

making games

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GAME

DESIGN | BUSINESS | ART | TECHNOLOGY



THE MAKING OF

SHADOW TACTICS

BLADES
OF THE
SHOGUN

POST MORTEM

HOW SALMI GAMES BROUGHT THEIR
MOBILE GAME ELLIPSIS TO THE PC

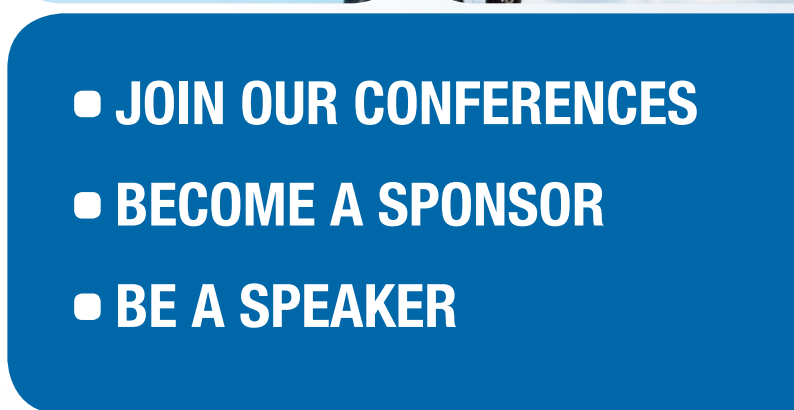
BUSINESS BEST PRACTICE

HOW TO DESIGN AND IMPLEMENT
YOUR OWN PAYMENT SYSTEM

GAME DESIGN CASE STUDY

NCSoft ON THE BALANCING IN
ACTION MOBA MASTER X MASTER

EVENTS FOR THE GAMES INDUSTRY



www.aruba-events.de



LET THE GAMES **BEGIN** (AGAIN)!

Gamescom 2017 is done and dusted. With a record number of 350,000 visitors and an opening speech by German Chancellor Angela Merkel, the world's biggest family get-together of the games industry wrapped things up for this year.

Some of the participants immediately left for their well-deserved vacation, while others had the next big events like IFA (International Radio Exhibition Berlin) or recently the Tokyo Game Show on their agenda. And again, others were or are about to make it to the finish line of one of the many releases of the coming fall and winter months. Admittedly, we would have liked to enjoy the warm summer for a bit longer... but hey, considering the number of top games we shouldn't really complain. As a famous saying goes: »Brace yourselves – the best gaming season is coming!«

Events, events, events

There's no rest for Making Games either: Making Games Conference, which will be held as part of the MEDIENTAGE (Media Days) Munich on October 25 and 26, attracting their audience not only with keynotes and expert panels, but also with a number of Master Classes, is definitely worth paying a two-day visit to the Bavarian capital. Detailed information with regard to the timetable and speakers can be found on our overview on page 12.

Another note: From now on, starting with this issue, Making Games will be released on the first Wednesday of each even month instead of the third Friday. As a positive side effect, issue 01-02/18 will be released right on the day of the German Developer Awards

which will be presented on December 6 and 7 in Cologne. The application phase ended on September 15 – now it's the jury's turn to play through nearly 230 submissions in various categories. The »Blue Byte Newcomer Award« will also be on board again, which includes a notable upgrade this year; you can learn more about that on page 16. We're already looking forward to the many creative projects which – with a bit of luck – we will hear more from in one of our future issues. And who knows, maybe some of the stars of tomorrow will follow »The Dwarves«, »Cubiverse«, »Shift Happens« or »Shadow Tactics: Blades of the Shogun«, the big winner of the German Developer Awards 2016, and make it on our cover. Which makes for a not so subtle transition to...

Bigger, bolder, better

Mimimi Productions won as many as four categories last December, almost simultaneous to the PC release of the now internationally successful title. And, as is often the case, the time was against us: Post-editing, a shortened production period and gamescom on the one hand, and significant milestones on the other. And while initially we weren't sure whether the time would permit doing a proper cover story, we actually may have – due to many sleepless nights – broken a record in terms of volume, which we're incredibly proud of and which you, our dear readers, will hopefully enjoy as well.

Enjoy the latest issue!

Your team at Making Games!



Dirk Gooding
Editor-in-Chief
at Making Games Magazine



Nico Balletta
Managing Editor
at Making Games Magazine

»We're already looking forward to the **many creative projects** from the potential stars of tomorrow!«



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COVER STORY

The Making of Shadow Tactics: Blades of the Shogun

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We sat with Johannes Roth, the CEO of Mimimi Productions, to talk about the studio's history and how the idea for »Shadow Tactics« came to life.

25 Case Study – Finding the Perfect Art Style
»The Last Tinker« and Shadow Tactics couldn't be any more different – and so are their looks. Director Bianca Dörr talks about the difficulties of finding the perfect art style.

32 Case Study – Level Evolution in Shadow Tactics
Moritz Wagner knows exactly what an excellent level needs and explains how Shadow Tactics' mission maps evolved start to finish.

37 Case Study – Blades of the Engine
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48 Case Study – Eye Candy: VFX in Shadow Tactics
Nobody sees them when they're in the game, but everyone knows when they're not: visual effects. Florian Smolka about footprints, shadows and lots of blood.

53 Case Study – The Shogun's Blades
In a game like Shadow Tactics, every single playable character is essential – for a mission's success as well as the game's story and atmosphere.

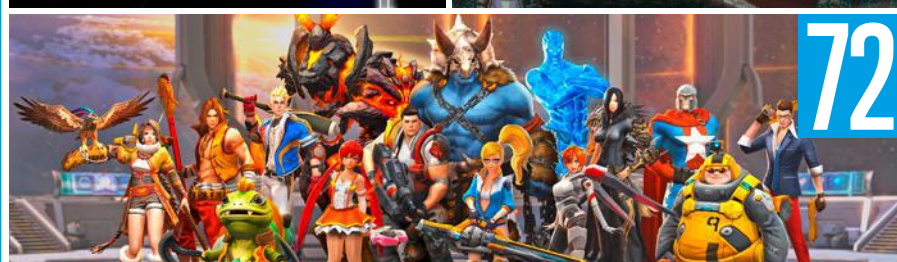
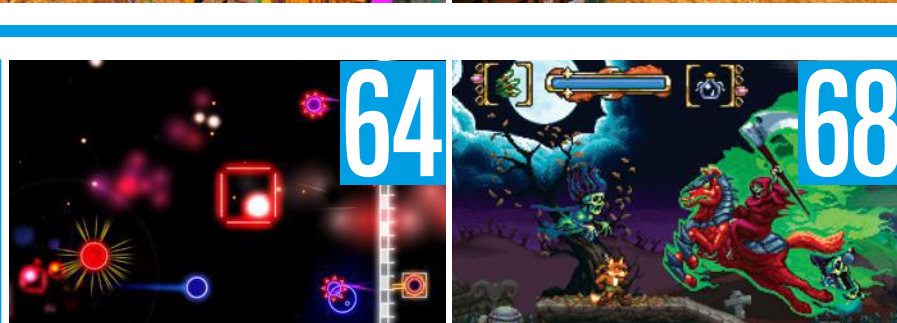
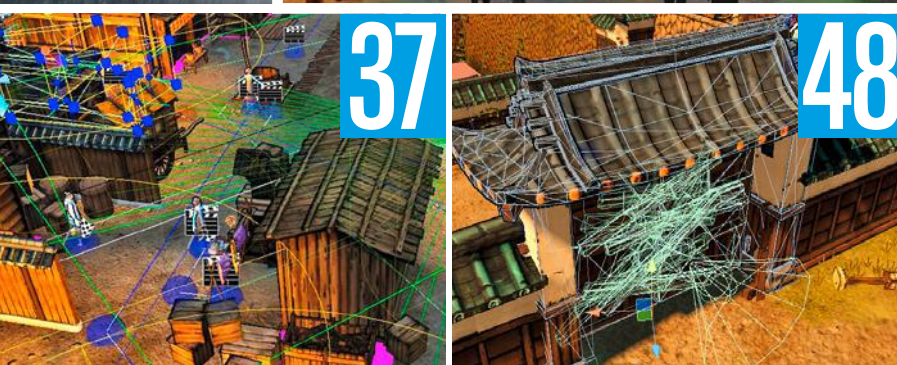
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We visited Mimimi Productions at their studio and took the chance to take some pictures.

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Porting games developed for mobile to PC, such as »Ellipsis«, can be quite challenging. Salmi Games can tell a thing or two about that.

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With FOX n FORESTS and the help of their simultaneously developed »pixel pipeline«, Bonus Level Entertainment want to revive the 16-bit era.

72 Interview: Balancing in Master X Master
We sat with Jiho Lee, Hyung-Min Lee, Seungcho So, Monnseop Lee and Bonhak Koo from NCSoft to talk about balancing their action MOBA Master X Master.



FOCUS GAME

THE CALM AFTER GAMESCOM

All done and dusted - the world's biggest game show including its much-touted visit by high-profile politicians.



Timm Walter
Head of Operations at GAME,
the German Games Industry
Association

Timm is a political scientist and as Head of Operations in charge of the operating business of GAME. Prior to his time in the association, he gained wide-ranging experience in politics and the media industry as well as in various clubs and societies.



Ubisoft presented a strong portfolio of upcoming releases at gamescom, including highly promising series offshoots like »Far Cry 5«, »Assassin's Creed: Origins« and »Anno 1800«.

In my last column I was wondering what effect the newly discovered political love of the games industry might have and what we as the representatives of said industry can expect when not only the Chancellor, but also the Secretary Generals and Chairmen of the big parties as well as various state representatives meet at the trade show that is so important for us.

I wish I could write about genuine torrents of enthusiasm by the politicians and about a growing understanding, not only for our form of art and culture, but also for our economic situation – especially with regard to the international market and competition situation. But unfortunately, that's not the case.

»We can only hope that the annual gamescom trips are more than just a getaway to a fun alternate universe.«

»No guarantees«

Of course, each year, more and more politicians find their way – be it by accident or will full intention – to gamescom, and the by now traditional round tour on opening day is becoming more and more popular. To the surprise of no one, we heard the Chancellor say words like »worthy of support« and »potential«, but can we really call this a major achievement?

Unfortunately, I don't possess a crystal ball (which I am painfully aware of since I'm not writing this feature from the terrace of my beach mansion underneath palm trees), but also since my bitcoin portfolio has failed big time. But more importantly, this means that I can only guess how much truth really lies in these words.

Two occurrences in Germany in the last weeks clearly showed the significance of digital topics beyond the industry though: First, the possibly worst electronic election guide of all times (in preparation of the German Bundestag elections), which basically completely ignored the topic of digitalization. And second, the worst tv debate (between the two candidates for Chancellor) of

all time, which basically completely ignored the topic of digitalization.

