

Release Notes



Havok Physics

Version : 6.5.0 Release

including all development since version 6.1.0 Release

Character Controller

Bugs

HVK-4220 Fixed	2 Bugs in Simplex solver (4 case and 3 case)	6.5.0 Release
	In some cases the simplex solver used in the phantom based character controller can get the priorities of colliding objects wrong. As a result the character controller would start penetrating high priority objects. This has been fixed.	

Character Controller RB

Bugs

HVK-4800 Fixed	Setting m_maxForce on Character Rigid Bodies and setting Linear Velocity to 0 causes NaNs	6.5.0 Release
	Setting maxForce to zero is no longer causes NaNs.	
HVK-4385 Fixed	Rigid Body Character Controller contactPointRemovedCallback infinite recursion	6.5.0 Release
	Logic for adding vertical contact points has been moved to a PostSimulationListener callback.	
HVK-4658 Fixed	Rigid body character controller does not respect m_maxSlope when one of the collidables is an extended mesh shape or a list shape	6.5.0 Release
	Slope of contact point obtained when rigid body character controller collides with another collidable now correctly judged from the character's point of view.	



HVK-4666 Fixed	hkCharacterRigidBodyCollisionListener::contactProcessCallback asserts when normals cancel each other hkCharacterRigidBody no longer asserts when contact normals cancel each other.	6.5.0 Release
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HVK-4665 Fixed	hkCharacterRigidBodyCollisionListener::contactProcessCallback performs unnecessary calculation Removed unnecessary calculation in hkCharacterRigidBody.	6.5.0 Release
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Improvements

HVK-4280 Implemented	Add collector to hkCharacterRigidBody::checkSupport A collector can now be given to the CharacterRigidBody checkSupport method to gather information about the supporting surfaces.	6.5.0 Release
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HVK-4639 Implemented	The hkCharacterRigidBodyCollisionListener should be placed in a header file to provide more user control. The class declaration for hkCharacterRigidBodyCollisionListener has been moved to hkCharacterRigidBody.h from hkCharacterRigidBody.cpp.	6.5.0 Release
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Add asserts

HVK-4485 Implemented	hkCharacterRigidBody::setLinearVelocity() should assert if given timestep <= 0 Added assert to hkCharacterRigidBody if timestep was less than or equal to zero.	6.5.0 Release
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Constraints

Bugs

HVK-4766 Fixed	Ball and socket constraint atom stabilization code can result in unstable constraints for some solver settings The hkBallSocketConstraintAtom has now the m_stabilizationFactor parameter. It defaults to 1.0 and tends to reduce energy. This is the same behavior as the 6.1 release. With specific solver settings this stabilization may introduce jitter and can be set to 0.0.	6.5.0 Release
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New Features

HVK-4650	Implemented	Implement a center of mass / inertia modifier	6.5.0 Release
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The `hkpCollisionMassChangerUtil` can now independently scale masses and inertia tensors of `hkpRigidBody`s. Also the inertia tensor itself can be scaled non-uniformly with different scale along each of the principal axes. `hkpCenterOfMassChangerUtil` is added to allow displacement of the center of mass of bodies during collisions.

Improvements

HVK-4834	Implemented	Add a constraint position fix up step	6.5.0 Release
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A utility has been added, `hkpConstraintProjector`, that can be used to fix up ragdolls that have become highly disjoint. It must be called manually.

HVK-4881	Implemented	<code>hkpBreakableConstraintListener::constraintBroke</code> <code>nCallback()</code> should be moved to <code>hkpConstraintInstance</code>.	6.5.0 Release
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`hkpBreakableConstraintListener::constraintBrokenCallback()` is moved to `hkpConstraintInstance`.

Demos

Documentation Changes

HVK-4656	Implemented	Clarify error accumulation comments in Sliding World Demo.	6.5.0 Beta 1
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Shifting the broadphase now happens through the world using `hkpWorld::shiftBroadPhase()` function which takes care of all necessary steps like updating border. There is a new demo called `BroadphaseShift` which shows how to remove and add objects to the broadphase while it is moved over a grid.

General SDK

Improvements

HVK-4862	Implemented	Action timer in integrate job erroneously encompasses island splitting	6.5.0 Release
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The action timer was encompassing island split operations, incorrectly bloating the action timings. The timer has been moved to encompass only action operations.

