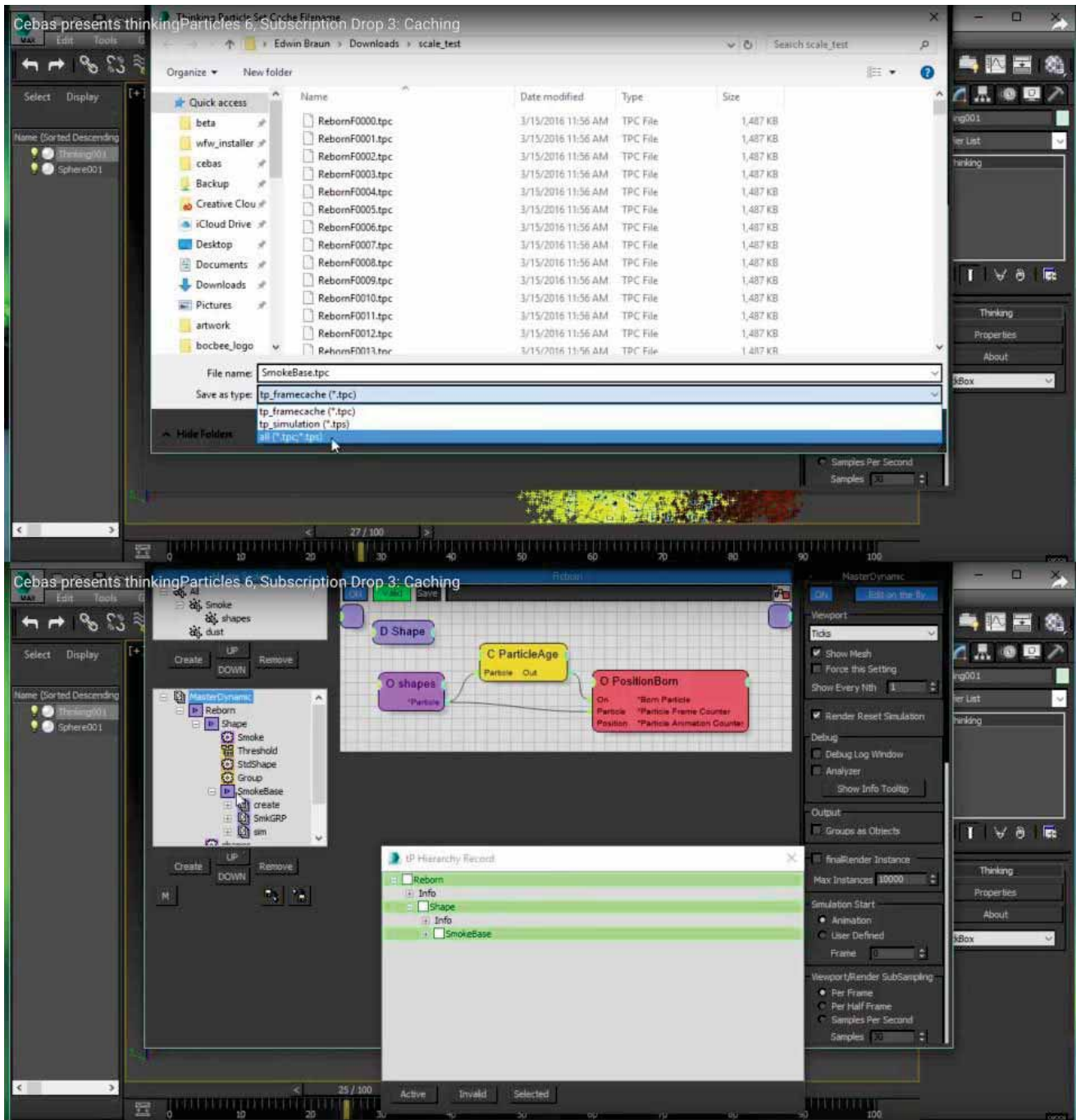
A new frame based particle cache file system has now been developed allowing for the storage of a cache file per frame step (TPC). This is in contrast to the already existing single file particle cache system (TPS). Cache write and read times have been dramatically improved in Subscription Drop 3 for all file cache operations. Writing a cache file is now up to 10 times faster than before; this means the disk transfer functions have been optimized by a wide margin. The following enhancements in detail are listed below:

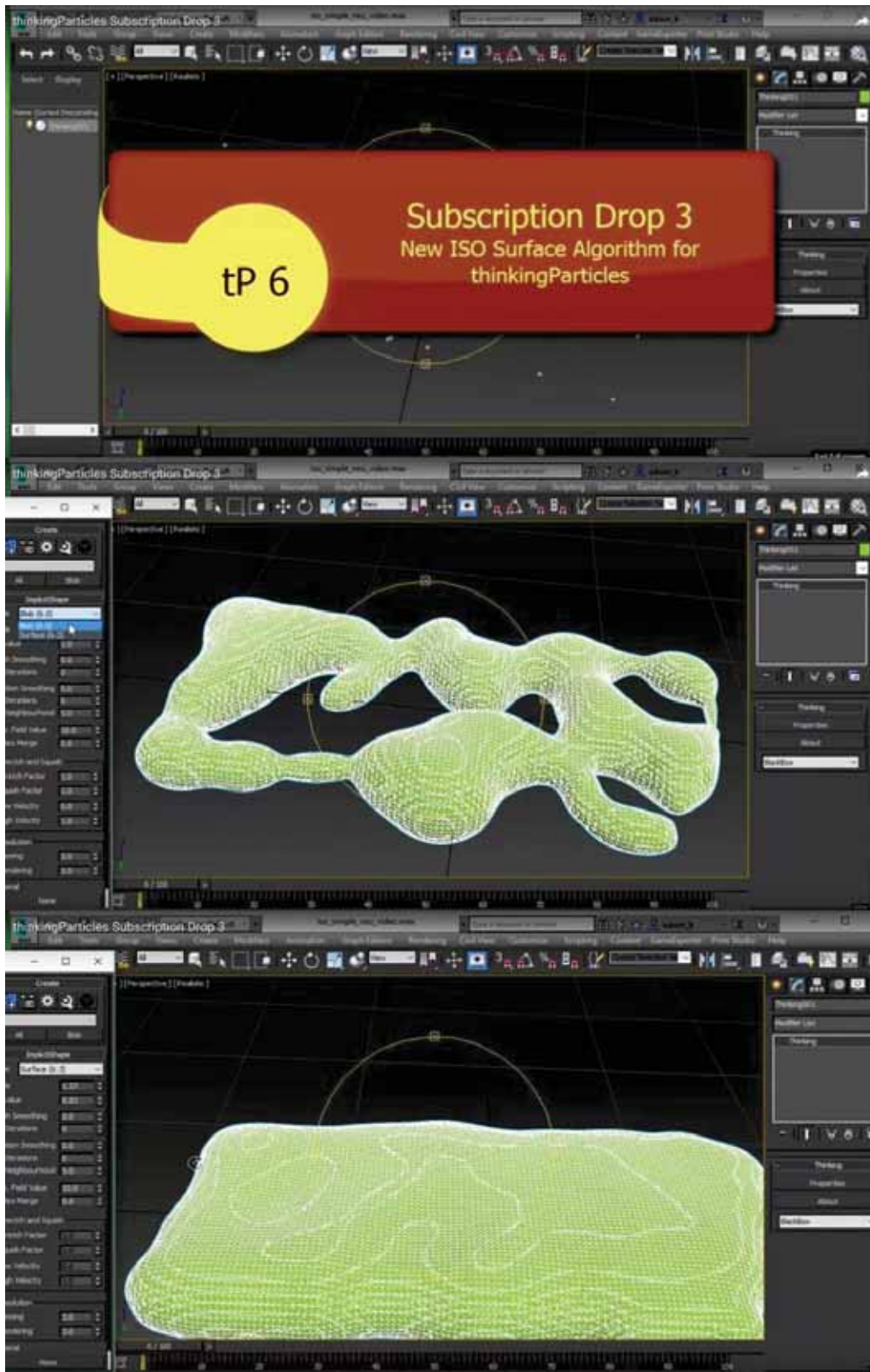
1. Per Frame Caching option thanks to the new *.tpc format, with enhanced sub-sampling option for output.
2. Selective Cache Channels; each particle cache file can be adjusted individually for its data to be output.
3. Hierarchy particle cache manager: adjust and control cache stacking in an easy and efficient way.

To accommodate for the new particle caching features in thinkingParticles the Max Scripting functions has also been extended to cover more file caching related stuff.

New Implicit Surfacing Options

ThinkingParticles 6.3 offers two highly advanced algorithm options to create an ISO surface. Surface (6.3) brings a new method to thinkingParticles allowing for the creation of flat surfaces out of point clouds. It's the perfect tool for creating surfaces for liquids with a smooth and even surface. To learn more, refer to the online manual.

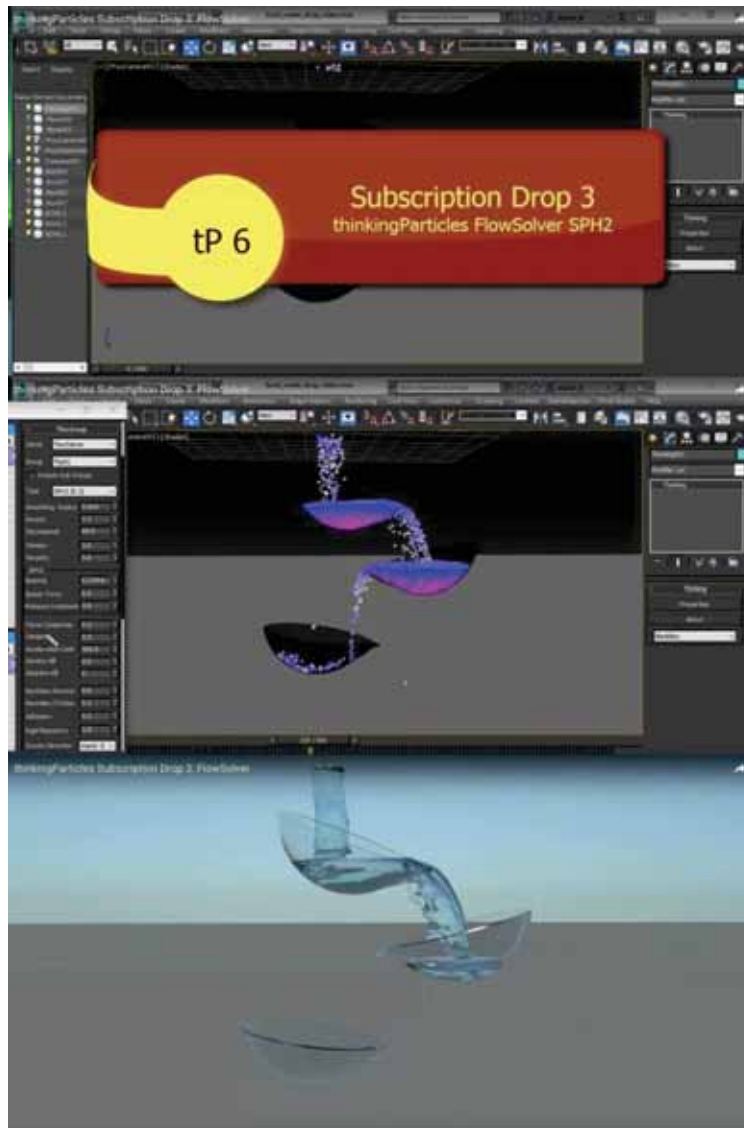




New Fluid Solver Options

ThinkingParticles SPH based fluid solver has been enhanced in Subscription Drop 3.

A new algorithm option has been added to the rollout menu; the new SPH2 method offers a much more improved and stable method to create fluids that are under larger pressure and bigger sub frame steps. While the first generation of fluid solver is still available to choose from and it offers the same great features as before; the new solver algorithm adds just more punch to the arsenal of fluid simulation effects available within thinkingParticles. It is suggested to use the newer incarnation of the fluid solver from now on, the previous method is mainly kept for compatibility reasons.



thinkingParticles Subscription Drop 3: FlowSolver



thinkingParticles Subscription Drop 3: FlowSolver

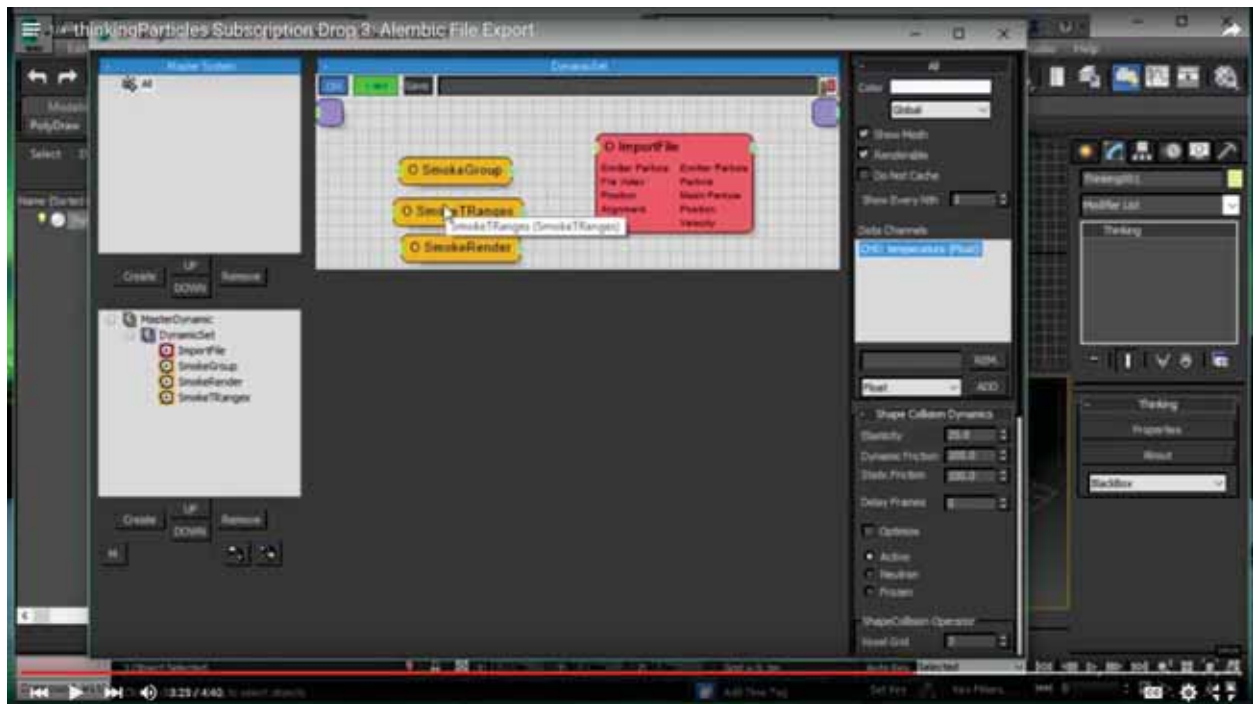


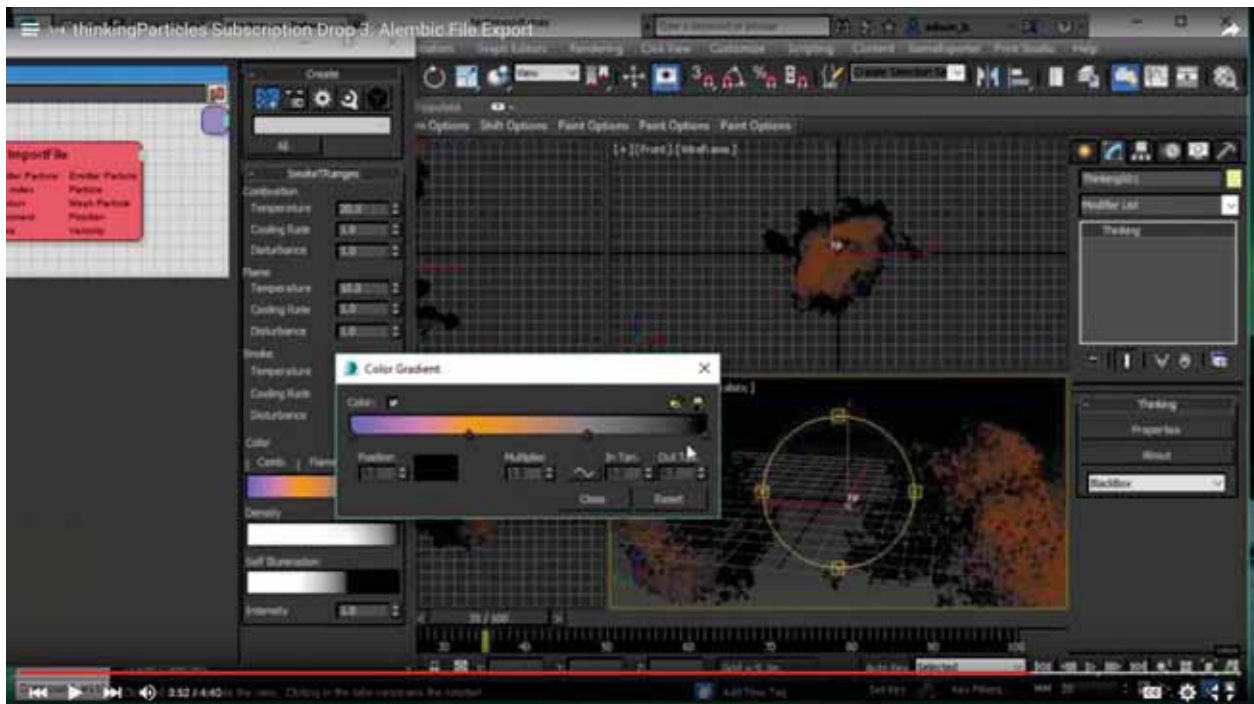
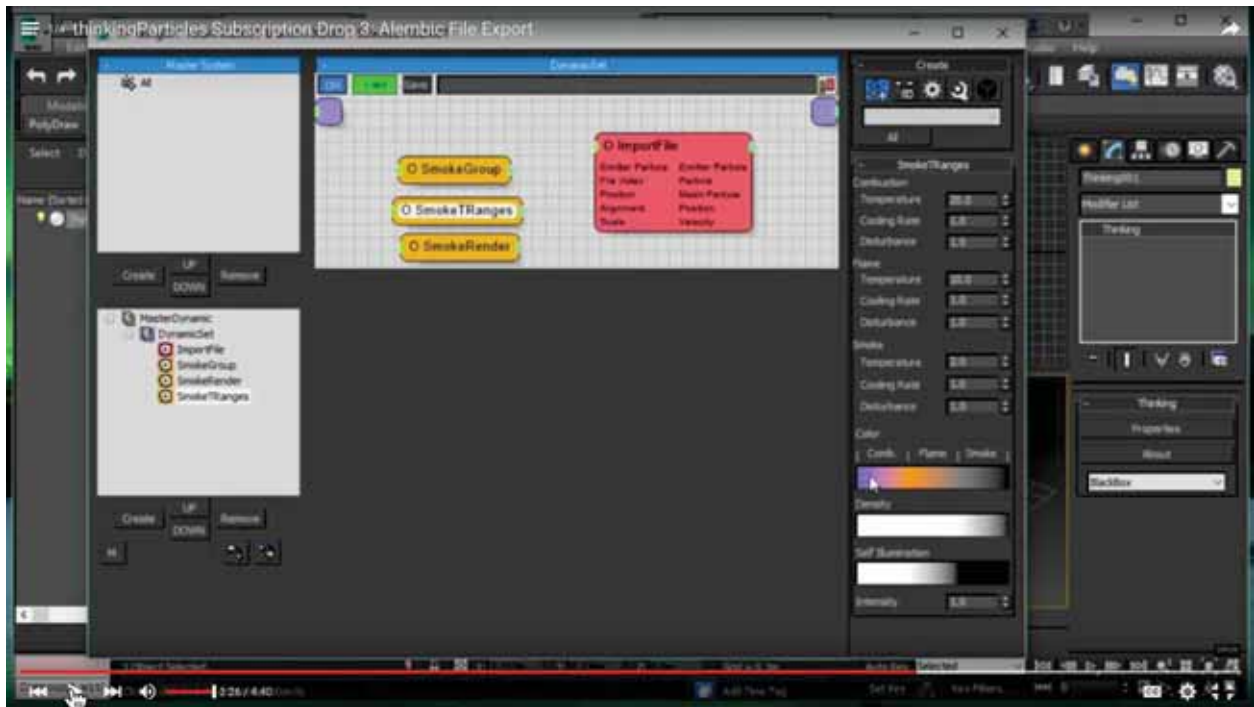
More New Features in Drop 3

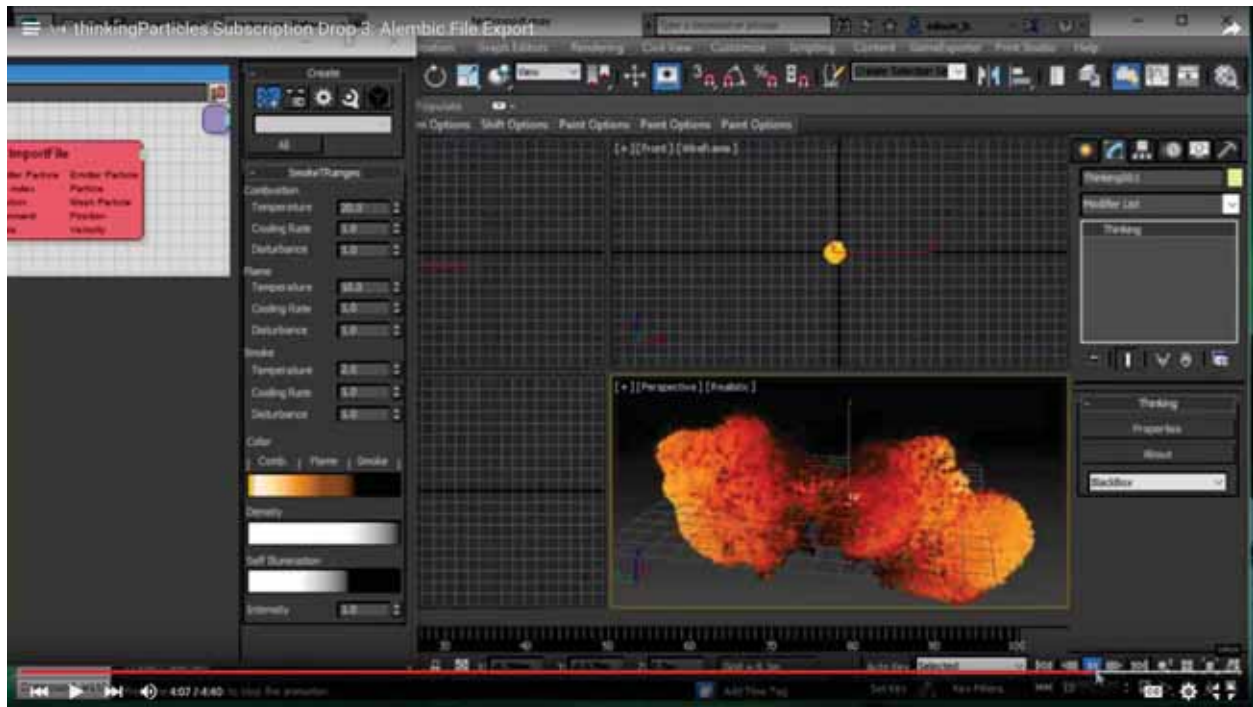
Direct Alembic Import: thinkingParticles now supports direct file import of Alembic

*.abc files, both pure Alembic particle files as well as mesh-based files. Alembic is an open source format widely used by large and medium sized studios around the world. Alembic is slowly becoming a standard file exchange format between different applications.