Digital representatives

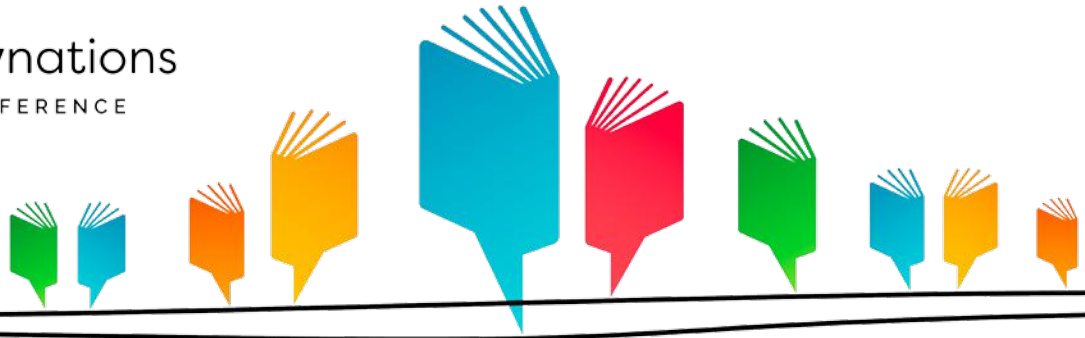
Of course, one may say: »But it's not the politicians or parties who created the election guide and the tv debate!« This may be true, but at the same time they pretend to know what the people want. If the people really don't have a digital agenda, we and

other IT industries, too, have a much bigger problem than we have been aware of so far. Since the elections are already over when this article is published, we can only hope that all relevant parties do indeed have digitalization and the associated prospects and possibilities on their agenda and that their annual gamescom

trips are more than just a getaway to a fun alternate universe to escape their reality of furious dairy farmers and steelworkers. And we should hope that the party programs will be more than just empty promises. If one may believe them, most parties have at least understood the necessity of a focus on digital content and economy.

Hope dies last

Since we actually can't do anything but hope (and since two politically coined columns in a row are a bit much), I can only conclude that this year's gamescom was very much dominated by Ubisoft who has very promising series offshoots in the works with »Anno 1800« and »Assassin's Creed: Origins«, both of which build on the strengths of their prequels. And with »Far Cry 5« and »South Park: The Fractured but Whole« we're looking forward to two titles which deal with politics again, even if in an exaggerated, satirical form. I guess we can't live without politics after all...



FOUR QUESTIONS FOR... NICO NOWARRA

Nico Nowarra is CBDO at Experimental Game GmbH whose focus is on developing the »Gamebook« technology. For 2018 the company is planning a very special event though.

»Story Nations« is the name of a conference whose premiere is scheduled for early next year. What's the thematic focus of this event, and who had the idea for it?

Story Nations came about in the minds of the people at »Experimental Game«. For years, we've been dealing with the topic of storytelling and developed a special technology for that. We enjoy presenting our ideas at various events and trade shows, and after a while we realized that there are conferences for all sorts of things, but unfortunately none focusing on storytelling.

For us, it's obvious that the different trades, from script writer – no matter whether Hollywood or videogames – to journalist to novelist, have a lot more in common than people working in these fields might think themselves. Story Nations is to create that link and bring together storytellers from all of these trades – with lectures of popular pioneers in this field, but also with hands-on workshops where people can learn from one another.

What's the date to save for all who're interested in it?

We decided for March 1 and 2, 2018. The goal of Story Nations is to invite exciting speakers. Storytellers like Christy Marx who was responsible for some of the most popular cartoon series in the 1980s. Or well-known novelists from the fantasy and science-fiction genre. Such high-caliber speakers obviously have a busy schedule you have to show consideration for if you intend to book them. Plus, to host an event of such size you need a considerable amount of money – for renting the premises and the technology, but also

for the speakers' travel and hotel expenses. There are a number of sponsors who have already shown interest, but since it was at too short notice to make the funds available in 2017, we decided to do it in March 2018.

Is Story Nations planned to be a single event, or are you generally prepared to establish an ongoing format?

We're fully convinced that there's a desire and demand for exchange between the different trades in storytelling, and the many positive reactions confirm this. There are storytellers from all kinds of areas who are looking forward to sharing their experience and knowledge, and just as many who would like to learn more about the work of others. Therefore, we have already started to host smaller monthly meet-ups which are kicked off by a short keynote speech. After that, everyone is free to join in the discussion. We sure hope to continuously attract increasing attention and maybe turn it into a regular event with a great appeal.

What personal expectations do you have for the event?

For me, Story Nations is a fantastic opportunity to bring together people from really diverse industry branches. This encounter of various perspectives offers authors as well as potential clients the chance to better develop mutual understanding and thus to create the best conditions for creative cross-media projects.



Mediadesign Hochschule Berlin is going to be the venue for the Story Nations event scheduled for March 2018. The faculty is already the venue for monthly meet-ups in preparation of the event.



DIVERSITY REQUIRES FUNDING

While games are gaining more and more importance, funding is still lagging behind.

Computer and video games are of utmost importance as a cultural asset, innovation driver and economic factor«. With these words, German Chancellor Angela Merkel herself opened this year's gamescom in Cologne for the first time on August 22. In her speech the politician pointed out the fact that more than 500 companies of the German games industry represent a strong pillar for Germany as an innovation location.

Despite the economic and social meaning of games, founders who want to turn their own game ideas into reality are still facing major challenges when it comes to financing their projects. Germany still has a funding system which is less suitable for audiovisual media productions like games than for movie productions, although games are economically and culturally relevant as well as innovative, and there is still no funding for »Game Development« in Germany today.

Funding at state level

Currently, funding programs only exist on a state level in Germany, which emerged from regional movie funding, e.g. in North Rhine-Westphalia, Berlin, Baden-Wuerttemberg and Bavaria. The conditionally repayable loans and grants are usually between 20,000 to 120,000 euros per project. For a lot of companies, these funding amounts are

a good start to put their visions to reality or to get them on their way into the games industry with a project.

Some federal states offer young companies in Germany additional innovation vouchers for the realization of their ideas and easier access to the market. Some examples for these are the »Innovation Voucher Bavaria« or Baden-Wuerttemberg's »Innovation Voucher C« which has been especially developed for the culture and creative economy. The amount of the grants varies from state to state as well as from voucher to voucher and ranges between 1,000 and 50,000 euros. Costs that arise before the beginning of the grant, can't be taken into account during the application.

North Rhine-Westphalia in particular offers an additional program, the lead market competition »CreateMedia.NRW«, which can also benefit game developers. Around 20 million euros have been made available for digital projects so far. The next submission deadline for projects ends on April 9, 2018.

Companies who want to get information on funding and grant options for certain projects in general, can contact the funders and networks of the respective federal states like the Medien Netzwerk NRW, Medienboard Berlin-Brandenburg, gamecity:Hamburg or the Medien- und Filmgesellschaft Baden-Wuerttemberg.



Stephanie Lang
Manager Services & Funding
at BIU - The German Games
Industry Association

When Stephanie isn't managing the Services & Funding department at BIU or organizing one of the many exciting webinars at BIU Academy, she offers free orientation support on all issues of funding.
Contact: lang@biu-online.de

Funding at federal level

In addition to regional project funding, companies in Germany can also benefit from certain nationwide funding programs: The KfW banking group, for example, offers start-ups the credit types »Start-up Loan«, »Capital for Start-ups« or »Universal«. Start-ups can also benefit from the co-investment fund »Coparion«, which invests in young, innovative companies with the same amount and the same economic conditions as private lead investors.

On a European level, developers can also apply for financial support by »Creative Europe Media«. The last funding round supported 32 games from 13 countries with over 3.7 million euros. Four games from Germany received grants of about 500,000 euros in total.

Still a long way to go

Funding in Germany is still fraught with difficulties, even if the funding programs have improved in the last few years. There are a lot of funding schemes supporting start-ups and even their investors with their projects, however the content industry often can't benefit from that.

The biggest obstacle for games companies still is primarily the so-called »innovation demand«. Even before a project starts, a large number of programs for research and development funding require a »proof of innovation« which the project is supposed to deliver. However, in the games industry the innovation is mostly of a non-technical kind. Free-to-Play games, for example, are an innovative business model from the games industry, even though they're no technical innovation per se. The innovation is only created through the users playing the game. Hence, funding of games in Germany is too often prevented by a too narrow understanding of the term »innovation«, which a lot of programs are based on. That's why a lot of companies still finance their projects through savings or capital provided by friends and family.

Also, countries like France, Poland, Canada or Italy have already established complex funding systems which are continuously being expanded. The current framework conditions in Germany, on the other hand, are no longer attractive for most audiovisual productions. The problem is not only the rather low funds, but also the outdated structure of the entire funding system.

The three-pillar principle

Germany needs a new funding concept which we believe should consist of three essential pillars:

Pillar 1: Existing funding, e.g. through awards.

Pillars 2: Prototype and project funding, which should be expanded, as well as existing investment and funding programs, which are made more and more accessible for games companies.

Pillars 3: Automatic funding on federal level – networks and founding centers whose focus is on better networks, consultation and visibility, both nationally and internationally. They need to keep going and to be supported in order to guarantee a vibrant German developer scene in the future, too.

»We can still do a lot more for funding the games industry.«

Angela Merkel

A combination of various funding components should enable games companies in Germany to access the required funds more quickly and easily, so they can go ahead and work on their game ideas and become competitive on an international level. Without funds, German games like »Shadow of Steam« or »Orwell« likely would have never seen the light of day. Diversity requires funding. To say it with Mrs. Merkel's words: »We can still do a lot more for funding the games industry.«

Stephanie Lang

The Dwarves, The Curious Expedition, Shift Happens and The InnerWorld are classic examples for games which likely would have never seen the light of day if it hadn't been for funding.





NEW DATES FOR »BIU ACADEMY« – WEBINARS ANNOUNCED

The webinar series »BIU Academy« of the German Games Industry Association in cooperation with Making Games will dedicate its next session to the topic »Gamification«.

BIU Academy« in cooperation with Making Games is a webinar series for developers, founders and all those who are interested in its topics; a training scheme without travel expenses about all topics surrounding game development and sales, like business models, design, management, legal, marketing, and much more.

- **Duration:** 60 minutes
- **Monthly; Tuesdays** at 5pm
- **Fee:** 19,00 EUR (free for members of BIU)
- **Register once at:** www.edudip.com
- **Book a webinar at:** <https://biu.edudip.com>
- **Current information at:**
www.biu-online.de
Facebook: BIUeV
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Webinar-Termine 2017

Termin	Thema	Referent
September 26	Gamification	Tahsin Avci (PopRocket Games)
October 10	From Colleague to Supervisor	Dr. Sabine Hahn
October 17	Avoiding Crunch Time: A Team Task!	Wolfgang Walk (Grumpy Old Men)
November 7	H2020 – Funding Options on EU Level	Immo Böke (EEN Berlin-Brandenburg) Anne Le Rolland (EEN Berlin-Brandenburg)

Änderungen vorbehalten

Be A Speaker!

Sie sind selbst in der Gaming-Branche aktiv und haben da das ein oder andere Thema, mit dem Sie sich nicht nur perfekt auskennen, sondern das Sie gerne selbst einmal im Rahmen eines Webinars vorstellen möchten? Wunderbar – der BIU ist immer auf der Suche nach Speakern.

