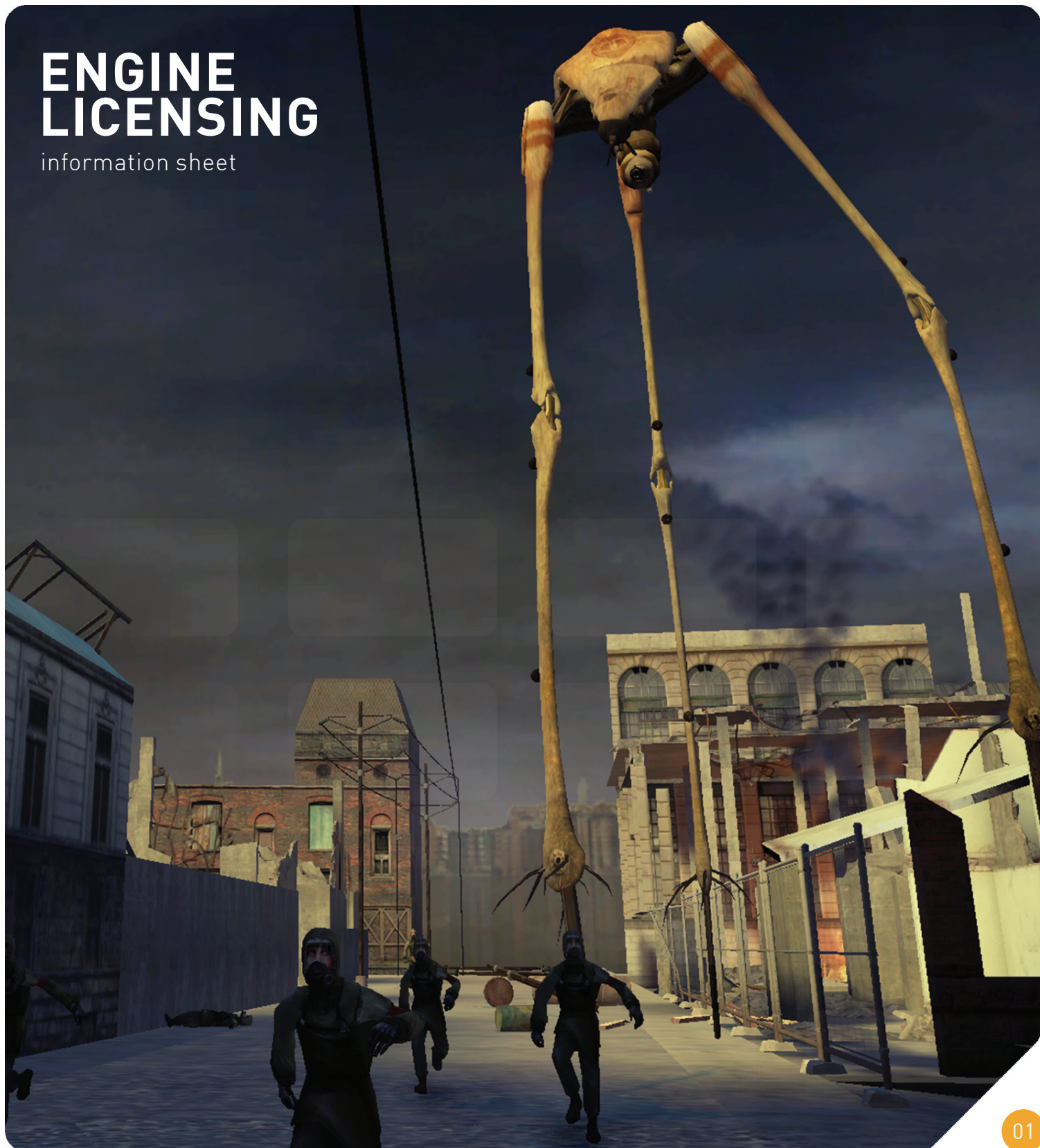# source ™

ENGINE LICENSING
information sheet

■ INTRODUCTION

The Source™ engine technology, the same used to power Half-Life® 2, is now available for license by third party developers. Source provides major enhancements in several key areas including character animation, advanced AI, real-world physics, and shader-based rendering.