Direct Alembic Export: likewise, AlembicExport is a new export node offering *.abc file export functionality. Many of the Alembic file format features are directly supported by this node. Particles as well as meshes can be exported in one go. Alembic export can be done either in one single file including many particle groups or in multiple files containing individual particle groups. The exported files may contain a particle system (particle points, no meshes), an object per particle group or each particle is stored as one individual object (mesh). For particle system exports, the AlembicExport node allows for the selection of specific data channels to be exported (e.g. velocity, spin, age ...).







New Particle Group Right Click Menu Option: Right-Clicking on any particle group name will now bring up an new context sensitive menu. For each particle group name clicked, a list of Operators using or referencing this particle group will be listed. Further clicking on the Operator names will automatically bring up the relevant DynamicSet in question. This feature works great for debugging complex DynamicSet setups containing hundreds of nodes, and help speed up work tremendously.

Render Resets Simulation - this new feature allows for quick and easy rendering adjustments of materials and light. Instead of re-simulating the whole particle system over and over again when rendering a single frame; thinkingParticles can now take the information as seen in the modeling viewport from that exact frame as set with the frame slider in 3ds Max.

Enhancements of 6.2 Features in Drop 3

Besides adding new methods to the Implicit surface operator, some work has gone into enhancing the overall processing time and stability of the **surface operator**.

The **PositionBorn** operator received some loving attention in the form of an enhanced random particle distribution when emit distance is used.

Bullet Physics has been updated as well: Bullet Rope; BulletRopeData; BulletRopeImport was missing the Margin parameter and all these are now fixed.

Another area that saw enhancements is the **VolumeBreaker** operator; helper object are now animatable and they are updated correctly.

The **LayerToParticle** operator got an overhaul which results in a general speed improvement.

To accommodate for the new **particle caching** features in thinkingParticles the MaxScripting functions is now extended to cover more file caching related stuff.

And a brand new enhancement to fluids: they will now work with the **Freeze operator**. Fluids can be frozen in time and released in time.

The **Bullet vehicle** operator will now work with the path follow even without a particle Input.

New features and tutorial videos

Please access <https://www.youtube.com/user/cebasVT>

thinkingParticles 6.0 - Subscription Drop 2

Released August 2015, Subscription Drop 2 is instantly downloadable for our valued Subscribers of thinkingParticles 6 via their Product Manager.

Subscribers can look forward to the all-new important vfx operators for smoke VFX with in-build real time rendering and Generator Operators.

In our ongoing desire to serve the needs and expectations of our customers, cebas VISUAL TECHNOLOGY Inc. is geared towards periodic releases of new Major Versions of its software. Our user community can expect continual enhanced features and stability for thinkingParticles for your vfx production as well as our rendering software. It is strongly recommended that, in pace with technology changes, you always keep your software up to date.





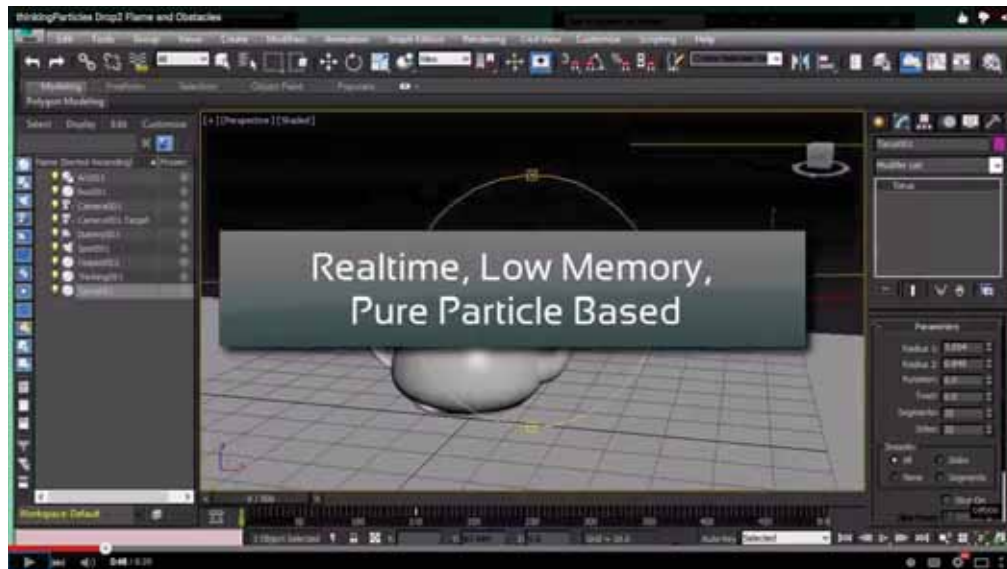
New features found in thinkingParticles 6 Subscription Drop 2

ThinkingParticles Subscription Drop 2 comes packed with advanced new features that expands on the ever growing possibilities of visual effects for thinkingParticles. FX artists can now explore new ways of handling **compressible fluid effects** like smoke and gas, as well as build amazing rule-based interaction between the fluid bodies (smoke/fumes) and rigid bodies.

In addition to simulating gas flows efficiently in a physically realistic way, thinkingParticles 6.2 is now build with an amazing feature that renders instantly such gaseous effects such as smoke, clouds and fire.

This release is not only about advanced new features, many bug-fixes and workflow enhancements have also been added as part of your tool sets.

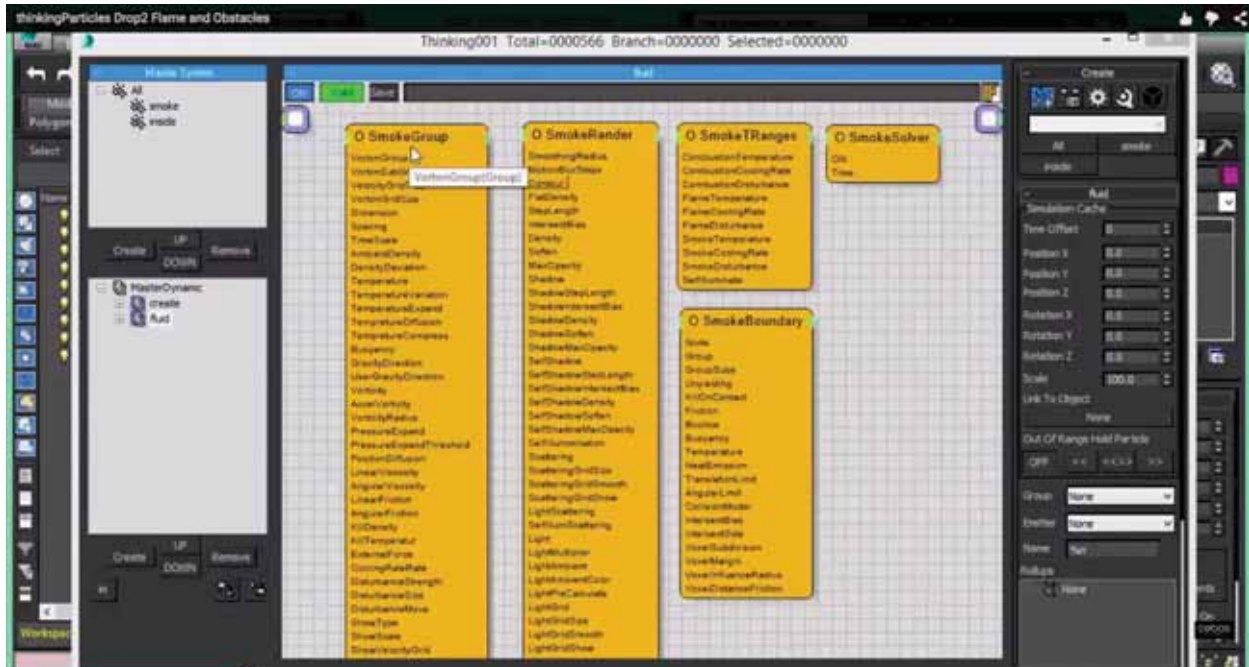
Valued Subscribers of cebas Visual Technology get ready to enjoy fully the benefits of continuous upgrades and new features that will show up as they become realized.



Access cebas thinkingParticles 6.2 Tutorials Youtube channel:
https://www.youtube.com/playlist?list=PLr2jKyAz7btttJNMA4-N1MD4_DwmzMwe

New in thinkingParticles 6.2 : Ultimate Smoke Operators

A whole new category, 'Smoke' was added to the Operator drop down menu/section:



SmokeBoundary - this new operator is dedicated to handling smoke fluid and rigid body interactions.

SmokeGroup - this is the main smoke fluid operator used to adjust and control the smoke fluid simulation.

SmokeData - like any other fluid type in thinkingParticles; the smoke fluid comes with a full set of simulation controls. SmokeData is used to access and modify those settings on a per particle basis.

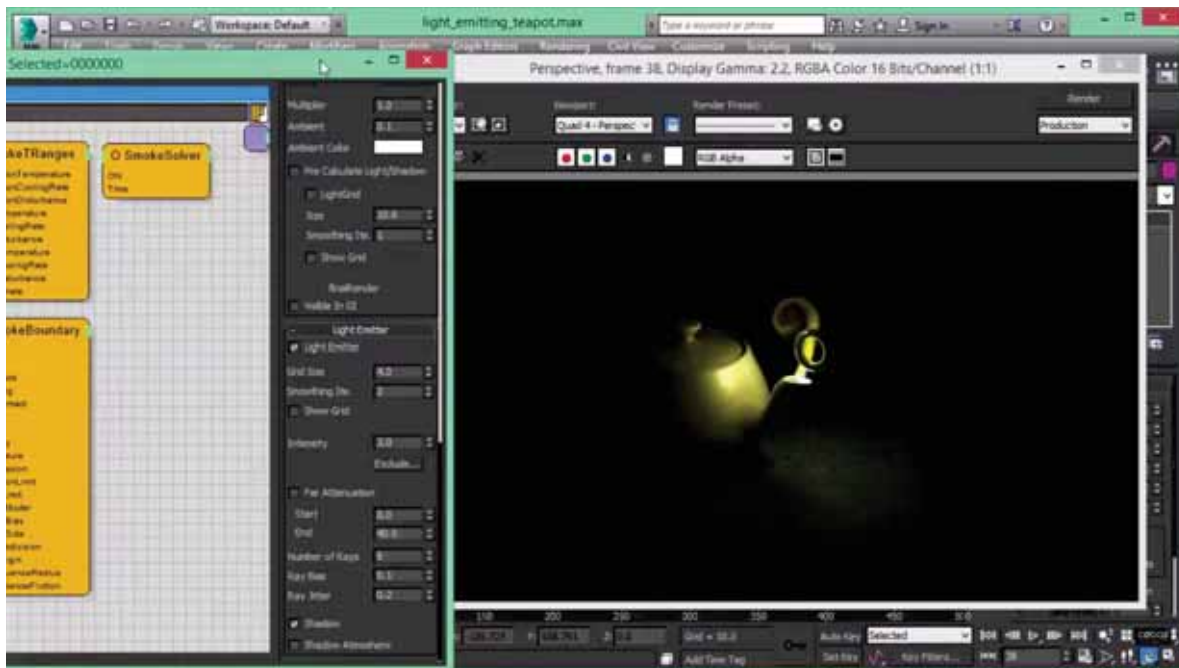
***SmokeSolver** - let there be smoke! Every fluid system needs a solver in its core, this operator represents the actual smoke fluid solver.

****SmokeRender** - what good is smoke if you can't smell it ? Or in this case - see it? This unique render node controls the rendering of the smoke fluid effect. For the first time; thinkingParticles 6 offers a fully procedural operator node to control a rendering effect right from within thinkingParticles, controls in real time! (Please see below, under Smoke_atmospheric_renderer for the list of render enhancements.)

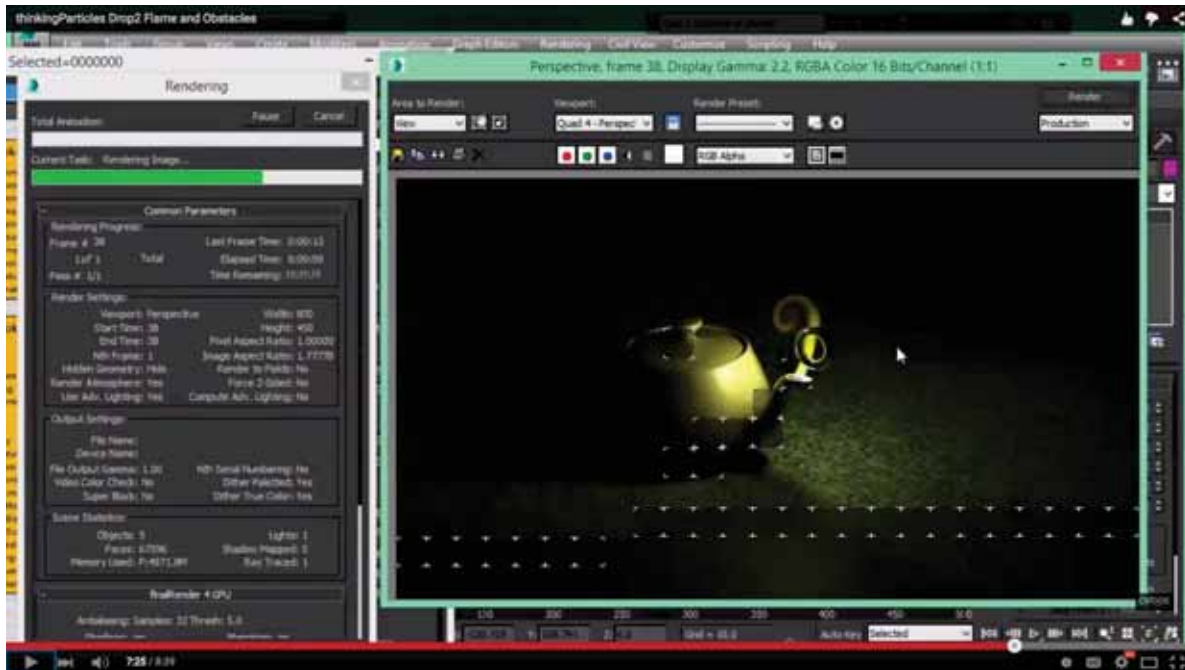
SmokeTRanges - rendering complex smoke fluids like fire, gas and burning stuff in general presents many challenges. Finding and adjusting the proper color to represent the burn rate of the gas matter becomes a child's play with this new operator node.



Now tP users have a dedicated smokeShader built-in!



Built-in rendering within tP6, the fastest rendering, real-time, no hassles.



New in thinkingParticles 6.2: Smoke Atmospheric Renderer

ThinkingParticles 6.2 atmospheric renderer offers multiple render elements that can be used to enhance the look of smoke and fire effects in the post processing stage - more power at your finger tips. Find below a list of supported render elements.

CombustibleRenderElement - A render element that will only show the combustible components of the smoke effect. This can be used to efficiently add glow or color grading.

FlameRenderElement - This render element stores all flame components of the smoke effect. This allows the vfx artist to add extra glow or some color grading effects.

ZDepthRenderElement - An advanced highly optimized Z-Depth render element that accurately represents the distance to the clouds' estimated average surface. This render element is the key to advanced depth of field effects with atmospherics.

TransparencyRenderElement - A render element that writes out a separate alpha channel for the complete smoke render effects.

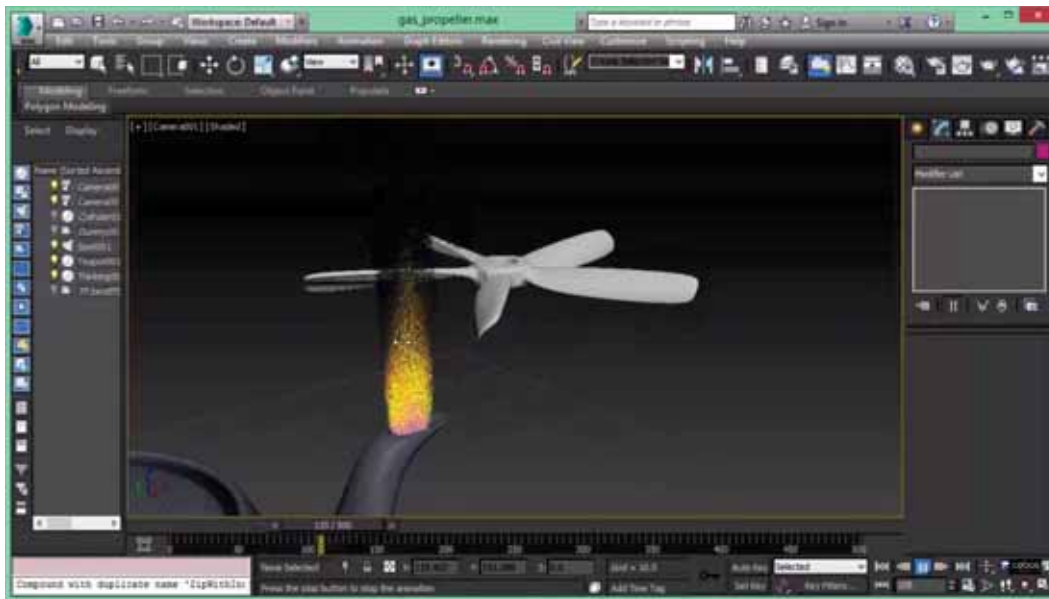
NormalRenderElement - This render element writes out the estimated 'surface normal' of the smoke effect. This render element can be efficiently used to change lighting or other surface dependent effects for the smoke component.

SmokeRenderElement - This render element stores all the smoke components of the fluid effect. Use it to adjust color or intensities in a post process.

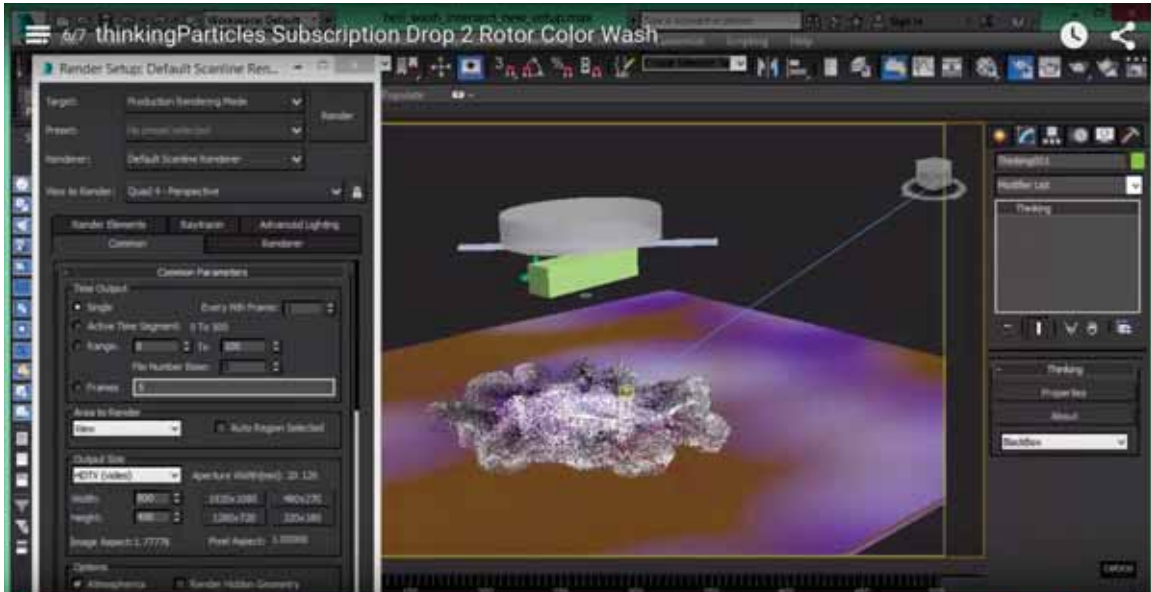
SmokeVelocityRenderElement - Atmospheric effects and motion blur are usually a hard thing to do. Normally atmospheric effects do not come with an option to render motion blur. thinkingParticles 6.2 Smoke Render engine allows to create proper motion blur with the help of this render element, as it stores all motion vectors of the fluid in one render element in multiple formats.



SubscriptionDrop 2: greater control over how body elements interact using the powerful link between solvers!
In this case, the smokeSolver and the bulletPhysics solver.



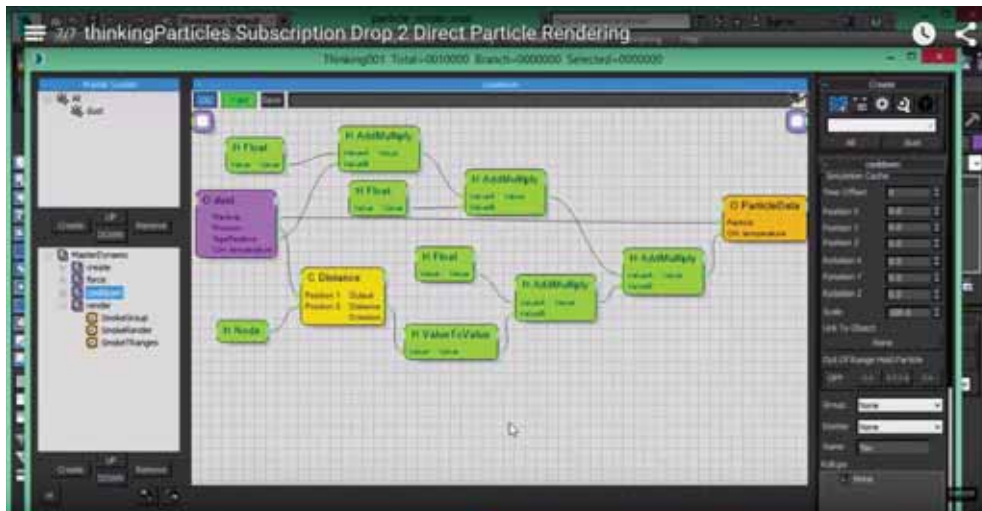
A popular VFX: the helicopter atmospheric effects comes easy with Drop 2: dust particles a-washed with whatever ground color choose! shadowCasting and colorMixing all at one go!



New in thinkingParticles 6.2: Direct Particle Rendering



Drop 2 now adds a direct particle-point rendering to your toolkit.



ThinkingParticles 6.2 is the first version to offer true direct volumetric particle point rendering. The SmokeRender operator does not only work with the newly introduced smoke fluid system, it is able to render all particles without a mesh (points in space).

This is a very powerful feature and opens up new creative possibilities. All of this point rendering functionality stays fully procedural within the thinkingParticles context. This amazing feature also allows for parameter controls such as distance-temperature fall off.

New in thinkingParticles 6.2: the Initiator Operator

The Initiator menu section has a new operator!

PPassString - with this latest release of thinkingParticles' 6 Subscription Drop 2, a new particle group access workflow has been introduced. Particle groups can now be accessed across 'hierarchy trees' just by their name or parts of their name. This new operator alone, opens up more powerful and efficient setups than it would have been possible ever before for VFX.

New Generator Operators

LayerToParticle - a powerful, brand new operator for thinkingParticles 6 offering the ability to automatically "import" objects from the 3ds Max scene into a thinkingParticles 6 simulation. Working with the standard 3ds Max layer system, one or multiple layers can be dedicated as an 'import' to thinkingParticles layer. Now, whenever a new object is created or moved to this layer - it will be automatically added to thinkingParticles.

LayerToParticleData - to support the functionality of the new LayerToParticle operator, a specialized LayerToParticleData operator has also been introduced.

