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SEPTEMBER 2006

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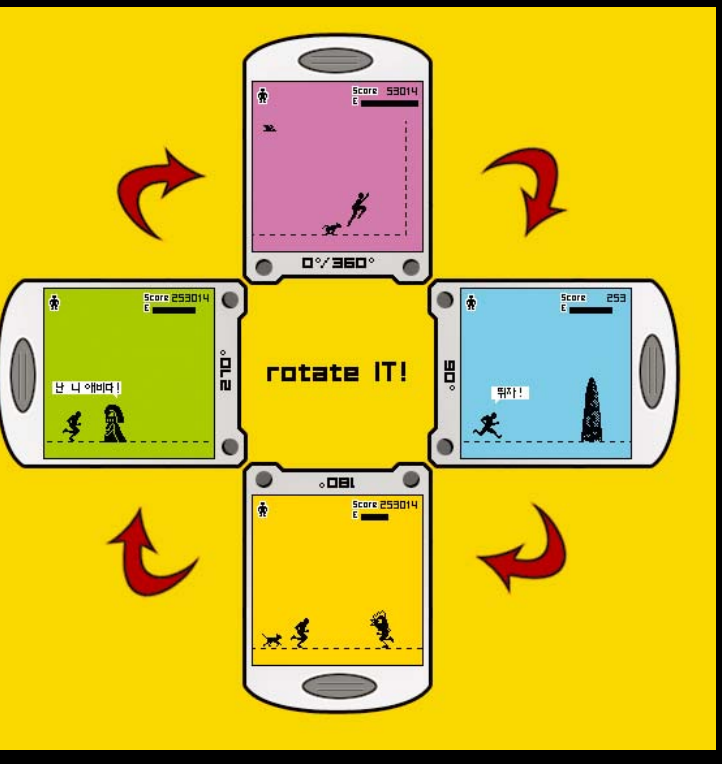

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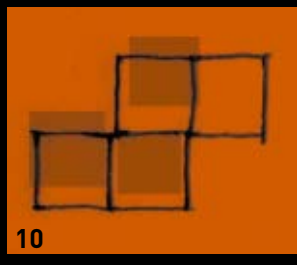

MOBILE POSTMORTEM

DEPARTMENTS

COVER ART: JOSH COCHRAN

COLUMNS

E3 EVO EMOTING

THERE HAVE ALREADY BEEN APPROXIMATELY A zillion editorials on "the demise of E3," or some such variant. For some of us, E3 has become the elephant in the room—it would be ridiculous not to talk about it, but at the same time we're pretty fed up with everyone talking about it.

The facts are fairly simple. Because many of the major U.S. publishers already reach key retailers and media with gamer days and other regular showings throughout the year, they simply don't see the need to spend millions of extra dollars putting on a sensurround giga-experience every May. (See Heads Up Display, page 5 for more details.)

So the publishers put their collective foot down, and now E3 will be a 5,000-person event in July without a show floor for that same select group of media and retailers—not GameStop clerks, rank-and-file developers, nor anyone else who could get past the increasingly stringent entry regulations. Bye bye, status quo.

But let's try to look around the tedious talking head analysis. What are some of the less explored items of practical interest to the game business that will be affected by a changed E3?

BETTER FOR GAMING FREEDOM?

Although the publisher-funded ESA has always been known for putting on E3, it might be argued that far more important is its work defending video games against innumerable U.S. state and prospective federal legislation—with some significant success, since all state bills signed into law to date have been injuncted against on First Amendment grounds.

You can be sure, then, that when the ESA decided not to run E3 at the same level, with significant revenue loss, it asked for and received additional member dues to help fight anti-game legislation—Electronic Arts intimated as much in a recent earnings call.

So perhaps removing some of the pressure of a grand-scale E3 will help to concentrate the minds and funding pockets of the ESA and publishers alike on these vital legislation issues.

WHAT ABOUT THE LITTLE GUYS?

Clearly, the big publishers have no problem attracting both retailers and publishers to their open days, or booking appointments at the 2007 closed-door version of E3. But how will the smaller publishers and peripheral companies be affected? Formerly, these are the companies who exhibited in (the more affordable) Kentia Hall and elsewhere, and who relied on word of mouth and people walking past their booths to generate buzz.

For one, some smaller U.S. publishers are already talking about banding together for special gamer days next year, in order to combine key products and give incentive for journos and others to make an effort to attend. Second, E3 itself will still provide some ways for the smaller players to be recognized, of course, but the foot traffic, key for a lot of those companies, will be gone.

Has the eclecticism of Kentia Hall been lost forever? Possibly.

PLAYABLE NIRVANA NO MORE?

Finally, here's the matter that concerns me the most. A lot of rank-and-file developers made the trip to E3, sometimes just for one day, to get a comprehensive snapshot of the state of game development. Perhaps they picked up some ideas along the way, and they certainly scored some hands-on time with dozens of playable titles before their release.

I'm not saying that events like GDC don't provide a whole heap of developer knowledge and a plethora of levels, or that Xbox Live or the internet in general doesn't provide downloadable demos and trailers, but for a snapshot of the game industry in terms of actual, playable games, all splayed and conglomerated together, I think E3 was one of the key events for the game creation community.

Then again, E3 wasn't meant to be for the benefit of the developers or producers, necessarily. And in related good news, developers won't have to crunch through E3 demo development any more, though no doubt other pre-release showcases will throw yet more wrenches at producers who juggle schedules.

And who knows? Maybe another show will step up and pick up some of the slack that's undeniably been left by E3's drastic downscale. All we know is that you have to embrace the elephant.

S!

—Simon Carless

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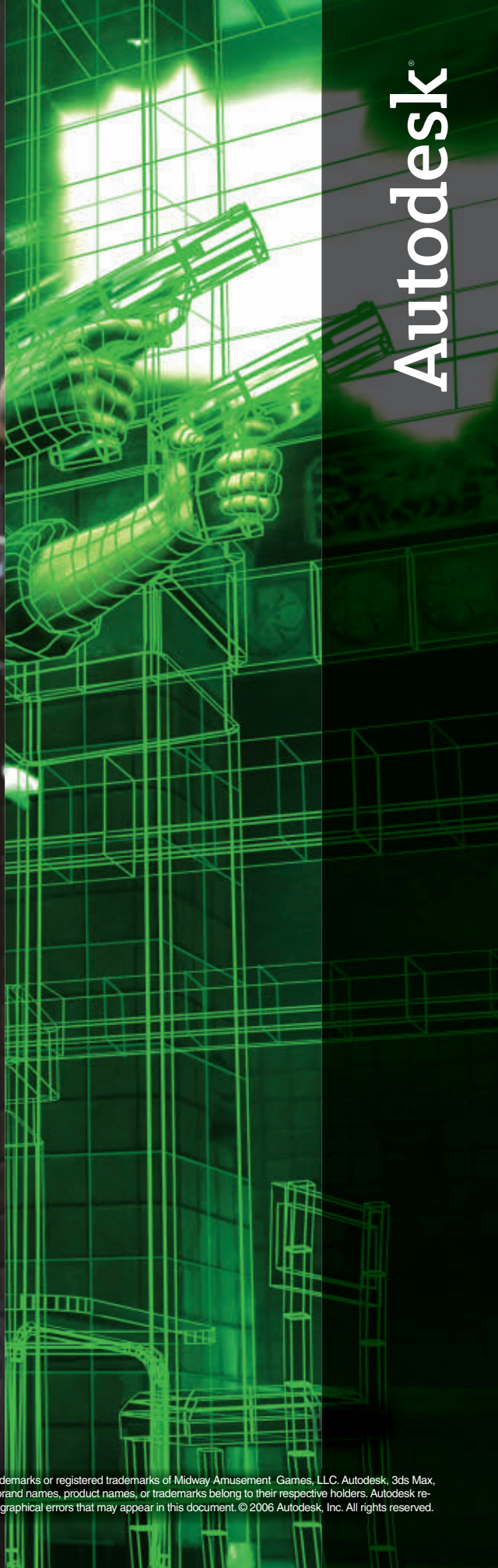

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MOBILE TALKS BACK:

Will original IP ever be financially important to the mobile game industry?

David Gosen, CEO, I-play:
The key to success in mobile is to have a balanced portfolio of powerful big brand licenses, combined with strong, creative, and original IP. Big brands help to bring first-time downloaders into mobile gaming as they "buy into" brands that they trust. Original IP, however, allows good content providers to demonstrate their real creativity and allows more margin to flow to the bottom line. Making a hit out of original IP in a crowded market requires real skill, not only in game development but in the management of marketing, pricing, and the distribution channels.

Scott Rubin, VP of sales and marketing, Namco Networks:
The reason [most games] are on top of the mobile charts is because they're mass market ... and that business is going to continue to be there. On the other hand, we're starting to see many of the same games over and over again in the industry, which is probably not a good thing. If publishers design original games for everybody, they'll be successful for the same reasons.

Tom Frencel, president, Capybara Games:
It's somewhat easier to make an original IP game be of lower quality. There are fewer safety checks on the publisher end of things, compared to branded games where there's a studio involved, or a third-party licensor to ensure the quality of the brand. So it's easier to make a mediocre original IP game than it is to make a bad licensed game, just because you have more eyes on the project.

John Greiner, president, Hudson Entertainment:
Today in mobile, new IPs are a much greater risk than known licenses. Consumers are mostly buying games from their phones directly, and most decks on phones are not graphically enhanced. Without a way for a customer to see a sample of the game, whether a screenshot, a short video, or even a demo, customers are much more unwilling to take a chance with a new IP. The mobile market is still in a very early stage, and only a small segment of the population plays mobile games. Thus, doing mass marketing campaigns isn't cost effective. As a result, there isn't a great way to market an IP and get the word out there that a new game exists. [However,] we do believe that original IPs will be important in the long term.

Greg Ballard, CEO, Glu:
Licensed IP has been a key to the initial growth of this industry, but the market is maturing and there's no question that there is a place for original IP. Our strategy is to release original IP when and where we see obvious voids in the market or on the carrier decks. For example, with [our original boxing title], we identified that there were no other arcade-style boxing games available for the mobile phone and decided that a license wouldn't be required to make this game successful. We believe it's this type of game that has the potential to succeed on other platforms, and in the not too distant future, we'll see games on consoles that originated on mobile.

Compiled by Brandon Sheffield

ZIFF KILLS CGW, LAUNCHES GAMES FOR WINDOWS

THE ZIFF DAVIS GAME GROUP HAS announced that it is closing its long-running U.S. magazine *Computer Gaming World*, which had been in print for 22 years, and is replacing it with an officially Microsoft-branded *Games for Windows* magazine and web site.

As part of the agreement, Ziff Davis will serve as the independent editorial voice for Microsoft's Games for Windows initiative and will launch the new magazine called *Games for Windows: The Official Magazine* and a companion web site on the group's 1UP Network. Microsoft will drive traffic to the network and promote the magazine, due to appear in the fall.

Computer Gaming World, founded in 1981, was one of the longest-running game magazines ever published.

Ziff Davis noted that the new magazine will carry much of *Computer Gaming World*'s editorial style and tone, as well as its editorial, production, and art staff, with current editor-in-chief Jeff Green stressing editorial continuity and expanded print distribution in post-announcement statements.

"We share Microsoft's passion for expanding the Windows gaming market," said Scott McCarthy, president of Ziff Davis Game Group. "This alliance will enable us to reach a wider audience than ever before, both in print and online, and it affirms Microsoft's commitment to gaming on the Windows platform. We're looking forward to working with Microsoft."

—Jason Dobson

E3 DOWNSIZED

INDUSTRY EXHIBITION 'EVOLVES' TO SMALLER MEDIA FESTIVAL

IN RELATIVELY UNEXPECTED NEWS, the Entertainment Software Association last month revealed that the 2007 Electronic Entertainment Expo "is evolving into a more intimate event focused on targeted, personalized meetings and activities." The announcement was prompted by significant media speculation that several big players—and thus funders—of E3 had pulled out of the 2007 lineup.

ESA president Doug Lowenstein underscored that the event, now called the E3 Media Festival, will only accommodate around 5,000 key attendees, as opposed to the massive 60,000 of E3 2006.

According to Lowenstein, as reported in the *Wall Street Journal*, E3 2007 will still take place in Los Angeles, but will "focus on press events and small meetings with media, retail, development, and other key sectors."

"The world of interactive entertainment has changed since E3 Expo was created 12 years ago," Lowenstein said last month. "At that time, we were focused on establishing the industry and securing orders for the holiday season. Over the years, it has become clear that we need a more intimate program, including higher quality, more personal dialogue with the worldwide media, developers, retailers, and other key industry audiences."

Industry reactions to the news varied, though many commentators concurred that the downsizing was likely caused by major publishers not wanting to participate, due to the excessive costs of E3 above and beyond the retailer and press days already held multiple times per year.

In an August conference call, executives from Electronic Arts commented of the shift, "We think it makes good business sense," and noted that the decrease in size of the event "will save the company multiple millions of dollars."

"Obviously, E3 is the primary revenue driver for the ESA. There are going to be some due assessments that are different to what they have been historically," said one EA executive, "to help the

Doug Lowenstein, ESA president

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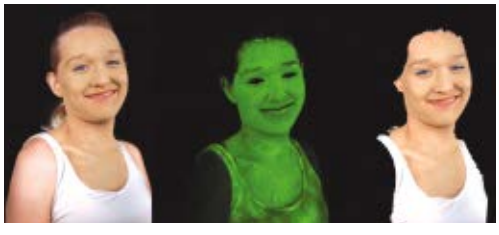
product news

LIGHTS, CAMERA, CAPTURE!



WHAT'S GREEN AND BLINKING AND MOVES ALL OVER?

A new method of recording motion for digital cinematography, unveiled in August, may change the face of animation—literally.

The system, from a new company called Mova, is being classified as a "reality capture system," not to be confused with the passé ways of mo-cap.

Called Contour, the system relies on phosphorescent makeup, the kind found in Halloween stores. Mixing the glowing face paint with a liberal amount of skin-tone foundation allows the models who wear it to look and feel rather natural. The phosphorescent material can be applied to the model's face, hands, and even clothing, doing away with both dot markers and those wetsuit getups. Using a sponge to apply the makeup creates an invisible pattern of what are essentially dots (which function much like dot markers), only a Contour user will have on average 100,000 dots compared to the 100 or so that traditional mo-cap setups can provide for a facial recording.

Once the model's skin and clothing has been prepped, she or he is placed before a few dozen cameras, set in front of fluorescent lights that blink about 100 times per second—too fast for the human eye to detect. When the light is on, the cameras record texture information; when the lights are off, the cameras grab the dimensional information.

The technology is spearheaded by Steve Perlman, founder and CEO of the Rearden Companies, of which Mova is a subsidiary. Perlman claims this new alternative to motion capture will provide more accurate results, require less preparation, and reduce the amount of by-hand cleanup generally tasked to animators working with mo-cap data. Rendering times will be significantly reduced as well, says Perlman, who also was a co-founder of WebTV Networks.

Pricing for the system has yet to be announced, though Perlman estimates that the technology will be fully usable in production by 2007.

—Jill Duffy

CALENDAR

CGames: Disability and Game Design
Dublin Institute of Technology
Dublin, Ireland
September 20
Price: 450 euros (student rate available)
www.comp.dit.ie/cgames/index.html

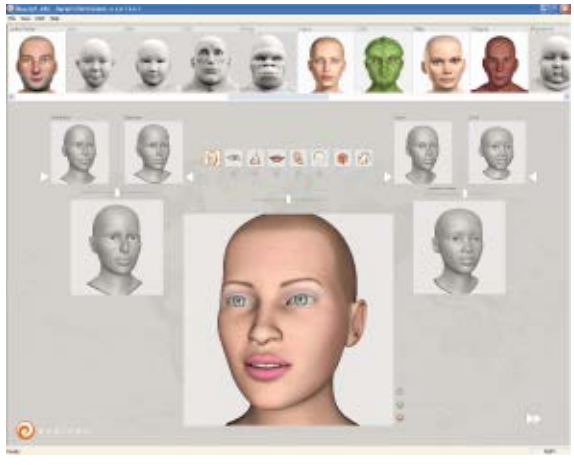
Game Developers Conference London
BAFTA Headquarters
London
October 2–4
Price: £75–£575
www.gdclondon.com

Future Play
London Convention Center
London, Ontario, Canada
October 10–12
Price: $150–$400 CDN
www.futureplay.org

SIGGRAPH ROUNDUP

BY JILL DUFFY

AT SIGGRAPH, THE ANNUAL CONFERENCE on computer graphics, tools vendors emphasized giving artistic control back to artists, freeing them from programming concerns. The conference, held in Boston in early August, played host to the game industry's top tools providers, many of whom announced new products or product upgrades.



Darwin Dimensions' evolver uses an ancestral approach to character creation.

DARWIN DIMENSIONS' EVOLVER

www.darwindimensions.com

A simple and inexpensive tool, Darwin Dimension's evolver lets artists (or really anyone) create human-like heads and bodies. The gist of it is that the user creates a genealogy using existing faces and bodies (called ancestors, appropriately enough, and there are 49 of them included with the program); the ancestors' features combine to create a new character. A system of sliders lets the user manipulate the character's features, or the ancestors' features, or the features that will be most or least prevalent in the child. Evolver can output the final character into a format that's compatible with all leading 3D software tools.

ATI'S FIREGL SERIES

www.ati.com

ATI spent its time at Siggraph showing off its line of FireGL workstation accelerator cards. The line supports Full Shader Model 3.0 vertex and pixel shaders and boasts up to a 1GB frame buffer and enhanced memory.

EYEON SOFTWARE'S FUSION 5.1

www.eyeonline.com

Eyeon Software announced an upgrade (5.1) of its product Fusion, a core compositing tool. The company confirmed that the new release will support models and scenes in 3DS, OBJ, and FBX file formats; the capability to project images and live action onto 3D geometry; and the ability to apply twists, tapers, bends, and skews with Bender 3D.

LUXOLOGY'S MODO 202

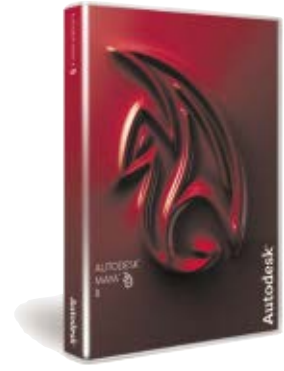
www.modo3d.com

Luxology has released a new version of its 3D creation software, which Siggraph attendees might have seen strutting its stuff at the ATI booth. Modo is en route to becoming a full-fledged 3D creation/animation competitor, with the latest leap adding improvements to modeling capabilities, rendering speeds, UV editing, and paint tools.