Für nähere Informationen wenden Sie sich an:

Stephanie Lang
Manager Services /
Referentin Förderprogramme

+49 30 240 8779 0
lang@biu-online.de

»Same, same but different« From Colleague to Supervisor

Date and fees

- **Duration:** 60 minutes
- **Tuesday, October 10** at 5pm
- **Fee:** 19,00 EUR
(free for members of the BIU network)

The games industry is still very dynamic – just like its corporate structures. Companies quickly grow from 5-man studios to medium-sized companies within just a few months. Same thing goes for the career of an ordinary employee who takes on a leading position, often much faster than expected. Such a leading position brings about a lot of challenges and, of

course, a new level of responsibility. The right tools and techniques as well as the right attitude and awareness of the new role can ensure the best possible conditions for a good working relationship with the staff.

The webinar is about the meaning of leadership responsibility, the competences a leadership personality should have, how »Leadership 4.0« works, how staff can be led stringently, and how to become an »alpha-intelligent boss«.

Apart from sharing theoretic aspects, we will focus on the practical relevance as well as on the discussion of individual questions by the participants.



Dr. Sabine Hahn
Lecturer, Business Coach
and Consultant with a PhD in
Media Science

Sabine Hahn is a lecturer, business coach and consultant with a PhD in Media Science. She has gained over 10 years of experience in the games industry, e.g. at Com2uS, Glu Mobile and Electronic Arts where she worked as Sales & Marketing Director Mobile. In May, she published »Gender and Gaming, Women in the Focus of the Games Industry«.
(www.beratung-hahn.com)

Avoiding Crunch Time: A Team Task

Date and fees

- **Duration:** 60 minutes
- **Tuesday, October 17** at 5pm
- **Fee:** 19,00 EUR
(free for members of the BIU network)

90% of all crunch time is the result of a wrong approach to task scheduling – and that's a task for the entire team. At the same time, crunch time is indeed the least effective time on the job. By sticking to just a few rules, crunch time often can be avoided completely, and the quality of the

game as well as the quality of life can be increased.

The webinar does away with the still prevailing biases, offers discussion strategies for realistic contract negotiations with publishers and a basis for studios to build an effective and sustainable production culture again.



Wolfgang Walk
Independent Producer, Narrative Designer and Lecturer

»H2020« Funding Options on EU Level

Termin und Kosten

- **Duration:** 60 minutes
- **Tuesday, November 7** at 5pm
- **Fee:** 19,00 EUR
(free for members of the BIU network)

»How do I apply for EU funding for interactive media and games?« That's what the webinar of Enterprise Europe Network Berlin-Brandenburg will be focusing on. The online seminar addresses people working in interactive media and games, who think about applying for funds from EU programs and would like to know more about it.

burg will be focusing on. The online seminar addresses people working in interactive media and games, who think about applying for funds from EU programs and would like to know more about it.



Immo Böke
Project Manager of Team Foreign
Trade, European Services at EEN
Berlin-Brandenburg



Anne Le Roland
Project Manager Media | Creative Industry | Service Economy
at EEN Berlin-Brandenburg.

making games CONFERENCE

PROGRAMM 25./26.10.17

Im Rahmen der
Medientage



MITTWOCH, 25.10.17

8:30 BIS 10:30 UHR: ERÖFFNUNGS-KEYNOTES

Ilse Aigner (Staatsministerin für Wirtschaft und Medien, Energie und Technologie), Felix Falk (Geschäftsführer BIU), Johannes Roth (Vorstandsvorsitzender Games Bavaria Munich, Gründer und Geschäftsführer Mimimi Productions), Hans Ippisch (CEO Computec Media Group) u. a.

10:30 BIS 12:00 UHR: EXPERTEN-PANEL: DIE ZUKUNFT DER DEUTSCHEN SPIELEINDUSTRIE

Felix Falk (Geschäftsführer BIU), Dr. Holger Weimann (Partner Beiten Burkhardt), Michaela Haberland (Förderreferentin Games, FFF Bayern), Johannes Roth (Vorstandsvorsitzender Games Bavaria Munich, Gründer und Geschäftsführer Mimimi Productions), Ministerialrat Daniel Curio (Bayerisches Staatsministerium für Wirtschaft und Medien, Energie und Technik), Hans Ippisch (CEO Computec Media Group)

13:00 BIS 17:45 UHR: MASTER CLASSES

Raum 1

Master Class 1	Game Design: Kalle Kaivola (COO remote control productions; ehemals Rovio Entertainment)	Arbeit mit IP - Von Angry Birds bis The Walking Dead	13:00 - 15:15 Uhr
Master Class 2	Game Design: Severin Brettmeister (Designer, Dozent Games Academy Berlin)	Interface und Storytelling – eine Liebesgeschichte	15:30 - 17:45 Uhr

Raum 2

Master Class 3	Technologie: Christian Spicker (Amazon Web Services, Industry Lead Gaming DE)	Warum Supercell, Rovio und Riot AWS wählen und wie AWS bei Gameplay und Monetarisierung hilft	13:00 - 15:15 Uhr
	Technologie: Sascha Wolter (Amazon Alexa, Technology Evangelist)	Warum und wie? Neuartige Spiel- Erlebnisse durch Sprache mit Amazon Alexa!	
Master Class 4	Business: Benedikt Grindel (Studio Manager Ubisoft Blue Byte)	Wann kommt Assassin's Creed aus Deutschland? Aufbau eines Studios mit AAA-Anspruch	15:30 - 17:45 Uhr



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DONNERSTAG, 26.10.17

9:00 BIS 10:15 UHR: ERÖFFNUNGS-KEYNOTES

10:30 BIS 11:30 UHR: EXPERTEN-PANEL: VR, AR, FREE2PLAY, MOBILE, AAA – QUO VADIS, GAMES-BUSINESS?

Hendrik Lesser (CEO remote controll productions), Wolfgang Emmer (CEO Aesir Interactive), Lars Janssen (CEO Travian Games), Christopher Kassulke (CEO und Co-Gründer von HandyGames™), Kristin Heitmann (InhaberIn appp Media), Evelyn Hribersek (Künstlerische Leitung EURYDIKE & O.R.PHEUS), Dirk Gooding (Chefredakteur Making Games)

11:30 BIS 12:00 UHR: MAKING GAMES AWARD

13:00 BIS 17:45 UHR: MASTER CLASSES

Raum 1

Master Class 5	Game Design: Andreas Suika Gründer & Creative Director Daedalic Entertainment Studio West GmbH	The Long Journey Home: Top-Down-Visions vs. Bottom-Up-Prototyping	13:00 - 15:15 Uhr
Master Class 6	Business: Hendrik Lesser CEO remote control productions	Von der Gründung bis zum Wachstum – Wie bringe ich mein Studio auf die nächste Stufe?	15:30 - 17:45 Uhr

Raum 2

Master Class 7	Business: Dr. Holger Weimann, Dr. Axel von Walter Beiten Burkhardt	Datenschutz ab 2018 – was Game Developer wissen müssen	13:00 - 15:15 Uhr
Master Class 8	Game Design: Christopher Kassulke CEO und Co-Gründer von HandyGames™	Mobile, VR, Wearable, Switch, PC, PS4, Xbox, Gameroom, Instant Games & mehr: Innovation als Grundstock eines Unternehmens in der täglichen Praxis	15:30 - 17:45 Uhr



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THE BRAND NEW **VIDEO PORTAL** WITH
TALKS, WORKSHOPS, PANELS, BUSINESS
AND PUBLIC KEYNOTES



WHAT IS MAKING GAMES ACADEMY?

You missed one of the Events? You were busy and had to skip some of the talks? Or you just want to enjoy your most favourite sessions once more? No problem!

MAKING GAMES ACADEMY is our brand new video portal for game developers on makinggames.biz. Here you will find developer talks, workshops, panels, business and public keynotes of the big German game developer conferences QUO VADIS, RESPAWN – Gathering of Games Developers and devcom sorted by day and channel.

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QUO VADIS has established itself as one of the leading European conferences about games. The conference regularly attracts top-notch speakers in their respective fields. Even industry legends like Richard Garriott, Bob Bates and Don Daglow have shared their knowledge in Berlin.

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Visit the making games academy: makinggames.biz

ANIMAGO AWARD & CONFERENCE

From September 7 to 8, 2017, animago celebrated its 21st birthday at Gasteig in Munich.

Already in its 21st year, animago AWARD & CONFERENCE was held in Munich's Gasteig for the first time on September 7 and 8. The two-day conference, which was hosted in Berlin until 2015, brought together fans and representatives from the movie and games industry, and made for lively conversations not only by numerous interesting lectures, but also through the annual presentation of the animago AWARD.

Of cats, monkeys and pirates

Distinguished experts from the movie and post-production industry attended the conference, which took place in three halls. Among them Arslan Elver (Framestore) who talked about the character work in »Guardians of the Galaxy Vol.2«, and Igor Jovanovic who thoroughly explained how Academy Award Winner MPC brought the epic water effects in »Pirates of the Caribbean: Dead Men Tell No Tales« to the big screen. Filip Lange and Wolfgang Emmrich of nhb Studios talked

Events like the Live Sketch Battle rounded off the exciting day program.

Photo Credits: Uwe Völkner



about the VFX production of the commercial trailers for Yoozoo Games' MMORPG »League of Angels 2«, and Liza Nechaeva told us what the team around »Simon's Cat« creator Simon Tofield had to consider in order to turn YouTube's cuddly scratching cat into a 360° video.

Those who rather wanted to get an overview of the nominated spots, short movies and trailers were able to do this in the screenings which ran parallel to the talks, and of course check out the products of the numerous exhibitors.

In addition to the exquisite catering, the highlight of the evening was the Live Sketch Battle and, of course, the animago AWARDS ceremony in the afternoon of September 8.

Something for everyone

The award nominees were clearly the winners of the event. There was everything from short movies to cinematic trailers, from both large companies and many student projects – the latter ones deserving utmost respect since all submissions were of outstanding quality. An overview of the winners of the individual categories can be found on the left.



Winner Best Cinematic: Beyond Good and Evil 2



The Winners

■ Best Character

»Poilus«

Isart Digital, France

■ Best Visual Effects

»Fantastic Beasts and Where to Find Them«

Rodeo FX, Canada

■ Best Advertising Production

»Canal Kitchen«, Unit Image, France

■ Best Short Film

»Afterwork«, Matte CG, Uson Studio, Apus

Estudios, Ecuador, Peru, Spain

■ Best Game Cinematic

»Beyond Good and Evil 2« Cinematic Trailer

Unit Image, France

■ Best Still

»Her Eventual Hesitation«

Marek Denko, Czech Republic

■ Best Motion Design

»Dust My Shoulders Off«

Grass Jelly Studio, Taiwan

■ Jury's Prize

»In a Heartbeat«

Beth David & Esteban Bravo, Ringling College of Art and Design, United States

■ Best Young Production

»Less Than Human«

The Animation Workshop, Denmark

■ Best Visualization

»Huawei Watch«

Glassworks London, Great Britain

Best Architecture Visualization

»Maisons Oxygène«, Villa 3D Animation

Valentinstudio, France



UBISOFT BLUE BYTE NEWCOMER AWARD

As part of the German Developer Awards, Ubisoft Blue Byte will once again present their Newcomer Award in 2017, for which the noble donors came up with an innovation this year.



Karsten Lehmann
Public Affairs Manager at
Ubisoft Blue Byte

Karsten studied Communication Science, Marketing and Political Science at the University of Duisburg-Essen and joined the industry in 2000, first at Ubisoft Germany, then at Blue Byte.