Enhancements in Subscription Drop 2

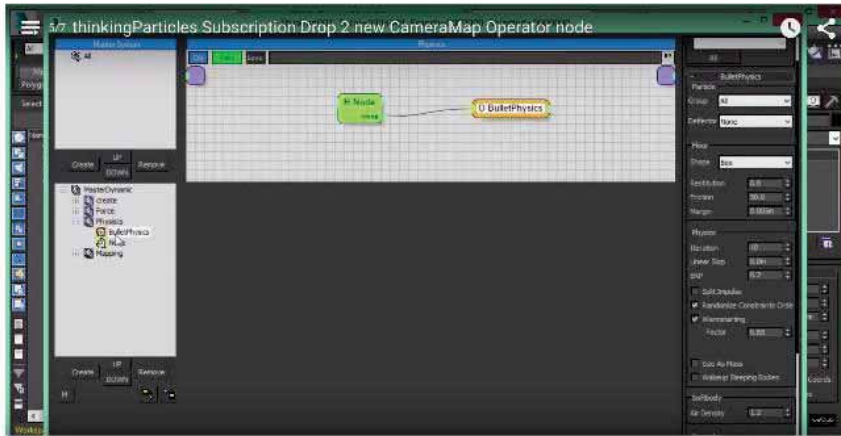
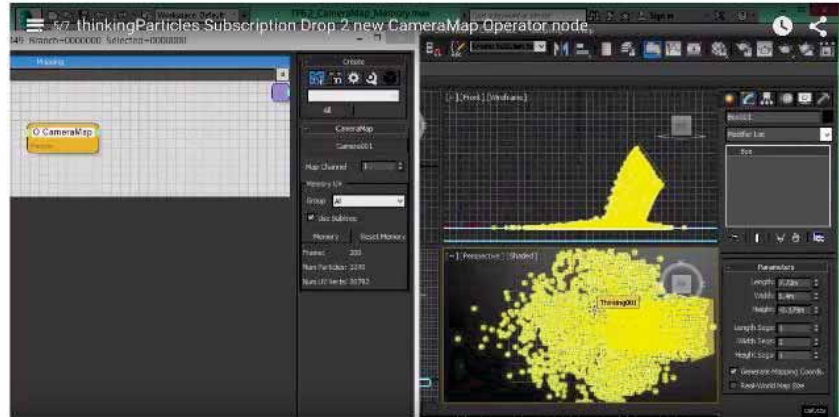
The Camera Map operator now has new features that allows for some truly amazing magic tricks.

CameraMap - a new feature has been added to the CameraMap operator to allow it to "freeze" or memorize UV-coordinates at a specific time. Those UV-texture coordinates are then applied to a selected group of particles, to simulate the same UV camera mapping throughout the animation based on a specific frame or time in the simulation.



- cameraMap projection onto particles: basic setup for scene shown on

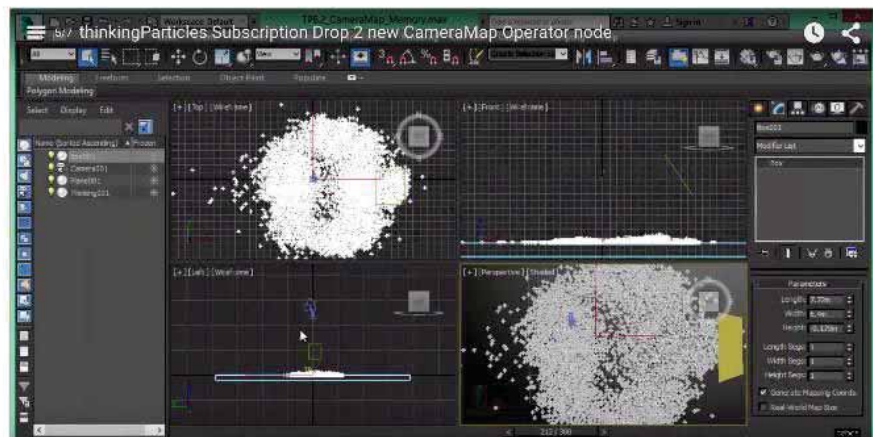
cebas Youtube playlist: 'thinkingParticles 6 Subscription Drop 2.'



bulletPhysics solver for collision. UV coordinates are projected onto particles for the effect.

cebas Youtube playlist: 'thinkingParticles 6 Subscription Drop 2.'

Polygon modelling



thinkingParticles 6.0 - Subscription Drop 1

cebas Visual Technology has announced that 'Subscription Drop 1' released December 2014 is now available for our thinkingParticles 6.0: 3D artists and VFX users before the year ends. With the introduction of Subscription Drop 1, users of thinkingParticles adds another set of **powerful spline generation** methods, high-performing volumeBreaker features with enhanced functionality into their Master System.

The new features in Subscription Drop 1:

Additional Helpers and enhanced Section

A new category was added to the Helpers drop down menu/section, 'Curve /Shape'.

Curve2D - With this new Helper, artists gets full steering in defining a curve to control an output value. There are two methods to use this new Helper Node. It can either be used directly, by wiring it to other Nodes; or it can be configured in a 'Satellite' mode, whereby another Operator Node is ruled to select the Curve2D function from a list of available Curve2D helpers. An example of such a satellite Node in-operation would be the SplinePool operator. A Curve2D Helper Node can be used in SplinePool to control the thickness of the spline shape.

Curve2D** - This additional helper to Curve2D is used to access and duplicate (instance), the parameters of any Curve2D Helper in a DynamicSet. This additional helper Node works when an original Curve2D Helper Node is linked.

ValueToValue - This new helper Node is used to define a curve to control an output value. It allows for detailed control of it's input and output range which are mapped to the curve.

Shape - This Helper Node allows you to query a Shape (spline) object. For any given length, for example, its 3D position on a spline, can be the queried output.

Shape** - Additional to Shape, this helper Node is used to access and duplicate (instance) the parameters of any Shape Helper in a DynamicSet.

ParticleData - A brand new output, AgeRelative, has been added to this Node to enable the artists to control other nodes based on the particles' lifetime as it is, between birth (0) and death (1).

PPass - New output, AgeRelative, has been added to this Node to enable the artists to control other nodes based on the particles' lifetime as it is seen between birth (0) and death (1).

SplinePool - Amazing intricacy that allows artist to convert defined Shapes-spline to a mesh. SplinePool also enables manipulation of the thickness of the spline mesh with the user-defined curves.

SplineData - This operator has been updated to allow detailed control for custom shapes and the use of the thickness curve function

SplineKnot - Splines can now have their own specific UVW-coordinates. New Inputs and outputs have been added to allow for better UVW control.

VolumeBreak - New functionality has been added to the volumeBreak Node to allow for the creation of more realistic and natural looking fragmentation. A highly optimized area-aware displacement method has now been developed to allow detailed control of the effect.

Background to thinkingParticles™ 6

More than 12 Years of Procedural Particle Effects

thinkingParticles™ 6 packs more than 10 years of product development and engineering into one massive procedural dynamics special effects system for 3ds Max and 3ds Max Design.

thinkingParticles is unlike anything you may have experienced before. Its total approach to Non-Linear procedural dynamics effects animation makes it the number one choice tool for professional Artists in the industry.

Leading industry VFX icons like Hristo Velev, Will Wallace, Joe Scarr, Mohsen Musavi, Anselm Von Seherr-Thoss, Paul Hormis, Sam Korshid, Ari Sachter-Zeltzer and many more - they all had achieved the most amazing special effects ever seen on the silver screen with the power of thinkingParticles. thinkingParticles along with other cebas tools have been instrumental in creating some of Hollywood's most compelling effects seen on the movie screen. This year (2014) started with another blast of demolition-envy, trend-setting movie titles riding on the tide of special effects.

Testimonials: see also http://cebas.com/?pid=testimonial_readmore

"Scanline's pipeline has evolved and strengthened heavily over the years, and our fantastic Pipeline team has integrated many tools and functions that enable us to do some truly incredible things with thinkingParticles. For instance, in one publish to the farm, we can send multiple jobs that are dependent upon each other, change operator or group values in between, create renders at various stages, and hand-off the result to the Lighting or Flowline departments.

Another great aspect of working with Cebas is the implementation of the Deadline "progress update" code in TP which allows us to see the percentage progress of a sim over time.

Lastly, our Pipeline and Flowline development teams have used the TP SDK to create an array of very powerful new operators and tools, one of which allows bi-directional communication between Flowline and TP - an incredible combination of VFX power."

~ ScanlineVFX, Joe Scarr, FX Supervisor

"With cebas' thinkingParticles, it's quite cool. It's living in a nice compact node that can be thrown between scenes. Blackboxes with basic building block setups can be easily shared between artists over the network or Dropbox. communication with the other parts of Max or the outside world is easy, with the tools to get geometry in TP and export it."

~ Bottleship VFX, Hristo Velev, Founder

"For RBD simulation, I think the SC (shapeCollision) operator in thinkingParticles is one of the best solver on the market if it's not THE best, always worked as expected, always accurate, works well with both convex and concave mesh, and having decent sim time over other alternative tool inside 3dsmax or outside, and SC friction can fake joints which is a timesaver on some assets.

I am not using tP only for FX, but also for procedural modeling with spline OP, automating multiple PRS animations, or instancing multiple animated objects with control and/or on animated meshes. "

~ Marc Auvigne, freelance Videomapping Effects Artist

" I like the nodal interface, giving a great overview of the whole setup (better than hundred lines of expressions in maya particles for example.) What I love the most in TP is that you have a lot of "out of the box" operators that allow you to do cool things in a simple way : for example you don't need to deal with quaternions to do a simple "pAttach". But if you want you can also do more complex setups / data manipulation."

~ Paul Parneix, VFX Supervisor/ FX TD, Unit Image

Rule-based Versus Event-driven Particle Systems

Where does thinkingParticles stand? The difference between event-driven particles and rule-based particles can be summed up quite simply: An event-driven particle system usually works based on "triggers" or events that must happen to activate an effect. This implies some kind of painstaking keyframe related effects. On the other hand, thinkingParticles is powerful because it is totally independent of any timing and keyframing!

thinkingParticles offers true Non-Linear and Procedural animation technology. Rules and conditions control

the particle effects, and not timers or events, as it happens at certain keyframes in an animation. A particle system created with thinkingParticles will always work, regardless of the timing or number of frames that may change in an animation.

The new release thinkingParticles 6 launched 2014, a trailblazer, delivers greater punch with advanced tools for integrating multi-physics and real world simulation effects surpassing any other products available for 3ds Max VFX artists.

Simulation License

thinkingParticles 6 introduces one more additional license model, the SIM-License. This simulation-only license allows batch simulation of multiple thinkingParticles scenes in one go, without using up a full thinkingParticles license.

If needed, more simulation licenses can be ordered at any time from the cebas online store at: www.cebas.com

By default, one simulation license ships with every full thinkingParticles version. Setting up a batch simulation rendering process is pretty simple and straightforward. All necessary scripting commands, explaining how to batch-simulate multiple thinkingParticles scenes are shipped with the latest release of thinkingParticles.

NEW in thinkingParticles 6

ThinkingParticles™ Release 6 offers virtually an unlimited amount of extended features. thinkingParticles 6 has the build-up power and flexibility of a programming language and a versatility limited only by the creativity of the 3ds Max artist. Remember, you do not need to learn programming or to write a single line of code to use thinkingParticles in 3ds Max. Everything is done through a visual wiring interface.

Overview of extended features Release 6 (includes all versions' features enhanced):

- 3 tightly integrated highly optimized, industry-standards Dynamics Solver
- Near real time soft-body Rope dynamics system
- Advanced geometry access functions for particle systems
- Fully Procedural Joint handling (Creation, Setting)
- True Hierarchical Dynamics Breaking System
- Low-Subframe Sampling Joint System with Fast Solving Speed

- High Precision/Low Sub-Frame Sampling Rigid Body Dynamics Solver
- Fully rule-based particle system
- 100% Scriptable DynamicSet and ParticleGroup Control
- True Scriptable thinkingParticles Plugin Operators
- Procedural referencing system for non-linear animation
- Complete particle baking option into 3ds Max objects
- Dynamics Simulation Recording for all particles
- MatterWaves as rule-based operator included
- Any 3ds Max object may be turned into a particle
- Full hierarchical Condition and Operator workflow
- One or many particles can be accessed at any time
- Automatic and intelligent rule-based Object Fragmentation
- Advanced Object Tracking features to handle mesh animation
- Multi Purpose Complex Operators
- Advanced and highly optimized Particle Dynamic Engine
- Full support of Particle/Object interaction
- Complete object parameter access "through" particles
- Advanced "Blurp" Operator to handle complex particle morph effects
- Ultra fast Real-time Particle/Object Collision Detection
- Particles may be affected by 3ds Max geometry
- Advanced Crowd Control Feature
- Instanced and morphable Skin or Physique Modifier support
- Special IK handling routines for real-time Crowd Control
- Advanced Wire Setup View for easier behavior setup
- Real particle Paint Support (particles carry color information)
- Extended PyroCluster support to access individual particles
- 100% integration into 3ds Max workflow
- All particle Space Warps are supported
- Enhanced and real-time rule-based Dynamics Engine

Complete learning and training coverage!

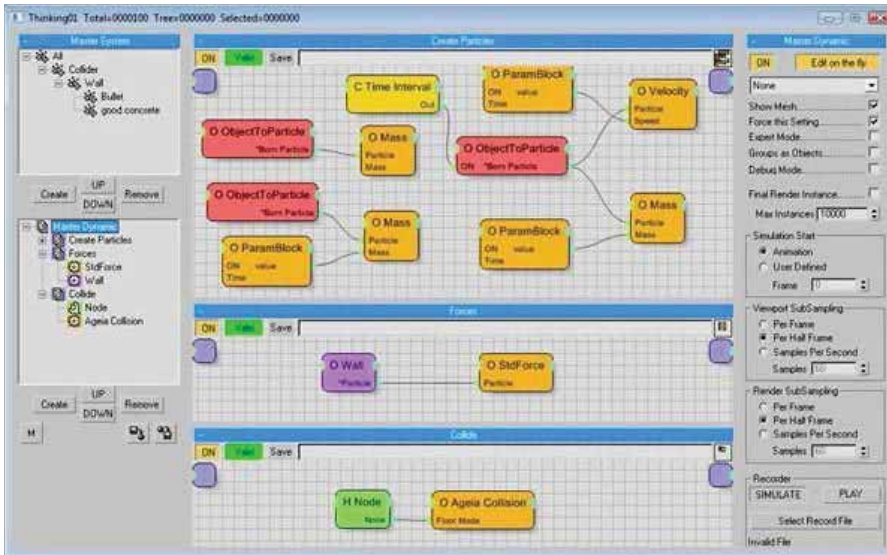
From beginners level, there are several hours of FREE Training Videos offered either directly from cebas or DVD tutorials from www.eat3d.com

This feature list represents only a fraction of the total power features users can access to create powerful visual effects with thinkingParticles 6. The possibilities are endless.

User Interface and Workflow

The stylish user interface layout of thinkingParticles 5 is reinforced in Release 6, adding a huge

workflow enhancement for a visually-pleasing experience.

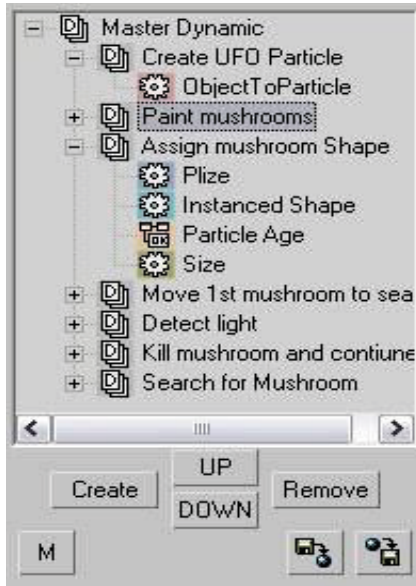


Schematic View Rollout

In the Schematic View rollout menu, the colors of the main thinkingParticles 6 UI can be easily adjusted or modified. The changes are stored in a separate Thinking.ini file that is stored within the 3dsMax/PLUGCFG folder.

DynamicSet Tree View

The DynamicSet Tree View is one of the most important areas in thinkingParticles 6. It is here that you set up your control systems and process ordering for your particle animation. Nearly all of the advanced effects that you can create within the system are based on the fact that thinkingParticles 6 is able to store its rules and operators in separate DynamicSets and have them evaluated based on other rules and conditions, thereby **avoiding** any errors or rule-conflicts from the outset.

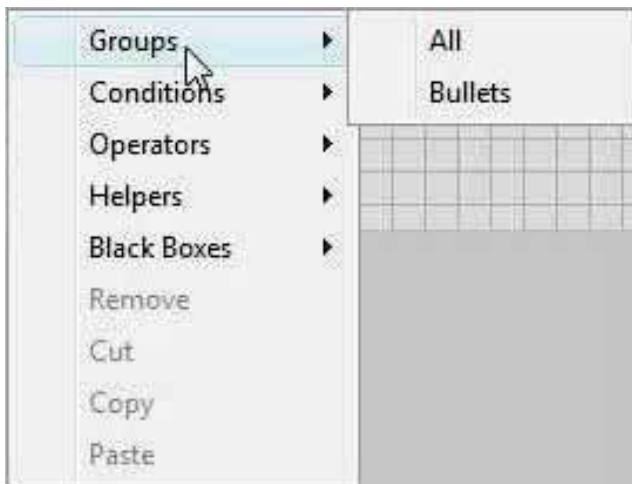


Special StartUp.thi Initializing File

A default thinkingParticles setup file was recently added to thinkingParticles 6. This file allows the user to define a default layout for the DynamicSet UI. Whenever a new thinkingParticles particle system is created it will use the file called startup.thi, if this file is present in the first available BlackBox search path. Startup.thi allows you to save custom setups for tP like Dynamic Sets and Groups. For instance, if you are consistently creating a 3 Groups and 4 Dynamics sets (named as you like with the properties you like) then you can simply save this setup in the startup.thi in order that every time you create a tP particle system, similar Groups and Dynamics will be automatically created for you.

Right Click Menu Options

The standard tP right-click mouse button behavior has been optimized and streamlined. With tP6, the user can now create any available operator with a simple right click of the mouse.



ThinkingParticles uses standard methods to navigate and manipulate the software and its parameters. All mouse buttons are used in a natural and logical way, just like any Windows application. In addition to the standard "point and select" approach, extra functions can be implemented by using a keyboard shortcut, along with the mouse controls.

Drag and Drop Options

With thinking Particles 6, you also have the ability to drag-and-drop one DynamicSet, or the operators that they contain, onto another DynamicSet in order to make it a sub-set of that DynamicSet. This process is sometimes called nesting. You can even drag and drop DynamicSets onto the Master DynamicSet to effectively bring them back to the main branch level.

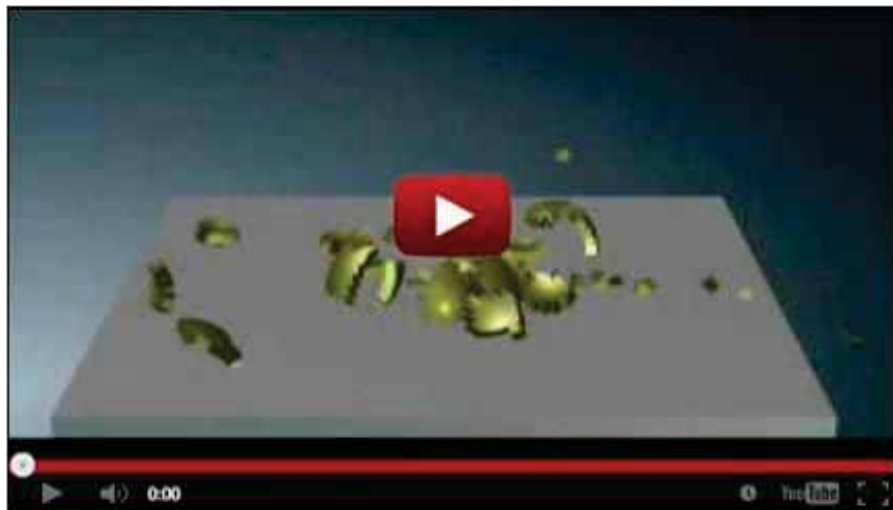
Materials

Material support has always been a strength of thinkingParticles. It was the first system to introduce true particle-based material blending at render time. With other properties, each individual particle can have its very own instance of a full material.

Material Nodes

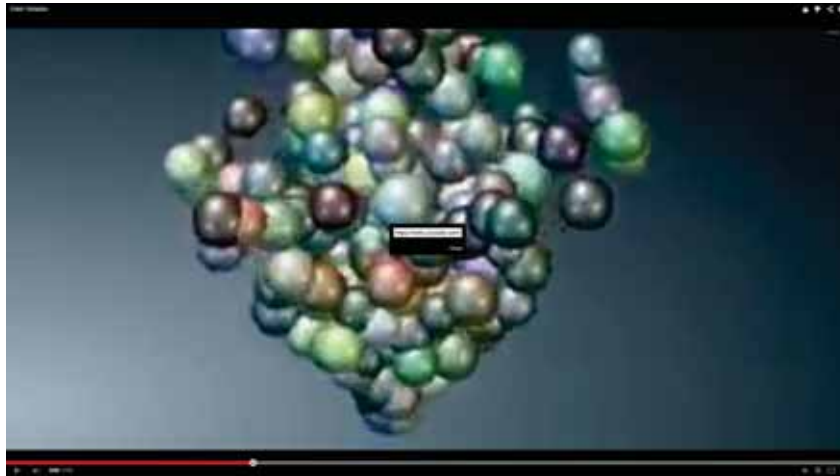
Controlling materials per particle has always been the dominating particle feature of thinkingParticles, a feature no other particle system could even match. Now, with the introduction of the MaterialTime node, it is possible to individually animate the material properties per particle, in a fully non-linear manner with total procedural control! Operators expand the functionality of thinkingParticles to allow for many more complex particle effects with materials. A dedicated thinkingParticles Multi/Sub-Object material has been added to the tool set, that allows for the creation of easy random variations of materials, for each particle object. Find below an example of the MaterialShape operator, that allows the user to assign any material at any time, to any particle.

<https://www.youtube.com/watch?v=4uinBDK-mrk>



Another powerful tool, is a **variation texture map**, that enables the creation of an unlimited amount of color or texture variation at render time! Every single particle will have its very own color or texture variation and no two particles will ever have the same color or texture.