AUTODESK'S MAYA 8 & 3DS MAX 9

www.autodesk.com

Autodesk, which now owns both Max and Maya, predictably announced two version releases of the 3D software packages at Siggraph. Maya 8 supports 64-bit development while Max 9—which will be available as of mid October—will feature several viewport improvements.



ATI's sleek FireGL X-3 256 graphics card.

NVIDIA'S SCENE GRAPH 3.2 SDK

www.nvidia.com

Siggraph-coordinated news for graphics chip maker Nvidia included the announcement that its Scene Graph 3.2 SDK is now available free of charge for developer partners. The tool lets developers "optimize applications and exploit the latest professional graphics processing hardware," according to company literature. New or improved features include rendering for the display of 3D volume data, support for Microsoft Vista, and a reduced memory footprint.

NATURALMOTION'S MORPHEME & ENDORPHIN 2.6

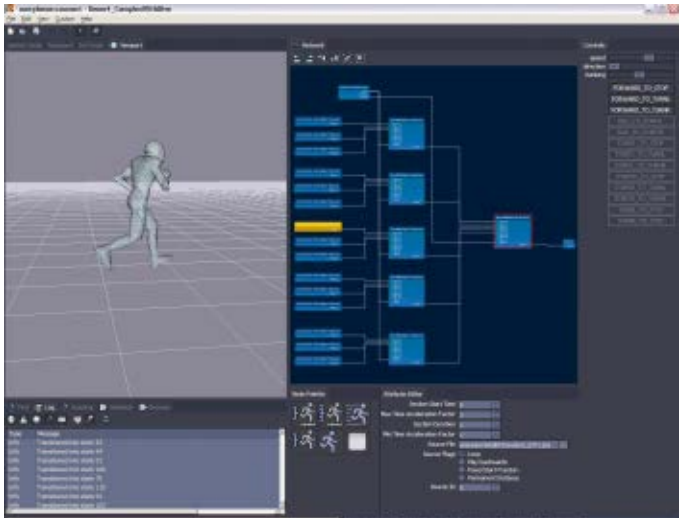
www.naturalmotion.com

Two announcements have recently emerged from 3D animation technology company NaturalMotion: news of a new animation engine, called morpheme, and a point release of the company's flagship "dynamic motion synthesis" product, endorphin (version 2.6). The updated tool now features new adaptive behaviors, new visualization capabilities, improved pipeline tools, and a networking scheme that allows multiple licenses to be run from a single server dongle.

AVID'S SOFTIMAGE XSI 5.11 & FACE ROBOT 1.5

www.softimage.com

Two product point upgrades from Avid push Softimage XSI and the recently released Face Robot a few paces farther



NaturalMotion's morpheme engine.

along. Improvements in Face Robot include an added focus on lips and wrinkle adjustment, as well as a pipeline that will support the Mova Contour system.

MOVA'S CONTOUR REALITY CAPTURE

www.mova.com

The hit of the show floor at Siggraph 2006 was a new motion capture system that uses inexpensive Halloween makeup as opposed to dot markers. Differentiated from its predecessors with the term "reality capture," Mova's Contour system can grab much more detailed face and cloth information, render it fairly quickly, and provide animators data that requires little cleanup. (See Heads Up Display, page 5, for more information.)

SEAPINE'S TESTTRACK PRO 7.5

By Justin Lloyd

Seapine's TestTrack Pro, currently in version 7.5, is an all-in-one, off-the-shelf bug tracking solution for teams of practically any size. It would even be useful to solo developers who have a public project that handles bug reports and feature requests from users, although many people in that situation will ordinarily resort to good old email and a spreadsheet.

Installing the TestTrack bug server is relatively easy. There are many configuration options, but the default installation takes about three minutes before you're ready to start entering your first bug report. The TestTrack server runs on Windows, Mac OS X, and Linux, and can run either as a service or as an application on a Windows NT/2000/XP installation.

The only part of the installation that stalled me was the default user name and password; other than that, I didn't have to check the manual for anything. If you're capable of installing other development tools or even Microsoft Office, TestTrack is a walk in the park.

EMAIL AND WEB INTEGRATION

TestTrack makes use of a native database format, though this can be reconfigured to use ODBC, allowing you to use Microsoft SQL Server, mySQL, and so forth, or an Oracle database. The TestTrack server includes an option to check automatically for updates and then send an email to whoever needs to be notified about the update.

With the server installed, you can now install the TestTrack clients on your developer machines, pointing each client to the TestTrack server. Each person reporting bugs can either make use of the dedicated client, one of the most feature-rich bug reporting clients I've used, or access the bug database through almost any web browser.

Seapine has created a capable web interface in a world of mediocrity when it comes to interacting with bug databases, but having familiarized myself with the dedicated TestTrack client, I find that to be a more capable and intuitive way of entering and filtering bugs.

Due to the distributed nature of the TestTrack server, there's virtually no reason to actually log in directly to the server machine. All of the server configuration can be done through the client or web interface. You can also locate the TestTrack bug server on a separate machine to the web server so that your IT department doesn't have to open a port in the firewall directly to the TestTrack server for those users reporting bugs from outside the organization.

REPORTING BUGS

Entering bug reports into the database is a breeze using either the dedicated client or web interface. Bug reports are entered

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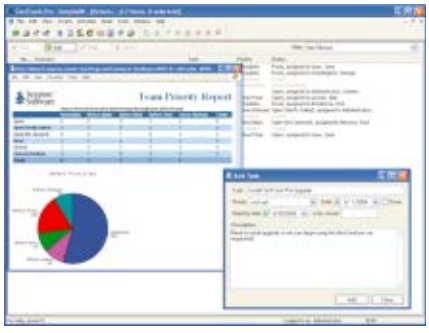
PROS
1. Fast, responsive, cross-platform native client.
2. Simple installation and setup of cross-platform server.
3. End user bug reporting tools SoloBug and SoloSubmit are included.

CONS
1. IDE support isn't great, no support for AlienBrain.
2. Administration of multiple defect databases can be difficult and time consuming.
3. Large scale projects (thousands of developers) and geographically dispersed teams may need a more robust solution.



TestTrack Pro can display all bugs by type.

via standard forms, which include a few required fields; the rest is optional or freeform, allowing multiple users to contribute to a bug report.

The client offers several features and a more responsive interface over the web browser option. TestTrack comes with some predefined project templates and default users, which you can reconfigure or delete as required. You can create custom user groups that correspond to different types of users, such as Q/A, programmer, producer, or writer.

The client includes a spell check feature and built-in, though basic, screen capture utility to enable easier entering of bugs. One of the minor features allows for multiple attached files to a bug, such as memory dumps or problematic assets. Until you've used a bug reporting tool that only allows one attached file, you don't realize how much you need this feature.

I have to point this out again; the web interface isn't as feature-rich as the dedicated client simply due to the limitations that are inherent with a thin-client web browser interface. Seapine obviously spent a lot of time on the web browser interface, but it cannot compete against a dedicated native client. If you've ever used a bug-reporting tool that only allows interaction via a web browser, try the TestTrack client. Then you'll realize just how blinkered and limited and unresponsive a web interface actually is.

The powerful filtering features of TestTrack allow managers and developers to sift through the bug reports, easily combining duplicate entries and preventing older bugs that have gone unanswered from slipping through the cracks. Bug reports are generated using XSL style sheets so that competent users can change how a report looks depending on how the business unit makes use of the report.

SOLOBUG

Bugs can be entered by three different means: by any registered user, by customers who email bug reports for later processing by a human, and by SoloBug.

SoloBug is a small bug-reporting tool that allows customers and end users in the field to send in information. Once a user saves the information, the captured data is saved in a file that the user can email to you for processing. The eminently configurable SoloBug is available for Windows, Mac OS, and Palm OS.

What bothers me about SoloBug is that I would like to see the transmission of the bug report from end users more automated, perhaps directly emailed from within SoloBug to the TestTrack server. However, on that note, there is SoloSubmit—a web interface that allows end users to submit bug reports directly to the TestTrack server. Anything that reduces friction to enable users to report bugs is a good thing.

INTEGRATION AND EXTENSION

TestTrack can integrate with various version control systems (for example, CVS, Perforce, and Visual SourceSafe), enabling developers to link defects directly to a source file along with providing Visual C++, Visual Studio .NET, and Visual Basic IDE plug-ins to enable easier bug handling.

TestTrack can be made to work with third-party programs and in-house utilities through a SOAP (simple object access protocol) interface. TestTrack makes extensive use of XML and DTD (document type definition) files for wrangling data in to a usable format, and these XML files can be extended for your own team's use. TestTrack is a very open, configurable and tweakable bug-reporting tool, you'd have to go OpenSource to find a package as open as this for writing your own extensions.

BUGGED OUT

Overall, I'd say this is a fine piece of software and if I hadn't already settled on a (less capable) bug tracking solution, Seapine's TestTrack Pro would certainly be the first on the list of packages for consideration. ::

JUSTIN LLOYD *is director of business development for Infinite Monkey Factory, a game development studio in Los Angeles. He has worked with software and hardware for 27 years, 20 of them specifically on video games. Email him at* ***jlloyd@gdmag.com****.*

ALEXEY PAJITNOV,

MASTER OF SHAPES

ALEXEY PAJITNOV'S RENOWNED GAME TETRIS needs no introduction, being one of the most accessible and recognizable titles of all time.

Pajitnov is one of the first developers in the game field to fight against intellectual property infringement. He's a pioneer in the casual game field, preferring to make games based on puzzles and patterns rather than character interaction, ever since creating the seminal TETRIS in 1986.

In this exclusive *Game Developer* interview, we spoke with him at length about his ideas, design process, experiences making games under communist rule, and the legacy of TETRIS.

Brandon Sheffield: *You're one of the first developers who ever had to deal with issues regarding patents and licensing ...*

ALEXEY PAJITNOV: Ah, much more than that. I was the first one to deal with any kind of entertainment software in Russia, which didn't really exist as a market yet.

BS: *So how do you think developers now should be treated with regard to intellectual property?*

AP: I feel that they should be treated absolutely the same way as artists, composers, and any other creative people who are able to own their intellectual property. I think any sort of laws that apply to them should apply to games as well. So I don't feel like they need to have some sort of specific rights or specific approach, but all the general rules should be applied in full force.

BS: *What do you think about situations in which one company copies the design or gameplay of another?*

AP: Well that happens in every area. When it's a very obvious kind of copying, there should be some sort of litigation involved, and that happens from time to time. It's a very big gray area in terms of what is copying and what is just following another's lead. There are hundreds and hundreds of TETRIS clones around the world, and I don't care about most of them at all.

In order for intellectual property to really function and work for the developer, it's very important to have a strong brand behind it. When a clone doesn't say the word TETRIS in it, or doesn't mention my name, or any of the story behind it, that's fine; those guys are just enjoying themselves, and will maybe collect some petty cash for it. My partners and I don't even go after them. We'll send them a threatening letter if they've crossed the line and have really bad behavior, but most of those versions are really crappy, you know?

Generally, that's not a really big deal. It's a big deal when there are no laws for an entire country—like China is a pretty bad area recently, without any kind of laws. They're all playing the Tengen version. [Tengen's unlicensed version of TETRIS for the Nintendo Entertainment System was the source of some major early video game litigation.] It's one of the biggest consumer markets. I think I missed half of my TETRIS money over there!

That's the worst situation: when the government doesn't support this type of law. The other issue is bad cases of obvious infringement when they're just blatantly stealing stuff, but that never happens. I don't remember any real precedent for that in the game industry.

BS: *Back when you made the first TETRIS, it seemed like everybody but you was making money off it.*

AP: That's not true. In short, my history is that I created TETRIS in communist time. There was no law to support individual efforts. Well, it was the beginning of the end [of communism in Russia], so I could've spent all my efforts fighting for my rights, but I decided to go directly to the

BRANDON SHEFFIELD *'s preferred version of TETRIS is the Korean fan-made MANIA GP: OH, MY GODDESS!! for the GP32 handheld. Email him at* ***bsheffield@gdmag.com****.*

ILLUSTRATION BY JOSH COCHRAN

ALEXEY PAJITNOV, MASTER OF SHAPES

authorities. I went to them and said, "Okay, help me publish it! Let's publish it together with your help and support."

I granted them the rights to TETRIS for 10 years. And I never got any of the money collected during the first 10 years. But after that, the rights naturally came back to me, and in 1996 I started collecting some royalties.

It's not that much money, but it is what it is. Especially now, with new platforms like mobile phones, it seems to be the next life for all of these casual games.

BS: *How active are you now in the Tetris Holdings company and who else is in it?*

AP: We just settled everything with TETRIS [in terms of rights] a year ago, and now we have a company called Tetris Holdings, which is my company, along with my very good friend Henk Rogers. It's mainly an office that collects funds, works with infringements and other issues, as well as licensing the project. I'm not very much involved, but they keep me up to date.

TETRIS was released for the Nintendo Entertainment System in 1989. An unlicensed version was released by Tengen, but was subsequently recalled in the U.S.

BS: *Can you talk about the TETRIS guidelines at all? [The TETRIS guidelines are a set of rules Tetris Holdings created in order to determine what makes an official TETRIS game from a design standpoint.]*

AP: Well, we had this kind of cool idea to make TETRIS one of the first computer sports. There have already been things like that, with DOOM or other types of action games, but they're all very hardcore. As far as casual players go, there's nothing for them, so the concept couldn't be very widely popular. TETRIS has that advantage, so we thought we should make some efforts to make that happen.

The first step was to synthesize the rules and make everyone equal when competing in TETRIS, so those guidelines are one step in that direction. We don't want to be rude with people or restrict them with some sort of odd rules for how to design games, but we want to create this similar feel so people can compete with each other. Otherwise, if everybody played a TETRIS version with its own rules, it would be really hard to compete.

TETRIS for the Game Boy was that system's first killer app. Pajitnov plays on level 10.

BS: *It seems like most of your games are based on mathematics and patterns. Why is that?*

AP: Basically it's my background. I'm a mathematician and an engineer, but mainly a mathematician, and I've loved riddles and puzzles all my life. In my early years, [puzzles] were the main kind of readily available entertainment in my country, you know? (laughs)

So that's why I love puzzles. All my life I've been excited by new puzzles. That's why most of my ideas are in the area of that kind of abstract stuff. But I really like and appreciate all types of games.

BS: *What other puzzle games have you liked recently?*

AP: I like ZUMA very much. It was a very well designed game, one of the good ones.

I have lots of questions about it, but I still really appreciate BEJEWELED as a game. I would do it a little bit differently, and as a matter of fact, I did. I consider HEXIC, which Microsoft published, as my response to BEJEWELED. But the critique isn't serious or anything.

Right now we have a very active casual game market and lots of interesting titles are starting to appear. I like the game where that frog kind of thing suspends itself on its tongue, but I don't remember what it's called.

BS: *WIK AND THE FABLE OF SOULS?*

AP: Ah, yes. I played it and enjoyed it. It's so well crafted! I really enjoyed all the design around it, but I didn't spend too much time on it. I looked at it and thought, "Well, that's another kind of interesting direction," people really starting to care about the artwork in these simple puzzle games.

BS: *What are you working on now?*

AP: Things are developing kind of slowly. I have an interesting group in St. Petersburg called Wildsnake. They were struggling a little bit, and I had used them as developers before. Recently, they struggled with good design, and they really begged me to help them with something, so we've worked together on a couple of titles.

One [ALEXEY'S DWICE] is already posted on the web. It's a fun game. The other one is going to come out soon as well.

The other work that I'm happy to be involved with is a second version of HEXIC for Microsoft. It's going to be awesome. I really believe it will be a very nice product because we aren't making very serious changes compared to the first one, but after three years of experience with the game, you really understand what is missing, what is extra, and you can really fix it. That's what I'm really happy with, and the Microsoft people are really happy with the enhanced multiplayer version, which we're crafting now.

BS: *How do you actually go through the process of designing? Do you prototype, or do you design on paper?*

AP: Unfortunately, I'm not programming anymore because all my partners have spoiled me, providing me with developers who make prototypes for me. Basically, when I work with a new

Unreal® Technology News

by Mark Rein, Epic Games, Inc.

Canadian-born Mark Rein is Vice President of Epic Games based in Raleigh, North Carolina. Their Unreal series of games is reported to have sold over 7 million copies world-wide. Epic's Unreal Engine 3 has won Game Developer Magazine's Frontline Award for Best Game Engine for the past two years. Since 1992 Mark has worked on Epic's licensing & publishing deals, business development, public relations, academic relations, marketing and business operations Currently in development at Epic: Gears of War for Microsoft and Unreal Tournament 2007 for Midway.

Upcoming Epic Attended Events:

Games Convention
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August 23-26

Tokyo Game Show
Makuhari Messe,
September 22-24

GDC London & London Games Summit
London, UK October 3-5

Serious Games Summit
Washington, DC
October 30-31

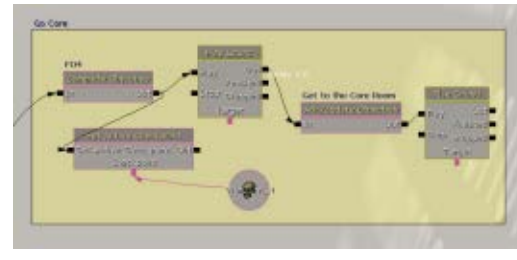
Please email: mrein@epicgames.com for appointments.