Am September 15 marked the end of the submission phase for this year's German Developer Awards, which will be held in form of a gala on the evening of December 6 at DOCK.One in Cologne. And once again the Ubisoft Blue Byte Newcomer Award will be part of it, which will include a noteworthy upgrade this year: For the first time, the participants will have the choice between two awards – the already established Mentoring program as well as an Incubator program for future founders. For the latter option, Ubisoft Blue Byte worked together with the Franco-German Accelerator company »SpielFabrique«.

In our brief interview, Karsten Lehmann explains what led to the decision and what the changes mean for the participants.

which we organized over the last three years. We regularly had individual members from the winning teams in the Mentoring sessions, who were already in the start-up phase or had serious intentions to found a company.

In cases like that, there are obviously additional questions that go beyond the content-related consultancy needs of a student game project. Hence, it's only logical to adjust the Newcomer Award to special needs like e.g. the graduating team of a game study program may have to found their own studio. It's also important though to stick to the original idea of the Newcomer Award, which is to give our feedback to mere practice projects from the study program in terms of Game Design, Game Art, Programming and many more.

Set of Rules

Next year, students and founders will have the chance again to apply for the Ubisoft Blue Byte Newcomer Award. The complete official set of rules is available at:

<http://bit.ly/2xyXskY>

The Ubisoft Blue Byte Newcomer Award which you present as part of the German Developer Awards, offers participating junior developers the chance for the first time to choose between two award categories: »Students« and »Founders«. What does this exactly mean for the applicants, and what was the reason for you to make this change?

We accompany the Awards for the fourth time already. The idea to explicitly cater to founders developed through the experience from the past workshops with students,

Assuming that not much will change for »Students«: How exactly does the cooperation with SpielFabrique look like? What can the winners of the »Founders« category expect? Which requirements do they have to meet?

The winning team will join SpielFabrique's Acceleration Program. The Incubator is specialized on game start-ups. SpielFabrique carries out targeted coachings together with a partner network. These coachings cover, for example, the business plan

DEUTSCHER ENTWICKLERPREIS



»Cubiverse« **1** **3** won first place at the Ubisoft Blue Byte Newcomer Award 2016, »Super Dashmatch« **2** came in third - both have since been featured in Making Games.

structure, positioning and communication strategy, or the right tool choices and design-specific questions. Ubisoft Blue Byte is a partner in this network of experts.

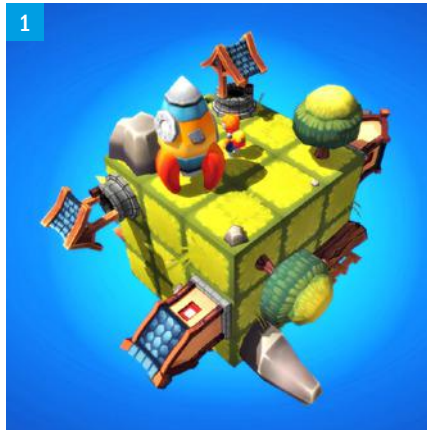
So far there have been no losers in this respect. Those nominated were eventually among the winners; only the final rankings weren't revealed until the end. Will the Incubator update change anything for ranks 2 to 5?

There will be two winning teams now: a mere student team and a team with concrete intentions to found a company or one which has just founded a company.

Your secret favorite of 2017?

I can't reveal anything yet; the jury comes together in October.

Thank you for this interview!



Event calendar www.makinggames.biz

Online event calendar with search function and event infos

OCTOBER 2017

Brasil Game Show

Location Expo Center Norte, São Paulo
Date 11 to 15 October
Topic Exhibition
Fee 75 to 399 R\$ (20 to 108 Euro)
Website <http://www.brasilgameshow.com.br/>

MEDIENTAGE München/Making Games Conference

Location Munich
Date 20 to 21 August
Topic Conference
Fee 99 EUR to 199 EUR
Website <https://medientage.de/>

NOVEMBER 2017

Game Connection Europe

Location Paris
Date 1 to 3 November
Topic Exhibition/Fair
Fee up to 500 EUR

Website <https://www.game-connection.com/>

PLAY17 - Creative Gaming Festival

Location Hamburg
Date 1 to 5 November
Topic Workshops/Game Jams/Exhibition
Fee 40 to 120 EUR
Website <http://www.playfestival.de/de/>

Paris Games Week

Location Paris
Date 1 to 5 November
Topic Exhibition
Fee 15 to 60 EUR
Website <https://www.parisgamesweek.com/en>

Sitex Singapore

Location Singapore
Date 23 to 26 November
Topic Exhibition/Fair
Fee —
Website <http://www.sitex.com.sg/>

International Conference on Interactive Digital Storytelling

Location Funchal, Madeira, Portugal
Date 14 to 17 November
Topic Conference
Fee 30 to 500 EUR
Website <http://icids2017.m-iti.org/>

VR NOW Con & Awards

Location Berlin
Date 15 to 16 November
Topic Conference/Awards
Fee 45 to 391 EUR
Website <http://www.vrnowcon.io/>

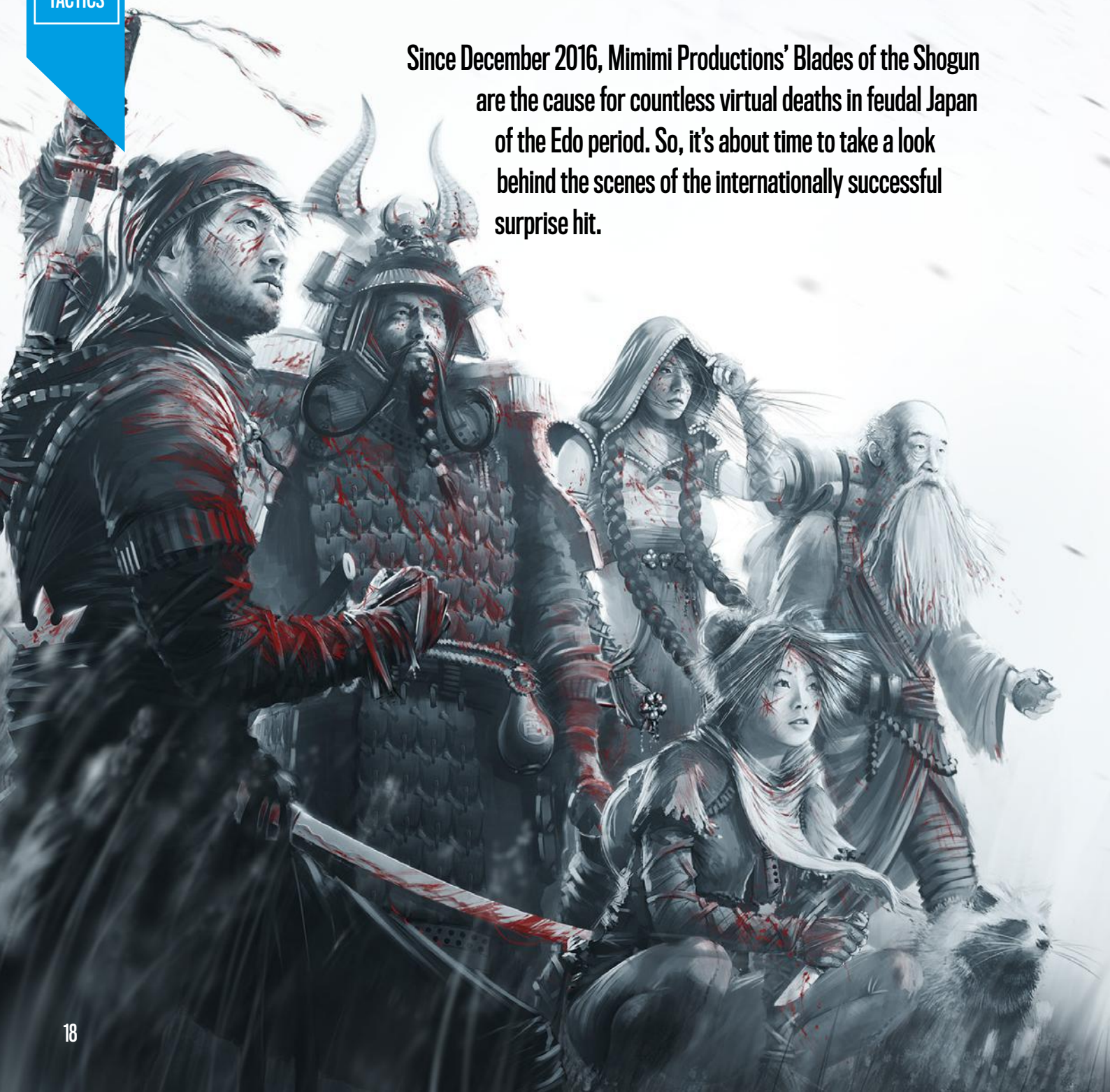
DECEMBER 2017

Deutscher Entwicklerpreis 2017 (German Developer Awards)

Location DOCK.One, Coogne
Date 6. December
Topic Summits/Awards
Fee tba
Website <http://deutscherentwicklerpreis.de/>

THE MAKING OF SHADOW TACTICS

Since December 2016, Mimimi Productions' *Blades of the Shogun* are the cause for countless virtual deaths in feudal Japan of the Edo period. So, it's about time to take a look behind the scenes of the internationally successful surprise hit.



MAKING OF
SHADOW
TACTICS



»Hey, Commandos was so awesome, why did nobody ever make it with ninjas?«

Noch Until nearly a year ago, not a lot of people had heard of the game developed by the Munich-based studio Mimimi Productions, but this was soon to change. In December, the homage to the two decades old real-time strategy hit »Commandos« was released for PC, receiving not only countless awards but also dream reviews. The same happened when the console version was released in summer 2017 – we are, of course, talking about »Shadow Tactics: Blades of the Shogun«.

Next stop: Colortown

While the world is still in awe, the team around the Mimimi founders Johannes Roth and Dominik Abé are already fully focused on the next project. And yet, they still found time to conjure up a »making of« of superlatives. And could there be a better way than to start with a brief introduction of the history of the young, but successful development studio, presented by CEO Johannes Roth himself? An essential part of this history is the direct predecessor of the ninja adventure: »The Last Tinker: City of Colors«. Even if these two titles could not be any more different, both play a key role in the history of the now internationally known studio. The prototype of the colorful puzzle was already developed

during their time at university when the full-time project Shadow Tactics was still far from being on the map. They wanted the prototype to be of high quality in order to give the members of the core team, which still exists today, a boost for interviews – and yet, a full title was not planned at that time.

In 2012 the team of six founded the company Mimimi Productions to publish their mobile app »daWindci«. What followed was the further development of The Last Tinker, which was made possible through financial funds by the FFF Bayern (FilmFernsehFonds Bayern) and a contract with Ravensburger Digital. Regular feedback from events like gamescom was implemented in the colorful platformer, and eventually they won Unity as a publisher. »We had one year to finish The Last Tinker. If we hadn't managed, we would have had to consider gaining some experience elsewhere in the industry first«, Johannes remembers. But it all worked out and after an entire year of development work, the brightly colored adventure was finally released in May.