Optimizations

HVK-4410	Implemented	Adding / removing / setting position of objects in the world is too slow	6.5.0 Release
<p>There are potentially several bottlenecks when you add a list of objects:</p> <ol style="list-style-type: none"> 1. <code>hkpWorld::add/removeEntity/PhantomBatch</code> was slow. This has been significantly improved in this release. 2. Too many collision pairs are generated when a set of new rigid bodies are spawned at the very same point. <p>As a workaround either do not spawn all the new bodies at the same position or temporarily disable collisions between the new pieces.</p>			

hkcollide

Bugs

HVK-4593	Fixed	In rare cases, an SPU buffer in the <code>hkAgent1nMachine_Process()</code> can overflow.	6.5.0 Release
Fixed			
HVK-4747	Fixed	<code>hkpStorageExtendedMeshShape::addTrianglesSubpart</code> doesn't copy all fields over	6.5.0 Beta 1
The <code>partIn</code> structure is now copied (consistent with <code>addShapeSubpart()</code>) instead of calling the constructor.			
HVK-3250	Fixed	Shifting the broadphase doesn't update the broadphase border	6.5.0 Beta 1
Shifting the broadphase now happens through the world using <code>hkpWorld::shiftBroadPhase()</code> function which takes care of all necessary steps like updating border. There is a new demo called <code>BroadphaseShift</code> which shows how to remove and add objects to the broadphase while it is moved over a grid.			
HVK-3251	Fixed	After shifting the broadphase, the <code>objectsEnteringBroadphaseBorder</code> array can contain spurious entries	6.5.0 Beta 1
Shifting the broadphase now happens through the world using <code>hkpWorld::shiftBroadPhase()</code> function which takes care of all necessary steps like updating border. There is a new demo called <code>BroadphaseShift</code> which shows how to remove and add objects to the broadphase while it is moved over a grid.			

HVK-4216 Fixed	Raycasting against <code>hkpConvexVerticesShape</code> does not take convex radius into account This is resolved by using shape shrinking. The shape shrinker leaves the plane equations at the expanded positions.	6.5.0 Release
HVK-4437 Fixed	<code>hkpGsk::handlePenetration()</code> can fail if two objects intersect with two parallel edges. Fixed	6.5.0 Beta 1
HVK-4504 Fixed	<code>hkpCollectionCollectionAgent</code> shouldn't require material info on all subparts for collision filtering The extended mesh now has a new parameter: <code>m_defaultCollisionFilterInfo</code> , which holds the collision filter information if no material is set. Note if you set this value to <code>hkpGroupFilter::USE_COLLIDABLE_FILTER_INFO</code> , and no material info is set, then the <code>hkpGroupFilter</code> collision filter info will be taken from the <code>rootCollidable</code> .	6.5.0 Beta 1
HVK-4654 Fixed	Welding calculations do not handle triangle junctions correctly Added new welding creation utility that takes also neighboring meshes into account and doesn't search for shared edges anymore. Use <code>hkpMeshWeldingUtility::computeWeldingInfo()</code>	6.5.0 Beta 1
HVK-4657 Fixed	Missing Cylinder and Capsule enums in <code>hkpMoppCachedShapeMediator::setSplittingPlaneDirections</code> This allows capsules and cylinders to be referenced by extended mesh shapes wrapped in <code>hkpMoppShapes</code> .	6.5.0 Release
HVK-4809 Fixed	Sliding world, 32-bit broadphase, broadphase consistency - broken. There were potential overflow problems for small worlds that were shifted large steps during conversion from float to integer which are fixed now.	6.5.0 Beta 1

HVK-4824 Fixed	The <code>hkpTriangleShape::getCentreImpl()</code> function does not calculate the correct value. This has been fixed. <code>hkpTriangleShape::getCentreImpl()</code> now calculates the correct value.	6.5.0 Release
HVK-4832 Fixed	Welding doesnt work between meshes Created new welding utility that takes several meshes into account	6.5.0 Beta 1
HVK-4891 Fixed	<code>hkCpuShapeRayCastJobProcessCommand</code> does not reset input 'from' and 'to' vectors between raycasts on successive collidables. This has been fixed. The input 'from' and 'to' vectors are now reset.	6.5.0 Release
HVK-4911 Fixed	<code>hkpShapeRayCastJob</code> does not properly handle collidables with NULL shapes on SPU <code>hkSpuShapeRayCastJobProcessSingleCommand</code> now checks for NULL shapes and ignores them.	6.5.0 Release
HVK-3232 Fixed	When shifting the broadphase <code>maxPositionExceeded</code> callbacks are not called Shifting the broadphase now happens through the world using <code>hkpWorld::shiftBroadPhase()</code> function which takes care of all necessary steps like updating border. There is a new demo called <code>BroadphaseShift</code> which shows how to remove and add objects to the broadphase while it is moved over a grid.	6.5.0 Beta 1
HVK-3237 Fixed	The wrong agent is created for multiray shape collisions when linear casting. This has been fixed. <code>hkpSymmetricAgentLinearCast</code> is now returned instead of <code>hkpSymmetricAgent</code> .	6.5.0 Release
HVK-3249 Fixed	Shifting the broadphase doesn't update <code>hkWorld::m_broadPhaseExtents</code> Shifting the broadphase now happens through the world using <code>hkpWorld::shiftBroadPhase()</code> function which takes care of all necessary steps like updating border o the extent. There is a new demo called <code>BroadphaseShift</code> which shows how to remove and add objects to the broadphase while it is moved over a grid.	6.5.0 Beta 1