POWERED BY UNREAL TECHNOLOGY

SONY ONLINE ENTERTAINMENT LICENSES UNREAL ENGINE 3

Sony Online Entertainment (SOE), the creators of EverQuest and Star Wars Galaxies, recently announced that they've licensed Unreal Engine 3 (UE3). Sony has teamed up with legendary comic book illustrator Jim Lee to work on a MMORPG based on the DC Comics universe and this is one of the titles that will use Unreal Engine 3. John Smedley, President of SOE, said that *"The combination of a top-notch graphics engine and a robust set of design tools will enable our teams to deliver incredible and innovative game content for next-generation consoles and the PC".*

Sony joins other MMO creators, including major players NC Soft and Webzen, who have licensed UE3. Why do MMO creators choose UE3? I asked SOE's Senior Vice President John Needham who responded "*SOE determined it would be faster and easier to utilize UE3 technology while our developers focused on creating fun, innovative games. Because of the great tool set and PC/PS3 cross platform functionality, UE3 gave us a considerable head start in prototyping fundamental design and core game play elements for a couple games in development, including the game we are creating based on the DC Comics license. Of course there is engineering that needs to be done in order to tie the UE3 graphics package to SOE's server architecture, but our programmers were able to get basic client-server functionality for the initial prototype up and running in a few months.*"



A Portion of an UnrealKismet Visual Script

FEATURE FOCUS: UNREAL KISMET

Unreal Kismet is a visual scripting language unique to UE3. It allows designers to create amazing in-game scripts without having to learn how to program. Here's what one of our level designers. Lee Perry, has to say about it:

"*I've never scripted or coded in my life. Our visual scripting system is a blast to work with. I've created levels with entire mini-games in them, AI behaviors, damage systems depicting various stun effects and healing, cinematics, bizarre control schemes, even physically rolling dice and telling me totals based on the angle of surfaces that are facing upwards when the objects velocity reaches 0. I'm even building a random level generator and I've needed virtually no interaction with anyone on the programming side to make this work. We've had level designers prototyping a fighting game in a level, a driving game with chase cams and effects, targeting systems - with incredibly low learning curves. You could walk into a room in a Deathmatch level and suddenly find yourself in the middle of a typical arcade dancing mini-game, it's insane how creative we can be now.*

Just last week a potential licensee was in house and described the game they were intending to build and how one of their critical game mechanics were going to work. Literally within 5 minutes, while they looked over my shoulder, I built that core dynamic into a level of our current game. The demo went well to say the least.

Typically I'll sit down with a new designer with no scripting experience for about 2 hours and show them the basics of Kismet, how triggers work, counters, toggles, cinematic system, conditions, variables, etc. Then I'll give them about a day to mess around with it. Within a day I'll walk in and see some things happening in their levels that would of been a nightmare to create otherwise - assuming they could accurately describe what they are looking for to a programmer - and that communication would no doubt affect the outcome.

Bottom line is that engines and tools dramatically affect your creative process, and our engine is being designed with far more in mind than pretty shadows.

For Gears of Wars we found early on that we could argue about a potential design decision for hours over e-mail, or someone could sit down for 30 minutes in Unreal Kismet and create the system to see if people liked it. Player-to-world interactions, enemy AI management, boss-fight design (and prototyping), and creation of destructible world pieces -- all of these were made possible because level designers had the tools at hand to get the systems designed and functional quickly. The benefits of this have been tremendous and opened a lot of doors for the project."

EPIC GAMES

For UE3 licensing inquiries email:
licensing@epicgames.com

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ALEXEY PAJITNOV, MASTER OF SHAPES

ALEXEY'S DWICE was designed by Pajitnov in conjunction with Wildsnake in St. Petersburg.

partner, I put together a spec of my ideas, and usually it's a two step process, sometimes three.

First is a proposal, two or three pages of a very rough concept of the game. At the point when this concept is sold to the partner, I put together what I call a prototype spec. It's a document, maybe five to ten pages long, mainly for the programmer to put together to prototype. Usually there are lots of details about user interface, scoring system—pretty much everything is there.

But they're working documents, because as soon as I see a prototype version, I do some changes. All the changes are in documents. Then at some point, the publisher or my partner gets tired of me sitting on the prototype and just enjoying myself with it, and then I have to give a green light for production.

At this point, the very final details are issued. Usually I have help from a producer at the publisher at this point. They don't want to trust me on final production, so a final production document is put together by the publisher, together with me, based on the prototype spec. This includes most elements, including art. I barely remember when I did all this by myself.

BS: *Do you often reject your own designs, or have designs rejected by publishers?*

AP: Yes, of course. I recently tried to calculate my rate with my colleagues, and we figured out that for most designers, about 5 to 10 percent of their ideas make it to the shelf. Closer to 5 than 10. I calculate my rate at about 20 percent, and I'm very proud of that. But still, 80 percent of it is in the garbage can! (laughs)

I can say that I have some kind of really excellent ideas that were thrown away, though. Usually I realize that most of them are ideas that the world doesn't need. But there are some which I personally like very much, so I come back to them over and over again at different times with different platforms and with different developers. Eventually, it comes to the stage where it could be published, and it comes out. I have two of them right now that haven't been published but I think should be. But I'm still alive. I'll have another chance.

BS: *Do you find that your name and background help you get published?*

AP: It helps sometimes, but you know, if you have a bad product it's even worse. If the publisher is just charmed by your name and publishes whatever you produce, it usually hurts your reputation rather than helps it. The game won't sell, no matter whose name is on it—if it's a bad game, nobody will play it. I'd rather have a publisher who ignores my reputation and just looks at the game, does lots of playtesting, feasibility testing, and focus groups. That's what we should rely on, not on names.

BS: *You mentioned you were a mathematician. What was your school and educational background?*

AP: I graduated from Moscow Institute of Aviation. Right now it's one of the biggest technical university in Moscow. Mind you, they call themselves institutes rather than universities, but it's at the level of a university. And I was in the department of applied mathematics. I graduated in 1979, so that shows how old I am. After that I started working at the computer center at the Academy of Science, working on speech recognition and artificial intelligence problems.

BS: *What made you come to the U.S.?*

AP: In 1986 TETRIS was published, and I kind of freelanced in Moscow looking for some sort of design group to make computer games. Then my partners and I decided that we had no customers in Russia practically and we should be closer to our customers to understand what their needs are and how their lives are structured. We decided to come to the U.S. and work here for a year or two and see how life works. And that's what we did.

We kept starting new companies here, one after the other, and then our family joined us, and that's basically how it happened. Now I'm a U.S. citizen and have lived here for 16 years.

BS: *Do you think that games should have social messages?*

AP: I think that's not my business. I should admit that I see some problems with it. Many players, hardcore players specifically, are not very socially mature. They're a little bit infantile, if you'll pardon the expression. It's better for those people to have some kind of social connotation with games.

I'm especially upset with these kinds of immoral games, which may have very good design and very nice graphics, but if the moral isn't good, it can be a problem when a large number of players give games a kind of authority over them. But again, it's really none of my business. Society is strong enough to tolerate all of these kinds of things, and I don't need to moralize about it.

CONTINUED ON PG 16


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ALEXEY PAJITNOV, MASTER OF SHAPES

PANDORA'S BOX was designed to be female-friendly, and appeal to a wider audience.

CONTINUED FROM PG 14

BS: *What do you think about the state of the industry in Eastern Europe? There seems to be more outsourcing happening over there, rather than original design.*

AP: Yes and no. There's lots of outsourcing, but there's lots of original design as well. The other traditional sources of outsourcing, like India and China, are actually worse in that aspect. Russia and other Eastern European countries are still able to come up with ideas and their own designs for software and technology. It's not that bad.

Outsourcing is a very natural step, so I'm not very upset about it. With this outsourcing work, many developers get good experience working with partners and the shape of the industry.

BS: *Are you still freelancing or do you work for Microsoft?*

AP: Yes, I'm completely freelance. Microsoft has just been a publisher.

BS: *I was asked if you would talk about PANDORA'S BOX, as that's a favorite game of* Game Developer's *editor-in-chief.*

AP: So your boss is male or female?

BS: *He's male.*

AP: (laughs) That's strange! PANDORA'S BOX is a game I designed especially for women. That's what I had in mind when I made it, and I'm very proud of that one. It was one of my favorite games to design.

At one point, I realized that for casual players the most difficult thing about my games was that some of them have some very deep logic. I was involved in another title called MIND AEROBICS, which was sort of an online game show for puzzles that existed for a couple of years on MSN. In this show, I was massaging the idea of visual puzzles, puzzles that rely more on color, on the feeling of the shape, and so on. I became so in love with this type of puzzle that I decided to build an entire product based on it.

I had a really strong partner in Microsoft, because it was a really original title. Basically, we did this game, and there is obviously some logic to the puzzles there, because puzzles can't be completely without logic. Still, it's very much based on shapes and colors. It's much more visual than anything else I've produced.

The product did okay. It broke even, I'm pretty sure, but unfortunately I think it was kind of too original to be really successful. The casual market wasn't that strong yet. It would be a very good time to make a second version of it, but I'm still working with Microsoft trying to pitch it.

BS: *How did you conceptualize it as appealing to women?*

AP: It's a very casual game with a strong aesthetic element, and things like shape and color are the kinds of properties that women are traditionally very strong [at grasping]. That's why I mentioned that it was kind of a female-oriented product.

It's a little hard to get involved in the game. The user interface and the structure of the game is a little complicated. But as soon as you start, you'll never stop until you finish it. I don't know anyone out of my friends who hasn't finished it once they started. Even Bill Gates! He played it to the very end, and sent me a three-page report about it. I'm not kidding—I have his letter! It's just his impressions about what he thought was good or bad, so it was a very professional kind of letter he sent me.

BS: *Do you interface much with Bill Gates?*

AP: Not too much. We both are very busy. But I do report to him sometimes about big things in the Microsoft group I'm involved with.

BS: *Have you seen much of TETRIS THE GRAND MASTER from Japan?*

AP: Oh yes. I've seen some videos of the gameplay, but I've never seen them do it live. I've seen the result, though. It's absolutely incredible. But there's a small secret involved there. In the most popular version in Japan, you have no time for the shapes to fall, but you have the ability to manipulate them on the bottom. That's why for Europeans the game style looks absolutely crazy because the blocks drop like shots from a gun, but still there's lots of work on the bottom. So when you play this kind of game at high speed, you realize that you could still handle it. Not for very long, but maybe for a bit.

It's pretty impressive, but not that hot. Still, what they do is really amazing.

BS: *What's your personal favorite version of TETRIS?*

AP: Most of the time I play Fusion Tetris, which is one of the versions in TETRIS WORLD. They have various kinds of TETRIS in there, but Fusion is what I'm playing now.

BS: *Do you have a high score from your original version of TETRIS?*

AP: It's hard to compare because I've worked on many different versions and prototypes, but if you take the original Game Boy version as the standard, it used to be that I would easily play on level 10 and see the rockets. So it's not really great, but it's good enough. It's a fair level. I'm not sure I could do it now, but in the old days I did it. I can't say I'm the best in the world, or even close to the professionals, but I've dealt with this game more than anyone else on the planet.

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STATE OF THE INDUSTRY: PC GAMES

PC GAME SALES ARE GOING DOWN THE DUMPER, OR SO GOES the commonly held belief. Indeed, retail sales of games for the personal computer have taken a header these last few years. But all is not as bleak as it would seem.

While sales of console games have climbed almost 22 percent from $3.7 billion in 2001 to $4.5 billion in 2005 in North America, and sales of games for portables have leaped almost 57 percent from $892 million to $1.4 billion in the same years, PC games have tumbled. In 2001, 70 million game units were sold for PCs, but only 38 million were sold in 2005, dragging the formerly $1.5 billion industry down to $953 million.

However, the above statistics—data collected from U.S. retail stores by Port Washington, NY-based NPD—don't tell the whole story, thanks to the growing popularity of digital distribution.

"We believe that the PC game market is indeed healthy," reports Anita Frazier, entertainment industry analyst for NPD, "and that sales made directly to the consumer via subscriptions or downloads are offsetting the decline we've seen at retail. While we don't forecast where that is headed, we will continue to update and improve our methodology for covering that area, recognizing that it is growing."

Despite the fact that no one can provide substantiating numbers, analysts and PC game developers and publishers insist that their sector isn't dying but is doing very well, thank you, even if one discounts the increasingly popular massively multiplayer online games (MMOGs) and casual PC games, as this article does.

LONG, SLOW DECLINE OF PC GAME RETAIL

Long-time gamers can surely recall a time when it was common to see AAA titles launched in PC format and then ported over to various console versions after weeks or months on store shelves.

CONTINUED ON PG 20

PAUL HYMAN *was the editor-in-chief of CMP Media's* GamePower *and currently writes a weekly column on the video game industry for* The Hollywood Reporter. *He's covered gaming for over a dozen years. Email him at* ***phyman@gdmag.com***.

PHOTO COURTESY OF MARY R. VOGT

PC GAMES

CONTINUED FROM PG 19

But the PC is no longer king. As the mass market in gaming has grown, says research analyst Michael Pachter, console gaming has become more prominent, mainly due to what he calls "the comfort factor."

"With console hardware, you can sit on your sofa and watch your 60-inch TV screen and use your wireless controller, which is a heck of a lot more comfortable than sitting at your desk squinting at a 15-inch computer monitor," says Pachter, who covers the video game sector at Los Angeles-based Wedbush Morgan Securities.

Similarly, there was once a time when gamers who wanted to play online had no choice but to play on a PC. But soon, all next-generation consoles will be online-enabled, resulting in further migration from PC to console, Pachter says.

In addition, PC games are still not "plug-and-play" ready, as console games are.

"You can grab a console game, plug it into the console, and be playing within seconds," Pachter says. "Ask a PC gamer how long it takes from the time they rip off the shrinkwrap to when they actually start playing. For a stud, I'd estimate 20 minutes. For a fumbler like me, not less than 45. That's because you need to make sure that everything works. Do you have the right version of DirectX? Do you have a powerful enough video card? Those are hassles that will only be borne by people who are really committed to playing a particular game. Me? If I'm playing MADDEN FOOTBALL, I'm not going to screw around with all that; I'll just plug it into my PlayStation 2 and play."

Wedbush Morgan game industry analyst Michael Pachter.

For hardcore gamers, though, it's another story. "It's almost a badge of honor for them to struggle with the game and make it work," Pachter says. "But, as the market expands, the new entrants to gaming want that comfort factor. Which means that the shift from PC gaming to console gaming is a trend that is going to continue—and accelerate."

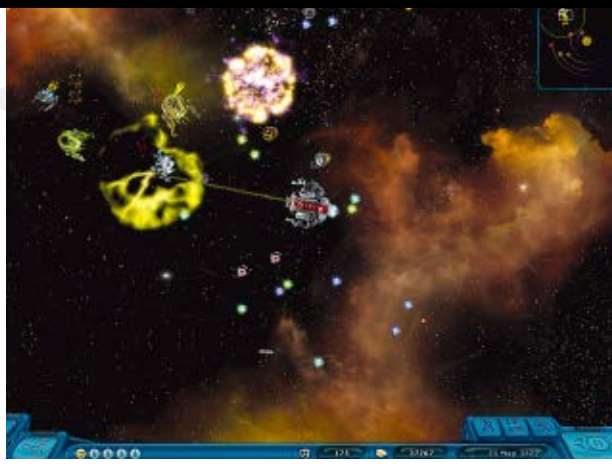
PC GAME DEVELOPERS: IT'S AN UPHILL STRUGGLE

PC game developers don't debate the laundry list of reasons console games have taken over the lead. In fact, some are willing to add to it.

At Plymouth, Mich.-based Stardock, president Brad Wardell says that with his latest game, GALACTIC CIVILIZATIONS II: DREAD LORDS, the most common tech support issue is video drivers.

"Isn't that ridiculous?" he asks. "In this day and age, why do we still have to worry about that kind of thing? Why should someone who wants to play our game have to update their ATI driver to version blah blah blah because of the need for TrueType support? No one messes with those things on a console game."

He says he also finds it "incredibly annoying" to buy a PC game, bring it home excited to play it, and then have to delay the fun while he installs, say, five CDs.



Stardock's GALACTIC CIVILIZATION'S II.

"It used to be that if you wanted a nice, crisp picture, you needed to see the game on your PC," Wardell adds. "No longer. With the move to high-definition, the look of PC games is starting to pale compared to the new, next-gen console games."

If PC gamers find themselves struggling with their favorite PC games, it isn't any easier for the developers who make them.

"Developers of console games don't have to deal with the headaches—and expense—that we [PC game programmers] have because we need to test on so many different hardware configurations," Wardell explains. "If a console game works on the PlayStation 2, on the Xbox, and on the GameCube, the developer's work is done. But on the PC, there are hundreds of possible configurations and a whole bunch of support issues and security issues and ... well, it's no wonder some developers are biased toward making console games."

Despite the inconveniences of PC games—to both players and developers—Wardell thinks calling the market dead is an over-exaggeration, likely the direct result of failing to count digital distribution.

"We've sold about 100,000 copies of GALACTIC CIVILIZATIONS II, but we're only credited with about 80,000 because about 20 percent of our sales came from digital downloads," he explains.

Similarly, he says the MMOG sector of the PC market is doing big business that occasionally saps sales dollars from the non-MMOG side of the ledger. "Let's take [developer] Blizzard, for example. In a normal year, they might be turning out a STARCRAFT III or DIABLO III for the PC. But, instead of creating one of those games that might sell 5 million units, they've been busy making [tens of millions] on their MMOG WORLD OF WARCRAFT. Heck, when you don't count the millions that MMOGs are sucking up, it's kind of unfair to argue that the PC market is dying."

USING EXTRAORDINARY STRATEGIES

Regardless whether the PC market is really flourishing, PC game developers are employing extraordinary strategies to retain their health.

For instance, in order to rein in costs, the PC industry has been "quietly moving overseas," according to Wardell. While development of GALACTIC CIVILIZATIONS II was accomplished stateside (because Stardock employed fewer than a dozen people on the

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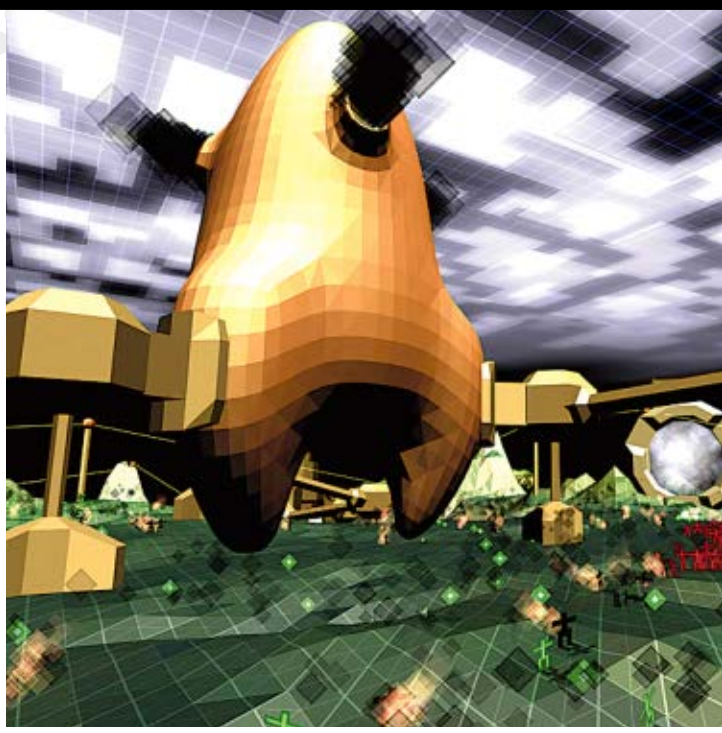
project and used homegrown application software), competitors are headed offshore.