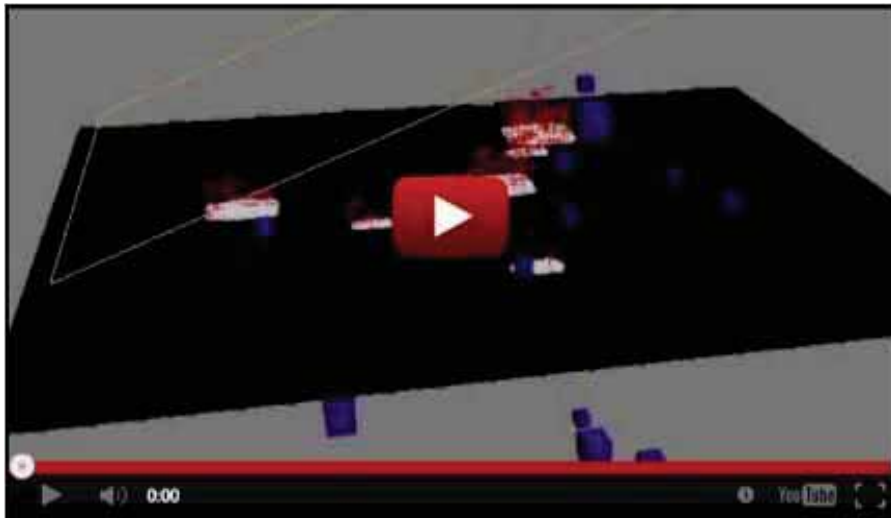
<https://www.youtube.com/watch?v=5R1MOCNCm4g>



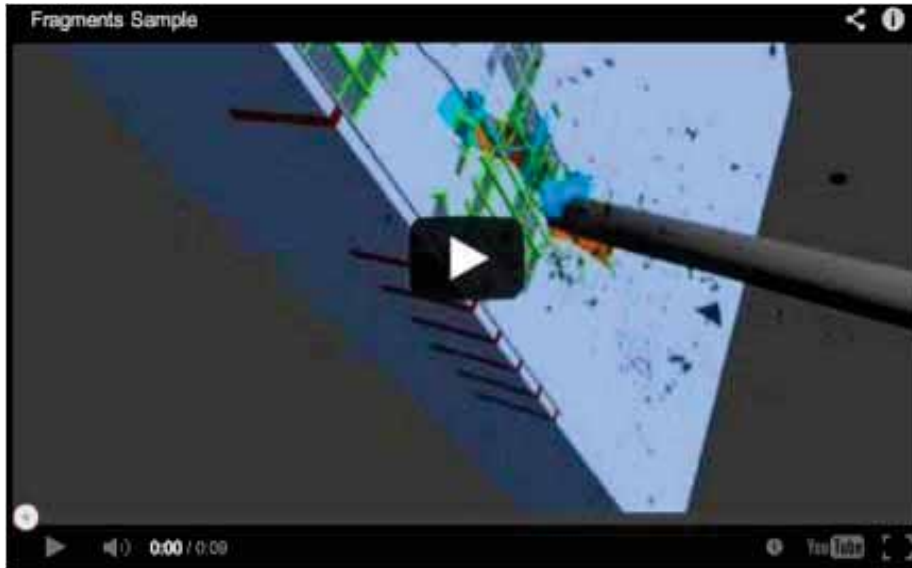
Tools Menu Section

The first available Tool node is the Collision Map tool that is meant to automatically create animated fragmentation masks for the enhanced and optimized Fragment operator.

https://www.youtube.com/watch?v=KOYCA7__drw



<https://www.youtube.com/watch?v=qPIWihdZC64>



Documentation and Training



Image (c) CafeFX from Spiderman 3

Documentation

ThinkingParticles 6 offers one of the most comprehensive user documentation together with product subscription. By using the latest help authoring tools offered by Adobe, the new offline Help system still enables instant and automatic updates over the web and the manual is never outdated. Easily readable and searchable, compiled with rich color images and animations, the user documentation explains in detail every single function and feature of thinkingParticles 5.

Tutorials and Training

ThinkingParticles also comes with hundreds of sample scenes and helpful written tutorials as well as many pre-defined setups and helpful MAXScripts, which illustrate the new functionality of thinkingParticles.

Trainees can access the cebas.com Training Resource by registering a free account. Tutorial free videos is available at <http://www.youtube.com/cebasVT> as well as community support is also available on Facebook, 'Cebas Thinking Particles' public group. Keep updated via our Facebook page: Cebas Visual Technology Inc.

Several hours of HD categorized training videos for new and advanced users are offered 24/7 as direct downloads from the cebas' members web page. This free offer of high quality training videos, created by industry veterans, is backed up and enhanced by additional commercially available training DVD material that can be ordered either from www.eat3D or directly from our online store at www.cebas.com.

Pre-mades and Scene Files

ThinkingParticles comes with many scene files as well as 30+ pre-made BlackBoxes and pre-made TD Tools.

Cars & Vehicles - Rule Based Autonomous Vehicle Simulation

Vehicle simulations within 3ds Max are a complex task and full of challenges! 3ds Max users would usually have to turn to a software that is worth several thousands of dollars to do a proper vehicle simulation or animations involving cars driving around. Thanks to thinkingParticles 6; anyone can now do it for an affordable price!

Vehicle simulation has never been easier or more advanced! Vehicle simulations in thinkingParticles 6 is build on a combination of rule-based, 100% procedural animation technology. The capability makes thinkingParticles the best choice for multiple vehicles special effects and physics simulation in 3ds Max.

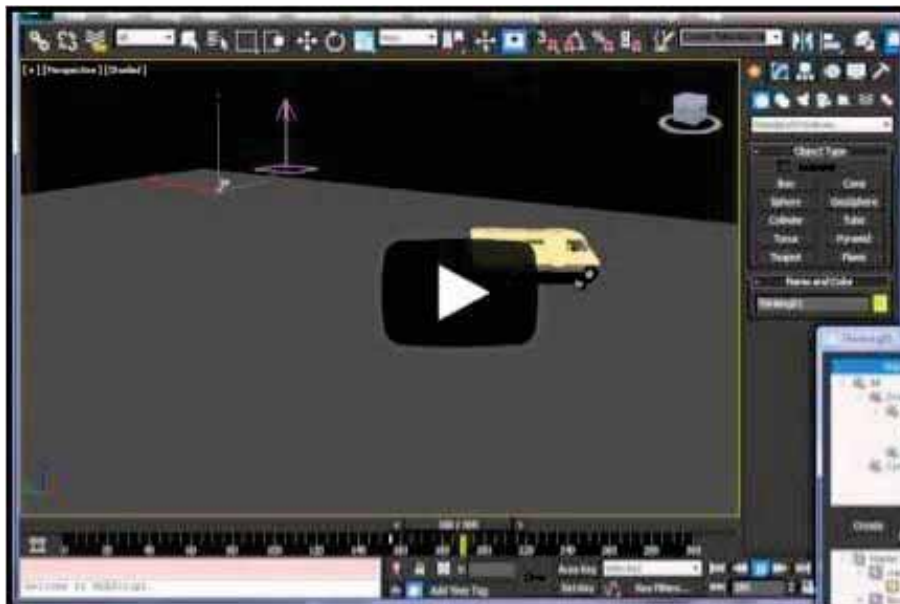
Check out the sample videos to learn more about rule-based vehicle simulation within thinkingParticles.

https://www.youtube.com/watch?v=vmXz6J_JxyE



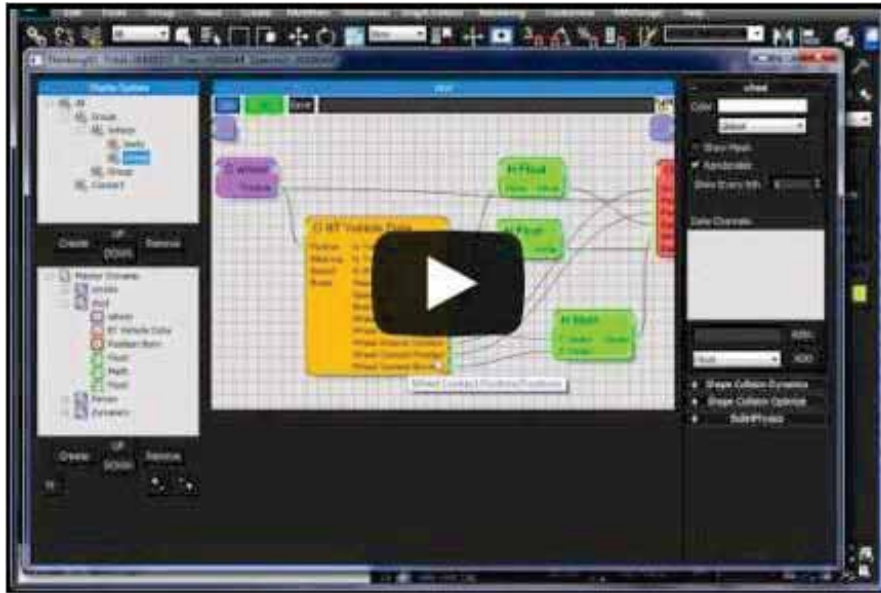
In the video below, you can learn about the detailed controls offered by thinkingParticles 6 to do vehicle animations.

https://www.youtube.com/watch?v=w2okgLD0_7E



A vehicle is nothing else than a particle in thinkingParticles!

<https://www.youtube.com/watch?v=j73TAYDkvAw>



Bullet Physics: The World of Newtonian Physics has a new Member!

ThinkingParticles 6 offers industry standard strength and a world of choice in physics simulation technology! With the integration of the renowned Bullet Physics Library, thinkingParticles now introduces more choices than any other rigid body simulation products for 3ds Max.

We believe in choices and we are offering them to you ! You are now able to select from the following rigid body physics engines:

Shape Collision

thinkingParticles own highly accurate Hollywood quality real world simulation system Bullet Physics Library - ultra fast equipped with accurate rigid- and soft-body collision engine NVIDIA PhysX - fast and widely used game physics engine.

To learn more about the Bullet Physics Library, check out the video below.

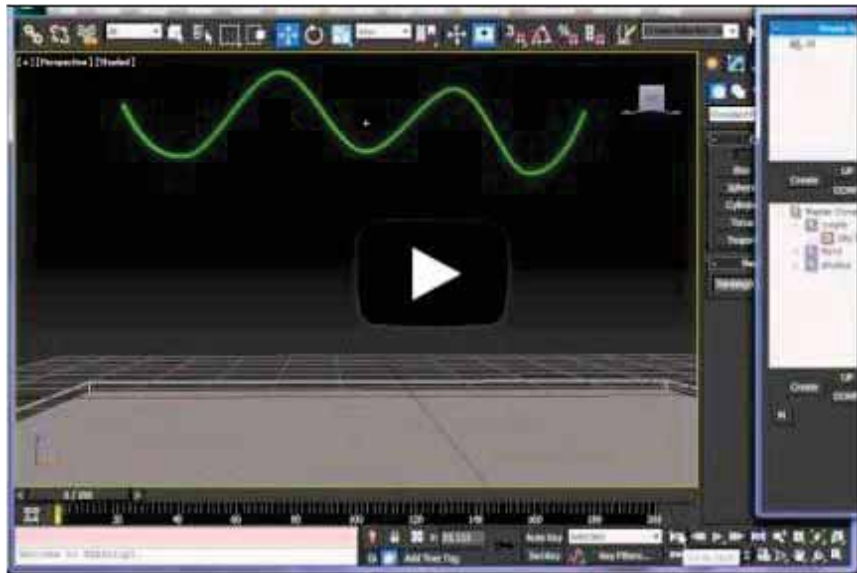
<https://www.youtube.com/watch?v=6DnE2TCaq0g>



Ropes Soft-Body: Get Entangled - Rope Simulation Done Right

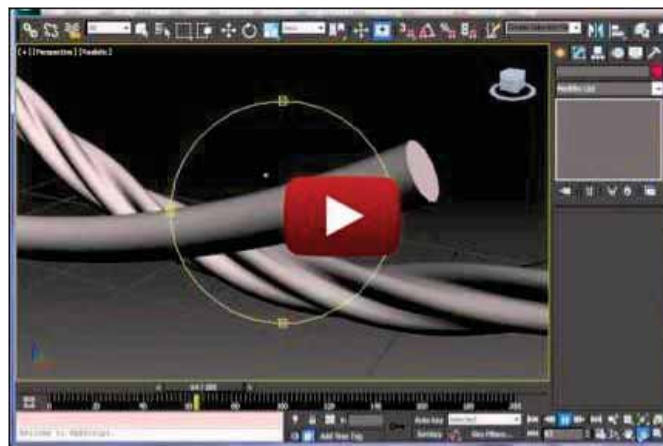
ThinkingParticles offers one of the most advanced Rope soft-body simulation tools available for 3ds Max. Every single aspect of a Rope simulation can be done either in a fully procedural way or manually with the help of standard 3ds Max tools. Check out the video below to learn more about the spline-based approach. To learn about procedural Ropes, check out the video below.

<https://www.youtube.com/watch?v=2mTmfsnwnv0>

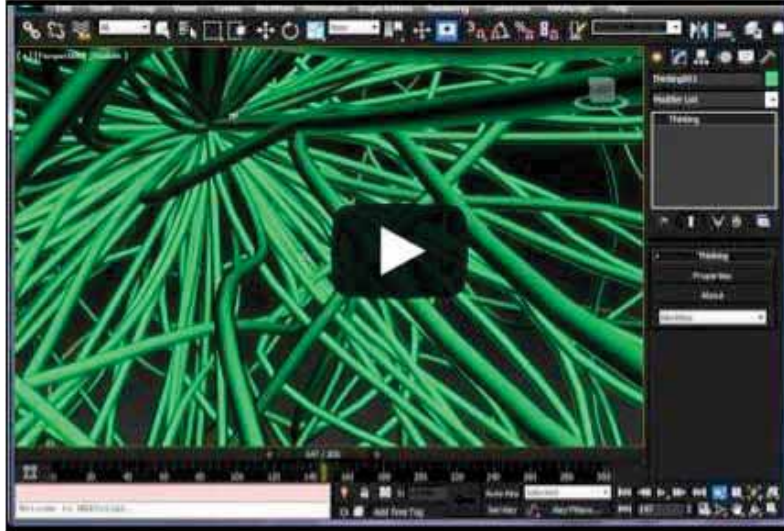


Ropes are complex beasts and can take many forms! Check out the video below to learn more about the shape and form a Rope can have in thinkingParticles.

<https://www.youtube.com/watch?v=1I9tTQ1v8Hs>

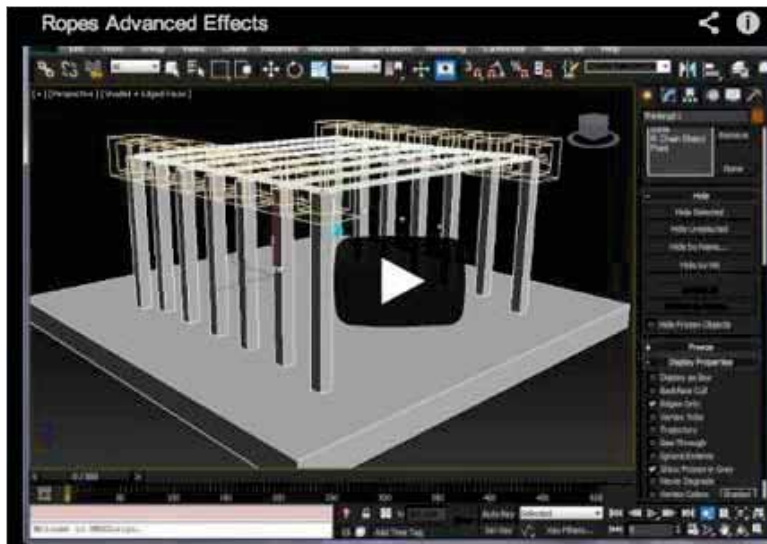


<https://www.youtube.com/watch?v=l8Ss0zZ4e-M>



The fun starts when combining thinkingParticles tools and effects! Check out this video that talks about complex Rope setups.

https://www.youtube.com/watch?v=aT_eFl-94Pc

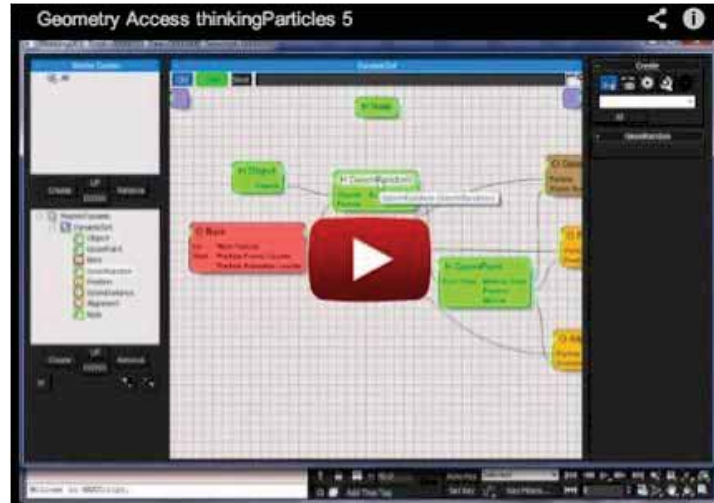


Geometry Access: Better Effects, More Control

All the power of thinkingParticles 6 comes from its flexibility and control of parameters in a scene. At any point of time - anything can be changed or affected in a scene. Check out the Geometry control Nodes

available in thinkingParticles:

https://www.youtube.com/watch?v=fknOvZlp_xk



In the process of fine-tuning the Geometry access Nodes within thinkingParticles, other optimizations have been also implemented to make it a holistic experience.

<https://www.youtube.com/watch?v=PJeAaa5000Q>



Demolition: The Real Thing... Virtually!

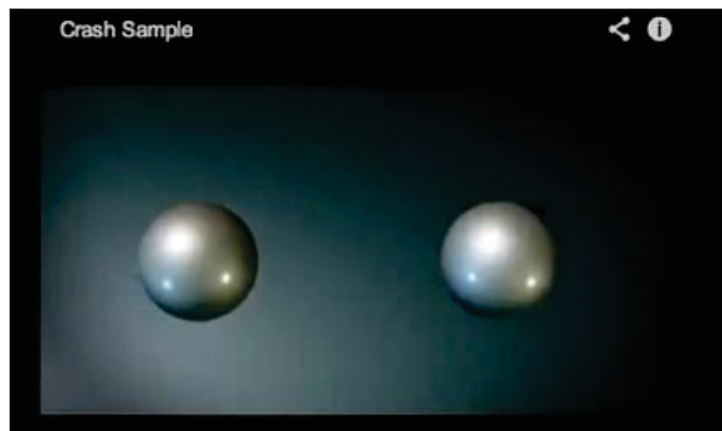
For a long time, practical effects have been thought to be the only way to "simulate" realistic demolition and explosion effects in the movie industry. Many directors accepted the artificial model-like look that came

along with an out-of-scale lighting, exaggerated shadow, flame, fire and dust look caused by the unrealistic scale blurring of any miniature effect.

The era of miniature demolition and practical effects is seeing the last of its days. thinkingParticles 6 has evolved into a stable, fast and easy-to-use rigid body and fluid dynamics effects system, which offers unmatched flexibility and power for 3ds Max production pipelines.

Take a look at the example shown below. When you analyze this scene, you will discover that there is a type of shockwave running through the sphere object. This shockwave effect is fully controllable through thinkingParticles. Everything you see here is rule-based! No single keyframe was used to create the animation shown below.

<https://www.youtube.com/watch?v=wP6b8lYWhQ0>



thinkingParticles - Demolition done right !

ThinkingParticles offers one of the industries' best Rigid Body Dynamics solvers capable of creating accurate and stable results even when working with very low Sub-Frame Sample rates, which is key to speed and high volume animation F/X output. In combination with Fume F/X, thinkingParticles 6 outperforms any other possible combination of fluid solver and particle system. Tightly integrated with Fume F/X, dedicated thinkingParticles operators enable the creation of the most amazing mixture of effects with modern CG technology.

<https://www.youtube.com/watch?v=0H98FUm0KVI>

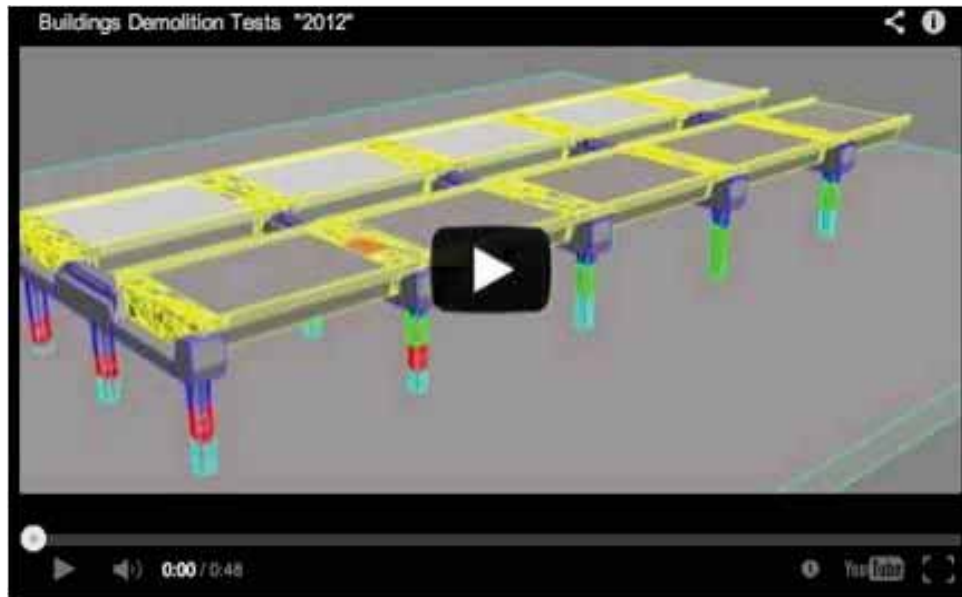


Doomsday: let's destroy the world !

Roland Emmerich's movie "2012" is a good example, if not the best, of the massive technological shift into modern CG technology. Effects, once thought to be impossible in CG, are finally possible and affordable with the release of thinkingParticles 6. The amount of work and progress in software technology achieved by cebas innovative team in the latest release of thinkingParticles is remarkable.

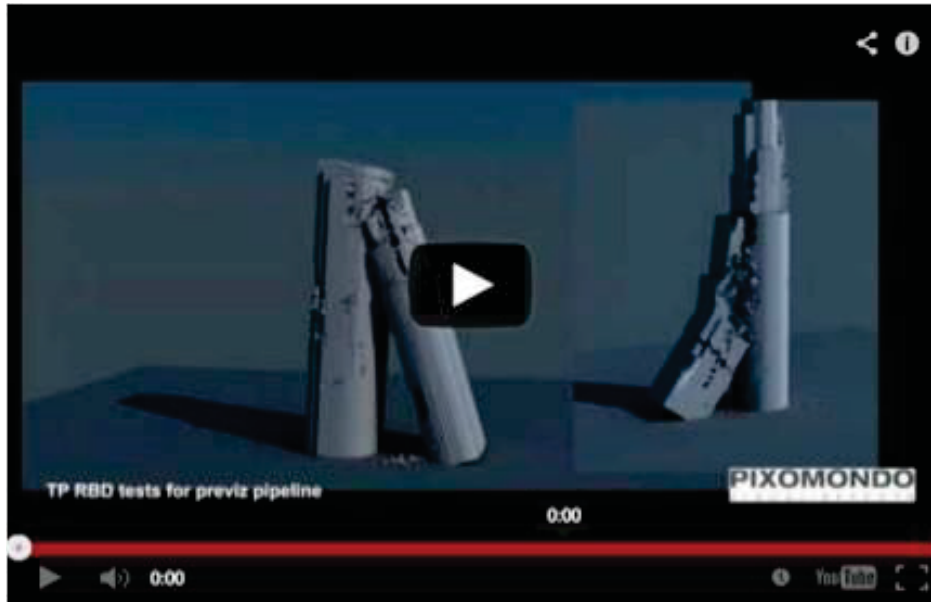
See for yourself; below is a compilation of "simple" tests done for the movie project "2012":

<https://www.youtube.com/watch?v=AD2l10pJhss>



VolumeBreaker on Steroids

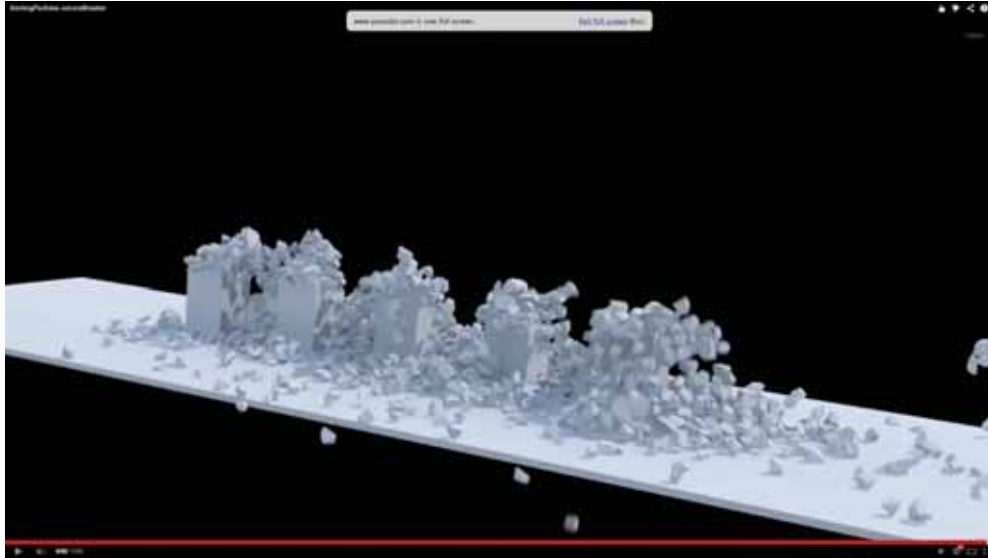
https://www.youtube.com/watch?v=_GmmruatRoE



ThinkingParticles 6 is the first and only Particle F/X product offering a fully procedural and integrated volumeBreaker engine. No other particle F/X application on the market offers this advanced and highly optimized automatic volume breaking system in its program core, as a standard feature.