HVK-4840 Fixed	hkplterativeLinearCastAgent::staticLinearCast can miss a closer hit if there is already a hit in the collector	6.5.0 Release
	This has been fixed. New hits that are closer than existing hits already in the collector are now detected.	

New Features

HVK-4830 Implemented	Improve performance of world raycasts and linear casts	6.5.0 Beta 1
	The Havok world now (optionally) maintains a kd-tree around the world and uses this for raycasting and linear casting. This can greatly reduce the cost of querying the world, although there is a slight overhead for maintaining the tree. If you wish to revert to the old raycasting behavior, set <code>hkpWorldCinfo::m_useKdTree</code> to false. Also, SPU queries have been split into two ELF's - <code>hkpSpursRayCastQuery</code> for raycasts and kd-tree building, and <code>hkpSpursCollisionQuery</code> for all other asynchronous queries.	

Interface Change

HVK-4831 Implemented	Shape merging utility	6.5.0 Release
	Added new function and demo. See <code>hkpShapeMerger</code> and <code>ShapeMergerDemo</code> for details!	

HVK-4730 Implemented	Bundled raycast function for hkpShape	6.5.0 Beta 1
	This is currently an internal feature, and not yet supported generally across all levels of interface, however there is an interface at the shape level (and the KD tree level) to cast 4 rays simultaneously. This gives a performance improvement. Note, when using KD tree bundled raycasts, all rays must point in the same octant.	

Improvements

HVK-3257 Implemented	split the objectsEnteringBroadphaseBorder array in hkBroadPhase::shiftBroadPhase	6.5.0 Beta 1
	Shifting the broadphase now happens through the world using <code>hkpWorld::shiftBroadPhase()</code> function which takes care of all necessary steps like updating border. There is a new demo called <code>BroadphaseShift</code> which shows how to remove and add objects to the broadphase while it is moved over a grid.	

HVK-4392	Implemented	hkpMeshWeldingUtility::calcWeldingInfoForTriangle() should always test for winding consistency	6.5.0 Beta 1
Inconsistent triangles (i.e. connected triangles with different winding) are now always reported - both in the runtime and the modeller tools			
HVK-4570	Implemented	hkpCdPointCollector::reset() should be virtual.	6.5.0 Release
hkpCdPointCollector::reset() is now a virtual function.			
HVK-4740	Implemented	hkpExtendedMeshShape should support 8-bit indices	6.5.0 Release
The hkpExtendedMeshShape now supports 8-bit indices.			
HVK-4868	Implemented	Add assert to hkpResponseModifier::setInvMassScalingForContact to prevent colliding infinitely massive bodies with MOTION_FIXED bodies	6.5.0 Release
HVK-4924	Implemented	hkpPairLinearCastCommand should optionally return start point information.	6.5.0 Release
hkpPairLinearCastCommand now has fields for start point results and capacity. If you don't wish to receive this information (the old behavior), these should be initialized to NULL and 0 respectively.			

Optimizations

HVK-4450	Implemented	Add extrusion to all triangles in hkpTriSampledHeightFieldCollection	6.5.0 Beta 1
hkpTriSampledHeightFieldCollection can now take an (optional) vector for triangle extrusion. This is applied to all triangles returned by getChildShapeImpl.			