"When I ask other developers where they are getting their programmers and artists, it's usually China or Eastern Europe where development is considerably less expensive," he recalls.

At Redmond, Wash.-based game developer Gas Powered Games, Chris Taylor reports that he was able to hold down costs on his latest title, SUPREME COMMANDER, but is very tempted to start outsourcing. Taylor is the company's CEO and creative director.

"We in the PC space are trying not so much to increase our profits as to protect our profits," he explains, "which is not a great place to be. In the past, we looked at art shops offshore and felt that the quality just wasn't there. But that's changing, the quality is getting better, and we're finding ourselves looking over the fence more and more and thinking, hey, maybe we should move some stuff to India or Korea or wherever. It's a lot easier than trying to contain costs at home."

While Taylor is fighting the temptation to go offshore, Lars Batiste has created a whole business around it. He is vice president of product development at Cinemaware and its parent company, Langhorne, Penn.-based eGames Inc., whose entire Cinemaware Marquee catalog comprises games from Europe, Russia, Asia, and South America.



Introversion Software's DARWINIA won several awards at the 2006 Independent Games Festival.

Gas Powered Games' CEO Chris Taylor.

"It's not important to us where they come from," he says. "The only thing that's important is the game's originality, how much fun the gameplay is, and if [the games] fulfill a new niche in the market."

For example, in June, the company began shipping to North American retailers the 2006 Independent Games Festival grand prize-winning PC game DARWINIA from U.K.-based Introversion Software.

Similarly, in March, the company launched its first title, SPACE RANGERS 2: RISE OF THE DOMINATORS for PC. The turn-based RPG was created by Elemental Games in Vladivostok in the extreme far east reaches of Russia.

"That's closer to Alaska than it is to Moscow," says Batiste, "which may be the reason there's so much innovation and creativity in the game—because [the developers] haven't been 'poisoned' by the traditional way of thinking about game design in the States."

Batiste's audience is most definitely the traditional hardcore PC crowd that is looking for something different. "It requires a certain degree of sophistication to distinguish between a unique, perhaps edgy game and a sequel- or license-based mass-market product," he explains. "We tend to sell to gamers who read the game news online and really research the titles before buying one. They're definitely not impulse purchasers, and they definitely don't want just another first-person shooter or, say, the official game of the *King Kong* movie. An RTS or a blend of genres is more their style."

The typical game from Eastern Europe, according to Batiste, is one that may not have "the greatest amount of art or huge cinematic sequences or sound design from Hollywood," but when it comes to gameplay and style, it often equals the domestic AAA title.

Just as Gas Powered Games' Taylor suspects, the cost of developing Cinemaware's games offshore is a fraction—typically one-fifth to one-third—of what it would have cost domestically. The savings start with the team size—only 15 people worked on SPACE RANGERS 2 for a year and a half.

"I'm not sure what the development cost was specifically," says Batiste, "but, generally, they're able to develop a AAA title in Russia for about $1 million compared to what typically costs $8 million to $10 million in the U.S. And these aren't considered bargain games, so the retailers are selling them for $50 each just like most other games. There's a lot more money to be made when you do the development overseas."

Especially when the games are sold through digital distribution.

"We sell both ways," explains Batiste, "in retail stores, where we've been able to place them on most store shelves successfully, and online through download services like Direct2Drive."

Plans are to concentrate more on digital downloads where, Batiste says, "you get to keep 60 to 80 percent of the selling price compared to 30 or 40 percent at retail. And, of course, if we were able to digitally download it ourselves and not go through a digital service, we'd get to keep nearly 100 percent. That's the ultimate."

Batiste believes that as more and more mass-market gamers get used to digitally downloading games like BEJEWELED in the exploding PC casual games sector, it will influence them to experiment with more sophisticated, non-casual games, like the ones he sells.

"I think there's an evolution happening," he says. "As the stores set aside less and less space for PC games, people will become used to downloading the games they want. And as casual gamers—many of whom are women—look around for other sorts of games to play, they will become hardcore gamers, too. They'll notice that there are deeper games than the ones they've been playing. Somebody who plays [casual game] ZUMA today could be playing AGE OF EMPIRES in a year or two. I predict that while there will always be retail, because people do like to browse the shelves and buy games in boxes with manuals, there's going to be a tremendous shift toward digital distribution in the next few years."

NO PURSESTRINGS ATTACHED

But Chris Taylor believes it isn't necessary to go offshore to hold down costs, and he intends to do all he can before he needs to outsource.

"You can waste a lot of money in our industry by being disorganized and not having clean processes and not having good technology reuse," he explains. "There's probably more fruit on that tree to pluck and save than people would believe."

Trimming salaries isn't necessarily the best route if you want to retain a professional team, he says. Instead, he's added a new section to the development process at Gas Powered Games that he calls "pre-pre-production."

"Because pre-production involves quite a few people, it can be quite expensive," he notes. "So our pre-pre-production is done by a very small team of four to six people who sit there and really work out the entire game. When they're done, another 15 people or so come in and flesh out the design. After that, we expand to 50 or 60 people who can then build the game in a shorter period of time than usual. By collapsing our total development time, we're able to really save money."

While some might argue that building console games is more expensive than PC games because of the licensing fees that must be paid to the hardware manufacturers, Taylor argues that console game development becomes cheaper as time progresses. Console technology doesn't change until a new generation of hardware is released, so it becomes less expensive each year to build the games as developers become accustomed to the processes.

"Your tools are absolutely identical from year to year because you're only tweaking and refining them as the hardware remains unchanged," he says. "But on a PC, every blinkin' five or six months there's a new video card or maybe a new version of Visual Studio, and you need to adjust your processes accordingly. And, of course, because you need to make sure that your game runs with, say, every single integrated video chipset, your configuration testing becomes awfully expensive."

CRYSTAL BALLING IT

If, as PC game developers contend, their sector of the game industry isn't on its deathbed, what does the future hold for non-console games?

Stardock's Wardell sees the PC market growing for a number of reasons. First, there are simply more people in general playing games and second, with the release of the forthcoming Windows Vista operating system, PC games will be easier to install and play.

He says growth will come because there will always be certain genres of games that people will only want to enjoy on their computers while other genres lend themselves more to consoles.

"For example, strategy games simply play better on PCs than consoles," he observes. "Games that need a combination of keyboard and mouse will thrive on the PC. For example, you don't see too many turn-based strategy games like GALACTIC CIVILIZATIONS on the Xbox."

The growing popularity of digital distribution, especially among hardcore players, will be a huge driver of PC game sales. Witness the fact that many consumers are willing to pay more to download Stardock's GALACTIC CIVILIZATIONS than they would if they bought it in the store—despite the fact that the online purchase comes without a box or manual.

"We charge $45 for a digital download," says Wardell, "which is five bucks or so more than the $39.95 retail MSRP, which is often discounted to $37 or even $36. So gamers are paying a $9 premium—and for what? For the convenience factor. You can press a button and, in a few minutes, if you have a decent connection, you've got the game."

The advantage to Stardock is obvious. Every penny of the $45 download price goes into its pockets "and we didn't even have to manufacture a manual or a box or pay for retail distribution," Wardell says. "That's $900,000 in revenue on the 20,000 units we sold direct."

But for games it sold through retail, "Once you remove the manufacturing, duplication and market development costs, we make just $15 a unit on a $40 game which is just $1.2 million on 80,000 units sold. Which do we prefer? You do the math."

Cinemaware vice president of product development Lars Batiste.

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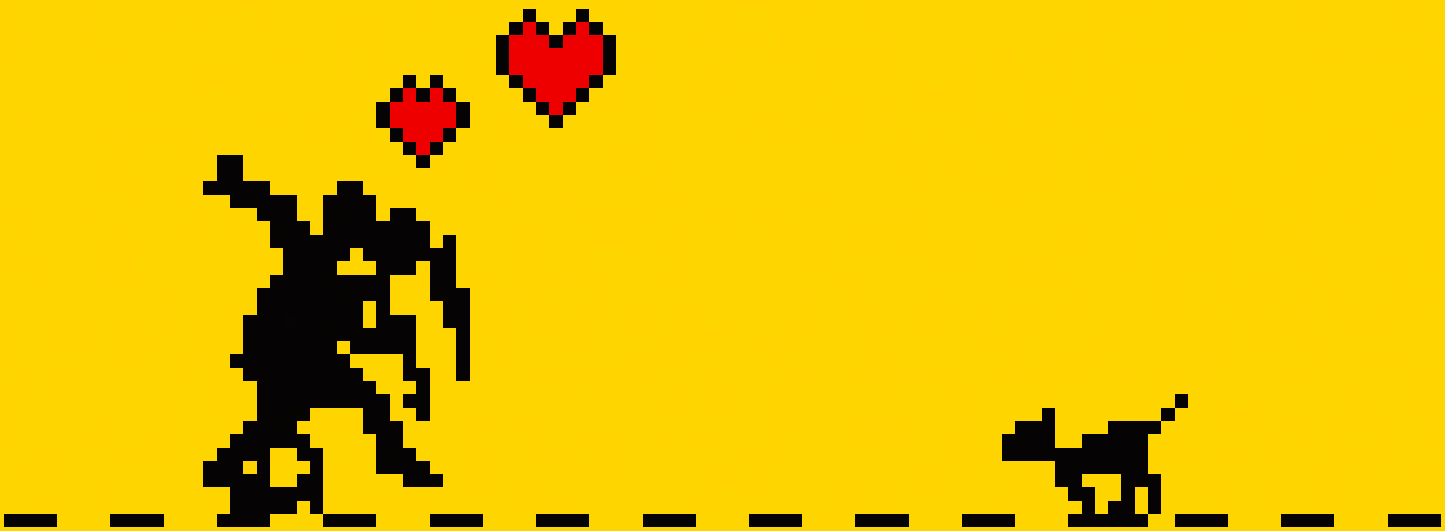
POSTMORTEM

MOBILE POSTMORTEM

GAMEVIL'S NOM



IN 2002, WHEN NOM WAS ORIGINALLY CONCEIVED, MOST OF THE mobile games in Korea were just ports of games from other platforms, or conformed to established gameplay models. Many of these games had major problems in terms of speed and quality when compared to the original games they were based on.

At the time, those kinds of games performed well in the market regardless of quality. I was quite unsatisfied with these circumstances, however, and kept wondering whether mobile games had to be this way.

I decided to design a totally original and creative concept for a mobile game. Designing a creative mobile game was a tough job, and creativity itself is rather vague as a design point. So I needed an idea for something that was simple and could make an instant impression on players.

What I came up with was to develop a game that works only in a mobile format. I strongly believed a game that works perfectly on mobile would be a creative game in itself.

Researching the platform differences between mobile, console, and PC game, I found mobile phones tend to have smaller screen sizes and file sizes, of course, and the processor speed of the handset CPU is much slower than that of other platforms. More importantly, I discovered that mobile handsets are exempt from some of the physical restrictions

BONG KOO SHIN *studied industrial graphic design before starting his career as a sound engineer at an arcade game development house in South Korea. He has since created online casual games, mobile content, and mobile games. Email him at* ***bshin@gdmag.com****.*

The NOM development team at Gamevil. Author Bong Koo Shin is standing on the far left.

that other platforms are bound by. For instance, users aren't restricted to looking at their screens in a 'proper' way; they can turn the device sideways or upside down.

After discovering this flexibility, I was very excited. With this fact, I decided to develop a game that uses all four orientations of the screen, but one of the challenges was utilizing this feature in a mobile game. I tried to implement this idea in several different genres, such as puzzle, but the games turned out to be too passive. I also had difficulty measuring the slope of the screen every time I was playing. I needed something more dynamic and engaging. So I kept on thinking of some creature or vehicle that could run on all four sides of the screen. A car? A motorcycle? Some imaginary creature? A human?

After some consideration, I decided to use a human character because of the wider range of stories I could design. The main character was named Nom, which means "person" (particularly male) in Korean, similar to "guy" in English.

The object of the game is to make Nom run on each side of the screen while overcoming obstacles and enemies, all by using a single button.

The player's only function is to push the key at the right time, which means timing is the key factor in the game. Various bits of funny dialogue and animation break up the action.

Nom runs continually, so the speed is fast-paced. Also, the key response has to be accurate since all the action is performed using just one button. The game also involves some special effects when Nom jumps at the edge of the screen and runs on another side of the phone. Since Nom was going to keep on running, background music was also very important. These circumstances shaped the design of NOM from the onset.

WHAT WENT RIGHT

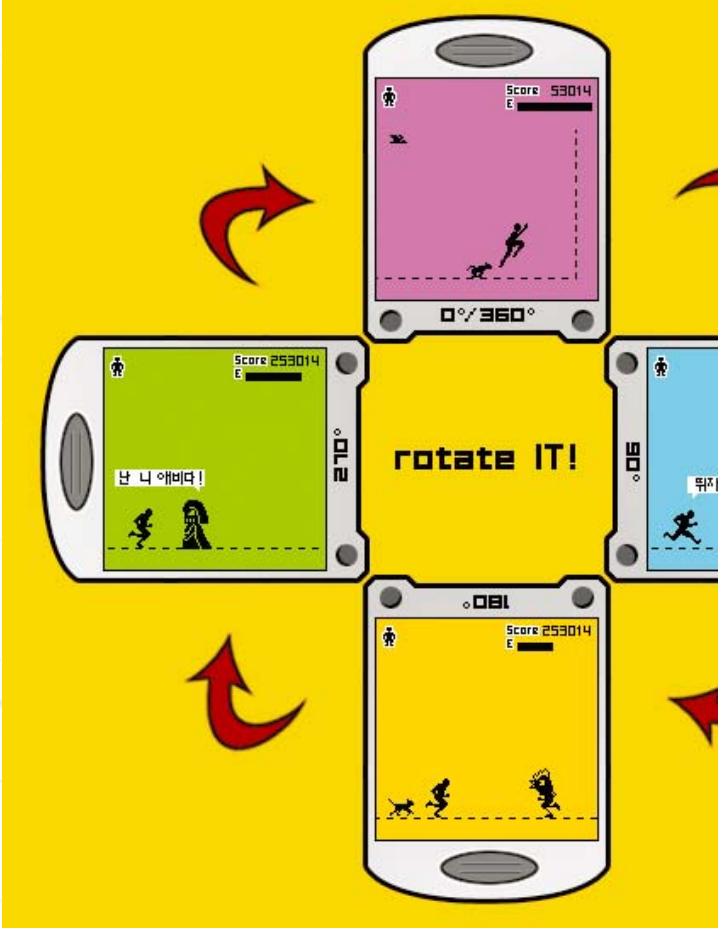
1 **UP THE SPEED.** The first prototype was a mess and the speed of the game was so slow that playing through it took a lot of time, which was no fun and made me feel very discouraged. Nom ran so slow, he looked like he was in a swimming pool.

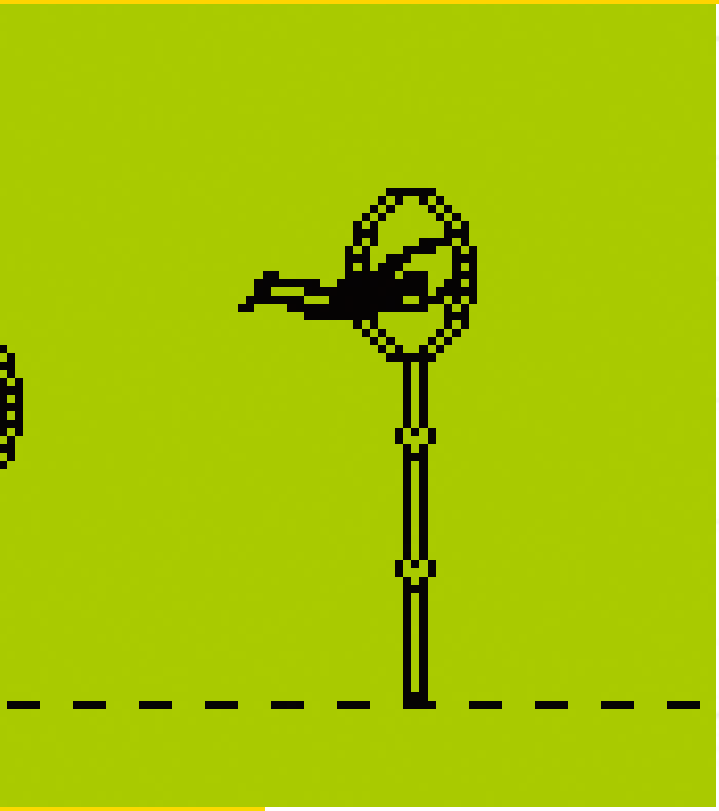
Platform games such as NOM have to be very active and dynamic, so speed is a critical issue. In order to up the speed, we needed to eliminate something.

The first thing we omitted was backdrops. Since the entire screen has to scroll, the backdrops were too heavy performance-wise, so we just dropped them altogether. However, the background color still changes when Nom switches dimensions, which we preserved to help avoid monotony.

We also reduced the frames of motion for Nom's running animation. The final animation wasn't completely satisfying to me, but the game speed was better than in previous versions, so it was a necessary sacrifice.

Also, in order to make the characters and objects visible, they had to be black, due to the colored background. This color scheme gives the game its simple 8-bit aesthetics, but still helped it look much more





attractive; I felt pulled into the game more because of it. This visual representation kept with our notion that NOM should be simple but unique.

2 **KEY RESPONSE.** NOM is a game that uses only one button, and pressing that button is really all a player can do in the game—so implementing proper key response was critical.