Prototype, pitch & publisher

»After we had released The Last Tinker, we had to think about what to do next«, Johannes says. »Before Tinker we had a few pitches, one of which was »Commandos with ninjas«. Dom already had the idea





Johannes Roth
Co-Founder and Managing
Director of Mimimi Productions

In 2008, Johannes built the still existing core team of Mimimi Productions and, together with Creative Director Dominik Abé, founded the successful and continuously growing studio which has been awarded many times for its games; *Shadow Tactics* even received the best rating for a German game on Metacritic since 2011. Johannes is also an advisor for studios all over the world, Chairman of Games/Bavaria Munich, a board member of GAME, the German Games Industry Association, and always eager to make the world a little bit better for developers. [@darkrage64](#)

in the first semester when he said to Mo: »Hey, Commandos was so awesome, why did nobody ever make it with ninjas? This would be just perfect: A handful of ninjas fight against a superior power, quietly killing off one after another until nobody really knows in the end what exactly just happened!« 2014 was also the time when Firaxis released their »XCOM« remake, which was even successful on mobile. Hence, at first we even started thinking about developing *Shadow Tactics* for mobile, but then decided in favor of PC and consoles. We then developed a mini-level prototype where at least you could walk around and switch between day and night. The opponents already had vision cones, and if you were caught, you died. We sent this prototype to various publishers. We also had other great ideas, but back then I strongly believed in this particular pitch. Difficult hardcore titles which used to be popular back in the days just experienced a revival, and it just felt right at that time.«

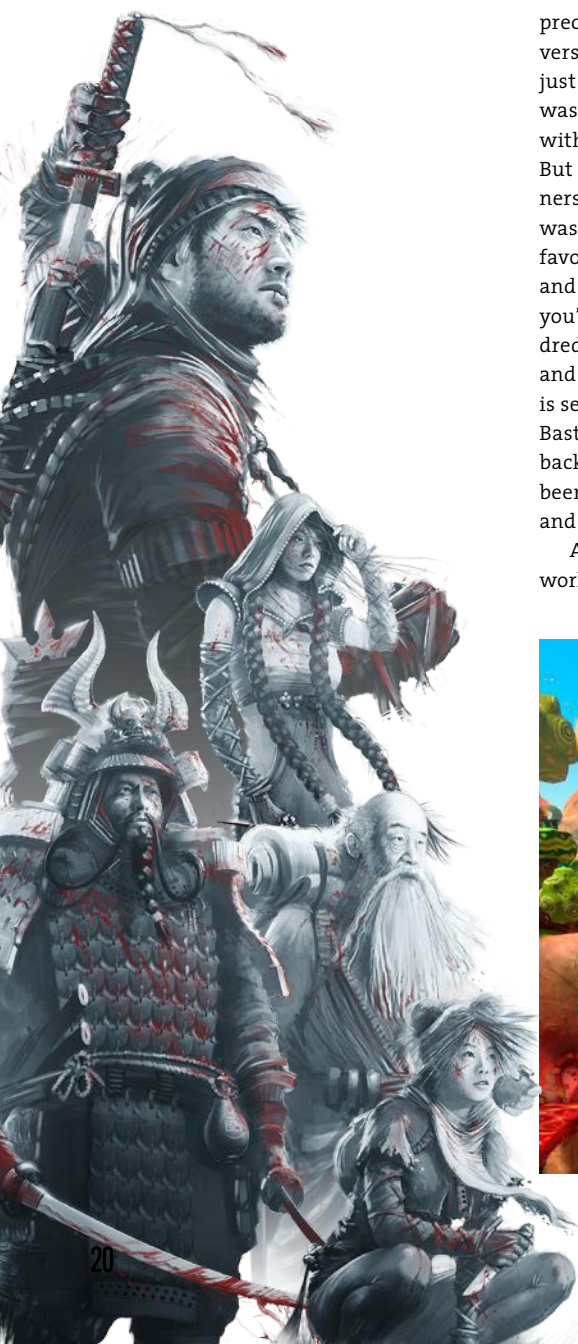
The publishers, however, didn't appreciate the concept although the digital versions of *Commandos* and »Desperados« just started selling well again. »The pitch was very simple indeed: »Commandos with ninjas« – that basically says it all. But in the end, only two or three partners showed interest, and one of them was Daedalic which turned out to be our favorite. When Carsten [Fichtelmann], Poki and the team pick a game, you know that you're not just one partner among hundreds. Daedalic are developers themselves, and the commitment they're showing is sensational. Thanks to their investor Bastei-Lübbe, Daedalic had enough funds back then, otherwise they wouldn't have been able to agree to the deal. We signed it and started developing *Shadow Tactics*.

Altogether we spent around 21 months working on the PC version, which shipped

in December 2016, and the time after the PC release was spent for the console port. Originally, a development time of 18 months was scheduled, and during the first 12 months we were right on time. The thing was that alongside the development we were constantly working on our vertical slice – this one level that was always polished and served for quality reference while the rest was more of a functional kind. The vertical slice was always really pretty – after the alpha we realized that the result was actually more beautiful than we had pictured it in the beginning. We learned a lot in these twelve months, be it about our tools, about the game itself, or about how the graphics make the best impression. And we realized that we had to keep the exact same level of quality for the rest of the game, too – but of course, our schedule didn't consider this! At this point we started investing the financial reserves of Mimimi Productions into the project. At the end of the year, it was pretty hard when on the one hand all potential subsequent projects didn't work out at the last minute and on the other hand many potential partners first wanted to wait how *Shadow Tactics* would be received before they would sign a deal with us. And the team, too, was very anxious, after all the title meant the world to us. We were anxious about the review scores, the community feedback, the sales – simply everything.«

Loved by the critics

Shadow Tactics was released on December 6, 2016 – the day before the German Developer Awards night where Mimimi Productions won in as many as four categories. At the same time, the first reviews came in. »The reviews were outstanding: an 86 rating from GameStar, 92 points from PC Gamer, even Rock Paper Shotgun



and Kotaku praised us. We couldn't possibly predict such a result after a development time of 12 months. When we made the unanimous decision back then to finish the game in the best way possible and not in the originally planned quality, I said very clearly that we would have to go »all in« with that decision – in case of failure, it would have most likely been »Game Over«. The unanimous decision was: »We just have to make it as awesome as possible, after all we also want to revive the whole genre!«

In the end it was as predicted: At the time of the German Developer Awards we had basically no money left. And yet, the entire team was there, even our interns, who had joined us for a while – everyone paid for their train tickets themselves. We just wanted to have a great night and celebrate together, while we were all aware that from December 31, 2016 on it would be over and only those from the team would be left who were working on the console version.

Well, the stakes were high... but luckily we won. The game was very well received, and from that moment on it was also much easier to look for further negotiation partners than before. And I would also like to point out that absolutely nobody tried to take advantage of our situation then and rip us off with a bad deal. Also, sometimes negotiations can take quite a while, and luckily this wasn't the case either.

I remember being on the train on December 23 – at that time, everyone else was already on holidays – and writing emails to the team to let them know that the contract had been signed and we were safe for the time being. We then got together again in early January and happily destroyed all paperwork which somehow had to do with the potential demise of our studio.«

Facts, facts, and more facts

»Of course, we also kept thinking of Shadow Tactics in numbers and how many units it would be selling in the end. If we sold about 10,000 units in December – according to my personal calculation – the project would start to become profitable in about one or two years, the funds invested would gradually be earned, and at least the entire project wouldn't be a financial disaster. With 30,000 sold units or more we'd be quite well off, and 50,000 would be a dream come true. In the end, 60,000 units were sold, and at the end of January it was already 100,000. At the moment, we are at about 200,000 sold units (consoles not included) via Steam, GoG and various platforms in China – a surprisingly strong market for us! What should also be mentioned in this context is that so far we have never granted discounts of more than 33 percent!«

Are we making any profit by now? »We've been making profit since January«, Johannes proudly says. »We're still far from being rich, as the Ikea furniture in our studio proves, but we can pay regular salaries. We now finance the work on our current project through the funds provided by our new publisher.

There would be two possible ways to use the money we're now making with Shadow Tactics: for growth or reserves. We decided for the latter since I want to avoid getting the team into a situation like last December again by all means. It's f&§%ing awful having to tell people that they will most likely lose their job in the near future. At the beginning, you're still more relaxed and hope for the best until things eventually get more and more serious. Personally, I was only comforted by the fact that we always had the best people on our team and everyone would surely find another job elsewhere. We had made



Left side: Before the development of Shadow Tactics, Mimimi Productions released the platformer The Last Tinker.

Right Side: Happy winners of the German Developer Award 2016.



In Shadow Tactics, five specialists like Aiko, a master of disguise, make the shogun's deadly wishes come true



In 13 missions, the assassins of the shogun are confronted with all kinds of weather conditions and daytimes – easy is for amateurs.



a name for ourselves and the game was a hit, so we were well-positioned. But even when things started to disappear over the horizon towards the end of December, I didn't manage to switch off completely for a long time. The whole situation still subconsciously burdened me for the next six months, I felt restless and had trouble sleeping. Also, financial tricks like not paying salaries were never an option for us. In the end, all that causes are debts, especially for people who simply depend on that money. Nobody had any private reserves since we had all just graduated from university; some of us even had considerable loans to pay off, which are indirectly also paid off by our company.

Controlled growth

Our company did grow, even if only to 25 people of which 23 are located here and two are freelancers. And that's not going to change any time soon since the office is now full anyway. I'm glad about it since otherwise we'd probably end up hiring this intern or that because they're awesome or supporting somebody who's close to us, etc. We rather put our focus on improving various processes. We brought Tobias [Filthaus] on our team since he was incredibly active in the closed beta on Steam. We asked him if he wanted to do the QA of our titles – the rest is history, and he's now a fixed part of the team, QAing our titles right from the start. After five years at Daedalic, Tom [Kersten] joined us as Production Director, taking charge of the project management and relieving Dom and myself in planning matters. And

then we expanded the team by the UI Artist Reinier [Goijvaerts] and an additional Level Designer. We have great artists on our team, but UI Design is a completely different matter and simply not their core strength. It's just great having a specialist on site who works together closely with the Concept Artists. In addition to the new members, we were also able to take over people whose contracts had still been limited.

We basically have no fluctuation in our studio, which is incredibly important for me. I ask job applicants straight forward in interviews whether they can imagine staying with the same company for ten years. Of course, I'm aware that there is no sensible answer to this question. For me, it's more about getting people to just think about things like that.

Having no fluctuation is a positive sign in two ways: For one, the company is doing well enough to not have to lay off people. Second, it says something about the work atmosphere in a company when people don't even waste a thought on changing companies. »That's really crazy...«, Johannes suddenly bursts out. »We, that is the original core team of six, have our ten-year anniversary in 2018. We've been making games in this team since 2008, not taking into account the actual founding of the company. It all started out with »Grounded« when we sent each other level sketches during the Christmas holidays... that's a really long time ago...