Source's animation system brings expressive characters to life with an unlimited palette of facial expressions that allow them to convey a message without having to say a word. In addition, these characters possess the industry's most advanced artificial intelligence, making them extremely capable allies and foes.

These characters populate beautifully rendered and physically simulated worlds. Next generation applications will require the use of a physics simulation to provide realistic and responsive environments. This will allow developers to break from authoring the pre-
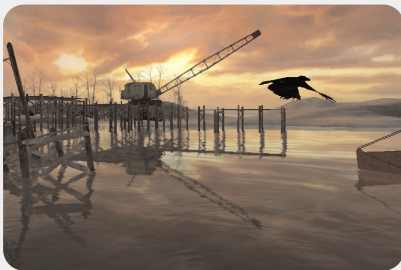
scripted events featured in previous generations of games, and open the door for the creation of completely new styles of play.

Source contains robust networking code, providing support for 32-player LAN and Internet games, and includes a complete toolset for level design, character animation, demo creation, and more.

Pricing
Source offers the most advanced features, tools, and support at extremely competitively prices. Discussed under NDA.

For more information, please contact *sourceengine@valvesoftware.com.*

■ Water refraction, High-Dynamic Range lighting, and advanced AI greatly enhance visual fidelity and believeability in Source.
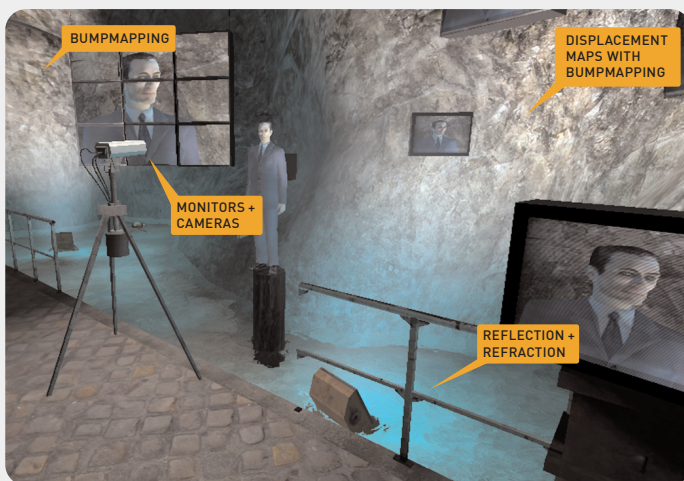
SOURCE™ ENGINE FEATURES

RENDERER

▸ Version 2.0b (and below) DirectX shaders, bump mapping, LOD on models and world

▸ Author shaders with HLSL

▸ Cube and environment mapping

▸ Dynamic lights, vertex lighting and light maps, many light types including flickering, pulsing etc.

▸ High-Dynamic Range lighting

▸ Water with refraction and fresnel effects

▸ Advanced particle system that can emit sprites or models

▸ Projected shadows allow for a large number of characters per scene
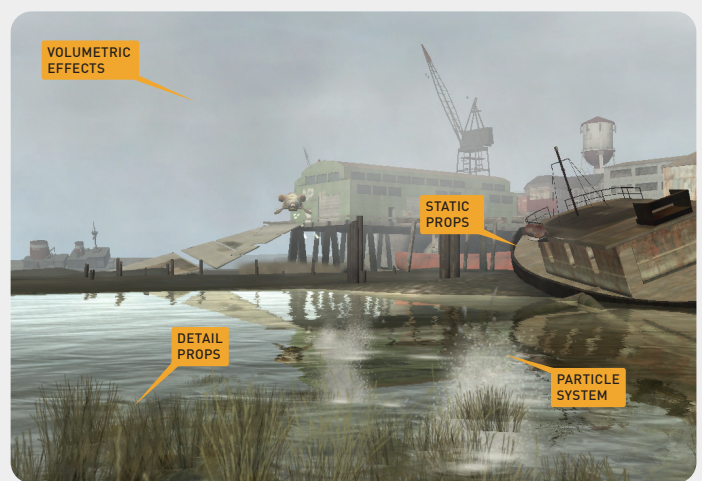
▸ Intelligent graphics caching system