First, we had to determine how fast we could make the key respond. The response had to correspond to the object closest to Nom as the game scrolled, so when we added an object, we had to put that object in the front of the object queue. We then made Nom respond to this type of key response, which helped, as simple as that may sound.

We also lessened the object collision area so that players could feel as though they had better control. When we first gave the object collision a wider area, our testers complained.

Lastly, we not only used the OK key but also gave the number keys the same function as the OK key. Because each handset has different characteristics, such as the positioning of the number pads, sometimes using the number key is much more convenient, depending on the phone's button layout.

3 **EVENTS WITHIN THE GAME.** The initial concept of NOM was simply to have the player jump over obstacles and knock down enemies when the character encountered them. There was no spirit to the game.

We needed something special, so we put some philosophical phrases and events into the game. These events were combined with a popular Korean trend at that time called *yupgi*, a word similar to "bizarre." For example while playing the game, Nom has to kiss a girl using the button, and at one point, he has a dog following him around. A grandma also appears at one point, and Nom must carry her on his back as he runs.

We tried to put different ideas into the game, such as being attracted to the opposite sex, a sense of endearment toward cute animals, and having respect for one's elders. I pared the dialogue down to the bare minimum, such as, "girl," "dog," and "grandma," so users could leave the rest of the words to their imagination.

These simple events stir users' curiosity and keep them playing. Nom is just a character who behaves as a normal human, and he delivers the very simple facts of life to all of us.

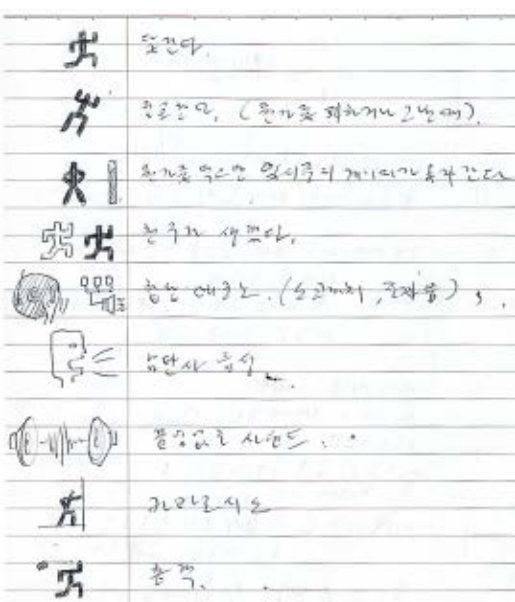
After the game went live, the events of the game were widely spoken about. I believe this helped Nom to be recognized as a living creature.

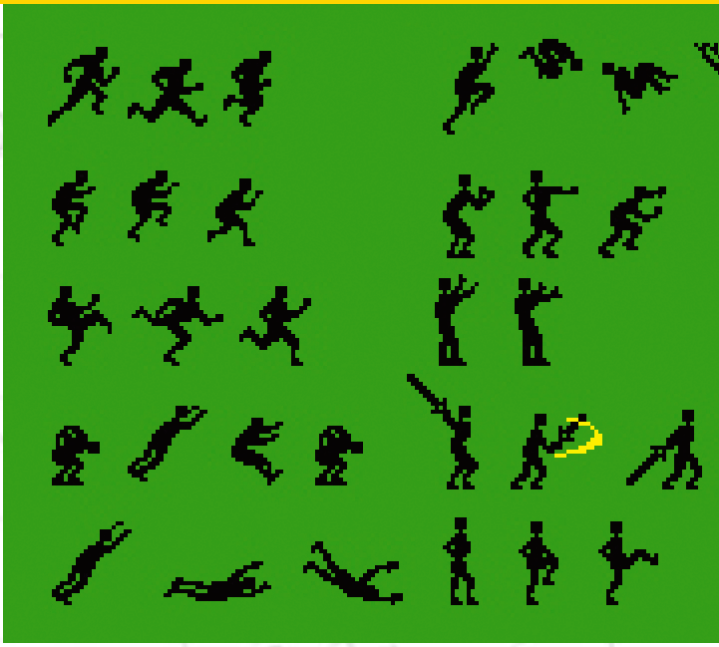
NOM concept documents.

4 **SOUND DESIGN THAT CONSIDERED ADDICTIVENESS.** Choosing a type of music that complements simple backdrops, simple characters, and simple gameplay was very difficult. The game is simple, so it has its own color, so to speak, and because it's so simple, even I got addicted to the game while I was testing it.

The simplicity gave me some inspiration for the music, and so it made sense to create an addictive factor into the music and make the experience as a whole addictive. Most of us know how mesmerizing it is to hear the same tune over and over again. Thus, I tried to produce music that fits that idea, using a simple melody that repeats infinitely.

I composed a simple melody that anybody could easily recognize. The





Frames of animation for the Nom character.

tempo of the music is about 135 beats per minute, about the heart rate of a person during light exercise, which made the game much more interesting. Once we added the music the game had its own rhythm, and the testers were moving up and down. The entire game turned out to be much more addictive as a result. From that point on, I promised myself to add an addictive factor in the music for all future games I produce.

5 **THE GAME ADVERTISED ITSELF.** There are several ways to develop and market a game, but NOM had a different concept in its marketing to match the unique quality of the game itself. Word-of-mouth advertising, along with people watching others play NOM, worked as the main marketing campaign.

Nowadays, seeing the screen of a mobile handset sideways is quite common because of digital multimedia broadcasting, but at the time when NOM was released, people barely saw others who rotated their handset while using them. The flipping and turning of mobile phones piqued the curiosity of many observers.

This movement eventually led to a strong brand association: NOM=rotating phones.

Casual conversations between players and observers spread among mobile users, and that led to more downloads from the carrier's deck. Due to such strong word-of-mouth marketing, our costs were relatively low. We've discovered that unique games are usually linked to unique marketing, and we've tried to apply this concept to other Gamevil games as well.

WHAT WENT WRONG

1 **TOO MUCH OMITTED.** There were many fun and interesting plans for NOM that we had to cut. Nom was supposed to change his size depending on certain circumstances, and there were to be more events and hidden features.

In the end, these elements were all omitted because of the limited file size. Roughly 40 percent of the original concept had to be taken out. The decisions on what features to implement were made by listing features' priorities and dropping the lower priority features, ones that had the least impact on the user experience.

Another limitation imposed by the small file size was the number of stages we could have. Handsets that have relatively low-speed processors provided enough play time, but handsets that have high speed processors provided too short play time—the game ran faster or slower depending on the phone's specs.

These were some disadvantages that we had to face, but since they were predicted up front, we were able to focus on them.

2 **TOO RIGID.** The limitation of mobile hardware can really affect design. One of the most disappointing things about NOM's development was that we couldn't use enough frames for Nom's movement. Nom only used three frames when he jumped. Our team also tried six frames for smoother movement, but it appeared too slow on mobile.

Reducing the number of frames per animation helped to reduce the overall file size, which did help us because NOM uses all four sides of the screen and thus needs four different running images. Ultimately, the rigid running animation added to an already silly-looking character, and may have added to some of his charm.

3 **IT'S STILL SIMPLE!** Even though the game has a unique style of graphics and game color, it was still hard to get rid of the simple impression I first had. Simplicity could be a strength, but it could also be a weakness.

We worried that players who download this game and encounter the title screen could have the initial reaction, "Why does this game look so simple?" My team and I worked really hard to make it simple, yet robust, which was important because if was key factor was missing, the game would have been a failure.

Another worry was that the game might feel quite empty if played on a larger screen, but we tried to emphasize an Asian style of art referred to as the "beauty of emptiness."

4 **STRANGE IMPRESSION.** It's strange that NOM's strength could be considered a weakness as well. It is said that Korean people are mild and gentle, and are averse to change. When the game was first released in Korea, people seen on

the streets rotating their phones were sometimes regarded by others as people with mental problems.

At that time, most mobile games were too typical, and games that were bizarre and different gave people a very strange experience. The early adopters and teenagers loved this concept but others wouldn't accept it easily. Now, thankfully, people love the concept and enjoy playing the game.

5 **NOM'S RIVAL? NOM.** When it was released, there was no true rival for NOM since it was one of the only unique and creative games in the mobile market. It was a huge success, but we quickly realized that any sequel to NOM had to better the original version. In other words, NOM is the toughest rival for NOM.

This predicament is another reason I didn't put more interesting features into the game—I didn't want NOM to be finished with just one title. I was considering the sequel to NOM even when I was producing NOM. NOM 2 is now live in South Korea, and if you have a chance, I would strongly recommend playing both and comparing them. I believe you'll understand that I was thinking about NOM 2 while producing the first title.

NOM FROM OUTER SPACE

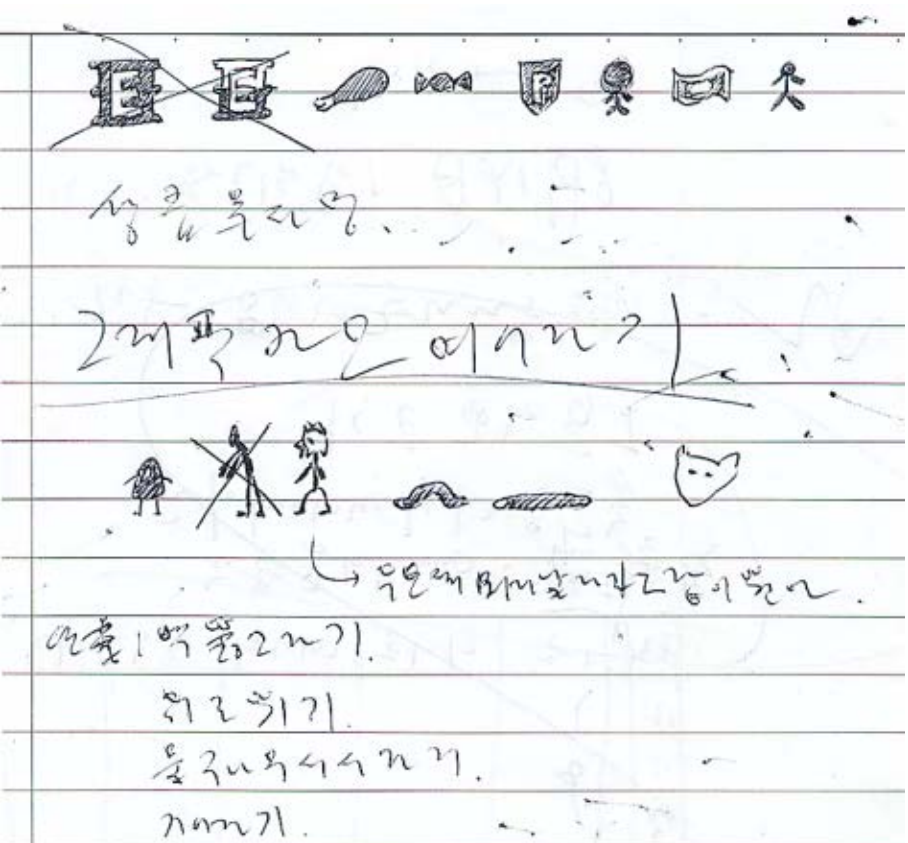
NOM is a simple casual game, but making it taught me much that I will carry with me throughout my career in game development.

It's important to create something new and fresh in this industry, despite having to overcome the challenges of coming up with revolutionary ideas. These ideas will lead to a new game system, a system that will develop unique and interesting games, and the games that are developed in this way will have a competitive edge. Marketing will be also become more competitive in this environment.

At Gamevil, we strongly believe that if developers enjoy developing a game, the users will enjoy playing it.

In closing, I'd like to briefly introduce NOM 2, which is the world's first mobile game to send a message to outer space. ⁘

Bong Koo Shin has also written a postmortem of NOM 2, with a detailed explanation of how Gamevil coordinated with the Ukraine Space Agency to send messages to aliens upon completion of the game. Read it online at www.gamasutra.com.



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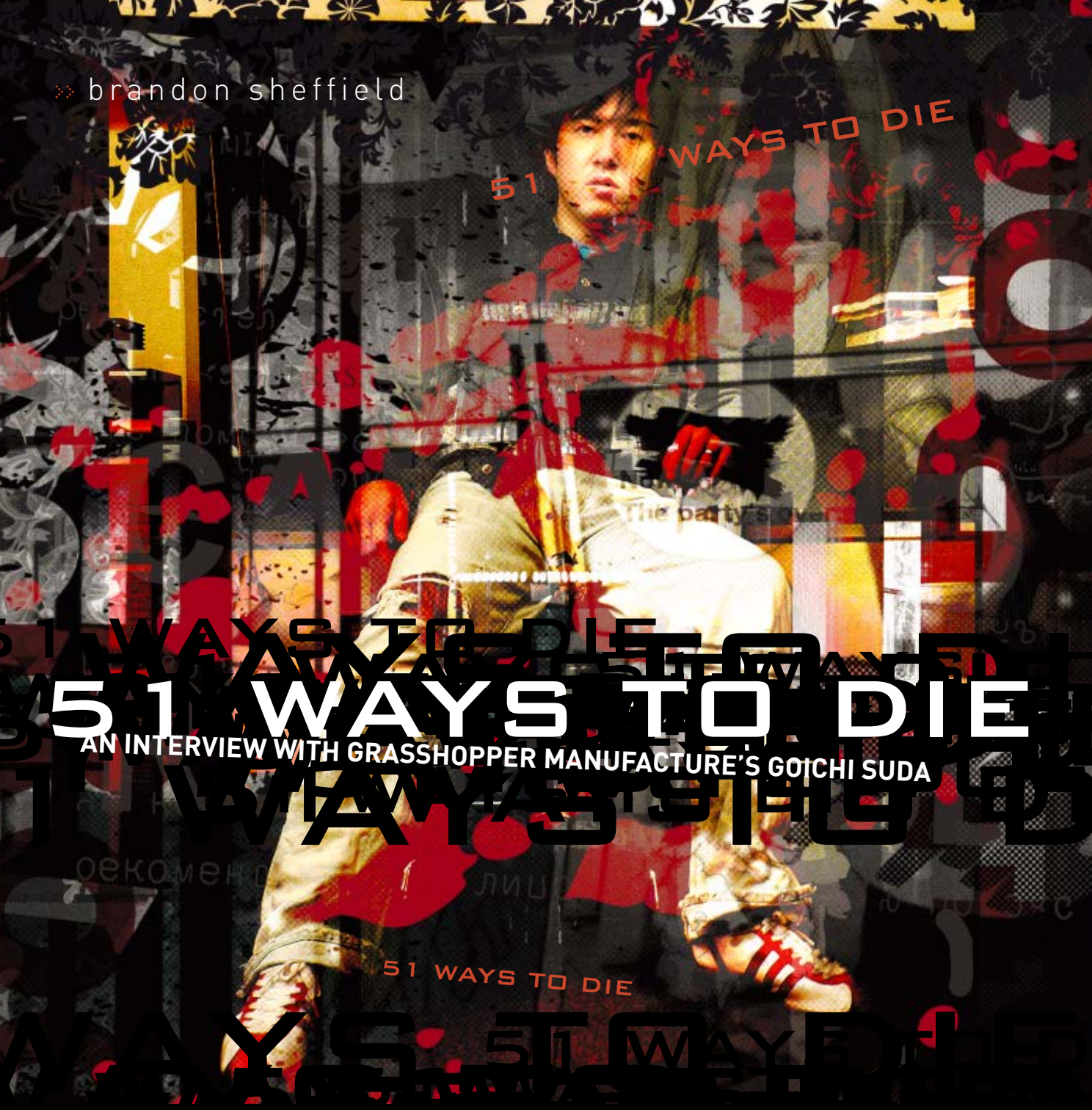

51 WAYS TO DIE

AN INTERVIEW WITH GRASSHOPPER MANUFACTURE'S GOICHI SUDA

GAME DESIGNER GOICHI SUDA TYPICALLY GOES BY the name Suda51; the given name Goichi can be verbalized as "five one" in Japanese. He and his company Grasshopper Manufacture have been gaining prominence in the industry due to their unconventional use of sound and graphics in games.

Grasshopper Manufacture-designed titles include the "one day mystery" FLOWER, SUN, AND RAIN, the action thriller KILLER 7, the anime-licensed title SAMURAI CHAMPLOO: SIDETRACKED, as well as the intriguing Nintendo DS RPG CONTACT.

Game Developer spent two exclusive sessions talking with the soft spoken but stylishly dressed Suda, discussing his influences, his thoughts on violence in games, and the benefits of realism.

BRANDON SHEFFIELD *is still the features editor of* Game Developer. *He likes doing interviews. You could be next! Email him at* ***bsheffield@gdmag.com****.*

Brandon Sheffield: *Your games seem to really make players aware that they're playing a game, not immersed in an experience. Abrasive sound design seems to have something to do with that. What's your intension?*

Goichi Suda: That could be because I have a lot of respect for the older games. I probably do it subconsciously as an homage. It's not really intentional.

For players, they shouldn't have a smooth, flat experience. It shouldn't be a constant, traditional [story] curve. It should be like a jet coaster, with sudden peaks and drops. That makes it more exciting.

BS: *Can you give some examples of older games that influenced you?*

GS: CRAZY CLIMBER, ELEVATOR ACTION, and [French game designer] Eric Chahi's games, for instance. Arcade games from the 1970s and early 1980s were especially powerful for me. ... They made breakthroughs past ordinary genre expression.

BS: *What's your own background? Where did you work before Grasshopper Manufacture?*

GS: Right before I started making games, I worked at a funeral home.

BS: *What kind of reaction do you want players to have when they interact with your games?*

GS: I don't really want to make a normal, traditional situation ... not just with games, but with my surrounding life as well. I want to show that there's lots of creativity out there. I want people to feel as though nothing has to be standard.

BS: *Given that trend away from the standard, to what do you attribute Grasshopper Manufacture's increasing acceptance in the U.S., especially in terms of sales and name recognition? [KILLER 7, for example, moved less than 15,000 copies in Japan, but 10 times more in the U.S.]*

GS: I think it's because the U.S. accepts new styles with open arms. I feel like the sales of KILLER 7 really show the market differences between Europe and the U.S.—where there's a good market for Mature rated games—and Japan, where demand for Z rated games [CERO's equivalent of an M rating] is low.

The past year or two was probably a bad time to introduce a new style of game in Japan. The market just wasn't ready to accept change.