Anyway, we're doing well – we're not rich, aren't flushed with money, and put everything we have aside. We have a great

partner and an awesome team. And it's okay to just pay taxes for once instead of feeling the need to invest and grow and eventually get into a situation where people aren't safe. We want to keep focusing on one project at a time instead of running several – that's just not our thing. It's very important for us that people can use their core competences at full capacity. If there are several active projects, you need to restructure and use your team members' competences in certain areas, even though they may be better suited elsewhere.«

New projects instead of DLC

That this attitude can be a blessing and a curse becomes evident

when Johannes answers the question about new projects and possible DLC for Shadow Tactics. »We're already working on our new project. I can't go into detail yet, but we stay true to the genre – however there will be no official successor to Shadow Tactics. DLC

for Shadow Tactics is a different matter though... We would have loved to develop additional content, and we also came up with some great ideas, but we just had to remain realistic in this respect. The thing is: A level is a level, and the work it takes for a DLC map is exactly the same as for a map in the main game, and players have the same demands on quality for both. This again means that almost the entire team would need to be involved since it takes the best people to guarantee this type of quality. At the same time though we need these people for the new project which would have to be pushed back. Plus, we would have to do localizations and recordings since all DLC obviously needs to be translated into Japanese, which can become very expensive very quickly if it's not done in one go – DLC should pay off after all. The financial aspect plays a significant role, but what's even more important is the time. Hire new people for it? They would first have to make themselves completely familiar with the project, for which they would need the support of the main team which again wouldn't really have time for it and may even have created new technologies unknown to the DLC team – it's a never-ending story. Long story short: We decided to invest all of our capacities and our commitment in one single project. We would have loved to develop DLC, but the new main project takes clear priority and would otherwise just suffer. And we would never consider releasing low-priced DLC of lower quality just to make money.

To avoid any confusion: We already started working on the new project in

»We would never consider releasing low-priced DLC of lower quality just to make money.«

January, while we were still working on the console port. But this was only of a technical nature, we didn't develop any more content from then on. We knew from the start that we wanted to have a console version, hence we considered certain aspects from day one. We already developed gamepad controls for the PC version, making sure, e.g., to include all skills. Developing separate or even »light« versions was never an option. We also regularly cross-checked technical features, e.g. whether we could also implement a quick-save option on console. Apart from that we were fully focused on PC and only after that was done we took proper care of the port.

It was much harder to achieve the same performance with the technical limitations of the consoles – we bow before developers like Naughty Dog, considering what they achieve with »Uncharted«. It's a fact that the processors in the consoles aren't nearly as powerful as they are in current mid-class PCs. Shadow Tactics may not look like Uncharted, but still every level features over 100 opponents who all need to be computed at the same time. Then there's the added characters here and there, while somewhere at the other end of the map a patrol is doing its deed. At the same time, the route, the AI, the vision cone and everything the NPC sees and hears need to be computed at all times – no matter what location the player currently is at.«

Lessons learned and future plans

To push through a project like Shadow Tactics doesn't happen overnight, and regardless of the actual success, the team has gained first and foremost one thing, and that's experience. Will it directly affect the next project?

Porting & localization



In addition to an English version, the team didn't decide for a German, but a Japanese localization. Considering the theme and the setting of Shadow Tactics, it's very fitting, but still unusual.

»To give Shadow Tactics a Japanese localization had nothing to do with trying to make it in Japan«, Johannes explains.

»Right now, the game is actually only available for PC, a platform that doesn't play a major role in Japan. We're currently working on the console version, but there are still some market-specific peculiarities to sort out. The decision was made simply because we loved the idea – the added atmosphere is unbelievable, and the community appreciated it, too.

Obviously, we had to take some criticism in Germany that there was no German localization of the game. But the fact is that we had to decide in favor of either Japanese or German solely for financial reasons. Well, you all know the result. And also in this respect we were very lucky to have Daedalic as a partner since they understood our motivation behind this step from the start.«

Very subtle: Explosions are a deliberate diversion to draw the guards' attention in a certain direction.





Top: Presented in a smaller format, the Polish Collector's Edition of Techland corresponds to the German one, which is limited to 1,000 units and is already sold out.

Bottom: Co-Founder and Creative Director Dominik Abé proudly presents one of the goodies of the Collector's Edition.

»Unlike The Last Tinker, we knew pretty soon who our target group for Shadow Tactics would include. The Last Tinker was colorful and playful, but yet demanding, and somehow that didn't really match. Shadow Tactics was designed to be hard from the start, hence we attracted a very specific circle of players. That was a great experience throughout the whole course of development, and it was a good feeling to have a certain level of security.

One of the biggest obstacles we had to face was once again the marketing. Of course, you can register at SteamSpy and check how many people bought Commandos and how many also purchased Shadow Tactics. It's still really hard to reach the people out there – despite all those great reviews and press coverage. Just recently somebody said to me how awesome our game was but that he had only heard about it two weeks before and that our marketing was really bad. And I just thought: »Sorry, we were represented on all sorts of channels, on all kinds of front pages and in all print media and even on TV recently – what else should we do?« We were even featured by some big Streamers and Let's Players, and that guy didn't even notice that. We just can't afford putting up posters on bus stops. It's still very hard to both reach the old Commandos fans and to captivate younger players who aren't familiar with the old games. It's just not a cineastic blockbuster game and therefore it's hard to advertise for it. But once people get to lay their hands on it, e.g. at trade shows, they all love it and say things like »Finally a proper »Assassin's Creed«, just harder and with more characters« or »Awesome, just like »Metal Gear« with an isometric perspective!«

It's not going to be any easier in the future to explain that to people, but at least we now already know our target group and community, which are probably not going to change with the next title. Luckily, we were able to claim a niche with

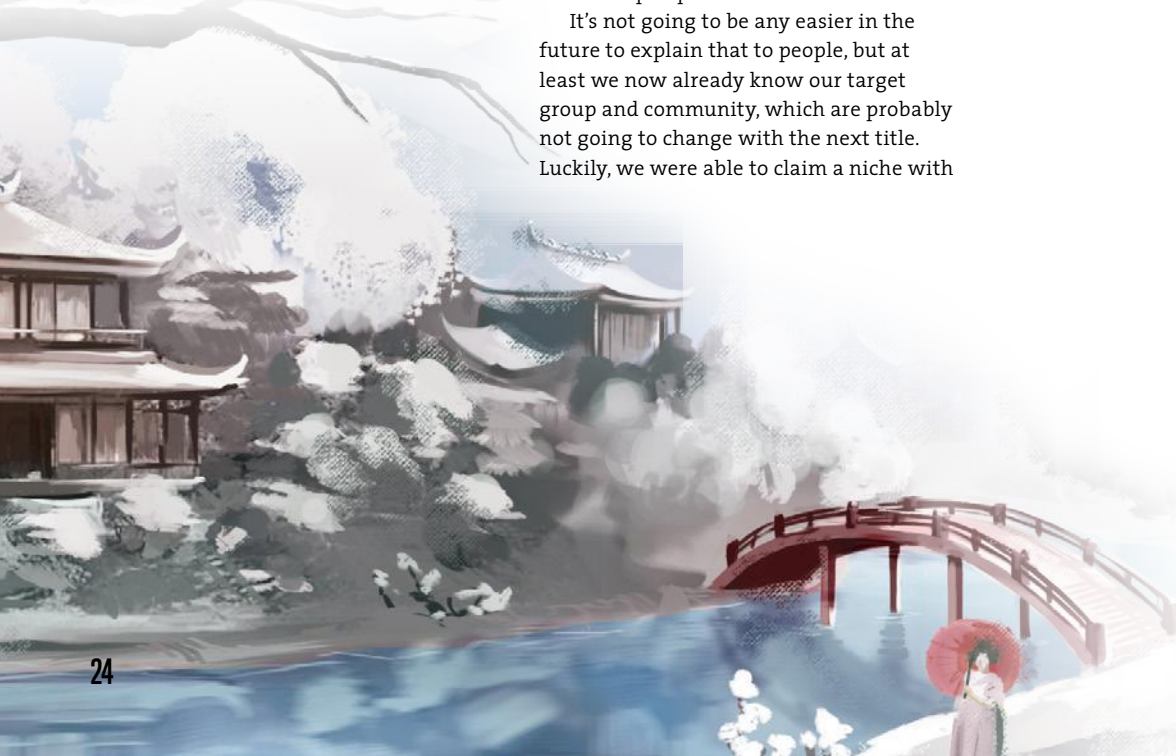
Shadow Tactics, even if other studios may now follow. We don't feel fully secure, and the pressure to deliver an awesome product won't be any less in the future – but it won't change our goal to do just that!«

What we wish for in the future? »Right now, I'm actually completely happy. I wouldn't mind for the salaries to rise again, but at least we can offer a fair and regular salary to our team. We are able to grow. We did everything to avoid extra hours and to be able to go on holidays.

It's also clear that the work will be just as stressful in the future. My biggest wish, however, is to always find a way to keep the team together as it is now.«

»It's still very hard to both reach the old Commandos fans and captivate younger players.«

Johannes Roth





FINDING THE PERFECT ART STYLE

From colorful to rather dark and realistic: finding the right art style for Shadow Tactics took time, but it was worth every second.



Bianca Dörr
is Art Director and Texture Artist
at Mimimi Productions.

In her position as Art Director, Bianca is with Mimimi Productions since 2012. She's not only in charge of leading and coordinating the art team, but also works on game asset textures and develops the art styles for every major project. On top she is responsible for the quality of all graphics and artworks. [@Katzenviechle](#)

Since the company's founding in 2012 we developed two big games for PC and consoles as well as several mobile apps, with these two games being »The Last Tinker« and our recent release »Shadow Tactics: Blades of the Shogun«. In this article we want to take you behind the scenes of our quest to find a fitting art style for both The Last Tinker and Shadow Tactics. First off, we will introduce both titles and their art styles to you. After that we'll dive right into the development process before we talk about problems and challenges we encountered along the journey – and of course about how we solved these issues.

The Art Style of The Last Tinker & Shadow Tactics

The Last Tinker is a third person jump 'n' run in a colorful world, inspired by games like »Banjo Kazooie« and »Jak & Dexter«. As Koru, you must defeat the Bleakness that threatens Color-town by using the power of colors.





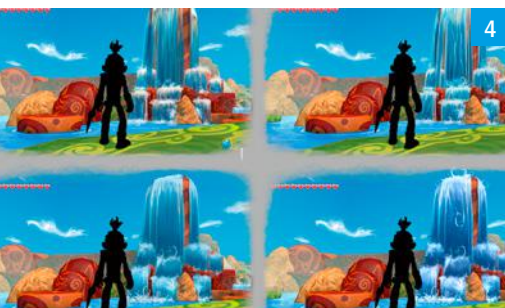
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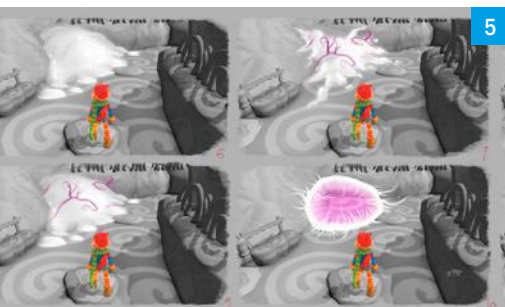
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3



4



5



6

The game's style is defined by round and smooth shapes, bright colors and a warm light setting. Everything is made from paper, color and glue which combined results in papier-mâché. As a contrast, we added some cardboard elements to create edges and make the world look more interesting. No straight lines, no 90 degrees, rather playful than super accurately drawn patterns – everything looks like it's made and painted by children. The game's characters are cartoony and funny, showing their attributes in their looks.