hk dynamics

Bugs

HVK-4540 Fixed	Allow users to set gravity per rigid body Added a factor which allows the client to scale the gravity on a per body basis. The default is 1.0, but you can now even choose negative factor to reverse the effect of gravity	6.5.0 Beta 1
HVK-4755 Fixed	hkSpuCollisionCallbackUtil::Event::m_contactMgr can point to invalid memory We added a function <code>hkSpuCollisionCallbackUtil::Event::getContactManager()</code> , which returns <code>HK_NULL</code> , if the contact manager has been deleted.	6.5.0 Release
HVK-4908 Fixed	Rigid body angular velocity not exported properly in TOI handling. Angular velocity of some rigid bodies was not exported properly in TOI handling. The angular velocity's x component could be zeroed. This is fixed now.	6.5.0 Release
HVK-2882 Fixed	Contact constraint priorities not handled correctly by solver We now expose the solver internal <code>m_numToisTillAllowedPenetration[QualityType]</code> parameters through the <code>hkpWorldCinfo</code> . This allows the user to manually tweak the priorities / collision agents.	6.5.0 Release
HVK-3639 Fixed	The <code>hkBoxMotion::getInertiaLocal()</code> function can cause division by zero. This has been fixed. There is no longer a possibility that the <code>hkBoxMotion::getInertiaLocal()</code> function will cause a divide-by-zero error.	6.5.0 Release
HVK-3921 Fixed	Inconsistent penetration results between MOVING, KEYFRAMED, and FIXED objects We now expose the solver internal <code>m_numToisTillAllowedPenetration[QualityType]</code> parameters through the <code>hkpWorldCinfo</code> . This allows the user to manually tweak the priorities / collision agents.	6.5.0 Release

HVK-4846 Fixed	hkpConstraintInstance::isEnabled() returns the opposite of what it should.	6.5.0 Beta 1
Behavior Change	The method <code>hkpConstraintInstance::isEnabled()</code> was returning false instead of true and true instead of false. This has been fixed.	
HVK-390 Fixed	Welding algorithms do not stop hkRigidBody hopping when moving from one mesh to another.	6.5.0 Release
	<code>hkpMeshWeldingUtility::computeWeldingInfo</code> now takes a list of shapes that are checked for adjacency and welding is correctly calculated for triangles that touch an adjacent shape. The create rigid bodies filter also has an additional flag which specifies how to handle unconnected edges.	
HVK-4845 Fixed	The <code>hkpConstraintCollisionFilter</code> does not reenale collision properly if a constraint is removed.	6.5.0 Beta 1
	The <code>hkpConstraintCollisionFilter</code> does not reenale collision properly if a constraint is removed. This has been fixed by using a new function <code>hkpWorld::reenaleCollisionBetweenEntityPair()</code> .	
HVK-4913 Fixed	Friction was miscalculated in TOI handling.	6.5.0 Release
	Friction was miscalculated in TOI handling. This could result in unrealistic high angular velocities. This is fixed now.	
HVK-4914 Fixed	Combining the moving surface modifier with the soft contact modifier will strangely accelerate the rigidbodies involved.	6.5.0 Release
	Fixed	
HVK-3199 Fixed	Non-const pointers <code>hkCollisionDispatcher</code>, <code>hkProcessCollisionInput</code> can be got from the <code>hkWorld</code>	6.5.0 Release
	Fixed. Now a new function <code>hkpWorld::getCollisionInputRw()</code> gets non const access to the collision input.	

New Features

HVK-4497	Implemented	Add callback on calls to setMotionType hkpEntityListener	6.5.0 Beta 1
hkpEntityListener now has an entitySetMotionTypeCallback method, which gets fired from hkpRigidBody::setMotionType.			

Improvements

HVK-4668	Implemented	collisions between debris objects should only be updated once at the end of the physics step, not during toi collisions	6.5.0 Beta 1
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We optimized TOI solving so that debris objects, which are involved in a toi collision, only get their collision detection redone once.

HVK-4669	Implemented	Implement a simplified TOI solving between 'debris' and landscape objects	6.5.0 Beta 1
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New collidable type HK_COLLIDABLE_QUALITY_DEBRIS_SIMPLE_TOI is introduced. Object of that type can report a single TOI with the landscape each frame. Those TOI's are handled in a simplified way -- the bodies are only backstepped to a non-penetrating position.

HVK-4838	Implemented	Ability to remove bounciness from rigid bodies	6.5.0 Beta 1
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Behavior Change

The Havok solver now is less bouncy. When you set restitution to low values (i.e. close to 0 or 0) objects could exhibit significant bounciness which, particularly for large objects looks unrealistic, making the objects seem weightless. Low restitution values now give more correct behavior.

HVK-4878	Implemented	The order of collidables returned from getOverlappingCollidables and getPenetrations is not deterministic	6.5.0 Release
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A new method, ensureDeterministicOrder(), has been added to hkpPhantom. If called prior to getOverlappingCollidables or getPenetrations, the items return by those methods are guaranteed to be in deterministic order.