While the stand alone product "volumeBreaker" can be used by anyone and with any application that runs on 3ds Max, the thinkingParticles integrated counterpart offers much more power and flexibility via its concept of doing everything non-linearly and procedurally.

<https://www.youtube.com/watch?v=KC0SVbyx12s>



What is volumeBreaker anyway ?

VolumeBreaker is a volumetric geometry fracturing tool that will instantly create sub-geometry within any mesh - geometry that perfectly fits together and fills any given volume. With volumeBreaker, cebas Visual Technology brings together a Hollywood quality destruction tool that outperforms in 3ds Max.

VolumeBreaker was developed in consultation with and to meet the very specific demands of VFX Artists who work on multi-million dollar movies. Because of this, volumeBreaker is truly a production proven tool.



Image from movie "2012" by Uncharted Territory

Demolition Made Possible

The core integration of volumeBreaker into thinkingParticles 6 proclaims a new era in visual effects. This

technological advancement is expected to revamp the art of creating practical and miniature effects in the movie industry. Like the business of a Blacksmith - miniature effects will become more and more an art of the past. Technologies like volumeBreaker, perfectly integrated into thinkingParticles, is the first step in creating fast, re-producible, affordable and realistic mass destruction effects for the big screen.

It's about time to change the whole industry - thinkingParticles is the vessel to do just that !

<https://www.youtube.com/watch?v=MIMxtCwOUq4>



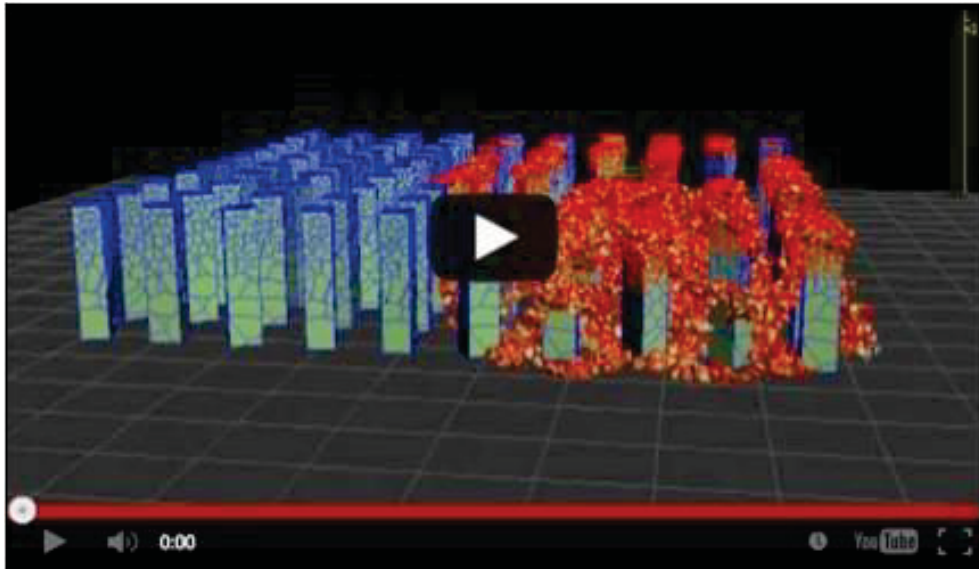
Particle Cache

The concept of particle caching or "baking out" particle simulations to a file is becoming more and more important as scenes become more complex with multiple layers of effects.

ThinkingParticles 6 in 3ds Max redefines working with simulation caches in a whole new way. Particle cache files are now handled exactly like any thinkingParticles setup - in fact, the files will behave in a manner that is no different from the original DynamicSet. Particle caches can be instanced, re-timed, played back and rotated, like you would do with any other particle generator. Particle cache files are now fully self-contained and portable - it is even possible to access and change the materials that are contained in such a cache file afterwards.

The animation shown below illustrates the use of only one particle cache, instanced multiple times; whenever the sphere gets close to a pole it disintegrates.

<https://www.youtube.com/watch?v=YWez3phH4ZM>



Dynamic Set Caching

The various particle caching functions available in thinkingParticles offer a powerful way to create highly complex particle animations and render them in a massive network environment. With the latest release, DynamicSet Caching is enhanced greatly in thinkingParticles by adding more information to each file and making it available through Asset Tracker.

Cache playback is no longer restricted to the same scene setup; a cache can now be played back in any DynamicSet, even in completely empty thinkingParticles' scenes!

Playback Particle Exclude

Options like removing particles after the recording session or changing materials afterwards, open up new styles of workflows like never before!

https://www.youtube.com/watch?v=__b8D79t3w0



NVIDIA PhysX: Welcome NVIDIA to the world of 64-Bit !

... PhysX now on 64-Bit

ThinkingParticles 6 also offers many advanced features and state of the art software technology, including plug-ins to the NVIDIA's PhysX Rigid Body Dynamics Game engine. For a long time, their release of PhysX was for the 32-Bit operating systems only. Now, with the release of thinkingParticles 6, support for 64-bit operating systems has been added for PhysX as well. Below is a short summary of features supported by the PhysX rigid body game engine.

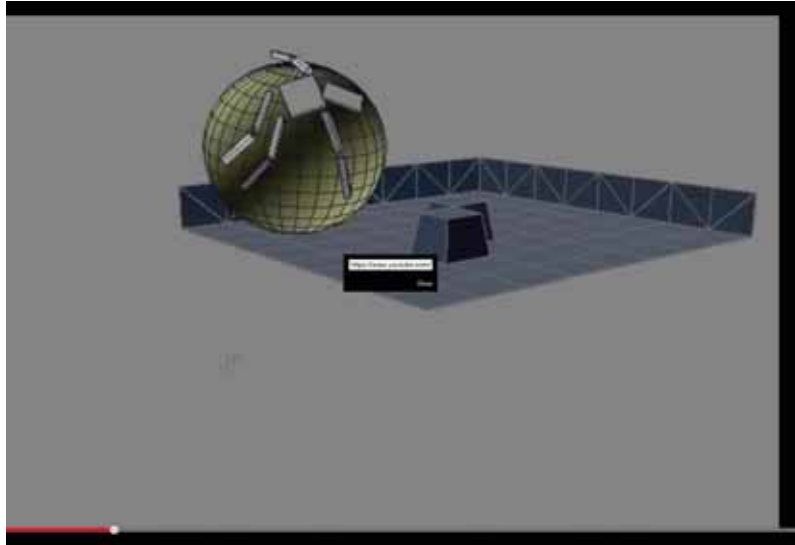
NVIDIA PhysX support

thinkingParticles 6 supports the following system driver version:
"PhysX_10.01.29_9.10.0129_SystemSoftware" .

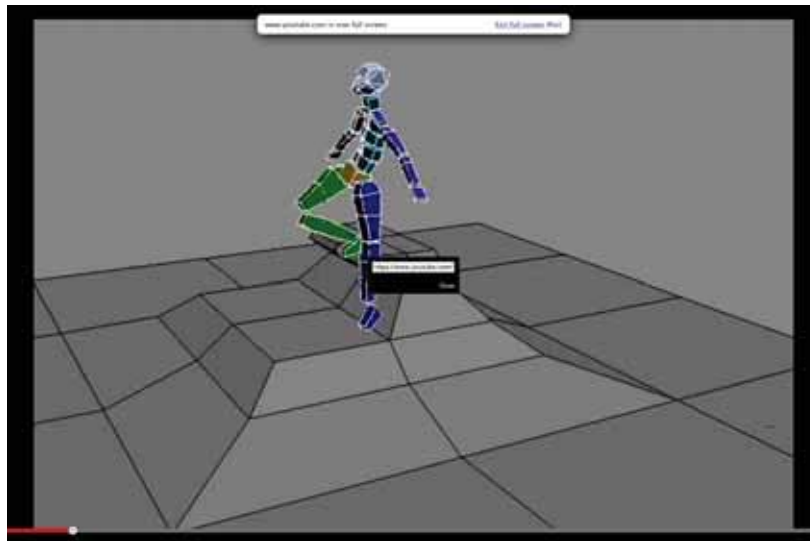
<https://www.youtube.com/watch?v=-HadEaOBm3w>



<https://www.youtube.com/watch?v=SbmfXu1o6m0>

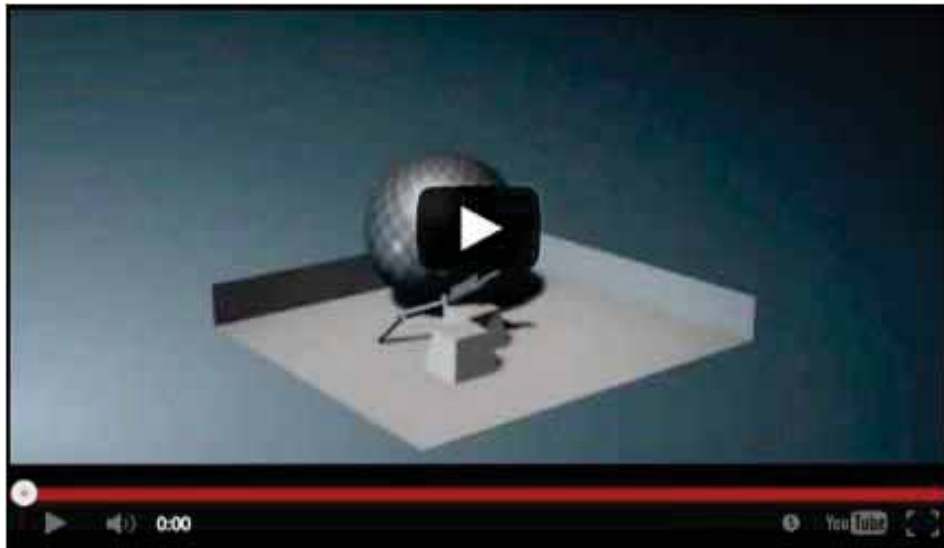


<https://www.youtube.com/watch?v=j2zPmWF2DQs>



The animation below, shows the power and flexibility of using joints with PhysX in thinkingParticles.

<https://www.youtube.com/watch?v=Z8yP8pKvDZo>



Thanks to the constant feedback from some of the largest and most prominent studios in the industry, thinkingParticles 6 has evolved into the super creative tool that it is today. Every single operator found in thinkingParticles, was created as a result of direct user feedback. Real world production needs does directly into enhancing the interface and workflow of thinkingParticles.

It is a tool, sculpted by the creative talents of the most promising CG Artists in the industry today. Using PhysX in thinkingParticles, it takes only 10 seconds to simulate this car which fragments and blows up into a crowd:

<https://www.youtube.com/watch?v=KecQAOjO72M>



ThinkingParticles has now integrated the most advanced simulation technologies available on the market, ensuring its status as the leading tool for particle effects in the CG and VFX industry. thinkingParticles is the future! As the use of NVIDIA PhysX hardware becomes a global-wide spread, thinkingParticles is more than ready to help you take your art to the next level by fully supporting the PhysX Game Physics Engine to its best advantage, with thousands of rigid bodies, accelerated joints and other enhanced physics features.

The fragmenting animation below simulates in real time, in the 3ds Max viewport, the power of PhysX in thinkingParticles.

https://www.youtube.com/watch?v=_GuhgyZJTfM



<https://www.youtube.com/watch?v=0ot3IsNzBUY>



Joints: The Procedural Way

In addition to the existing NVIDIA PhysX Joint helper object, another more advanced Joint helper has been added to the tool-set to be used with the new ShapeCollison rigid body solver.

Rigid body particle dynamics and especially joints are among the new "big" things in thinkingParticles that have been fine-tuned and optimized to the best possible extent. The result of our efforts to deliver the best ever Hollywood F/X tool can now be seen in the many flexible ways to create and use rigid body joints.

No other effects application for 3ds Max offers greater flexibility and control in creating and handling Dynamics Joints like thinkingParticles.

- Modifier Joints
- Object Joints
- Operator Joints

Besides the many different ways to create or handle a Dynamics Joint, there are also many different types of joints.

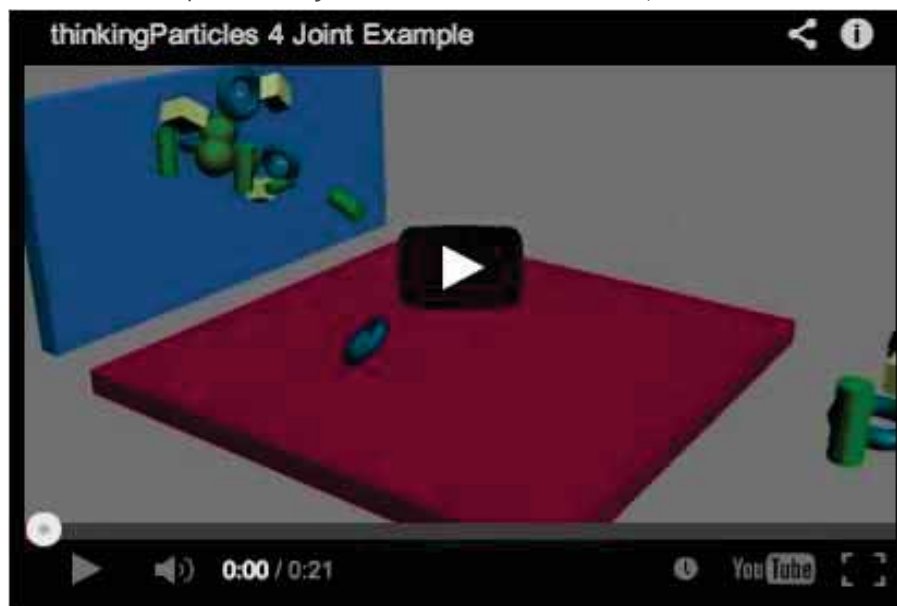
The joint types in detail are:

- Fixed
- Spherical
- Cylindrical
- Ball
- Hinge
- Spring
- Wobble
- Slider

Every Joint types aforementioned shares several common properties such as a joint that is 'breakable'.

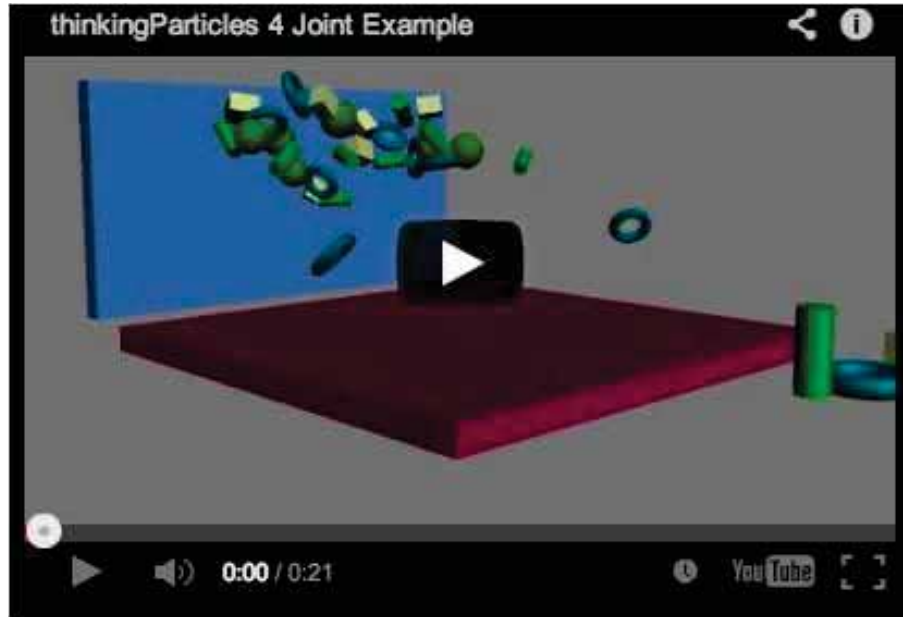
In this first video below, a procedurally fixed joint creation is shown. Whenever two particles are close to each other, they "link" together and stay fixed.

<https://www.youtube.com/watch?v=SulQxMBvGIE>



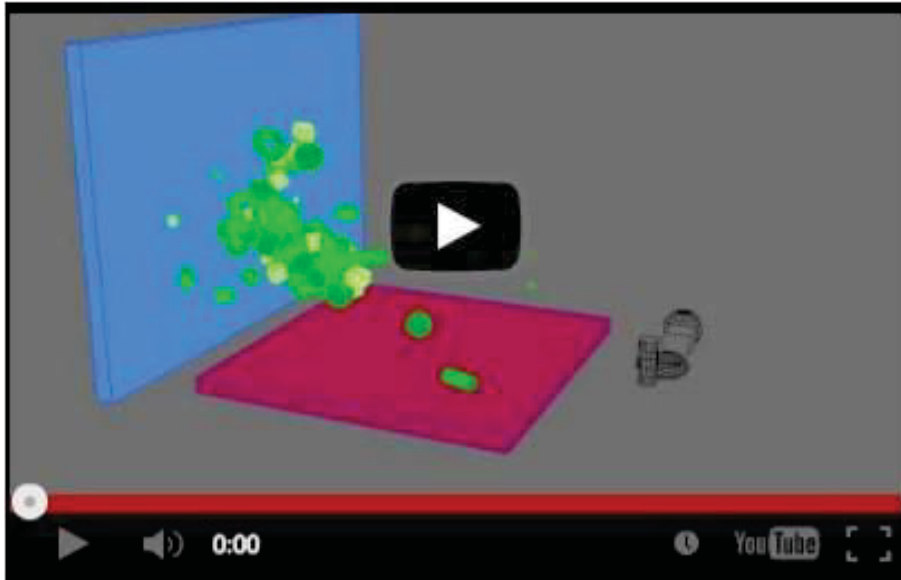
The video below shows a procedural creation of "springy" joints. Whenever two objects are close to each other, a spring joint is automatically created.

<https://www.youtube.com/watch?v=JCHTSMZ-rjM>



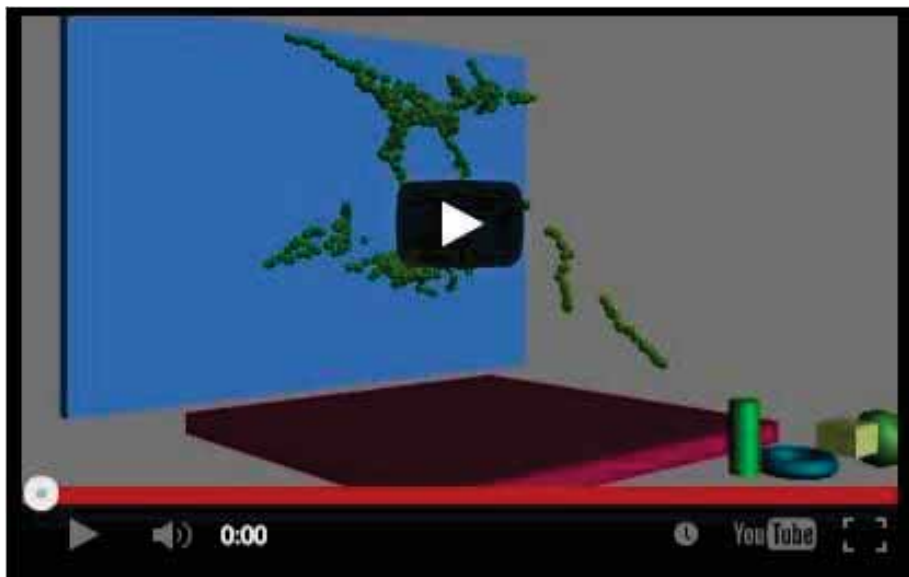
Below you'll find more joint test variations, all created procedurally based on rules. thinkingParticles 6 not only allows for the creation of joints procedurally but joints can also be set and adjusted in a 100% procedural way.

<https://www.youtube.com/watch?v=c8Usfot7w1E>



Another fun variation of procedural joints.

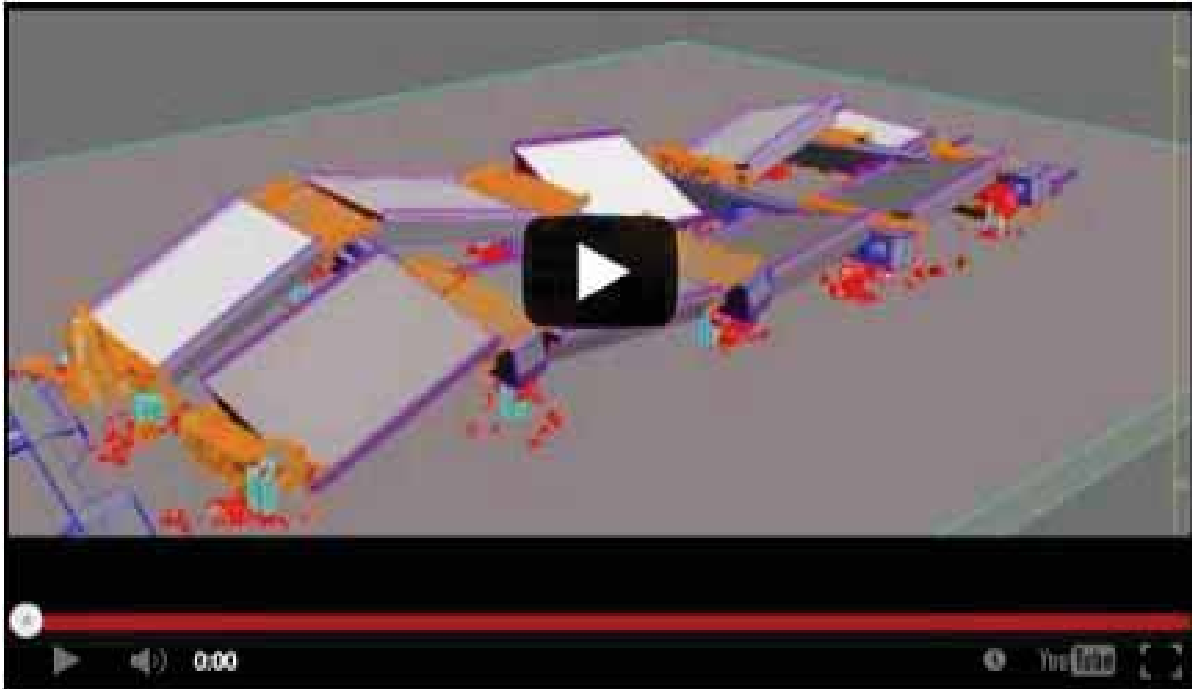
<https://www.youtube.com/watch?v=VMsKHuUUMTM>



Hierarchical Fragmentation

~ *simulated detonation of structural particles in sequence*

<https://www.youtube.com/watch?v=byi9b1Ltf6c>



ThinkingParticles' HFragmenter redefines your way of working with 3ds Max special effects in destruction sequences. This newly developed thinkingParticles sets of operators is one of the most powerful features implemented so far. The operator is complex and flexible beyond imagination. For most users, this new way of working will be at first something to digest for sure - but the more the energetics becomes clear the more you will love it!

Chaos Forced into Structure!

HFragmenter is all about structuring complex physics into a single, easy-to-use interface allowing the user to keep full control at all times. HFragmenter is a powerful Hierarchical Demolition (Fragmentation) set of tools. It's not just one thinkingParticles node; it is a set of multiple tools, all inter-linked and working in concert to achieve amazing demolition simulations.