Shadow Tactics is set in Japan's Edo period and it's quite the opposite of The Last Tinker. It's a hardcore realtime stealth game in which you control five different characters with individual skillsets. Basically, it's »Commandos« with Ninjas. You kill or sneak around enemies to accomplish your missions. Theme and story of this game are darker and grittier, that's why we decided to create a more realistic style and combine it with non-realistic elements like outlines imitating ink, that typical Japanese paintings are famous for. We included many details and each map has its own interesting light setup to catch the mood of a level. In comparison to The Last Tinker, we used more desaturated colors. All characters are human but they all have their own unique silhouette, so you can instantly identify and recognize them. However, they have longer legs than normal humans – a design decision we made because the perspective made them look smaller and somehow compressed.

Finding the Style for The Last Tinker

The Last Tinker started as a project while we were still at university and we had three to four weeks to complete it. It had to be in 3D which was a problem for us at that time. When we started developing the style, our

artists had nearly no experience in 3D modeling – our strength clearly lied in creating 2D graphics. So we thought about how we could use our skills in creating 2D graphics for a 3D game. We didn't have the time and experience to make high detailed models so we thought about what we could create with the help of simple shapes and if we could create details with the help of textures. That's why we started with a 2D image that we projected on a plane and roughly cut out the shape of the image. Then we extruded the face and voila – we had a 3D model. Now we just needed the right material to realize this style, ending up with cardboard [2](#).

So we decided to create a world made entirely out of cardboard but we weren't really satisfied with the early outcome. It looked sort of boring. Plus, we felt like cheaters because our 3D models were so simple. Still, we needed 3D models with plain shapes that could quickly be created and animated. Then we had the perfect idea: Papier-mâché! It's perfect for beginners in 3D modeling. Plus, at university we were five artists. After starting the real production, we were two artists, then four. By only having to handle one or two materials we were able to create a world fully made of papier-mâché. Material handling was crucial, as creating different good looking materials that look good and real costs a lot of time. Everybody loved the idea and since we had proper 2D skills, we decided to use textures to add detailed hand-painted patterns.

Now we had a base to work with. To get to know the material better we came together with artists and game designers in tinkering sessions [1](#), testing different shapes and patterns. We had two or three of these meetings and in the end we really knew the material and its potential. The figures we made were nice references. Some

were really good, some were pretty ugly. Oh, and we still have them in our office. One of them sits right next to me and watches me ... creep ... **3**

Anyway, after having decided on a direction, we wanted to get a clearer vision for our design, which we eventually found in the works of Hundertwasser and Niki de Saint Phalle. Both focus on round and smooth shapes which colorful textures. Plus, we looked for papier-mâché figures made by kids because we wanted the world to look like kids built it. Those references gave us a good feeling for how the world and characters should look like.

First Steps in the Right Direction

After graduation, we occasionally experimented with the prototype, got a lot of feedback and wondered how we could improve it. When it became official that we could make The Last Tinker a complete game, we developed a story and reworked the gameplay which both influenced the style of the game. The first thing we noticed was that everything looked too clean and not very lifelike.

So we added some color splashes and dirt to make everything look a bit more used. Along with the story came Color-town's different districts, which served the gameplay well. Prior to that, the world was so colorful and chaotic that players often got lost. Introducing the districts and with them some coloring rules helped solving this issue. As already mentioned, we initially used only two materials. After starting the development, however, we considered adding more materials like water and paper hills **4** to make the world more interesting. We struggled a long time with the water because it never really fit into the world.

Then we had the idea to add patterns that you can see on nearly every asset: spirals. They appear as ripples in the water

and as splashes in waterfalls. Honestly, I love spirals and I loved drawing them. After some time though, I was so fed up with them that now, every time I see a spiral, I'm about to scream!

Of course, not all of Tinkerworld is friendly and colorful. The Bleakness wants to erase everything in it. The player sets out on an adventure to defeat the Bleakness and the monsters it created – so much for our vision of the first prototype. Style-wise, they needed to fit into the world, so we gave them round and simple shapes. Still, we wanted them to look like something totally strange and foreign to the world. So we decided to make them out of some kind of goo, however, they seemed like being made out of porcelaine. Again – with the story we added in the later production, in which whole colortwon is covered by bleakness – we needed to find a design for this new material. We had an overall feeling and look for the creatures but we still struggled with the Bleakness that wasn't lifelike.

We had so many concepts **5** and it took us very long to get the Bleakness' style right – also because of some technical problems. We ended up with a mix between a less shiny form of goo, and something that you can't touch, something that isn't really quite there. We also added some patterns on every bleak object to give them a little bit of a mystical appearance **6**.

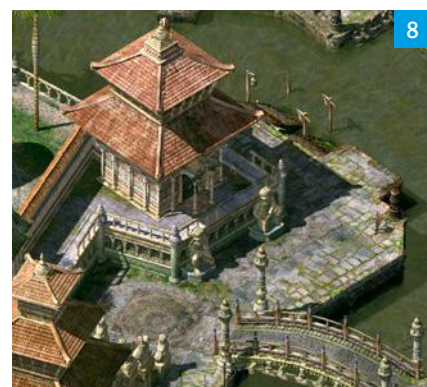
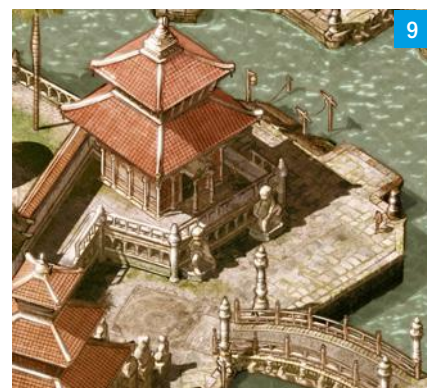
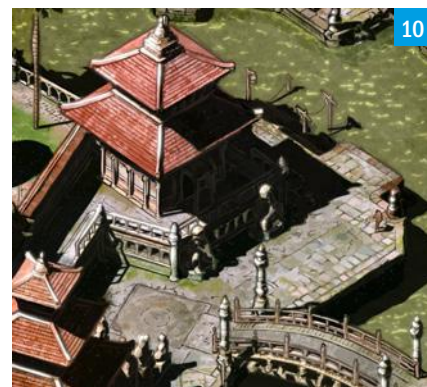
Finding the Style for Shadow Tactics

The basic idea for Shadow Tactics formed during our time at university. Our Creative Director had always been a huge fan of "Commandos", so he thought "Why not revive this genre?" So, what's cool and fits a stealth game? Exactly: ninjas! So we pitched a Commandos-like game with ninjas, with the very first draft being a mobile version. And as we all know, it's always common to reuse skills you acquired in prior projects to

»We wanted to reach the old fans of Commandos which were used to a much more realistic style.«

8 9 10

The concept artists painted over Commandos screenshots in terms of analyzing and finding a fitting art style.



10

9

8



14 While the vertical slice served as quality reference, the rest of the levels looked rather rough.

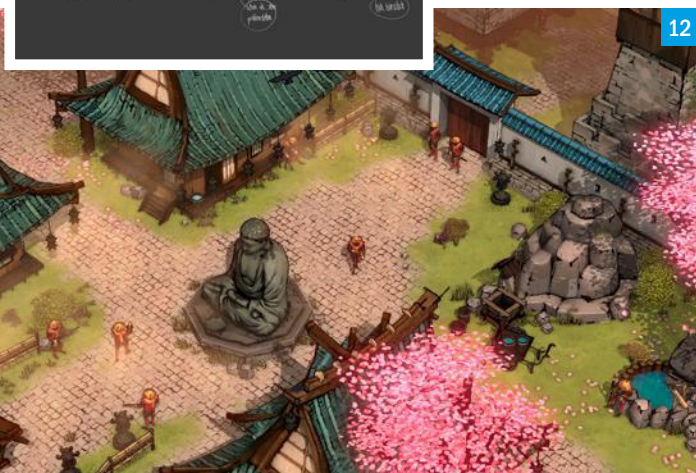
do something completely different ... not. Shadow Tactics was supposed to become a mobile game **7**, so we had a rather cute and cartoony style in mind, which we were already used to. Or in other words: we were – artistically speaking – kind of stuck and pretty much too influenced by our work on The Last Tinker, but we knew that this wasn't the style we wanted to go for. We wanted to reach these old fans of Commandos which were used to a much more realistic style with tons of details and crispy textures.

We analyzed the spiritual predecessor **8** and tried to understand what made Commandos ... well, Commandos. We wanted to keep its core elements within in our own style to keep the old fans of the game happy – for us artists, however, finding the right style became a real struggle. We had our concept artist overpaint some Commandos screenshots **9** **10** to get a better feeling for a more realistic style while trying to add our touch to it. We never wanted to create some super realistic style, because that just

11 A collection of different outlines and patterns

12 The prototype level at daytime ...

13 ... and at night



12



13

wouldn't have been us. Plus, for only four artists it was nearly impossible to make a realistically looking game, so we mixed realistic elements with non-realistic elements. We started to concept and model some buildings because somehow the concepts we had created so far didn't get us any further. In the beginning, we reduced the complexity of the models and again used textures to obtain detail, which based on photographs that our artists painted over to give them a painted look. We experimented with different non-realistic elements like outlines and canvas patterns **11**. The outlines worked best ingame and fit the Asian style the most, while the canvas patterns created too much noise and simply didn't look good. After finishing the first playable prototype **12** **13**, we already knew that we also wanted to include numerous interesting light-settings for catching different moods.

Shadow Tactics' pre-alpha

For our vertical slice we created polished assets to get a feeling for the style and the quality we wanted to reach, so a lot of time went into one level **14**. Between putting up the prototype and this pre-alpha version we had time to get used to the perspective that brought its own challenges with it. We changed the color palette and various little details, because the prototype seemed a bit too cheerful and idyllic. Shadow Tactics' story included wars and tragedies, so we developed a better fitting style, using more desaturated colors, but still keeping it very painty, though with reduced details and thick outlines.

From there on out we received some feedback from friends from other games companies, many of them asking „Oh, is it a mobile game?“ Just what you want to hear when you're developing a big PC and console game ... it really bothered us. We realized that our current version was too far away from the original Commandos style, lacking detail, crispiness and realism. We used no normal



or specular maps which therefore had no depth and small surface details – everything was kind of plane. This particular level admittedly wasn't the best choice for a vertical slice, because it was one of our most colorful ones – not the best basis for finding the right art style for a game that's getting darker and darker in the long run.

From Pre-Alpha to Alpha

When we created our alpha version [15](#), we added some normal as well as some specular maps for metallic assets, also adding further details to textures like on stones and thatches. We changed the way that nature looked, from a very painty to a more realistic style, with small leaves instead of big spots. We also removed the outlines from all foliage. Additionally we used the new lighting system from Unity 5. However, we first wanted to get the overall setup right, so we lost the interesting lighting at that stage. And still, it wasn't what we were aiming for ...

From Pre-Alpha to Pre-Beta

In our pre-beta version [16](#) we decreased the overall number of outlines and made them thinner. We even considered deleting them completely but lost that thought because they created a nice depth and contrast between asset and terrain. We also added dirt to the textures to give everything a gritty and used look. And our shaders learned color variations which you can see on the stones. At that time we didn't have a good setup, that's why it looks a bit out of place. Besides making the scenes more realistic, however, it kind of masked the fact that we used the same assets over and over again. We tweaked a lot of small things in this phase of development and improved our terrain by adding normal and height maps. These height maps did a better job in blending textures, so the transition between two materials like grass and dirt looked rather crispy than blurry. Eventually, we gave every level a nice light-setup and used color mapping to

create more variety between the levels thus creating the proper mood. Ambient particles like in *The Last Tinker* made the world more lifelike. Well, so much for finding and creating the right art style for *Shadow Tactics*.