BS: *It seems you were leaning toward having a political voice in KILLER 7. Is there something you want to tell people with games?*

GS: As for a political message—well, KILLER 7 was based in America. The game is made by Japanese people so I can't really ignore the relationship between America and Japan, and that was touched on. I wasn't necessarily trying to make a particular political statement, though.

To use a music metaphor, my games are maybe closest to rock. I certainly have a desire to create a genre within games that you could consider rock. It's my intention, actually.

FLOWER, SUN, AND RAIN featured a live-action music video as its intro cinematic.

"BEFORE I STARTED MAKING GAMES, I WORKED AT A FUNERAL HOME."

BS: *What do you think about the backlash toward representations of violence in games? It seems like it could be a vehicle for telling a story, but most people focus on the superficially negative elements.*

GS: That's a tough question. Well, like you alluded to, if you cut someone, kick someone, shoot someone, and blood comes out, and the characters represented are humanoid, that's going to cause some concern. But if the characters are cute little 2D pixel-based beings, and when you kill something it just bounces out of existence, I mean that's the same thing, isn't it? Conceptually there's no difference, it's just covering up the act of violence with a pretty and superficial shell. I'm not sure that's any better.

And yet, if you kill someone in a game and make them bleed, it's possible that a player might think that's easy to do and think they could repeat it. It's all down to the story and scenario whether killing somebody or violence in general is good or bad, I think.

It's hard to show that difference, and that's one of the things I think hardest about with games. It's something developers should really focus on.

BS: *How about the general trend of the industry toward realism?*

GS: Naturally, when new hardware comes out with bigger specs, you've got to make games that take advantage of it. People who have pushed the limits of lower spec hardware will move on to bigger things—it's inevitable. That's definitely happening right now. It brings in new players, too.

On the other hand, you can make a more niche, maybe more counter culture type of game, too, can't you? Some people will want that, maybe even some of the new players. Both can and should exist.

It's good to have that balance. Games that try to represent reality are definitely important.

BS: *Is next-gen a concern for you, then?*

GS: Well, E3 [2006] was a tough one for developers because we're all wondering which platform we should go for. If you make a game for Wii, you can't really port it to PlayStation 3 and Xbox 360. It's really tough to make games multiplatform now.

BS: *What's your impression of Wii, compared to the others?*

GS: The market has felt really stagnant for a while in Japan, but when the DS hit, it made some interesting waves. I feel like the DS was quite good as far as devising new methods of playing games, and I think that Wii will do something similar. I'm hoping we'll see the creativity of more developers sparked by that. We're pretty interested in it, so we're doing a Wii game called HEROES right now, with [Japanese game companies] Marvelous and Spike.

BS: *Are you concerned about ever having to have larger teams, and maybe losing more personal control, with the advent of next-gen for instance?*

GS: Well, I'm not really concerned about control. But with bigger teams and bigger budgets, there are bigger risks. And then the expectation is that the games you should be making should be something closer to reality, or maybe something more grandiose. It's a really tough question to answer.

BS: *It seems like your games take on a specific task and methodology within a specific universe. Do you prefer that to the more open style world of something like a GRAND THEFT AUTO for instance?*

GS: Well I like both styles, really. But it depends on development time and budget. If I had longer development time and a bigger budget, I probably would go into that sort of GTA, free-form area.

BS: *Do you think it would be difficult to keep your unique style and sound design in something that's more user-controlled? Is it still possible to tell a convincing story?*

GS: It's probably possible. Yeah. I can do it. In fact, it's *super* okay.

BS: *KILLER 7 and your previous title FLOWER, SUN, AND RAIN both seem like they're stories meant to be interacted with more than played.*

GS: That's basically true ... especially if that's the impression it leaves you with.

BS: *Do you think games can achieve certain emotional responses? There seems to be a big drive for that now. Or is it more important to open players' minds to new possibilities?*

GS: With my games, if you play them to the very end, I would hope players would feel as though the game didn't end there,

SAMURAI CHAMPLOO: SIDETRACKED was based on a license, but used a unique combo path based on soundtrack integration.

"IF YOU CUT SOMEONE, KICK SOMEONE, SHOOT SOMEONE, AND BLOOD COMES OUT, THAT'S GOING TO CAUSE SOME CONCERN."

but that it extended into their reality. Hopefully, it would open them up to something beyond the game.

BS: *Could they potentially be tools for change, either politically or socially?*

GS: Well, music can do it, so games should be able to.

BS: *If you were to make such a game, what would be on your agenda?*

GS: I think any sort of agenda would depend on and change according to the theme of the work. I definitely want to make a game with a realistic future, as I'm very interested in and concerned about current changes in the world.

BS: *I heard you were thinking of making a game with [Metal Gear creator] Hideo Kojima?*

GS: I don't know yet. Right now, we seem to get along really well. I met him in the course of things, and we've been talking.

BS: *Lots of Japanese game creators are leaving their companies to start new ones these days. Do you think the Japanese market will change for the better as a result?*

GS: To be honest, I don't know. There are a lot of good things that come from this trend, but a lot of bad things as well.

Creators who are directly involved with a development company have looser budget constraints and don't have to be as concerned with staffing up and down as projects change, so when they start independent companies, they have to be able to adapt to the budget change and also work around a small staff.

In the situation when a developer starts from scratch in an entirely new environment, the thing they wind up being most concerned with is getting good business standing and industry presence. That takes precedence over all other work and has nothing to do with working to create a high-quality game.

Killer 7 was the first Grasshopper Manufacture game to release in the U.S.

On the other hand, when a creator loses the brand power of a top development company, success is entirely based on the creator's true capabilities. That's definitely desirable.

BS: *How do you balance making original IP and licensed games? Are you able to get the style and message you want even in licensed games?*

GS: At Grasshopper, we'd like to make more original games, but you've got to make licensed titles sometimes. It's not like we have big plans for original IP, in terms of something we want to communicate. We just want to be able to make what we want to make.

Right now I'm working on a licensed game for Bandai Namco Games. It's true that I'm restricted by the licensor in some respects, but they do allow me to express my style freely. That's why we have a very good working relationship.

Grasshopper is a very fortunate company in this respect, though not everyone gets this sort of chance.

BS: *Why do you place such a hard focus on unique graphics and sound in your titles, even those based on existing licenses?*

GS: Actually, I don't particularly focus on the sound or graphical experience, even though it may seem like I do in the games I make.

To me, the most important thing is to accomplish the role and original mission that we set out as a company, through the games we produce, and the way Grasshopper operates. Orders from clients are important, but when they ask us to make something new, we really put our hearts and souls into creating a game packed with original ideas that are new to this world.

I put a lot of thought and consideration into avoiding trite ideas and common artistic expressions. I think about it a lot. My job is to design games from original ideas. I want to generate as much creative, new property as possible.

Games as a medium are expressed through a combination of programming, visual, audio, and scenario, so as a general rule, our ultimate objective is to create games that introduce players to new experiences in every single aspect.

BS: *Do you try to hire specific people for Grasshopper, to keep that kind of company culture?*

GS: Well, of course we have titles like programmer, artist, sound designer, et cetera ... but it's a bit more freestyle. Anyone who comes in has to have that sort of image in his head. You've got to be a jack-of-all-trades. Not only that, you have to be able to do things independently without being told every minute detail. You've got to be able to create your own design, and stick with it.

Thanks to Stephanie Tang for translation assistance.

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Greg Ballard, CEO, Glu Mobile
Ted Cohen, Partner, TAG Strategic
Kristin Lindsey Cook, Dir. of Multi Platform, Fuse
Stephen Davis, President, InfoSpace
Rajesh Khera, Director of Mobile Solutions, RealNetworks
Jeremy Laws, SVP, Universal Pictures Mobile Division
Steve Lerner, CEO, Wind-up Entertainment
Anil Malhotra, Chief Alliance Officer, Bango
Brian McGarvey, VP & GM-Americas, Vivendi Mobile Games
John Najarian, Senior VP, New Media at E! Entertainment Television
Paul Palmieri, Acta Wireless
Ray Schaaf, COO, Navio Systems
Adam Sexton, Groove Mobile
(subject to change)

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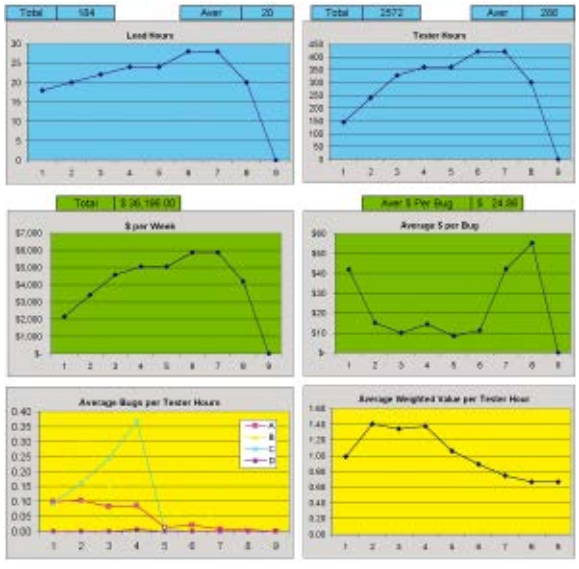
PAUL STERNGOLD AND GUNJAN BAGLA

DASHBOARD CONFESSIONAL

GAME INDUSTRY EXECUTIVES DESPISE unpleasant surprises, especially ones that could have been avoided.

In October 2005, Midway Games had outsourced large parts of the publisher testing on several projects that were all successfully completed on the development side. When the invoices arrived from the outsource partner, they were all in line with expectations except for the last one. It should have been a relatively small, inexpensive project, but had been billed at double the cost of the others. Instead of ramping down the team, the testing partner had increased the number of testers and kept them on the project for several weeks beyond the final release date. How could this have this happened?



Midway's Q/A dashboard mockup.

COMMUNICATION BLOCK

Our quality assurance management knew that our schedules and build plans were in a state of continual change, much like the schedules and build plans of many other publishers. However, resource planning with the outsource vendor was being performed only once for each project and was not viewed as an ongoing, iterative process at the time. There was also no provision for management to report and review the test partner's progress and performance. Clearly, we didn't have the processes necessary to oversee a large quantity of outsourced test projects.

The testing partner didn't clearly define its methods for planning and verifying staffing levels or adjustments either, nor "start work" and "stop work" events. Once told of the problem, our partner responded swiftly—they proposed and then implemented a thorough and well-documented set of procedures to address planning, communication, and changes.

Midway Q/A decided to take another step to fix the situation. We contacted a game industry consulting firm called Amritt to help us increase visibility into the testing partners' activities. Amritt proposed a visual reporting tool specific to our needs that would provide at-a-glance summaries of vendor hours, expenditures, and performance—a dashboard.

Over a period of several months, Midway and Amritt worked closely together to fashion a powerful dashboard that bundled an array of data points and statistics into a single, digestible form. This dashboard simplified cost and performance analysis and even helped with planning.

THE DASHBOARD

The dashboard shows not only summary charts, but also detailed information for day-to-day metrics regarding hours worked, costs, and bug reports. The charts are color-coded, with blue indicating hours, green indicating costs, and yellow indicating bug finding and regression. (Bug finding and bug regression are combined because a bug regressed is considered equal in value to a bug found.)

The yellow bug charts help us understand how an outsourced test team is performing. These performance metrics can be compared with an internal team's numbers. In addition, they give us insight regarding readiness for submission or release.

Each bug is given a weight from 1 to 5, based on its severity rating in our bug tracking database, with 5 being the most severe kind of defect. The total weighted value of all bugs found in the week is then divided by the number of test hours to arrive at the average value.

This represents a bottom-line, all-in number that summarizes how much "bug for the buck" Midway receives from its test partner. The chart showing average weighted value by tester hour is perhaps the most valuable metric for us.

FORWARD DASH

Our dashboard can be used with internal test teams as well. In addition to providing baseline performance statistics against which to compare the test partner, it also provides the same information and insights about Midway internal teams as it does about the test vendor.

Each project supervisor now reviews the dashboard weekly to ensure that staffing levels are meeting expectations. Supervisors also evaluate bug-finding performance and appraise this in weekly conference calls with the test vendor's leads and supervisors. In addition, upper management uses the dashboard to make sure that overall project costs are in line. The dashboard has proven to be a powerful communication tool and also spurs further communication between publisher and test vendor.

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GUNJAN BAGLA *is managing director of Amritt Ventures. His firm worked with Midway to develop the dashboard. Email him at gbagla@gdmag.com.*

STEVE THEODORE

THE SCALE'S THE LIMIT

Dealing with patterns in 3D

DON'T GET ME WRONG. NEXT-GENERATION graphics are a wonderful thing. Nobody loves the kid-in-a-candy-store excitement of a new tool more than I do. But with the thrill of new power comes a hangover.

Graphics have gotten better, but time and effort are as scarce as ever. Knowing how great we could make things, if only we had a little tweak time, makes the psychological cost of saying, "enough" that much worse.

WHEN ENOUGH'S ENOUGH

This thought struck me very forcibly while I was working on a new creature with a complex system of armored scales. In the old days, "scales" would have meant a couple of hours painting some fake shading and plate lines on a texture map. But with normal maps and higher poly counts, it's possible to really capture all the subtleties of faceting, lapped plating, and complex contours in a game model. Unfortunately, that entails hand crafting every one of those damn scales and fitting it into place.

FIGURE 1 Regular patterns highlight any flaws in UV mapping or surface construction.

Handling repeating patterns like my armored scales is actually a great case study in the art of saying, "enough." Patterns are a perennial problem for 3D artists because they reveal one of our biggest weaknesses: the dicey relationship between the tri-dimensional form of an object and the flat rhythms of the clothes, tiles, welded panels, or scales that wrap around it.

The regularity of patterns emphasizes any flaws in that relationship—that's why we use checkerboards as a test texture when UV mapping. Now that texture resolutions and polycounts are so high, distortions in that 2D to 3D relationship, which once would have passed unnoticed, now stand out as an illusion-busting eyesore. At the same time, our tools for dealing with them haven't really leapt forward.

There are at least four different approaches to the problem of repeating patterns in a 3D model. The combination of cost, quality, and look defines each way of working.

FLATLAND

Textures are still the cheapest and fastest way to wrap a repeating pattern onto a model. Apart from the overhead of painting extra maps for bumps, specular masks and other next-generation doodads, creating patterns in a texture is pretty much the same as it's always been, which is not to say that getting good results is easy. The same set of UVs will almost never represent both texel sizes and shape relationships within the texture correctly at the same time. This means that creating a pattern on the 3D model is almost never the same as creating a pattern in the 2D texture map, as Figure 1 shows. (For more background on why UV texturing is such a boondoggle, see "Maps and Legends," *Game Developer*, June/July 2004.)

UV texturing has advanced a good bit in recent years, although not in a way that helps with the problem of patterns directly. Now that Max and Maya both offer pelt-style mapping, creating UV maps with highly consistent texel density is fairly easy. Unfortunately, these maps are nearly impossible to paint into directly because that consistent density comes at the expense of consistent angles. A straight line in the UV map likely shows up as a curve on the model, and vice versa.

FIGURE 2 This mail armor clearly shows the advantages of using a normal caster (r) rather than a bump map (l) for patterns with a strong 3D component.

Placing seams carefully is a good way to leverage pelt mapping for working with patterns. If the pattern you're creating is based on clothing, you can often get UV shells that work exactly like clothing patterns. In Figure 2, both pieces of mail armor are "mappings" of an oddly shaped piece of 2D texture wrapped onto a 3D shape.

If your texture seams coincide with the seams in your character's clothes, you can basically fill the UV shells with a plain 2D pattern. You'll have mismatches at the seams, but that's exactly what happens in real life (as will be all too obvious in the next year or so when checkerboard shirts make their inevitable comeback from 1981).

Another way to profit from consistent texel density is to employ a 3D paint program. 3D paint doesn't make the problem of laying down a pattern go away entirely, but using a pattern stamp brush is the fastest way to lay down a pattern that is visually consistent in

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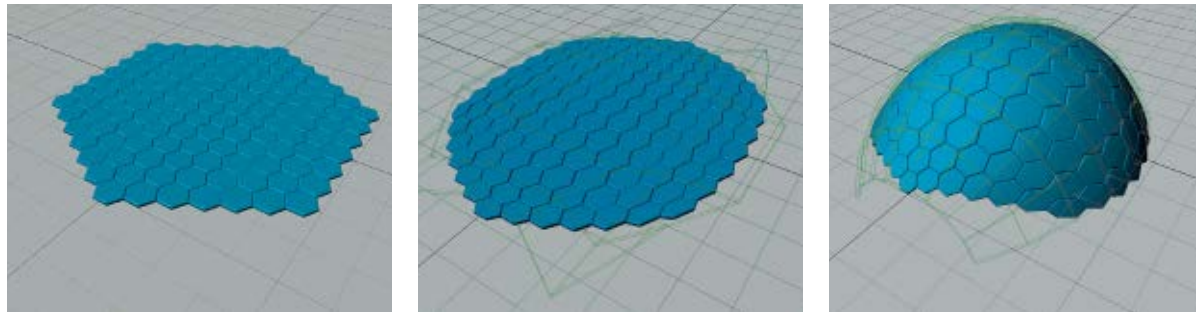

FIGURE 3 **Building a patterned object in three dimensions requires that you first create the 2D pattern; second, warp it into the correct 2D shape with a free form deformation (FFD); and third, use a new FFD to model the 3D shape.**

spite of any awkward flows in the underlying UVs.

The drawback to these two uses of pelt maps is the same: they're pretty inefficient in terms of memory use, with lots of large awkward spaces between UV shells. If you're really stuck with a complex pattern that has to stay consistent, you can sometimes cheat by setting up a dedicated UV channel that is pattern-friendly. Once you've added the texture, use Max's render-to-texture or Maya's texture baking to translate from the convenient UV set to a more efficient game UV set. If you take this route, be sure to author the original texture much larger than your intended final one, so the incoming pattern will be effectively anti-aliased by the render-to-texture process.

ZEE SHORTCUT

Figure 3 reminds us that building a patterned 3D object is a multistep process. And using straight-up texturing to add patterns has one important drawback: it's basically flat. The only feasible way to add the appearance of depth to a painted pattern is to use a bump map, and bump maps work well only for very low relief. They're perfectly fine for something like the seams of fish scales or the seams between floor tiles, but authoring bump maps to represent a complex three dimensional pattern like the skin of a crocodile or the surface of a pebbled path adds a whole new level of frustration to the basic hassles of 2D to 3D pattern management (for more on the strengths and weaknesses of bump maps see "Why Be Normal," *Game Developer*, October 2004). For example, in a model of a medieval warrior in scale armor, the difference between modeled and normal cast scales and a bump-mapped texture will be unmistakable, as Figure 2 shows.