Structural Integrity

The purpose of such hierarchical demolition tools is to help you create a structural skeleton that is based on freely adjustable physical parameters and hierarchical ordering of components of the object to be destroyed. This unique approach will let you freely define the parts which break off of from an object, when

and how. Once a structural skeleton has been defined, it can be altered and adjusted to your needs any time.

In the video below, a complex structure with multiple components breaks apart in a very specific and controllable way. It illustrates the real power of HFragmenter: its flexibility and 100% procedural approach.

<https://www.youtube.com/watch?v=h4mIJRpwFok>



One Mesh Only

All of the HFragmenter tools are built on the idea of being "one mesh" at first. This enables the shape collision engine to handle huge amounts of complex objects, which then interacts with each other while keeping proper preservation of Mass when demolished.

"Carving out" chunks of debris or fragments from one single mesh helps the collision engine to communicate and calculate with only those active parts of the object relevant to the actual effect at any point of time. Another key advantage of this "one mesh" approach is the preservation of mass, that comes for free, by using the one mesh approach.

Imagine a 3D model of a huge, several storey high building in which each level of the building has multiple rooms and assets, such as chairs, tables, doors, carpets, lamps and so on. To simulate a total collapse of such a building, caused by an earthquake for example, would be a massive task for the physics engine because it would need to handle every single object by its own. It's more efficient to actually start breaking

parts of the object off, as the disaster progresses, through the structure as the building breaks; individual components can be released as well.

<https://www.youtube.com/watch?v=yYeErl77Y60>



Camera Mapping Particles

~ focused terrain map-driven disintegration and re-build

The CameraMap Operator offers an even more powerful method to map particles and use mapping data in a creative way, not thought of before!

There are many ways to use this operator to create particle effects; things like camera mapping thousands of little spheres coming together to form an object and disintegrating, or rebuild from a dust cloud. A camera mapped particle setup might be used to drive a fragmentation and so on ... just imagine the things you can do. With the power of thinkingParticles - such standard tasks as mapping an object become amazing ! In a 100% procedural way, mapping and UV channels can be created for any amount of objects in a scene.

<https://www.youtube.com/watch?v=kE7DkwXmobY>



One very powerful way to use this operator is to pick the main render camera and allow the CameraMap operator to activate every frame or sample. Then in a compositing program, you can paint a mask on top of the rendered sequence and use that mask to activate certain particles or areas. For example, during a shot driving through a collapsing canyon, you can paint per frame which parts of the canyon will be activated (fragmented, etc). Be aware, you may need to add additional controls such as distance checks to the camera in order to avoid affecting all particles in that line of depth (i.e. the ray created from the camera through the mask out to infinity).

thinkingParticles and FumeFX *

the perfect vessel for out-of-this world fluid effects with full control !

FumeFX, the leading fluid system on the market today has offered full support to thinkingParticles 6 and its 100% procedural way of working with effects scenes. ThinkingParticles 6 interfaces easily as Particle Sources for FumeFX. Additionally, FumeFX provides real and fully integrated thinkingParticles operators of equivalent functionality which supports each system.

FumeFX, when used in combination with thinkingParticles, allows for the creation of fluid effects that dynamically impinges on each other temporal-spatially. "Cross-Matter" particle effects are easy to create and more importantly, they are easier to control. Watch how the pyroclastic cloud hits the airport tower and this creates an explosion and the dust cloud interacts with the building and debris as well. (* for all FumeFX questions please refer to the company Sitni Sati)

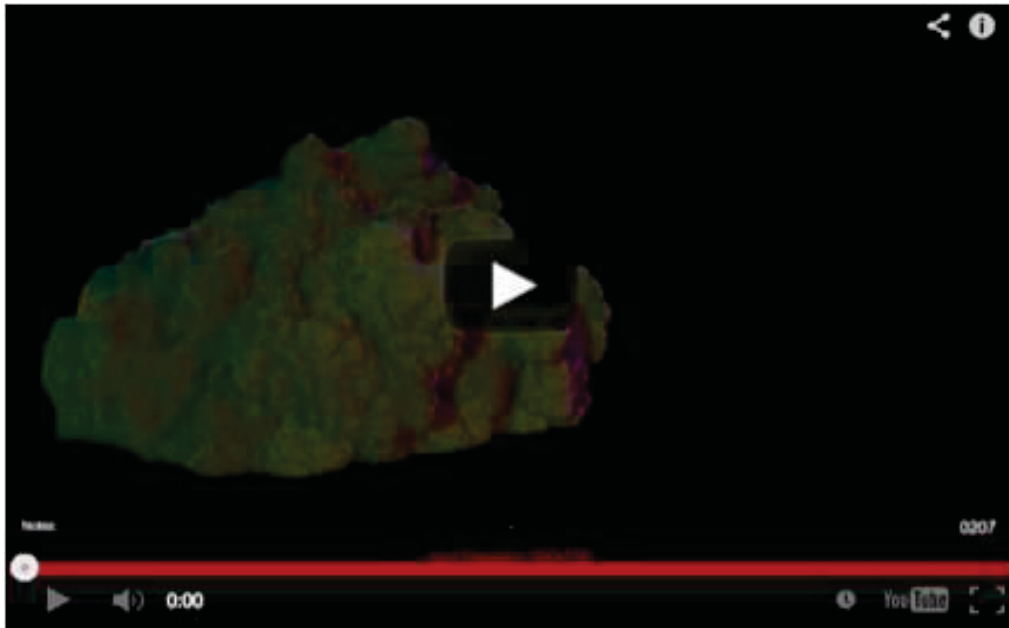
http://www.youtube.com/watch?feature=player_embedded&v=LUAhIN_xOFg



FumeFX specific thinkingParticles particle operators consists of Birth, Test, and Follow. Each respectively affects the following: Birth of particles in specific grid areas depending on smoke, fire, velocity and other channels. Testing of events based on those same channels and particle tendency to follow the movement of fire and smoke.

In addition to the operators mentioned above, there is a thinkingParticles Probe operator, which extracts channel values from any specific point or particle position. This enables adjustment of particle properties or the triggering of scene events from a FumeFX simulation. ThinkingParticles can also affect a FumeFX simulation with its geometry output, making FumeFX an ideal choice with which to add realistic detail to any thinkingParticles scene.

http://www.youtube.com/watch?feature=player_embedded&v=CS7b8z4WxWQ



Max Scripting: Full MaxScript Support

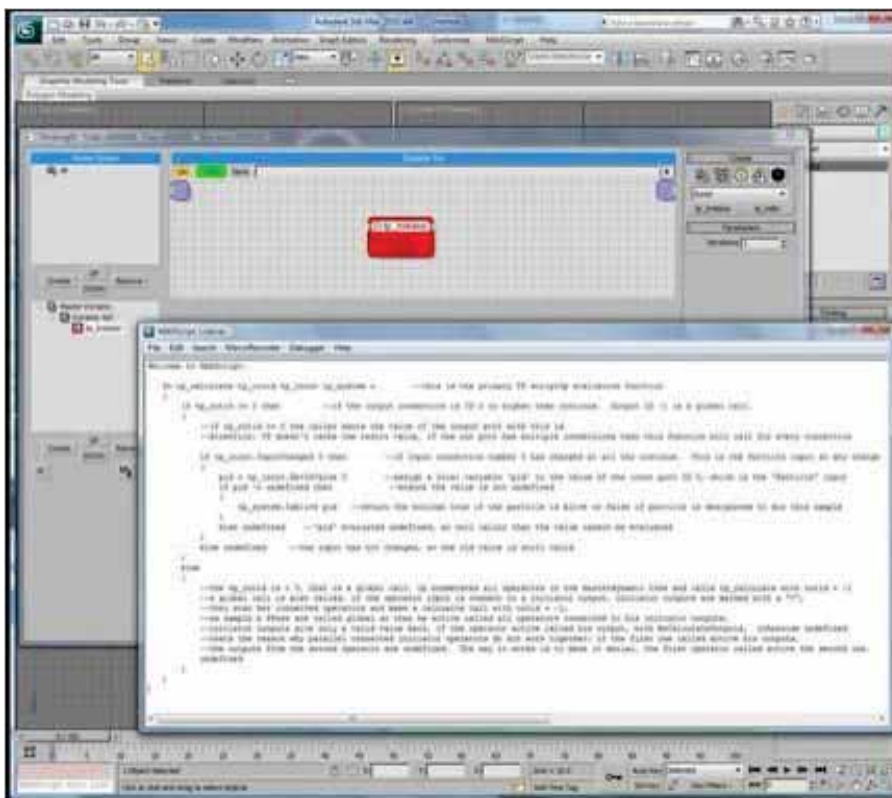
ThinkingParticles 6 incorporates the best ever MAXScripting support. Now, it is possible to even write complete thinkingParticles operator Nodes with inputs and outputs that behave just like native thinkingParticles operators! If we forgot something - you can now write it.

In addition to fully functional operator Nodes written in MAXScript, full MAXScript access to thinkingParticles DynamicSets and Node properties has been implemented into thinkingParticles 6. Find below a simple example of such an access, via MAXScript

The script below, from a selected thinkingParticles system, creates a new particle group and renames it, "MyGroup".

```
gr=$.GroupManager.CreatePGroup()
gr.SetPGroupName(0) "MyGroup"
```

In the illustration below, a scripted thinkingParticles Node is shown; the MAXScript integration allows for instant updates of the code and immediate visualization of the results.



Rules

~ rule-based, non-linearity to setup fast and simple animation, reversible.

thinkingParticles 6 uses a 100% rule-based approach to create particle animations and special effects. The unbelievable power and flexibility resulting from rule-based creation opens up a brave new world of animation effects that now can be created with 3ds Max. Crowd control, for example, is a perfect situation which would lend itself to the application of rule-based particle systems.

thinkingParticles 6 offers true Non Linear Animation (NLA). In fact, it depends on NLA completely. Combining NLA and a rule-based animation approach means unlimited animation and F/X effects power at your finger tips!

NLA Example:

Imagine a job to animate some cannons shooting at incoming targets. How would you do it - Rule based and with full use of NLA?

The animation below shows the cannon movements (aiming) and also the loading and shooting sequences of the projectiles. How would you approach such an animation? Keyframing - probably not. What would happen if the script changes and you are asked to change the amount of targets, or the amount of cannons? As you can see, this animation task could prove to be quite tedious. Especially, if you plan modifications to the complete environment.

thinkingParticles 6 makes it easier to solve such animation tasks in case of revamps. It is the ideal tool, thanks to its full NLA support.

This is how you would plan this task in thinkingParticles:

- Create the cannon object
- Setup the shooting sequence of the cannon
- Create some targets
- Turn the cannons into particles
- Create a rule to aim at approaching targets when they are near
- Create a rule to shoot at the targets
- Create a rule to explode the targets when they get hit by a projectile
- Lean back and enjoy the fully automatic animation !

In the animation shown below, you can see that the cannons aim and shoot at the nearest target. When a target gets hit, it explodes! (This is also a rule) Everything is automatic and rule-based. No single keyframe was used in the animation shown below.

<https://www.youtube.com/watch?v=IH7zZjAuWEk>



Here is another example of a rule-based animation:

The UFO flies from mushroom to mushroom, beams it up, and flies to the next. Animating by hand would be a lot of work, especially when conditions may change (amount of mushrooms or position). In this example, you just paint the mushrooms (which are simple particles) all over the landscape and the UFO starts to do its job for you - fully rule-based!

<https://www.youtube.com/watch?v=2Eq5ZRv25T8>



Blurp

~ morphing particles with one single operator, no wiring commands.

All of the power that thinkingParticles 6 has to offer comes from its many operators, conditions and helper nodes that can be freely combined into complex networks of commands. The number of possible combinations of different rules exceeds 4 billion! Like a true programming language, thinkingParticles offers unlimited ways to approach a solution which defines various particle behaviors.

The best part of using thinkingParticles is that no single line of code has to be written and no complicated programming language has to be learned! Even Max-Script (the scripting language of 3ds Max) is not needed. Everything within thinkingParticles can be done with simple wiring of visual nodes.

The most common particle effects can be created through easy to use operators that do not need complex wiring. One example of such an effect is "Blurp". An operator that offers particle morph features, without the need of complex command wiring.

<https://www.youtube.com/watch?v=6A1FfRLWQ3s>



How would you come from the left to the right side?

By the particle morphing effect, of course, shown above is completed by one single operator, "Blurp". This complex operator handles all aspects of such an effect completely. The only input that must be supplied is the 'On' condition. Everything else is handled by the Blurp operator directly. The set-up of such a complex particle effect takes just a matter of minutes, instead of hours or even days.

Color Blend

Blurp is a truly advanced and unique particle operator that outperforms just about everything out there. Another remarkable feature of Blurp is the "per fragment (particle)" color handling.

Yes, other particle systems also offer such a special effect but these systems are not able to blend a complete set of material properties while morphing from one object to the other. thinkingParticles has no problem performing this function. Think about the enormous capabilities. thinkingParticles help tracks every single fragment, along with its material, even when 30,000 particle fragments are morphing from one object into another.



Follow

~ rule-based particles crowd control

Many modern particle systems also offers "follow" features which allows a user to control the way particles should follow an object. thinkingParticles is no exception. It offers hundreds of different ways for particles to follow an object.

Keep in mind that thinkingParticles is a rule-based particle system, so there are no limits to the amount of different follow situations that you can program. Follow operators are the perfect solution for crowd control simulations.

Example: You may create a rule that tells the particles to start following an object, when it is near, or passes the particles. Another scenario would be to create a rule that tells the particles to follow an object and when it is blue and as it turns red, the particles are released ... As you can see, there is no limit to your own creativity and skill. Below is a list of basic follow operations found in thinkingParticles.

<https://www.youtube.com/watch?v=roGtvzJDf8M>



Here are some of the features the Follow operator has to offer:

- Follow an object in an absolute manner
- Follow an object in a relative manner
- Follow an object with a certain offset
- Follow an object and use its transformation
- Follow an object and hold the position
- Catch an object absolute
- Catch an object relative
- Catch the object's position
- Follow an object based on the distance to "follow node"
- Follow and keep relative distances between particles
- Follow a surface position
- Follow a volume position

<https://www.youtube.com/watch?v=hQOuzdWw8W0>



Complex Example of Follow

PathFollow

With the introduction of a new, powerful PathFollow operator, thinkingParticles extends its toolset even further than anything else on the market. PathFollow offers a multitude of options and methods to make particles follow any path, or leave any path at any time. One amazing feature of PathFollow is its ability to use an edge loop as a path definition. The effects resulting out of this feature alone are limitless!

<https://www.youtube.com/watch?v=Cyju8wmRX1A>



Spline Based Follow

SurfaceFollow

The SurfaceFollow operator helps constrain particle positions and movement to a selected surface. This operator also offers many extra features with which to create well-defined particle generation, based on distances traveled. The SurfaceFollow operator found in thinkingParticles 6 offers unique features along with an overall rule-based approach, it allows you to create particle effects unmatched by any other system for 3ds Max. Here, for example, you can see how particles slide across a surface driven by gravity. They are shaken off automatically when a certain rotational force is reached.

<https://www.youtube.com/watch?v=oMEEnKkSXVI>



Surface Based Follow

Even better, particles are staying perfectly on the surface while it is deformed or animated in any way.

<https://www.youtube.com/watch?v=tXaR5jfMAsY>



Surface Trigger Follow

Center of Mass: Automatic Center of Mass Calculation

~ finding the true centre of gravity

The built in dynamics engine of 3ds Max does not support an automatic center of mass calculation. In fact, it is the task of the user to build a center of mass with the help of dummy mass objects. Usually this is work for an apprentice, not for a high class effects animator!

Why would I need that?

The center of mass is vital for proper and believable realism dynamic simulations. A wrongly placed center of mass point can easily destroy the look of a simulation. Imagine a classic "standup toy" that always returns to its upright position. A heavy lead weight in the bottom center of that toy helps it to always stand up. Likewise, thinkingParticles comes with an advanced automatic center of mass algorithm that will calculate this important point within a 3D geometry. No user interaction is necessary for this task. A virtual "stand up" object will properly wiggle around until it comes to an upright rest. In many situations this feature alone is a lifesaver!

Life Saver?

For Digital Dimension, a well known visual effects (VFX) house based in Canada, thinkingParticles came to the rescue for their "Blade III Trinity" project. A bunch of vampires had to be sent back to their graves and this had to be done in the most impressive way. The "ashing" sequences were generated with thinkingParticles`new physics engine. Vampires break into a thousand pieces and fade to dust - a classic effect! With the introduction of rule-based dynamics, Digital Dimension went from a single step to a leap further than all such visual effects created before Blade I or Blade II. Breaking bones is a bit tricky, as there are a lot of them and it is not defined how they are formed or where their center of mass will be. And as everyone knows, there are a lot of bones to break and to shatter in a vampires' skeleton. No matter how Digital Dimension vaporized the vampires, the remaining bones tumbled and bounced off each other, nicely and believably.

<https://www.youtube.com/watch?v=8rdS8FhVdPY>



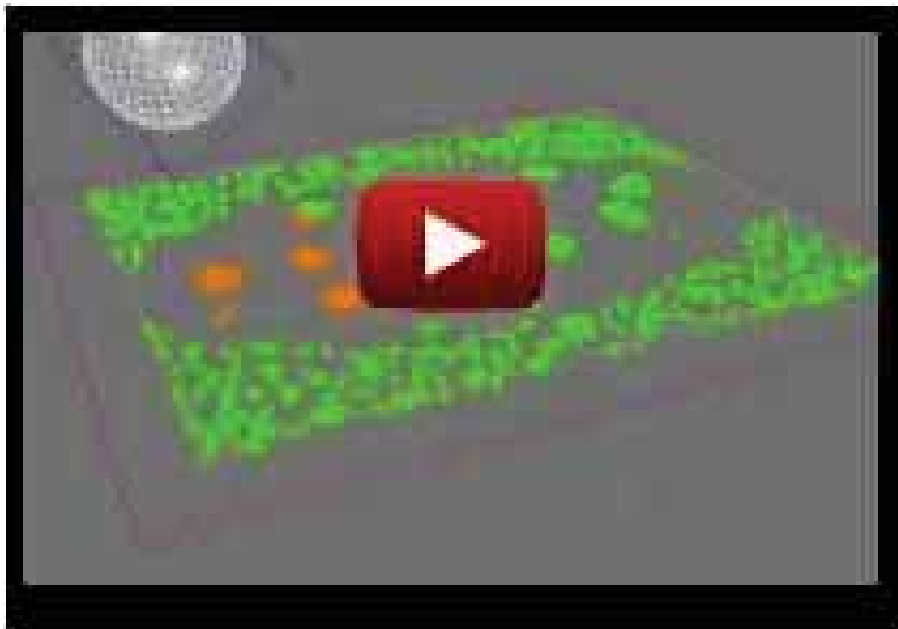
Technical Director [TD] Tool

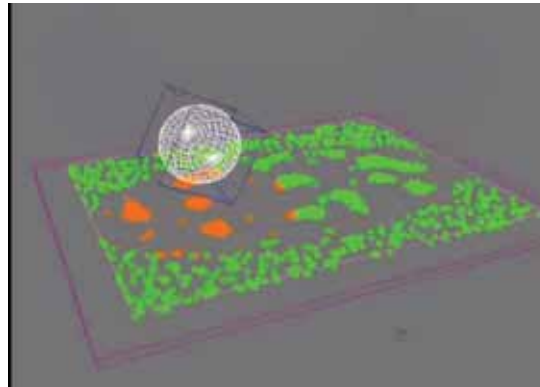
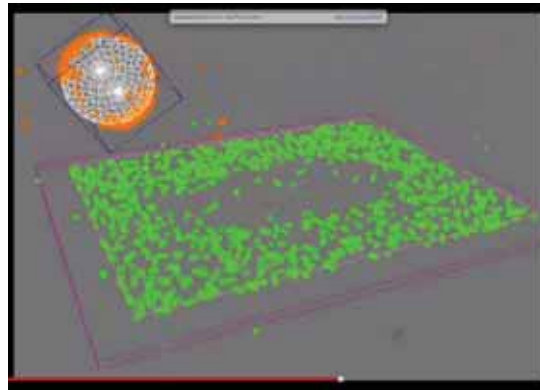
~ managing complex particle systems for team workflow.

thinkingParticles is a powerful tool that at first glance, may appear too complex for an average 3D animator with no technical background. A solution to this problem comes with the TD-Tool, a tool meant for Technical Directors who can easily set up highly complex particle systems while only exposing the parameters needed for the animators, who does the main animation work.

Click on the images to the right to watch the animations

<https://www.youtube.com/watch?v=1wCTH2VmSq4>





The screenshot displays the thinkingParticles software interface, divided into several control panels on the left and a 3D simulation view on the right.

Control Panels:

- Create:** Node: Spawn Node; Num. Cubes: 1500; Cube Size: 1.0.
- Obj. To Particle:** Primary Mag Obj (selected), REM., UP, DOWN, Pick Object, Group: All, Track: Object To Particle (selected), Instance Shape: checked, Use Subtree: unchecked, Hide, Changes Affect All, Random Seed.
- Gravity:** Strength: 9.8.
- All Magnetism:** ON: checked, Max Distance: 30.0, Mag Longevity: 15, Mag Thresh: 0.1.
- Primary Magnetism:** ON: checked, Max Distance: 25.0, Strength: 400.0.
- Secondary Magnetism:** ON: unchecked, Radius: 2.0, Strength: 0.5.
- Simulation:** Floor Node: Floor Node.

3D Simulation View: Shows a 3D scene with a grey floor, a wireframe sphere with orange points, and a large rectangular area filled with green and orange particles.

Helpers: thinkingParticles

~ custom creation effects

Helper Nodes

thinkingParticles offers many Helper nodes which offer powerful tools to help in everyday tasks. These flexible Helper nodes support the user in creating all kinds of new particle effects.

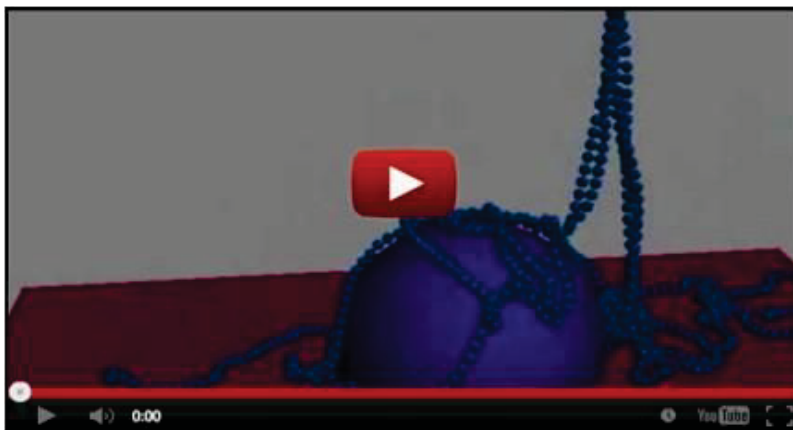
https://www.youtube.com/watch?v=j_r1tKPP6YA



Path Position

The Path Position helper is the ideal tool to acquire a position on any kind of path. It allows for easy placement of any particle onto a path, or around a path. This path can either be defined by a spline or an edge selection within a mesh.

https://www.youtube.com/watch?v=PMu_sumvF5I



Std Emitter

The Standard Emitter helper node is used to create positional and rotational information for particle generators or particles in general. The main use of this helper node is in conjunction with the TD- Tool, to supply a position when an Emitter is used for a Custom created particle system.

Counter - The Counter Helper Node is a great tool to "count" things in a particle setup and manage output

of the "counting" numbers for processing by different nodes in a DynamicSet.

Intersect

The intersect Helper Node is used to get the next intersection point for a moving particle in space. This intersection test is performed by shooting rays in the travel direction or into any user adjustable direction vector, if needed. Many uses can be found for this Helper node, one being an effect that creates particles at a certain impact position on a surface.