HVK-4889	Implemented	hkpPhantom::isOverlappingCollidableAdded should take a const hkpCollidable*	6.5.0 Release
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The hkpCollidable* argument for hkpPhantom::isOverlappingCollidableAdded is now const.

Optimizations

HVK-4488	Implemented	Rigid bodies integrated in their own islands are very slow (especially on PS3)	6.5.0 Beta 1
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Now `hkEntity::activate()` now checks the island size of the activated entity and if the island is small merges the island with another island.

HVK-4415	Implemented	<code>hkpPhantom::setTransformAndLinearCast()</code>, rather than <code>setTransform()</code> followed by <code>setPositionAndLinearCast()</code>;	6.5.0 Release
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`hkpShapePhantom::setTransformAndLinearCast()` is added to the interface. Previously, to update rotation and cast, one had to call `setTransform()` followed by `setPositionAndLinearCast()` which would result in two broadphase Aabb updated. Only one aabb update is needed now.

Add asserts

HVK-4351	Implemented	Warn if the customer tries to construct a huge (>12000 meter) 16 bit broadphase.	6.5.0 Beta 1
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Warning added.

Multithreading

Bugs

HVK-3463	Fixed	Access to <code>hkpWorldObject m_properties</code> forces you to lock the object.	6.5.0 Release
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Worked around by allowing to bypass the multithreading checks, by passing in an additional parameter to this function.

Packaging

Bugs

HVK-3967	Fixed	A circular link dependency between <code>hkpCollide</code> and <code>hkpInternal</code> exists on PLAYSTATION(R)3.	6.5.0 Release
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The circular link dependency between `hkpCollide` has been removed.

Preprocess utilities

Bugs

HVK-4673 Fixed	Coplanar triangles, if exported as a convex vertices shape and shape-shrunk, cause a huge convex radius surface.	6.5.0 Release
This has been fixed. It's now safe to export coplanar triangles as a convex vertices shape and shrink them.		

New Features

HVK-4787 Implemented	Add a utility to merge shapes into as few hkpExtendedMeshShapes as possible	6.5.0 Beta 1
Added new function and demo. See hkpShapeMerger and ShapeMergerDemo for details!		

HVK-4831

Serialization

Bugs

HVK-4919 Fixed	hkpSaveContactPointsUtil::GetIdForEntityFunc & GetEntityFromIdFunc require an HK_CALL	6.5.0 Release
The prototype for hkpSaveContactPointsUtil::GetIdForEntityFunc and hkpSaveContactPointsUtil::GetEntityFromIdFunc require an HK_CALL or the functions will not receive the proper argument values. The appropriate HK_CALLs have been added.		

Interface Change

Tool Chain

Bugs

HVK-4864 Fixed	Rigid Body Node (Maya 2008) - Quality Type, Solver Deactivation and Deactivator Type enums shared by all instances	6.5.0 Release
A UI bug has been fixed where changing one of these parameters in one rigid body would also change it in other rigid bodies previously edited.		
HVK-4675 Fixed	Content tools should test and warn if hkpShapeCollection does not contain any valid keys before building hkpMoppBvTreeShape	6.5.0 Beta 1
Inconsistent meshes are now reported in the modelers and we also print the name of the inconsistent mesh		

HVK-4952 Fixed	Constraint / Rigid Body UI manipulation doesn't work on XSI	6.5.0 Release
	A bug in the XSI physics tools has been fixed where viewport manipulation of constraint spaces and rigid body center of mass / inertia was not working.	

HVK-4622 Fixed	hkpRigidBody generates a warning when triangle shapes are not mopped, but tools exports unmopped shapes for shapes with less 5 triangles	6.5.0 Release
	We now only throw a warning if the number of triangles is greater than 100.	

Utilities

New Features

HVK-4883 Implemented	Add wind effects to hkpUtilities	6.5.0 Release
	A new set of utility classes have been added to hkpUtilities, with associated demos	

Improvements

HVK-4211 Implemented	Shape shrinker improvements	6.5.0 Release
	The Create Rigid Bodies filter has a new option to specify the relative shrink value as well as a maximum vertex displacement. That fixes small objects and sharp edges.	

HVK-4373 Implemented	We have two pair-wise collision filters - hkpPairCollisionFilter, hkpPairwiseCollisionFilter - remove one.	6.5.0 Release
	Deprecated hkpPairwiseCollisionFilter is removed.	

Vehicle

Bugs

HVK-4014 Fixed	hkVehicleInstance::WheelInfo should store a list of 8 hkShapeKeys.	6.5.0 Release
	hkVehicleInstance::WheelInfo can now store up to 8 hkShapeKeys.	