Of course, building the pattern out of 3D pieces is a big jump in complexity and management overhead, so you should only take the plunge if you really need the extra graphical oomph. If you're not sure about the costs and benefits, Zbrush is a useful half-measure between the overhead a full 3D model and the limited abilities of bump maps.

Texturing a pattern that includes 3D information is basically the same in Zbrush as creating a purely graphical pattern with any 3D paint application, except that by using masks or brush alphas, you can integrate very complex 3D displacements into the pattern stamps. The process isn't foolproof, and you'll always need to do some cleanup by hand after the stamps are laid down. In general though, results are good, especially for organic or irregular shapes.

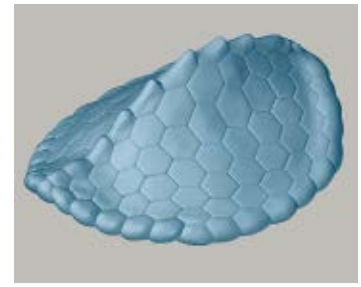

FIGURE 4 **The 3D pattern object touched up in Zbrush—this lets you add detail without compromising the pattern.**

If the displacements in your pattern are very strong or your final mesh is very crude, you should experiment with using a normal caster rather than generating the normal map within Zbrush. Normal casting will produce higher quality results than Zbrush's internal maps if the low- and high-resolution meshes are significantly different. However the Zbrush method will cost you a few minutes where a normal cast can cost an hour or more of setup time.

MILES OF TILES

Sometimes, even Zbrush doesn't really cut it as a tool for making full relief patterns. Creating the pattern tiles as actual geometry offers two very distinct advantages. First, since you can texture map the tile objects themselves directly, registering the color, specular, and normal components of the final textures comes free with the casting process. Second, and more importantly, normal maps created by casting have more precise and subtle per-pixel lighting than those made with old-fashioned bump maps, particularly on complex surfaces. See Figure 4.

Pattern tiles made from geometry automatically anti-alias during the casting process, which produces a clean and uniform look in the final model. Occasionally, this can be a drawback. Sometimes you want to emphasize sharp features, like a cut line between faceted areas, which are smoothed away in the casting process. Most of the time, however, the appearance of solidity that comes from a good cast is hard to beat.

Hand-placing every scale in a suit of armor or every reticulation on a knobby

FIGURE 5 **You can texture the pattern tiles in a 3D pattern object individually or as a unit.**

crocodile is a big investment in not only modeling time, but also management overhead. Like dentistry, though, it can be made less painful, if not exactly fun.

First, try to use instances rather than copies wherever possible to avoid slowing your machine to a TSA-level crawl. More importantly, remember that the purpose of tile application is to add detail. You shouldn't attempt it until the main forms of the object are worked out. Trying to build a dragon one scale at a time is suicidal, whereas covering him in scales after he's built is merely a chore. When it comes to texturing, remember you can work with pattern tiles as a unit (see Figure 5).

Once you've got that base surface, of course, you'll have to place the pattern tiles. For small patterns, you might just turn the base object into live construction surface or use snaps to hand-place the pattern tiles. For even mildly complex models, though, you'll need some kind of help.

Geometry and normal constraints are huge productivity boosters, allowing you to concentrate on placement while they keep the tiles glued to the surface. Constraints don't eliminate the need for hand tweaks—normal constraints are notoriously unable to decide which way is "up"—but they make life much, much easier if you need to change the frequency of the pattern.

For really complex models, though, you'll need some kind of automatic placement method. For Max users, Conform compound objects are a good starting point. There are a number of scripts available at Scriptspot.com and highEnd3D.com that can further expedite the process in either Max or Maya.

Placement tools fall into two broad categories: snapping scripts and UV-based scripts. Snapping scripts will pop an instanced tile onto the vertices, faces, or edges of the base mesh. These give very precise control over tile placement, but the burden of making sure the vertices themselves are well laid out falls to you. UV-based scripts place tiles using the UV layout of the base mesh as a guide. Handily, this lets you use a preview texture to work out the layout quickly before plopping down dozens or hundreds of instanced tiles and bringing your machine to a screeching halt.

A good UV test texture will also help you predict areas where the underlying surface flow is too twisty to make for a decent application of tiles. There's no need to make the placement UVs resemble the final UV layout of the normal cast model, so you can be as lavish as you want with UV space if that helps your tile placement.

WARPED TOUR

Sometimes, you actually don't want your pattern to be completely precise. Many organic forms, like scales or feathers, combine the rhythm of repeating patterns with morphs in scale and proportion. Capturing this combination of rigidity and flow can be awkward with textures and is impossible with instanced tiles. However, the use of UVs as a guide for pattern layout also offers an interesting technique, which brings us back almost full circle to traditional texturing methods.

If a surface has UVs that are done well, you can essentially reverse engineer it to make a guide on which to build your final pattern. Lay out your pattern on a flat plane with a snapshot of the UVs as a guide. Since you don't have to worry about 3D orientation, this is far faster than snapping to the full 3D version of the mesh. With the pattern complete, you can use a lattice or space warp to wrap the whole assembly onto the original mesh, knowing for sure that the proportions and relative positions of the tiles are correct.

Using a deformer allows you to warp the tiles so they echo the flow of the underlying surface. You can model the changes in the pattern by hand, or you can chain deformations together to capture the combination of structure and fluidity that marks organic patterns like scales. First deform the tiles in the plane to fit the 2D outline of the guide, and then deform that warped pattern onto the mesh. Fittingly, the math behind free form deformations was actually invented by a biologist who was trying to prove that all fish have scales that are basically morphed variations of the same layout.

Of course, each of these options has to be weighed against the ticking of the clock and the aching of your carpal-tunneled fingers. Still, it's good to know what can be done and what doesn't have to be, so you can stick a fork in your model with a clear conscience, albeit with a little lingering regret.

MICK WEST

CLOSER TO EVOLVING

Trends in game programming

THE JOB OF A GAME PROGRAMMER HAS been constantly evolving since game programming became a viable profession sometime back in the 1970s. The primary factor driving that evolution has been the exponential increase in the power of game platforms, particularly consoles.

Market forces have also influenced the evolution of game programming. The increase in the size of the game market, the subsequent diversification in the gaming audience, and the emergence of mobile and casual games have significantly impinged upon the traditional image of the work that a game programmer performs.

I've noticed a few interesting trends in game programming that have emerged over the past few years, which are worth reflecting on because game programmers who want to advance their careers—and any studio head who wants to make money—need to anticipate and plan for what will be expected of them in the years to come.

CONTENT-DRIVEN TRENDS

Historically, programmers have been the primary bottleneck in the game production process.

Frequently, large sections of game code have to be written from scratch, and significant portions of the game logic are either implemented in code or need to have code written to support them. This has meant that development schedules depended heavily on the programmers, as they were basically implementing the game.

But lately, the development of a game seems to be more heavily driven by the creation of content. The role of technology—and of game programmers—has shifted from implementing content to providing the tools for others to implement content, resulting in a trend that is causing a shift in scheduling. The programming of new features now happens toward the front of the schedule. Additionally, this change is increasingly relegating programmers to a supporting role in the latter parts of a project.

The shift to content-driven development has essentially created a new breed of engineers: technical content creators, or more specifically, technical artists, technical level designers, and script programmers. The technical artists and level designers have to operate within a complex set of technical constraints, while also understanding the technology enough to leverage all it has to offer. They may be tasked with work that's very much like programming.

Script programmers have a differently focused skill set compared to regular programmers. They have very little focus on algorithms and data structures, and instead focus on event handling and implementing state-driven behavior.

EPISODIC CONTENT

Ubiquitous high-speed internet connectivity has made episodic content a market reality. While the change is hampered by market inertia and piracy concerns, it is inevitable that the game industry will move to a system of content delivery that's free of physical media, as has already happened in the casual games market, where nearly every game is sold online. The trend is also sweeping over the full price PC game market.

This prevalence of downloadable media naturally encourages the development of episodic content—content that extends a game without being an entirely new one. The prime use of episodic content is to add extra levels, chapters, goals, missions, or stories to a game.

Since this additional content will consist mainly of data (models, levels, scripts, audio), the role of the programmer will be limited to providing the initial framework that allows for the additional content to be seamlessly incorporated into the game.

Episodic content will further advance the trend in content-based development. With a sufficiently robust base engine, a game might extend its series by several years without requiring any extra traditional coding, the only programming being executed at a high level via the technical content creators, particularly script programmers.

MULTI-THREADED TRENDS

Probably the most dramatic change in technology from a programmer's point of view is the forced shift from single-threaded engines to multi-threaded ones. The next generation of consoles all have multi-core processors, and the majority of PCs aimed at gamers released from 2006 onward will have some kind of multi-core processor.

While a multi-core architecture is going to be the norm, the majority of game programmers are still unfamiliar with the techniques of multi-threaded programming. In addition, tools for debugging and profiling multi-core code are still in their infancy. In a complex engine with many interacting systems and many patterns of memory access, the task of optimizing for multiple cores is going to remain something of an art form for several years.

Generally, the trend here is toward more and more cores on a single chip. Long-term trends point to 8, 16, 32, and more cores on one chip. Understanding the concepts of data level parallelism, Amdahl's Law, and pipelining will become a game programmer's core skills (for further discussion, see "Multi-core Processors," February 2006, *Game Developer*).

PROCEDURAL CONTENT

A decade ago, artists created their 3D models one polygon at a time. Eventually, modeling tools grew more sophisticated—yet most artists still

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Novel input devices, such as the Wii controller from Nintendo, may have as much of an affect on game programming as content-driven development.

deliver assets that are essentially just a bunch of triangles with materials.

Increasingly, 3D objects are created in a procedural manner via a mathematical model of that object, and a set of parameters. The classic example is a tree. Trees of a particular species are very similar, but no two trees are the same. If a programmer can create a mathematical description of a tree, then she or he can generate an infinite number of varied trees.

Procedural content can either be pre-generated (essentially, used as an exotic modeling tool), or generated at run time, so the designer can simply say, "Forest here," without having to specify the look and position of each individual tree.

As environments become more realistic, a much larger portion of the models used in the game will be generated using some form of procedural content. Technical artists will be responsible for generating the archetypes of particular objects (and textures, animations, and even sounds), and then designers or other artists will tweak the parameters to create a specific instance or allow multiple instances (like a forest) to be created.

The challenge of the programmer within this trend is to provide the tools to allow the artists to work effectively and intuitively with the technology. Programmers are not artists, and the sooner an artist can start using the procedural technology in a non-technical environment, the better the results.

EMERGENT GAMEPLAY

Originally, game programmers would program exactly what went into a game, and they would understand exactly why a certain thing happened at a certain time under certain conditions. The amount of code and data involved was reasonably small, and usually the behaviors of game entities were hard coded by, of course, coders.

Now, it's more typical for the behavior to be determined by data set up by a designer, and involve the interaction of many complex systems. The programmer creates the technology to simulate an environment, and the game designer places objects in it and creates gameplay by influencing the behavior of those objects in a variety of ways.

Thus, instead of the behavior of the game being specifically coded in, it now emerges from a large number of variables, and it's no longer always clear why certain things happen in the game. Debugging becomes more difficult, and programmers often find it painstaking to get the game to behave exactly as they want.

This trend, overall, is showing how game development is leaning toward a softer form of content creation, where (for example) non-player characters are inserted into the game with a set of very high-level directions and a sufficient level of underlying logic to handle all eventualities. The actually gameplay that emerges is not always clear at the outset, and will not be directly coded by the programmer.

But the challenges here lie in debugging the inevitably fuzzy mess. Avoiding performance issues may also be a problem, as layer upon layer of behavior modifiers may be added to push the behavior in the desired direction. Programmers and designers must work together to know when it is appropriate to write new code rather than modify the behavior via tweaking the data (see "Evolve Your Hierarchy," March 2006, *Game Developer*, for additional discussion).

PROGRAMMABLE GPUS

The rate of increase in power of video cards aimed at PC game players has outstripped Moore's Law. By some measures, the processing power of the GPU can greatly exceed the power of the CPU. With this shift in power, an increasingly large amount of work can be done on the GPU, and not just rendering graphics.

The highly parallel nature of modern GPUs makes them very suitable for tasks that exhibit a high degree of data-level parallelism, where many individual chunks of data (such as a rigid body) have the same code executed on them independently (such as physics-based motion and collision resolution). Using the GPU for non-graphics related tasks is referred to as general purpose GPU, or GPGPU.

From an engine programmer's point of view, the major challenges associated with this trend are managing the flow of data between the CPU and the GPU, and implementing the required logic in the restricted instruction set of the GPU.

MUSCLE-DRIVEN ANIMATION

A specific example of procedural content is muscle-driven animation, in which the motions of the game's characters are driven by an accurate physics-based model of bones and muscles under the characters' skin. Animations such as running and jumping are not pre-created by an animator, but instead are generated in real time, based on the physical state of the character and the interaction with the environment.

Doing this accurately requires a significant chunk of processing power, and so has not really been utilized very much in games. Even in the pre-rendered world of Hollywood CGI, much research is still being done to make this technology look good, even for relatively straightforward tasks such as running over variable terrain.

Muscle-driven animation is also the

ultimate goal of facial animation, leading to lifelike and infinitely varied facial animations, which can also link directly into a speech synthesis system.

Again, the challenge programmers face with this new technology is how to provide the tools that allow technical animators to define the archetypical motion models and parameter sets, and then allow the less technical artists and designers the creative freedom to fully utilize the muscle-driven animation system.

NOVEL CONTROLLERS

On the PC, you have a mouse and a keyboard, sometimes a joystick. On a console you have a controller, included with the console purchase.

For the vast majority of game players, the interface between their brains and the game has been fixed and consistent—and relatively simple, being just a two-axis analog control and some buttons.

Three trends in technology are driving change here. First, newer consoles are shipping with motion sensing controllers. Most notably Nintendo's Wii, with its revolutionary controller, opens up a whole new set of challenges for programmers.

The technical challenges of working with a motion-sensitive device are to provide a mapping between the user's actions in manipulating the controller and game's actions. Since the 3D motion of the Wii controller is a dimension more complex than the simple analog sticks and buttons of previous controllers, it will be quite some time before programmers really come to grips with all the ways this new technology can be used.

Second, there has been an increase in the number of "pointer" games, where the game action is controlled by mouse or stylus movements in a 2D plane, and the user is either pointing and clicking or drawing actions on the screen. This trend in control technology is driven by the Nintendo DS, but also by the casual games market. Since the Wii controller can function as a pointer, this type of control technology may also crop up in several games for that platform.

Third, GUITAR HERO, DANCE DANCE REVOLUTION, and DONKEY KONGA have shown that games can be packaged with a very inexpensively produced, game-specific controller, and be wildly successful. Each type of new controller presents new problems for programmers as they attempt to provide intuitive ways of translating the raw data from the controller into something representative of the player's intentions.

The Sony EyeToy also represents something of a trend here with its own set of problems, namely, the idea of incorporating live video of the player into the game as a control element. This technology is still in its infancy, and the fiddly nature of setting up a video camera as a controller suggests it's unlikely to achieve extensive usage.

The most likely use of a camera is in-game chatting. I predict that people will attempt to incorporate some kind of facial expression recognition into their games (imagine a poker game that could tell when you are smiling, so you really have to maintain your poker face). The AI required for effective video processing is still unsuitable for games, but it's an exciting avenue for the games of the future.

INNOVATIVE SPEECH

A game feature that's closer to becoming common is voice control. The Nintendo DS is broadening the popular appeal of voice control with NINTENDOGS, which incorporates simple speech recognition into the game. It's relatively simple for a game to use single word commands. Even most mobile phones now have some form of voice recognition.

But beyond recognition of single words, the great move forward in this trend will require leaps and bounds in natural language programming. Eventually, players will be able to hold simple conversations with characters in a game, or characters in a game will be able to synthesize conversations between themselves. This technology will inevitably appear in titles like THE SIMS, but it is unclear when the technology will mature.

GAME AS PHONE

Computers and game consoles can now be used as communication devices. Sometimes, this takes the form of online chatting or instant messaging. Sometimes it's full voice and video communication over the internet, which may be incorporated into gameplay. Online games on next-generation consoles offer buddy lists and chatting by default.

As well as the more obvious challenges posed by this technology, the use of games as communication devices has the potential to greatly increase the emphasis on reliability and usability of the game.

Users develop a very strong expectation that their phones will not crash or pause, and this translates to a strong expectation that the game will not crash or interfere with communication. In a single player game, a game crash is very annoying, but in a multi-player experience, it is much more annoying, as you are ripped out of real-time communication with real people. This increases the programmer's focus on reliability and a fluid user interface.

FOLLOWING FLOW

The complex interplay of technology, market forces and innovation in game design makes it impossible to project trends more than a few years in the future. Certain technological developments (more CPU cores, more memory) are inevitable, but that's only part of what's driving trends in game development.

Ten years ago, the PlayStation had only been out a short while, and the industry was in the midst of a shift from 2D to 3D games. Much of what occurred during this shift was a gradual evolution from one game to the next. This progression seemed inevitable, given the benefit of hindsight, but at that time the future of game development was as much in flux as it is now.

The evolution of game development is just that, an evolution, driven by the invisible hand of the market and shaped by periodic seismic shifts in technology and game design. While it is impossible to predict exactly where this will lead or how quickly, the wise game programmer would do well to occasionally pay attention to where it seems to be heading.

NOAH FALSTEIN

GAME SHUI

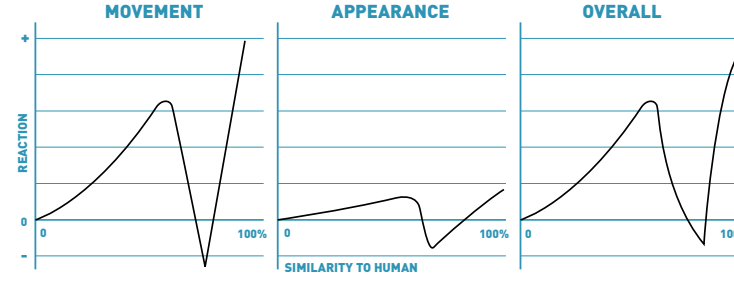
INVISIBLE MONSTERS

Tales from the Uncanny Valley

Remember the 2004 movie *The Polar Express*, starring Tom Hanks playing a bunch of different roles, courtesy of motion capture and CGI that tried hard to be real—and to many people's taste, failed in a spectacular way? The problem is one that has produced buzz in the game industry with the intriguing name (introduced by Japanese roboticist Masahiro Mori), the Uncanny Valley.