Modifications have been applied to the VolumePos node and this gives more volume placement options than the previous version, opening up new possibilities to create special particle effects.

<https://www.youtube.com/watch?v=ViX-s3prWsM>

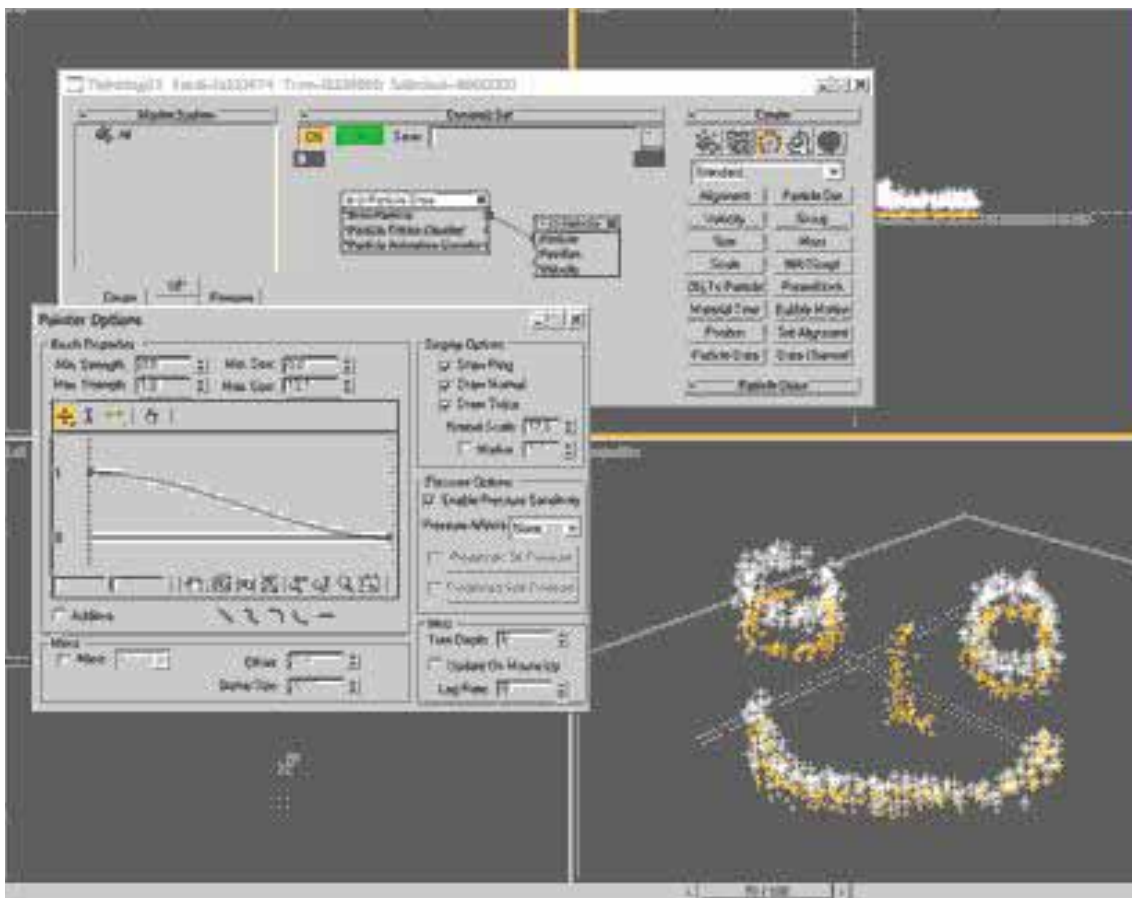


Draw Particles: Paint your Particles on any Surface

thinkingParticles offers many ways to generate particles in a scene. The MatterWaves node, for example, uses a purely procedural approach to generate particles. Another way of creating particles is by drawing them onto any surface you want. The ParticleDraw node can be used with many advanced particle painting options, including pressure sensitive devices such as drawing tablets.

A unique feature of the ParticleDraw node is the time recording feature, that allows the sampling of paint strokes in time, while spreading the created particles over a defined animation range.

thinkingParticles offers endless power!



thinkingParticles & finalFlares - a Perfect Match!

thinkingParticles and finalFlares is a perfect combo with which to achieve special effects, like no other product combo could achieve.

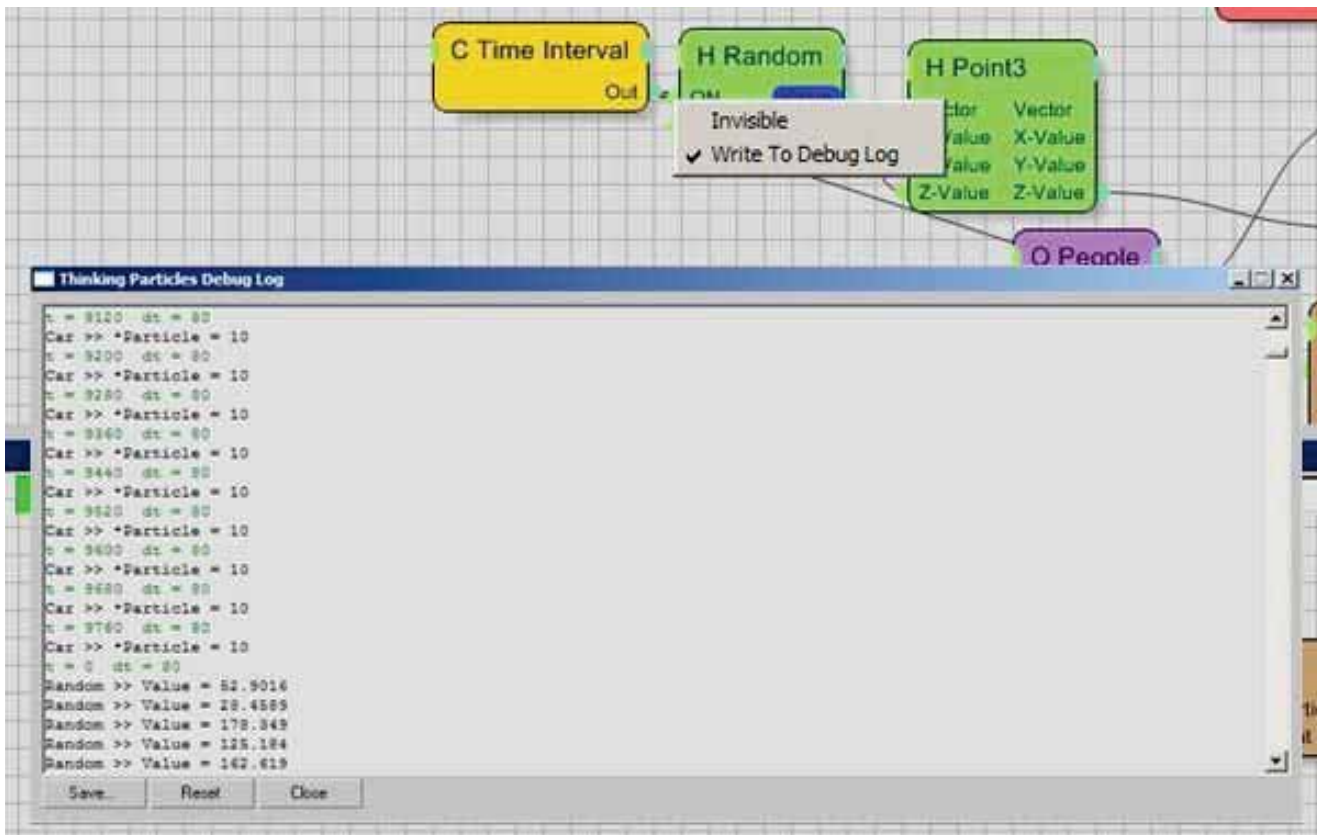
In fact, the integration of both products is so advance that thinkingParticles drives nearly every aspect of finalFlares through a rule-based approach! The color of a len's flare for example, is now easily set by a thinkingParticles rule.

<https://www.youtube.com/watch?v=CrdDxRJ8gIA>



Debugging

thinkingParticles comes packed with many useful features: some are greatly advanced Nodes that can be used to create exceptional effects. The introduction of a full port debugger in thinkingParticles will help users get down to basics with their wire connections and evaluation flows; certainly a small feature that emits a big impact in the daily work of an F/X artist.



Object Influence: Geometry influences Particles!

thinkingParticles gives you control over every aspect of a particle by rules or conditions. One remarkable node is the rule-based Motion Inheritance Operator. Particles may be influenced by moving geometry, speed, rotation, or both aspects. Any component of an object movement can be used to influence particle movements.

<https://www.youtube.com/watch?v=u7H1uOtDxtY>



Geometry Instancing

New additions to Geom Instance has further enhanced the functionality of character animations for even greater and more in-depth control, with hundreds of thousands of characters. StdShape has also been enhanced for finalRender instancing.

In the animation below, you can see that we not only have an incredible amount of characters rendering in unison, as instanced geometry, but the characters are all controlled with the Non Linear Animation system of thinkingParticles. These characters can clap, run, jump, fight and do whatever is needed, all based on thinkingParticles rules and robust NLA.

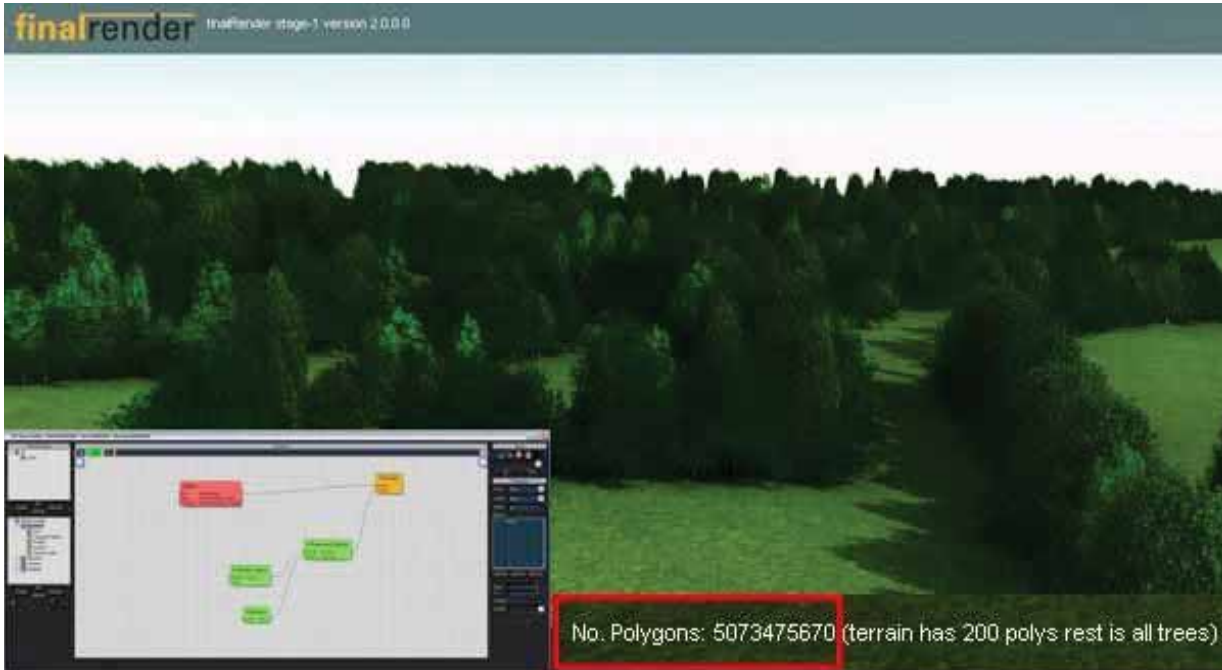
<https://www.youtube.com/watch?v=U6cwlUTSVv4>



In the images below, you can see that these trees have been distributed as particle instanced geometry and are even using texture variation: 5+ billion polys rendered with Physical Sky and full GI in 7 minutes at a resolution of 1024x768 !

thinkingParticles' geometry Instancing represents a ground breaking technology empowering you to create amazing environments and huge animated crowd scenes.

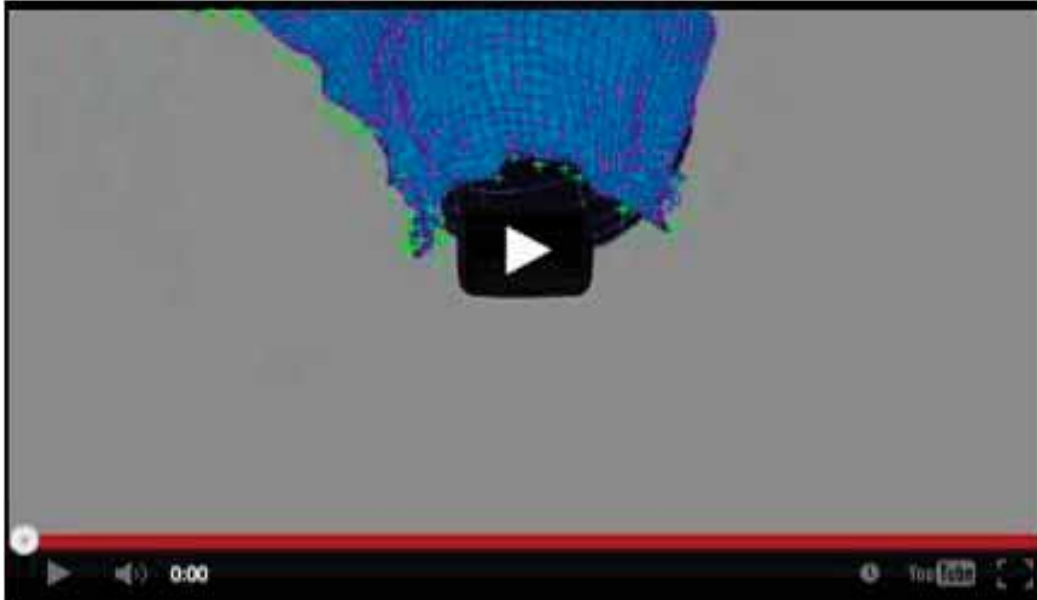
Massive animated crowds and characters are all possible when using thinkingPaticles instances.



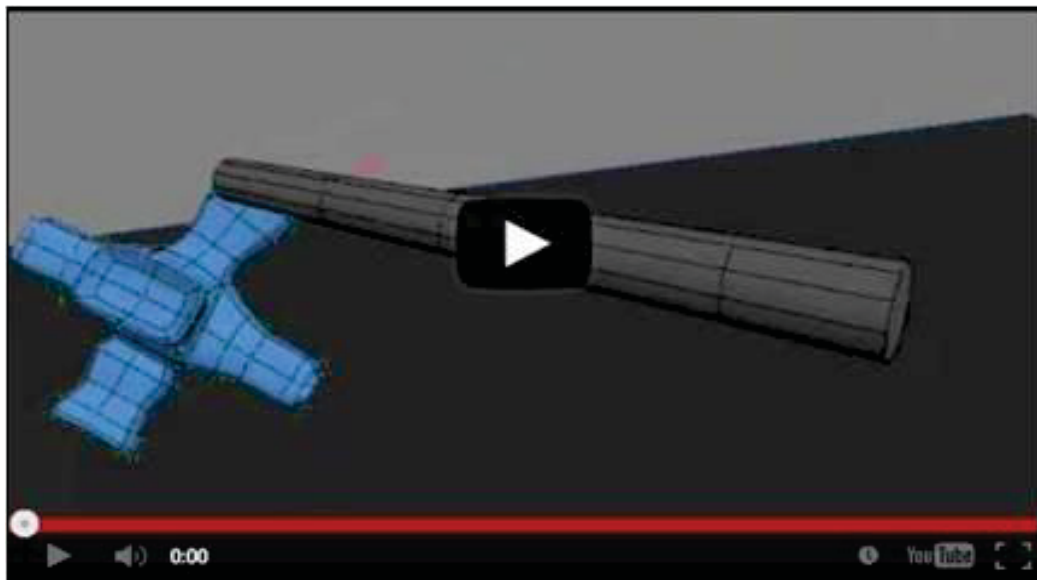
Vertex to Particle

The **Vertex To Particle** node offers a new way to create particles based on the vertex position of any picked mesh. In addition to creating particles, it also comes with its own spring-based dynamic solver which simulates soft body-like behavior.

<https://www.youtube.com/watch?v=GlpOyfkmBdY>



<https://www.youtube.com/watch?v=TISoXJ6sdEw>



Dynamics

ThinkingParticles offers many specialized Dynamics effects nodes, with 100% procedural control potential. Some of the Dynamics nodes are:

Force node:

ThinkingParticles can achieve an independent particle force that is totally controlled by thinkingParticles alone, without the need of adding standard force fields in 3ds Max.

Orbit:

Orbit is a useful thinkingParticles node that offers the ability to set a specific orbit for one or multiple particles, which orbit around a definable position with a definable orientation.

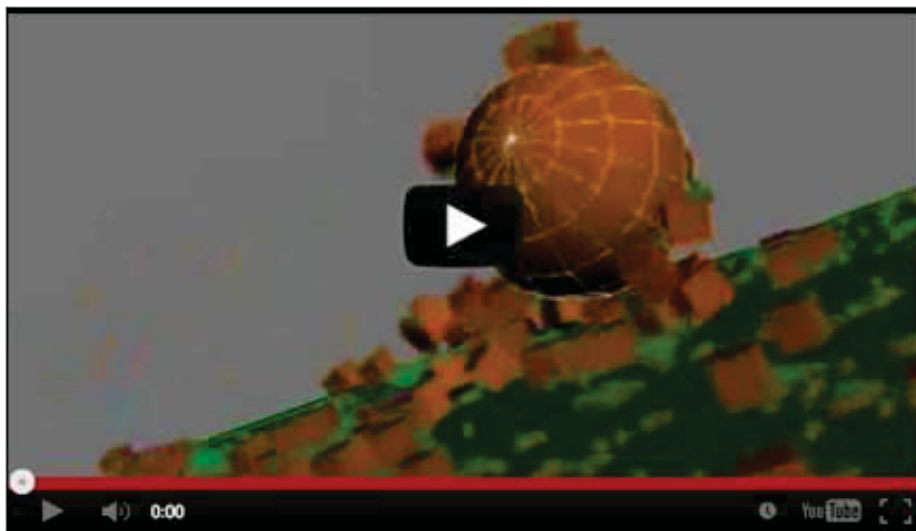
PAttach:

With PAttach, for the first time in thinkingParticles history, it is possible to perfectly link two particles to each other, so that one particle behaves exactly like the other. Along with the new referencing system, PAttach can be used for many amazing flocking or bonding effects.

ShapeJoint:

With ShapeJoint, particles can be locked together even when physically accurate dynamic solutions are calculated.

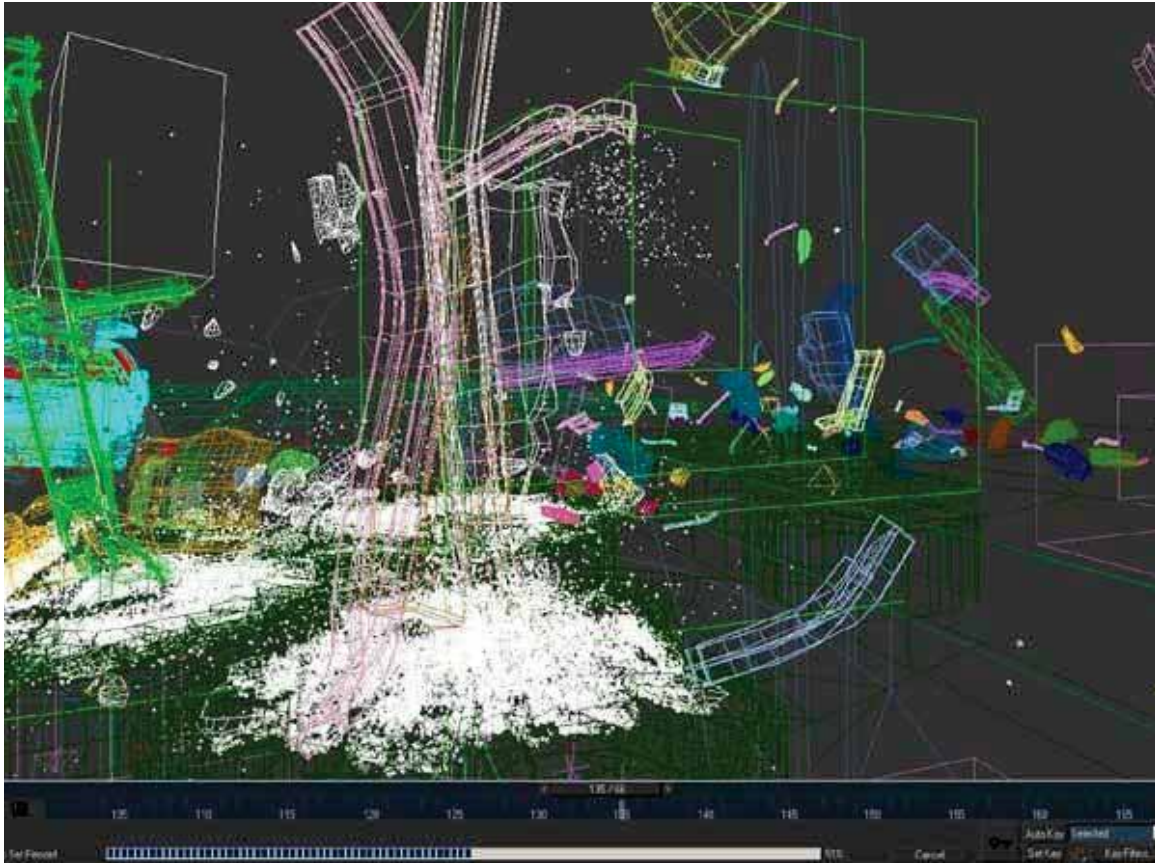
<https://www.youtube.com/watch?v=tRUC8JlUxKo>



ThinkingParticles 6 has been enhanced and fine-tuned with multiple internal and external tools, and

functions. The Shape Collision node now offers even more power and a better workflow. Also, the BringTo node has added options which make it possible to bring a particle to its target position in different ways.

Force fields, for example, can be applied even though the particle is traveling towards its target position.



Surface Stick: Choose a Position! Take your Seat!

Many special effects based on particles depend on exact particle movement and position in space. Placing particles on surfaces or along edges of objects is another important feature that should be available in any professional particle system. thinkingParticles offers all this and more!

Every single particle can be accessed and modified in any way you like! Position, rotation, age and speed, and easily be set or modified with simple rules. Particles, hitting a surface, may stick on that surface and even follow a deformation of that surface.

https://www.youtube.com/watch?v=_teSxEmBRo4



Brain gray matter

This section outlines some of the amazingly powerful Probing, Memory and Condition nodes, that allow unlimited control of particle and group particle operations. thinkingParticles offers a variety of magnitude of control over your particles.

Memory Node

A common user may wish to add a memory node that allows the storage of any kind of data, with an adjustable amount of storage depth per variable. This is exactly what the new Memory node does!