▸ Occluder entities for visibility blocking

▸ Indoor/Outdoor environments
  · Deformable terrain
  · 3D skyboxes extend the horizon and add parallax on distant objects
  · Dynamically rendered organics (grass, trees etc)

▸ Subdivision surfaces, diffuse & specular bump maps

▸ Real-time radiosity lighting

▸ Effects include but are not limited to: particles, beams, volumetric smoke, sparks, blood, environmental effects like fog and rain

▸ Scalability
  · Dx6-Dx9 hardware supported

MATERIALS SYSTEM

▸ Instead of traditional textures, Source defines sets of materials that specify what the object is made from and the texture used for that object. A material specifies how an object will **fracture, sound when dragged across another surface or broken**, **as well as the object's mass and buoyancy**. This system is much more flexible than other texture only based systems.

▸ Materials can also interact with objects or NPCs. For instance, mud or ice can make sounds and cause vehicles to slide/lose traction.

■ Source enables DX9 shaders written in HLSL

■ Create expansive and highly-detailed outdoor environments.

SOURCE™ ENGINE FEATURES (Cont'd)

■ Players and non-player characters are physically simulated, and possess the ability to interact with objects and vehicles.

MULTIPLAYER NETWORK CODE

▸ Time and gamer tested by millions of gamers around the world

▸ Support for both LAN based multiplayer and Internet based multiplayer games

▸ Prediction analysis for interpolating collision/hit detection

▸ Optimizations for high-latency, high-packet loss 56k connections

ADVANCED CHARACTERS

▸ Detailed and believable characters provide intelligent player interaction

▸ Realistic eyes
 · Focus on player/object, not simply parallel views
 · Proper eye "bulge" for realistic eye reflections

▸ Simulated musculature provides outstanding emotions, speech and body language

▸ Language independent speech, characters can naturally speak in many languages

▸ Skeletal/bone system for animation

▸ Layered animation system can synthesize complex animations out of several pieces

PHYSICS

▸ More responsive world with realistic interactions

▸ Sounds & graphics follow from physics

▸ AI characters can interact with physically simulated objects

▸ World-class machines, constraint systems and ragdoll physics

▸ Ropes and cables move realistically when bumped or hit by an object

▸ Can be controlled by level design

▸ Kinematic animated bone followers

▸ Custom procedural physics controllers

▸ Vehicles
 · Wheels slip and skid
 · Realistic suspensions
 · Tunable parameters: Horsepower, gearing, max speed, shift speed, tire material, tire friction, spring tension/dampening, etc.
 · Multiple players in a vehicle
 · Hovercraft

■ SOURCE™ ENGINE FEATURES (Cont'd)

■ Source's advanced AI create intelligent, life-like characters.

■ Source includes a powerful suite of sound technologies.

ADVANCED AI

▸ Graphical entity placement allows level designers to quickly control the interactive gaming environment.

▸ Sophisticated navigation: characters that run, fly, jump, crouch, climb stairs and ladders, and burrow underground

▸ Senses things using sight, sound, smell

▸ Determines relationships such as friend/foe status of other entities

▸ Battle capabilities allow squads of AI characters to operate together, know when to advance, retreat, lay cover fire, etc.

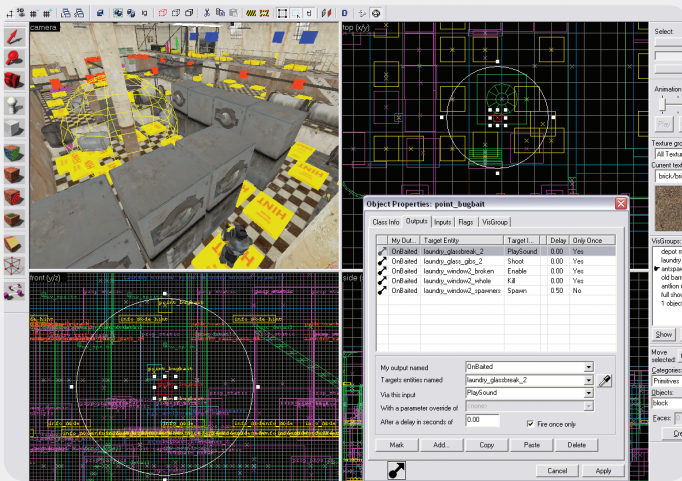▸ Provides for intelligent character interaction during non-combat scenes.