It turns out that as realism in robotics, computer graphic renditions, and animation fidelity of humans increases, so does their popular acceptance. This emotional response is charted as a steadily rising slope—until the depiction and animation gets close to being photo-realistic but not quite right. Then, there is a sudden drop or a valley in the curve. If a human figure looks almost right but with some subtle defects, it triggers disturbing feelings of uneasiness in the viewer. The *Final Fantasy* movie had this problem, depicting people that, for momentary flashes, looked amazingly real, and the next moment just seemed creepy and unnatural.

Now, as the new wave of consoles are upon us, this issue is of prime importance to our industry. The temptation to try to make people more realistic, to push the limits of the hardware, is strong. We stand poised on the edge of the uncanny valley, and if we're not careful we may tumble in. How can we navigate the valley safely, or should we even try?



The Uncanny Valley occurs when a non-human's likeness to a human nears reality, but lacks perfection.

GUARDRAILS UP

There's a strong temptation to try to jump the valley, just make humans so realistic that they are indistinguishable from live actors. When the circumstances are constrained enough, it can be done. Some sports games are showing us that it is possible to achieve impressive realism without triggering unease. Ultimately, it comes down to what evolution has primed us to see in depth. Our ability to read other people's faces and body language has been honed over generations to a very fine point. Pixar, with its CG movies and an unbroken string of hits, provides some clues of successful tactics we can use to design a path around the Uncanny Valley.

Stay away from trying to do realistic humans. Having main characters who are bugs, robots, cars, or fish avoids triggering that sense of unreality.

Good voice acting can convey a lot of emotion and realism without expensive graphics.

Engage the players with an interesting story with strong human interest, even if the protagonists are not human or are superhuman.

If you do depict humans, do it with exaggerated style and unique design. Let it look like you aren't trying to be ultra-real on purpose, instead of trying and failing.

Avoid extreme close-ups, and use artistry to suggest details without actually having to render them.

With these techniques and others it is possible to provide high entertainment value without the expensive brute-force methods of trying to create artificial humans head-on.

MONSTERS FROM THE ID

These approaches are not new. The movie *Forbidden Planet*, released nearly 50 years ago, holds up remarkably well for science fiction movies of its time. It's worth watching now, even if just to see how it must have inspired Gene Roddenberry to create *Star Trek* a decade later.

There are aliens in the movie, but the story goes that they died off millennia earlier. The film never shows what they looked like; it merely suggests some very non-human shapes by comments about the doorways they left behind.

The main non-human character was Robby the Robot, another guy in a robot suit, but it didn't look like a person was inside, and his head was decidedly non-human, and his voice was wonderful. The film's prime monster was conveniently invisible except for one scene where it is outlined in electrical discharge, which is one of the few scenes in which the movie is visually dated. But the chilling moments happen when the monster is invisible, seen only by its effects on the world around it.

The rule from the March 2006 column, "Design to the medium's strengths instead of struggling with its limitations" is a good one to keep in mind. We need not give up trying to cross the Uncanny Valley—we just have to weigh the cost of climbing back up the other side before we set forth.

NOAH FALSTEIN *has been a professional game developer since 1980. His web site, www.theinspiracy.com, has a description of The 400 Project, the basis for these columns. Also at that site is a list of the game design rules collected so far and tips on how to use them. Email him at* ***nfalstein@gdmag.com****.*

JAKE KAUFMAN

MO MOBILE, MO PROBLEMS

CREATING AUDIO FOR GAMES IS A VERY involved process. In your average game level, a large number of events happen simultaneously, and they must be accompanied by sounds that respond quickly and often overlap. These in turn are layered over looping background music.

In the world of mobile game audio, that standard is not even considered average—it's bleeding edge. Plus, it's only possible on a few of the phones people own today. The variety of formats involved is a perfect example of the fragmentation that results when equipment and middleware vendors compete to promote their own proprietary tech, instead of cooperating from the start.

There's a lot of incredibly exciting stuff happening now, and a lot of advancements are already available to composers and sound designers, transforming phones into full-powered gaming platforms that can play densely layered sound and music. The problem is that people still want to play games on their old phones, and as a result, the audio designer is in limbo between full freedom and terribly stifling limitations.

Working on something like 700 phones, I still find myself on the latter side of that spectrum more often than not. This overview shows the different challenges and innovations that mobile game audio designers will encounter as we drift between the Iron Age and the Space Age of phone sound.

HI-DEF PIPE DREAMS

The quality of synthesis on phones has taken a huge leap forward in the last few years, but when you're targeting handsets with such profound variance in capabilities, you probably won't have time to give sufficient attention to the advanced features of just a few of them. The baseline is—and will likely remain for some time—General MIDI (GM).

In the cowboy serial drama of music production, GM is the trusty sidekick who keeps getting replaced by different actors, causing confusion and emotional upheaval. It's not going away any time soon, though there are strong movements to expand and adapt it.

On phones, polyphony can range between 1 and 96 voices. If GM isn't supported directly, it can usually be mangled into a format that is, using various vendor tools. Lots of handsets have powerful FM synths, and some feature decent onboard wavetable synths with passable reproductions of Roland Sound Canvas-style patches. Many phones can also play digitized samples in various formats. On some, though, you're still stuck with just a beeper.

My audio team barely avoids insanity by maintaining a huge list of which phones handle which formats, workarounds for horrible bugs, and memory limitations. Sometimes, we like to print out a copy of the list and set fire to it.

GM and tiny speakers being what they are, you can't count on music or sounds being even remotely similar from device to device. Techniques such as "pitch bend range" and volume controllers rarely behave correctly, for example.

THE CHOPPING BLOCK

There's no one true way to approach mobile audio, but there are ways to organize your composition so your head doesn't explode.

Designing freely and then scaling down for limited platforms keeps your creative vision intact, if you're strong enough to handle the ego-crushing optimization process that awaits. You can take a balanced approach and write simple music with disposable ornamentation, or go spartan, designing simple melodies and expanding whenever possible. Personally, I just write the best stuff I can think up and then don my butcher's apron and do the deed.

The Scalable Polyphony MIDI standard (see www.midi.org/about-midi/abtspmidi.shtml) was created to help avoid such heartbreak, letting devices drop channels and steal notes based on their polyphony. Since it's only supported on certain devices, though, we still have to grapple with 20 other formats, reducing its utility as a standard. Even if it were adopted universally, it doesn't address the disparity in GM instrument sounds.

EAR TO THE PULSE

Amazing new possibilities are presented by newer phones and APIs opening up the audio buffers instead of sticking us with a bare *playsound()* function. With direct access to the sound pipelines, developers can write or license audio players to handle anything. The phone in my pocket right now has more CPU power than my desktop PC had in 2001, and it's starting to show in today's games.

Some technology vendors are already working to legitimize game audio on phones. Beatnik's Audio Engine, for example, is a complete environment for composition and design, supporting DLS banks and realtime software mixing. The tools provided by Qualcomm and Yamaha for their BREW and SMAF frameworks are powerful and flexible, and will only get better over time with developer feedback.

Thanks to the work of such industry think tanks as the IASIG's Mobile Audio Working Group, new standards and ideas are being drafted out, and communication with vendors and developers has become a continuous loop of suggestions and advancements. Over the coming years, audio designers will have to do less and less catering to the lowest common denominator.

JAKE KAUFMAN *is sound designer at Gameloft. He is fanatical about retro gaming and spends his time writing new music for Game Boy and TurboGrafx-16 soundchips. Email him at jkaufman@gdmag.com.*

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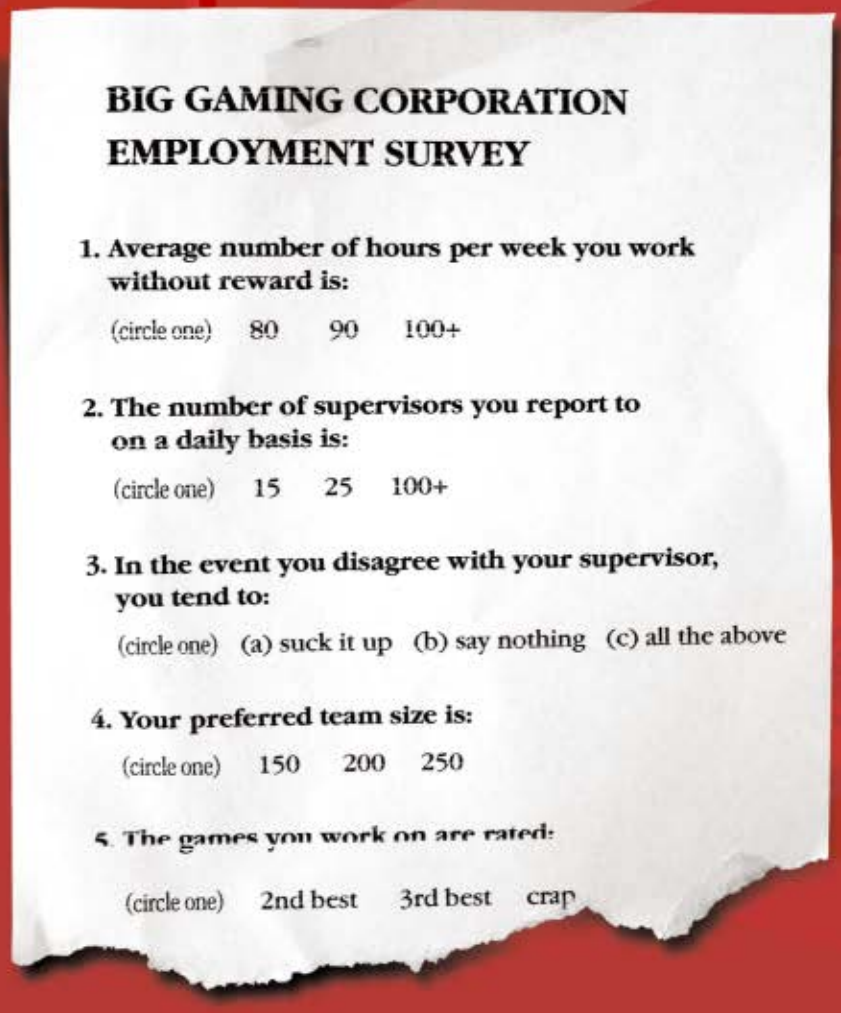

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HEADS UP DISPLAY

CONTINUED FROM PG 5

ESA fight violent game legislation and similar objectives, presumably—but still a large overall saving."

Now that E3's mammoth presence is set to dissipate, developers' calendars will no longer be completely domineered by the single event, leaving other events organizers in the game space strategizing their lineups.

"There was a lot of business at E3 that took place between middleware providers, tools providers, and unique R&D teams that were trying to enter into the video games space," said Jamil Moledina, director of the Game Developers Conference. The dialogue at E3, he said, was often an extension of conversations that began at the GDC. "Some of it was endemic to E3, but a lot of those companies in the business of making games and creating games are now adrift."

In a statement made at the initial time of the E3 announcement, Moledina commented that a smaller E3 will also be a more credentialed one. "The more visible area that is being removed from the E3 experience is the vicarious consumer presence, where gamers with vaguely game industry-ish credentials could get hands on with playable games. Likely, heirs to that essential consumer sector are the Penny Arcade Expo in Seattle and America's VideoGame Expo in Philadelphia, as well as the Games Convention in Leipzig and the Tokyo Game Show on an international level."

A less dominant E3 certainly does open new opportunities for smaller conventions and conferences. Paper-gaming convention Gen Con, for example, has since said it would move its Southern California show into the Los Angeles Convention Center in 2007. "When the news came out about the drastic changes at E3, we began to hear from some industry players about Gen Con increasing its capabilities to better accommodate the industry," said Gen Con CEO Peter Adkinson. "With our vast experience in producing quality gaming shows, it is a natural extension for us to make Gen Con a place where the electronic industry can show off its products."

Thus, though the massively scaled E3, which had been running since 1996, has now departed, there will be plenty of opportunities for the game industry to meet at events in the rest of the year, even at the E3 Media Festival. Viva la evolución?

—Simon Carless

ADVERTISER INDEX

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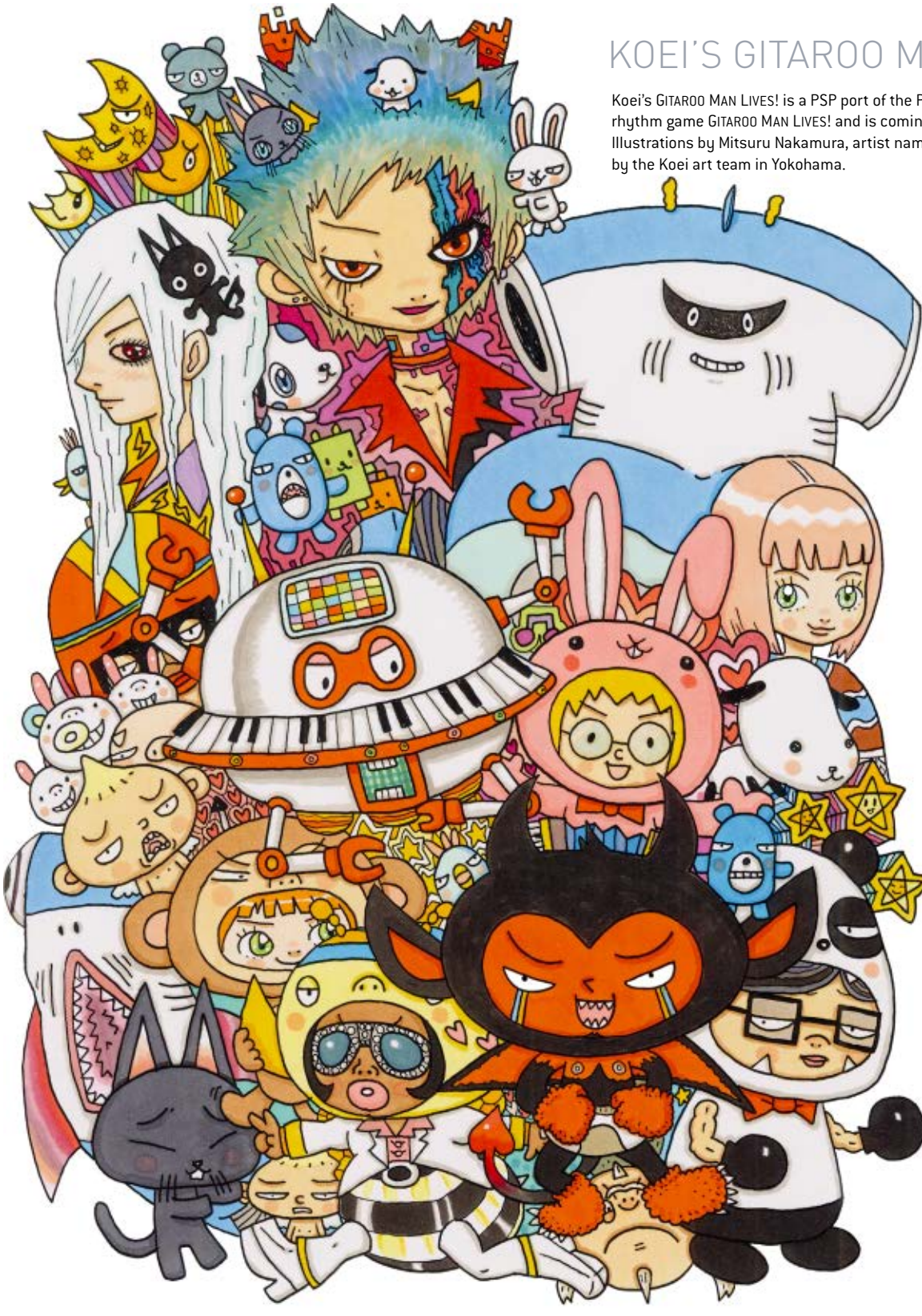
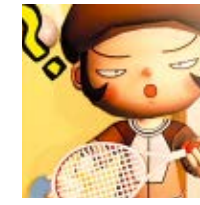
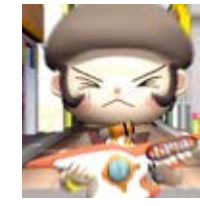
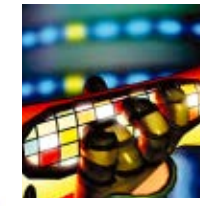
KOEI'S GITAROO MAN LIVES!

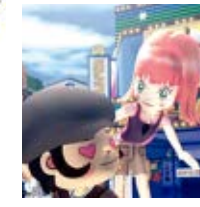
Koei's GITAROO MAN LIVES! is a PSP port of the PlayStation 2 music and rhythm game GITAROO MAN LIVES! and is coming to the U.S. in 2007. Illustrations by Mitsuru Nakamura, artist name 326, with in-game art by the Koei art team in Yokohama.







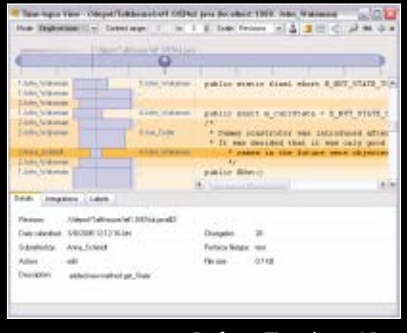




Perforce | *Fast* Software Configuration Management

Introducing Time-lapse View,

a productivity feature of Perforce SCM.



Perforce Time-lapse View

Time-lapse View lets developers see every edit ever made to a file in a dynamic, annotated display. At long last, developers can quickly find answers to questions such as: 'Who wrote this code, and when?' and 'What content got changed, and why?'

Time-lapse View features a graphical timeline that visually recreates the evolution of a file, change by change, in one fluid display. Color gradations mark the aging of file contents, and the display's timeline can be configured to show changes by revision number, date, or changeset number.

Time-lapse View is just one of the many productivity tools that come with the Perforce SCM System.

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