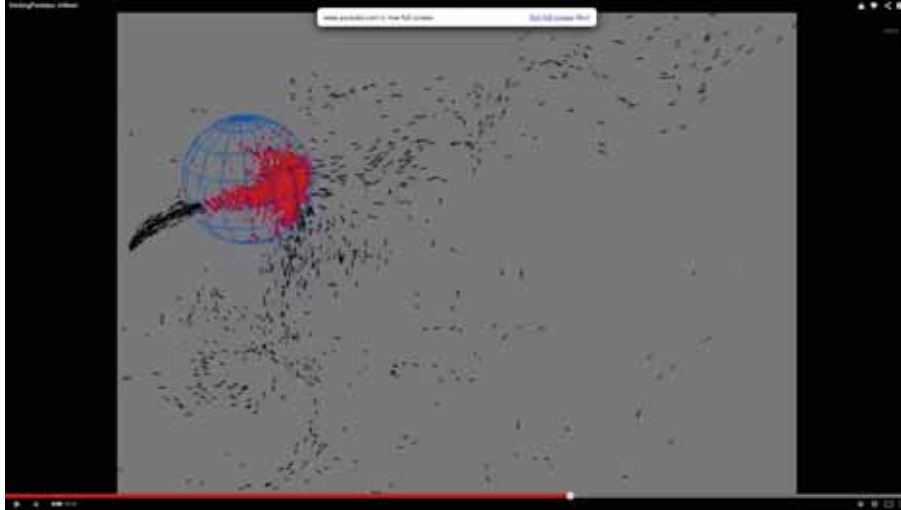
The Memory node, which has been added to the thinkingParticles tool set, offers the storage of multiple variables along with multiple values per variable, on a "system-wide" basis. This means that every DynamicSet is able to access the stored values at any time, regardless of the number of nested DynamicSets used in a wired network. Values may be stored per particle or globally.

Storing data is one of the most important tasks when doing complex particle system setups. The Memory node is especially made for this kind of task. One of the biggest features that the memory operator offers is the DynamicSet-wide parameter access. Any value may be accessed in any DynamicSet at any time.

Condition Node

A powerful volume testing algorithm has been added to the thinkingParticles tool set. The InMesh condition node helps you discover whether the particle is inside or outside a given mesh.

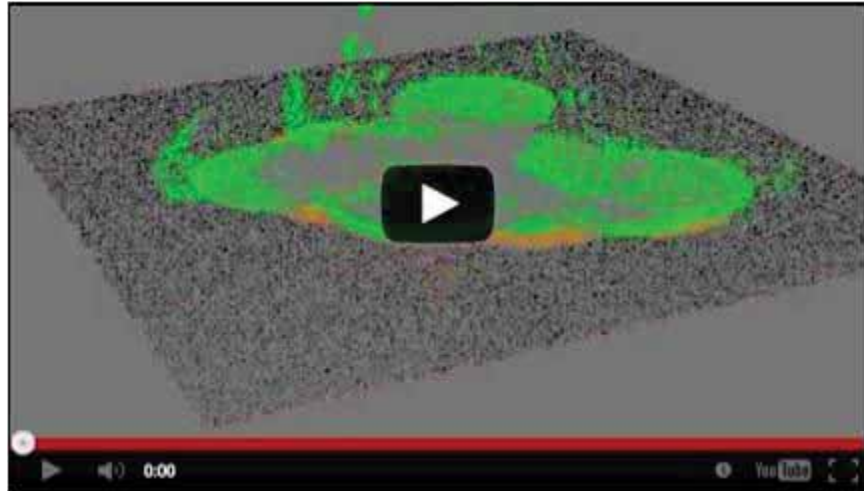
<https://www.youtube.com/watch?v=s3zZyy8ftcY>



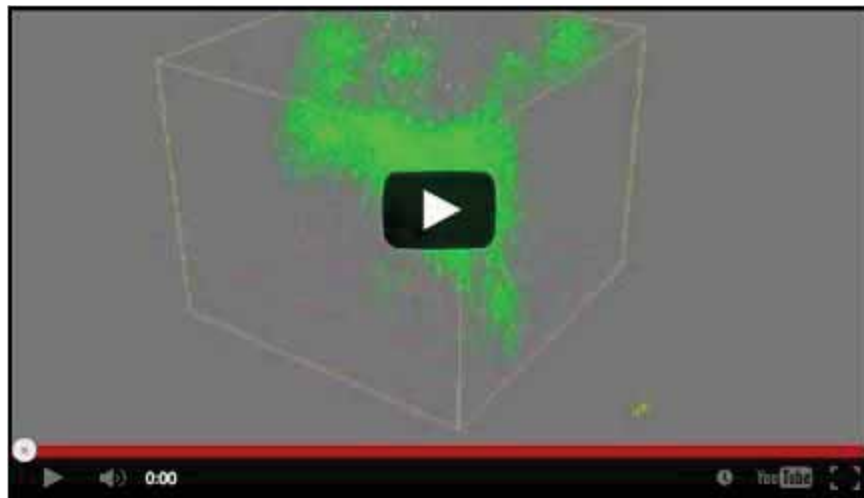
Initiator Nodes

Advanced and powerful Nodes, like PSearch, open up a whole new world of particle effects that were never possible before. With the help of the PSearch node, it is an easy task to search for the nearest and furthest particle within a specific radius.

<https://www.youtube.com/watch?v=k3dsx-ssFR8>



<https://www.youtube.com/watch?v=lxAPn9dIWz4>



Another ground-breaking addition to thinkingParticles is the **Iterator node**, that for the first time, allows the user to control the amount of Node evaluation that should take place. Iterator nodes are best described as FOR Loops, in a programming language. They allow for the repetition of a Node evaluation, as often as defined by the node itself. Again, this single addition to the tool set of thinkingParticles opens up a whole universe of particle effects that was simply impossible before!

Reference System

For the first time in 3ds Max particle history, a particle system has introduced a procedural referencing system with full support of a non-linear animation workflow. Any number of particles can be "connected" to any other number of particles, which may have within the cluster, any amount of nested levels of particle

groups! A simple set of powerful Nodes offers all the functions needed to create highly complex particle systems.

<https://www.youtube.com/watch?v=5Dv0TKST6Tg>



Double Star Initiator Outputs

In tP6, a secondary Initiator output type has been added to some of the former tP5 Nodes. This new type of output port offers more flexibility and possibilities to access the particle data.

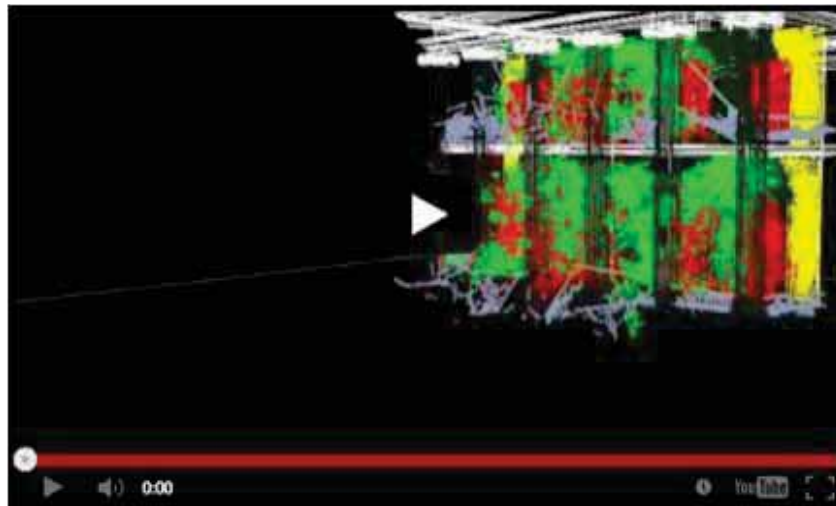
<https://www.youtube.com/watch?v=0q6S8UYyA4Y>



Fragments

The Fragment Node offers enhanced functions to create destruction or demolition effects. For example, this node makes it possible to break only visible edges. The addition of this feature easily allows the sculpting of the shape of debris or fragments. By pre-breaking objects and sculpting the chunks, truly advanced demolition effects can be easily achieved.

<https://www.youtube.com/watch?v=uCow8NjNkuU>



Playback Particle Exclude

thinkingParticles was the first particle system for 3ds Max to introduce particle baking or simulation recording of complete particle systems. New options are now available, like removing particles after the recording session. These options open up new workflows like never before!

https://www.youtube.com/watch?v=__b8D79t3w0



Shattering

Animating the shattering of multiple objects is one of the toughest tasks to achieve in 3d. Until now, there has been no effective way to animate breaking objects within 3ds Max. thinkingParticles offers advanced fragmentation functions that are perfectly combined with the real-time physics engine. Along with ease of use, many complex tasks can be achieved in no time at all.

The core philosophy of thinkingParticles is the rule-based approach under all circumstances. Rules can be used to define the shape of the fragments and also the size and thickness. Besides the shape and size of fragments, the time and power of impact can be used to "steer" the fragmentation and shattering process.

Find below an example of rule-based shattering with thinkingParticles. In this animation, you can see that a log is crashing onto the ground and its bark is shattering into pieces.

Note:

Only the parts hitting the ground become fragmented. At the maximum force of impact, the fragments are much smaller! Such a complex behavior can never be animated manually and thinkingParticles is the solution.

<https://www.youtube.com/watch?v=9FUcxHsk8Wo>



The object shown below is going to be fragmented; with thinkingParticles, you will not see the typical and ugly seams and cracks, which indicate a "broken" smoothing group. thinkingParticles 6 uses one of the most advanced fragmentation methods available. Check out the next example.



Notice how all the smoothing groups and shaders are still intact in the non-fragmented areas; no cracks or seams whatsoever, just a perfect render in those areas that need to stay intact.



It stays clean and smooth where it should and falls into little shards, without destroying surfaces that are not part of the fragment.



This also works for simulating the opposite effect, where broken fragments are reassembled. When fragments begin to build a new object, the assembly is done in a perfect seamless way. Currently, there is no other product that can do this, other than thinkingParticles.



Deforming Fragmentation

Particle explosions are easy to achieve in 3ds Max. However, not all built-in particle systems offer the in-depth control and functionality that thinkingParticles provides. Even very expensive 3rd party plug-ins don't come close to what thinkingParticles is capable of doing.

<https://www.youtube.com/watch?v=R9YEZDvMN7g>



This animation illustrates how thinkingParticles can initiate a particle fragmentation effect while the original object is deforming. Other particle systems like PArray or PCloud cannot create this effect. Older style particle systems usually create object fragments as soon as the function is activated - meaning the connection to the original object is lost forever. thinkingParticles solves this problem by using rule-based fragmentation operators and conditions. It's up to you to decide when and how the objects will be fragmented.

Object Access

Another feature of thinkingParticles is introduced by a special operator, called ParamBlock. This operator truly enables the accessibility of all object parameters within thinkingParticles.

The user may connect any particle parameter to an object parameter, or the other way around. In a scene, a particle may influence the position, color, size or segmentation of any 3ds Max object. It is possible to use the ParamBlock operator, to access every parameter of an object, and use it as an IDS (input data stream) or ODS (output data stream) connector. A radius of an object, for example, may control the particle speed or even age. A particle collision event, may control a Light On/Off parameter.

In the example movie shown below, thinkingParticles was used to change the Diffuse color of the object for each particle collision.

<https://www.youtube.com/watch?v=reNxKS5HwLA>



Characters and Crowd Animation

Character Studio Support

thinkingParticles may be used to create particle-based crowd animations by using complex IK models as particles. All operators and conditions will also be valid for character studio biped and skinned meshes. thinkingParticles already offers powerful "follow" operators and also "avoiding" conditions, to create impressive realistic crowd animations.

<https://www.youtube.com/watch?v=iSXkQ4rvAFA>



There are many ways to create complex crowd animations. Some systems use a really time consuming approach, that forces a "re-calculation" of a solution, for each single change to the system. Unlike particles, such crowd control systems need a lot of experience and processing power to be effective and usable.

thinkingParticles, on the other hand, uses a true particle system approach. This means that particles are used to "place" and manipulate the characters or IK-objects in a scene. The big advantage in using particles for crowd control, is Real-time Feedback! There is no endless waiting for the crowd solution to render. Adjust any parameter and watch the changes happen in real-time. In the example shown above, the characters are controlled by a standard Wind Space Warp. The direction of the wind is changed in the animation and the characters (particles) change accordingly. A simple Wind Space Warp allows you to control thousands of characters.

Understand, that in this animation, complex interactions between two animation sequences are happening at the same time. First, it's the particle system that "drives" the character studio animation, and second, the character studio animation controls the particle animation. When a walk cycle has ended, the particle has to wait until the next cycle starts. In the other case, the character has to walk as fast as the particle moves; when the particle stops, the character animation has to stop as well. thinkingParticles does all this automatically, based on simple rules.

Note that while thinkingParticles is not a full-blown crowd control system, there are some operators that are "crowd ready" and offer powerful features that you won't be able to find elsewhere. The thinkingParticles kernel offers a robust framework for more enhanced operators to control masses of characters in a scene! And don't forget, there's always the SDK available that allows you to program your own operators and conditions. An example of an "avoiding" situation for multiple characters:

<https://www.youtube.com/watch?v=rCwSqKYXTTQ>



Control the Masses

The Geometry instancing has been greatly enhanced! A complete animation tree has been added to the operator. This animation tree allows you to create complex crowd animations in a rule-based system! A character, for example, can have multiple animations within one single point cache file. The animation stored in the point cache needs to be "complete," including all possible transitions. The all new geometry instancing will ensure that transitions between the animations are smooth and happening at the correct time. This new system is perfect for crowd simulations in a stadium or arena. For the first time, thinkingParticles' Advanced Animation Tree (AAT) technology allows you to control complex masses of characters with the ease of a few simple mouse clicks!

<https://www.youtube.com/watch?v=rCwSqKYXTTQ>



10K Romans in the gladiator stadium

CA Scanline Production GmbH, a German effects house, uses thinkingParticles almost in every single project for TV and film. Their team of programmers has added so many extra nodes and controls to thinkingParticles that it has virtually become their very own power-workhorse, for all kinds of effects. From a massive crowd control system to fluid dynamics effects, thinkingParticles has proven to be the most flexible and powerful particle system for them. (For the VFX studio production/pipeline testimonials, visit cebas.com - Insights)

Through clever use of thinkingParticles, it was possible for SCANLINE Production to render the impressive Stadium scene in the movie "Hero of the Gladiators". In a 15-minute special effects sequence 10,000 Romans have been brought to life with finalRender and thinkingParticles! Simple rules control the movement and clothing of each single Roman in the stadium.



Particle Access

No other particle system for 3ds Max gives you as much in-depth control as thinkingParticles. You may access the values of any particle or group of particles at any time and apply any effects to them. This offers real particle control, like never before.

The combination of thinkingParticles and other powerful cebas plug-ins, such as pyroCluster®, finalFlares™, or finalRender, will allow you to create special effects in 3ds Max as never before. Thanks to the fully integrated inter-particle access, anything can be done. A particle rule within thinkingParticles may, for example, control the color or intensity of a lens' flare effect created with finalFlares. The same is true for a pyroCluster atmospheric rendering effect. Based on rules, thinkingParticles may control nearly every aspect of the pyroCluster effect.

<https://www.youtube.com/watch?v=49osrSNvESk>



In this sample, you can see that particle fragments emit new particles. This is possible without losing full control over the new particles. One single powerful user interface allows you to control any of the three particle groups in this animation. You may add some gravity effects to the fragments and at the same time, you may add some wind effects to the trails.

With the introduction of internal plug-in data streams, cebas has evolved a whole new world of possibilities. For example, one could assign various pyroCluster effects to different particle groups in thinkingParticles. A collision between two fragments may create a dust cloud, while in the same animation and particle system, a sequential collision between a fragment and another object may create a explosion and fire effect.

Dedicated pyroCluster Support

ThinkingParticles works perfectly together with other cebas plug-ins. pyroCluster automatically detects the presence of thinkingParticles operators and offers new UI options and controls.

For example, the thinkingParticles' particle groups can be used directly within pyrocluster. Unlike PFlow, the 3ds Max integrated event-driven particle system, thinkingParticles does not need a special operator or node to access the pyroCluster data. A highly optimized bi-directional data channel stream allows you to send and receive extended data in real-time, between both applications. pyroCluster may change command nodes in thinkingParticles, or the other way round. Parameters within pyroCluster may be changed directly by thinkingParticles.

<https://www.youtube.com/watch?v=VJuJePAmjP0>



A-Bomb: Mushroom Cloud Simulation

One amazing part of thinkingParticles, is a fluid-based operator called A-Bomb. The default settings of this operator will make a perfect A-Bomb type mushroom cloud with realistic rolling movement! However, with thinkingParticles' true rule-based approach, you can create much more than just a simple A-Bomb effect! This operator uses a fluid-like system that allows for the proliferation of swirls and vortices effects. It can be used, for example, to create rocket exhausts, breathing chimneys, fuel explosions and water fountains. We are sure that you will find many more uses for this unique thinkingParticles operator!

Check out some of the examples, all created with the A-Bomb operator within thinkingParticles.

<https://www.youtube.com/watch?v=jjGjM5dXrU8>



<https://www.youtube.com/watch?v=jjGjM5dXrU8>



Thumbprint creations: 'Light in Action'

~ *personalized tP operators*

Because thinkingParticles offers the power and flexibility that is usually only found in programming languages, it would be nearly impossible for anyone else to reproduce exactly your own personalized particle system VFX effects!

In thinkingParticles, all of the specialized particle effects that you create and use with your personal skills becomes your very own property that no one else can duplicate. A wire setup of conditions and operators in thinkingParticles can be as unique as your fingerprint!

Check out the example below, that illustrates the potential of thinkingParticles for 3ds Max.

<https://www.youtube.com/watch?v=twD52EcWiDs>



ObjectToParticle node: 'Open The Door'

Rule-based control of animation and particle time, is one of the most powerful Non-Linear Animation (NLA) features of thinkingParticles.

In the example animation shown below, a door opens whenever a particle approaches. This animation does not use a standard linear keyframe animation approach. Particles do, in fact, control the animation of the door!

Animating this door by hand would mean, that you have to decide, when and how fast the door needs to open. However, the particle system can be changed at any time so this would mean re-animating over and over again, which could easily be avoided, by using the NLA approach in thinkingParticles.

An ObjectToParticle node was used to turn the door into a particle. Now that the door is a particle, it's possible to use any rule-based methods to control the animation by a condition or operator. In the case shown below, a simple distance operator was used to measure the distance between the door and the approaching particles. The door opening is fully automatic. No keyframe is necessary, since the animation is controlled by rules alone.

https://www.youtube.com/watch?v=lfD7-Csx_M8



Another remarkable feature is the ability to control the speed at which the door opens by setting the particle velocity. Faster particles will force the door to open faster. Another idea would be to open the door, based on the impact of the particles. If 300 particles hit the door, the door will open. Once again, you've seen how thinkingParticles offers limitless possibilities, for any dedicated CG artist.

Fluid transformation of metaballs Supported!

ThinkingParticles offers full support for standard particle types, like the ones from 3ds Max. Using different particle types is also a rule-based process. The particle shape/type may be changed at any time by a simple or complex rule.

Check out the sample below; it illustrates the rule-based approach to control particle shapes by conditions. In this case, the shape changes from metaball to cubes, when the particles reach a certain age.

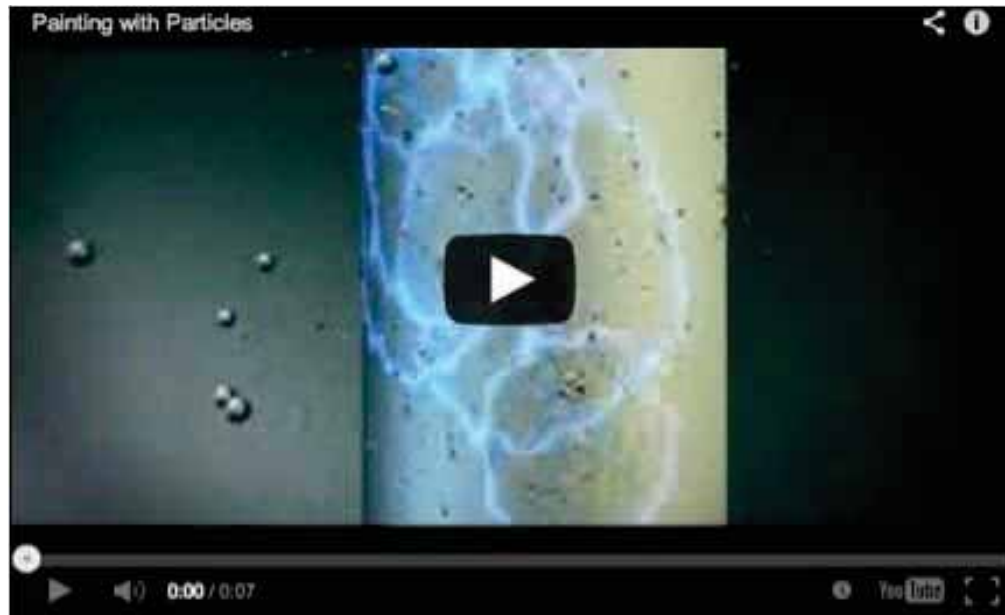
https://www.youtube.com/watch?v=4JN3TE_YziY



Paint with Particles

ThinkingParticles offers a rich collection of nodes to control particle behavior. You can combine many operators to create one "super" particle system. It's possible to make operator-created particles, based on the behavior of other particles. Particles may even be used to Paint another material onto objects!

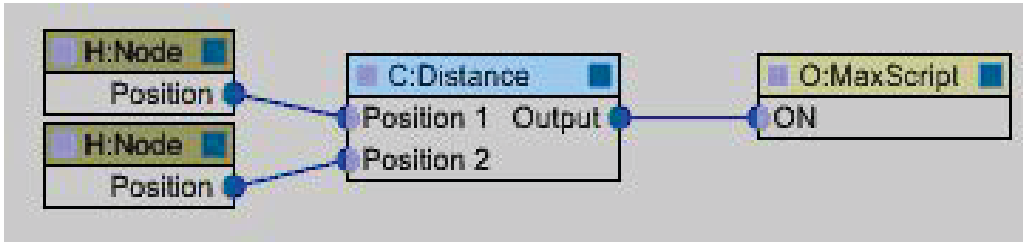
https://www.youtube.com/watch?v=y_TDA9xYwlg



In the example shown above, a Paint operator was used to create splashes on an object's surface. Accurate "surface level" collision detection is used by this operator to detect an impact on an object's surface. Each particle hitting the surface will paint a user-defined material at that exact location.

Expressions: Rule-based MaxScript support

thinkingParticles offers full MaxScript support through special operators. MaxScript itself is a power horse that lets you create amazing things. Together with thinkingParticles 6, MaxScript is truly unbeatable in its versatility.



In the example of "Wire Setup" shown to the left, we used a Distance operator to measure the distance between two nodes (any 3ds Max geometry) and as soon as those two objects come close to each other, a MaxScript is executed.

As you can see in the second illustration, thinkingParticles supports two levels of Max Script execution. Every thinkingParticles node can become active or inactive (based on rules) and each level has a MaxScript assigned to it. In this setup, the MaxScript operator turns the Spot01 on, when the distance falls within a certain range.

On the other hand, whenever the MaxScript operator is deactivated, another MaxScript is executed. In our example, the script just turns the light off again. This example of the spot light control was chosen because it is easy to understand. There is almost no restriction on how you can use MaxScript with thinkingParticles. You can load a MaxScript of any size into the relevant slots of thinkingParticles.

Software Developers Kit (SDK)

Something missing? - Is there a special effect that you cannot create with the features offered by thinkingParticles? Well, there is good news for those who needs ever greater creative freedom and power. thinkingParticles 6 extensive SDK allows you to program additional operators or conditions for thinkingParticles.

To use the thinkingParticles SDK, you will need a VISUAL C++ compiler from MICROSOFT and good knowledge of object oriented programming.

NOTE:

The SDK is not a part of the shipping product and it won't be available to the public. cebas VISUAL TECHNOLOGY Inc. reserves the right to decide who qualifies to use the SDK. Further restrictions may apply and will be discussed with the relevant parties. Production houses are welcome to use our SDK to enhance and develop additional operators and conditions for their "internal use" only.

Commercial developers who plan to create additional thinkingParticles operators and conditions must be approved by cebas VISUAL TECHNOLOGY Inc. Anyone interested in the thinkingParticles SDK may contact cebas at: info@cebas.com

[Click for more information and to purchase thinkingParticles 6](https://www.cebas.com/index.php?pid=productinfo&prd_id=187)
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Feel free to write to cebas: support@cebas.com (all technical issues)
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