SOUND

▸ 5.1 surround sound, 4 speaker surround

▸ High-quality 3D spatialization

▸ Custom software DSP

▸ Automatic DSP based on environmental geometry

▸ ADPCM decompression

▸ 16-bit 44KHz, stereo wave data with all features

▸ MP3 decompression (requires **Miles** license)

▸ Support for audio streaming on any wave

▸ Real-time wave file stitching

▸ Pre-authored Doppler effect encoded waves
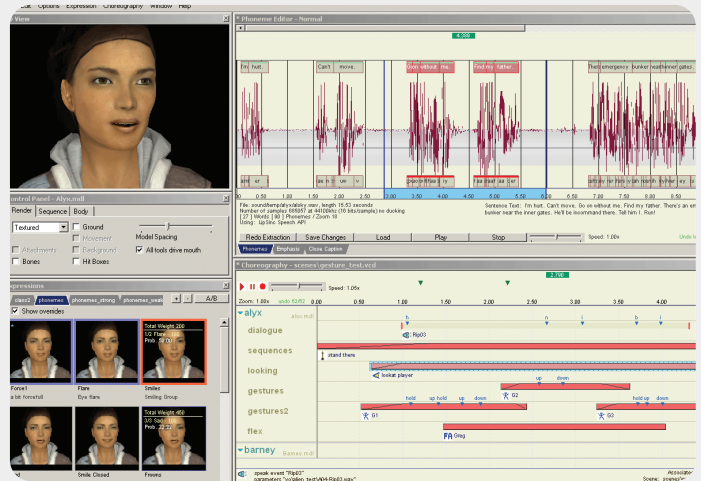
▸ Pre-authored distance variant encoded waves

UI

▸ **Server browser** - Displays all active game servers and allows a player to choose which one to participate on. Players can filter and sort server lists in order to speed up the display and selection of a server.

▸ **Friends instant messenger** - Allows players to message each other both in and out of the game as well as join friends in existing games. No more confusion about what server your friends are on, you can easily join with this feature.

▸ **VGUI** - Valve's custom GUI interface mimics most window controls but is rendered using the Source engine for both in-game and out-of-game user interface uniformity. It is platform independent and is **Unicode compliant**.

■ SOURCE™ ENGINE FEATURES (Cont'd)

■ Build and preview new worlds within the Valve Hammer Editor®.

■ Faceposer allows you to direct each actor in every scene.

PROGRAMMING

▶ All code written in C/C++ using Visual Studio 7.1. Easily and quickly derive new entities from existing base classes.

▶ Internal context sensitive performance monitoring system

▶ Graphics performance measurement tools built into the engine

▶ Modular code design (via DLL's) allows swapping out of core components for easy upgrading or code replacement

▶ Dx9 shaders all written in High Level Shading Language (HLSL).

▶ Allows custom HLSL shaders

TOOLS

▶ Faceposer

　· Facial expression tool used to craft speech and emotions

▶ Valve Hammer Editor®

　· WYSIWYG World editor

　· Create world brushes

　· Terrain editor

　· Place detailed world models and AI NPCs

　· Set navigation points/paths for NPCs

　· Place triggers, clip brushes, logic etc.

　· Allows level designer to hook up I/O between entities to control AI within the game

　· Includes real-time lighting

▶ Half-Life® Model Viewer

　· Full model previewer with

　　lighting

　· Rotate models in any direction

　· Setup hit boxes

　· View physics hull

　· View normals

　· Wireframe, shaded or textured view modes

▶ Studiomdl

　· Model compiler

▶ Vbsp, Vrad, Vvis, VMPI

　· Map compilation tools (bsp, lighting and visibility)

　· VMPI - distributed compilation tool allowing level compiles to be spread across many pc's greatly reducing compile times

▶ Exporters

　· XSI, Max and Maya .smd exporters for exporting 3D models