Problems and Solutions

On our quest to find the right art style for both *The Last Tinker* and *Shadow Tactics* we certainly had to overcome quite a number of challenges. So, let's take a look at what these problems were and how we managed to solve them.

The Last Tinker

As mentioned earlier, the first version of *The Last Tinker* was too colorful and chaotic. Players got lost on a regular basis and didn't know where to go. Since we used every color to paint the assets and usually had a bright light-setup, we couldn't use color or light to guide the player through the world. As we developed the story we divided Colortown into different districts. That helped us bringing some order into this colorful world. By reducing the number of colors per district and, at the same time, adding specific shapes and patterns as well as some coloring rules, we were able to help players navigate better. Plus, every district is inhabited by different races [17](#) [18](#) [19](#). The whole game uses the same house assets. So by giving each districts its own attributes and uniquely designed assets, we could create enough variety and saved a lot of time by not modeling different house types.

Another way to facilitate navigation was adding unique landmarks like a big windmill [20](#) or unique fountains or maybe special buildings like taverns, that draw the players' attention and thereby help them remember certain places. Unfortunately, we never managed to completely solve this issue so eventually we gave our companion Tap a guiding feature. Whenever you call him, he shows you the way before you get lost again. Anyway, we just yellow to mainly



[14](#) Vertical slice
[15](#) Pre-alpha version
[16](#) Pre-beta version



17 18 19 Different colors were used to better organize and define The Last Tinker's different districts.

mark relevant gameplay assets climbable walls, pillars you can jump on or specific landmarks. So, whenever you see something yellow, that's where you want to go!

The Challenges of Creating Shadow Tactics

Shadow Tactics confronted us with a whole set of different problems, the biggest being the style itself. On the one hand we weren't sure on which platform we'd release the game. On the other hand our artists were still too influenced by our previous projects that were all cute and cartoony. »Realism« was another big thing. Not only did we want to make a more realistic looking game, we also wanted it to be historically correct. For that we had to do a lot of research and research takes up a lot of your time! Time – unsurprisingly – was a big problem, but well ... when isn't time a problem game development 21? As mentioned in the beginning we switched between styles a couple of times, until we were told it looked like a mobile game and we started to increase the quality, added normal and spec maps, better lighting and more details overall, which resulted in a ton of additional work. And with us still being only four artists, time was crucial. Also, we lacked experience in many ways, e.g. when it came creating high-detailed terrains and proper lighting setup, so we had to get to know a lot of new tools which – again – cost us a lot of time we didn't have. Oh, did I mention the time problem? Well, luckily we have a lot of comfortable couches in our office.

When we had finally developed the first style-prototypes and started with the creation of assets, we encountered a new problem.

The Perspective

In the beginning we had really large curved roofs that took up a lot of screen space which made it difficult for our level designers

to place enemies the way they wanted. It also made it difficult to navigate the player characters because you couldn't see what was behind the buildings. It was possible to rotate the camera but with all these roofs the player wouldn't have been doing much else, which would have eventually killed the fun. Also, the big roofs looked kind of out of place, so we iterated them a couple of times until they fit. We minimized the roof sizes and flattened 23 them so they wouldn't hide the enemies on the ground.

The Architecture

(56.) Another problem was the Asian architecture. We wanted our characters to be able to climb roofs to generate that sneaky ninja feeling. But Asian roofs are rather bent and curved and these shapes collided with our animations. The feet of the characters didn't adapt to the ground beneath them, so it always seemed like they were floating. Also, you could never tell where you were supposed to go because the shapes were too undefined – you never quite knew where you could climb up and where you couldn't. So we designed three types of roofs 24:

- flat and completely walkable rooftops
- rooftops with obstacles protecting you from your enemies' eyes
- inaccessible rooftops

Sadly, we lost a little bit of the Asian feel and typical design but in this case proper gameplay was more important.

Readability

The third challenge was readability. Being able to instantly recognize enemies and usable objects is a must. In the beginning we struggled with this topic because we didn't have enough contrast between the different assets. For example, every wood asset mostly had the same color. There was no real eye candy drawing the player's attention. Enemies kind of disappeared within the environment because they were designed in the



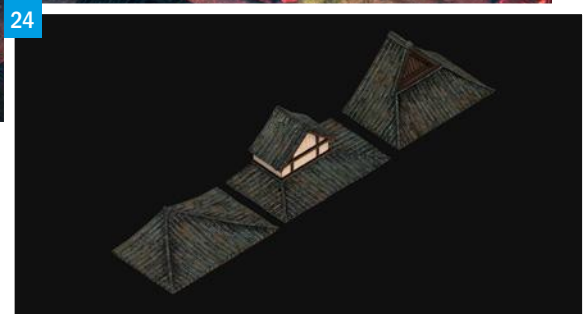
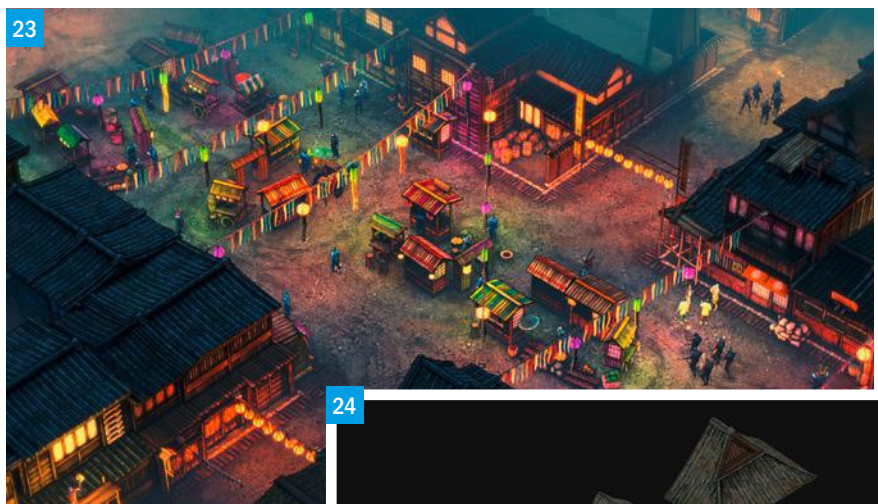
same color scheme like everything else. To solve this issue, we created some landmarks, made the shadows darker to create depth and added different color shades to give the assets more contrast ²². Then we developed a slightly different, more saturated and brighter color scheme for enemies. We also provided them with fake lighting so the environmental lighting wouldn't affect them as much as the assets surrounding them. The fake light was a gradient that made enemies look brighter from above while usually, they would look brighter on the bottom, to separate them from the ground. In this case, however, they are wearing dark trousers, so it wouldn't have had any visual effect. Thanks to the lighting, they wouldn't completely merge with the environment and were therefore a lot easier to spot.

Summary

Every game needs its own process of creating a style. You will encounter different problems and will have to find individual solutions for all of them, no matter if your following project is similar to the first. Problems might occur because many reasons, a new setting maybe. I think, what's always important when creating a style, is that you use the skills your artists have. Don't try to create something you can't identify with or that doesn't fit your skills just because it would be so much cooler. When you don't create something that you can absolutely relate to, you will get stuck and be very unhappy with the result. That said, it doesn't mean you shouldn't leave your comfort zone. We definitely left ours in order to make Shadow Tactics.

After The Last Tinker and some other cute looking games we wanted to develop something different and in the early beginnings we struggled a lot – the style simply wasn't like anything we were used to. After some long discussions, reworks and iterations, however, it turned out quite well. The Last Tinker and Shadow Tactics are two completely different games with completely individual styles. Sure, we could have gone for a super realistic style, but it wouldn't have made us happy. And if that had been the case, maybe we wouldn't have put that much heart and effort into it to make it look great.

Bianca Dörr



²¹ Time was scarce ... so was a good night's sleep.

²³ ²⁴ Flat and walkable roofs, with obstacles as well as inaccessible roofs.

LEVEL EVOLUTION IN SHADOW TACTICS

The Mimimi-way of level design:
from concept to final map.

When we started working on »Shadow Tactics« we knew that the levels are one of the most important aspects of the »Realtime Tactics« genre. Especially »Commandos 2« has huge and (more or less) open environments filled with enemies that have to be conquered by the player. Most of them are memorable places in unique settings and in our opinion one of the hooks that keep players engaged with the game. Simply wanting to see that next mission can be a big factor when you are struggling with that one &%?S!\$ group of enemies at the end of the current map – a map you probably already despise because you’ve been staring at it for hours, but also one you will fondly remember as »a pretty cool level« once you actually beat it.

So, we basically knew what we had to do with Shadow Tactics. But before we get started on actual level design stuff, let’s run the numbers real quick:

- Content: the first playthrough of the game should take a player about 25 hours. After some intense mathing (the average level should take about 2 hours, so, let’s divide 25 by 2 …?) we decided that having 13 missions would be perfect. For quite some time we also worked on 3 large DLC maps. Sadly, we cut those after we had built quite a bit of them, because of...

- Time: making the game would take about 21 months, though the initial plan was 18 months.
- Team: the design team at Mimimi Productions consists of 3 people, but we had additional help from one intern for 3/4 of our production. Keep in mind though, that we also had to do other boring things like game design, creating a story and writing it, building cutscene locations, scripting the cutscenes and so on. Long story short: *Enter Trump* “Great Team. Great People.” *Exit Trump*.

Well, that was that – now, let’s get down to business.

The Pillars

After re-playing and analyzing old RTT classics and talking about it A LOT, we came up with three main pillars. Actually, I’m not a 100% sure if we called them pillars, but that’s essentially what they were. Also, we never wrote them down and pinned them to our wall or something. But everybody knew them and worked towards them (yay, small team!). So here they are:

1. Memorable Places: each map has to be memorable and unique. If a player tells their friends about a level, they will know which one it is within seconds.
2. Huge Places: maps should be huge. Players should have to scroll over them and think



»Oh my ... how am I ever going to get through this?«. About 2 hours later they will have succeeded, scroll over a trail of 100 dead guards and simply feel epic.

3. Replay value: each mission should be fun when played for a second or even third time. This usually meant we had to build very openly designed maps that offered players multiple paths towards their goal. It was important to us to frequently build large parts of missions that players wouldn't visit on their first playthrough. This way they could see new stuff when coming back. Never be afraid to »lose« content when doing this – you don't! A choice only feels meaningful, if it causes the player to gain one thing in exchange for losing another.

The Concept

With these three pillars in mind, we started looking at possible settings for our levels. We wanted to deliver on the types of environments players would expect from Edo-period Japan: castles, ricefields, bamboo forests, even a monastery on the top of a mountain (ok, that one is probably more Chinese Kung-Fu movie style, but well...). We created many different levelsheets, 3 to 5 pages long documents that basically pitch a mission. Inspiration could come from anything. It might have been a larger theme like »I want to make a prison break mission!«, or a more mechanical idea like »I want to design a mission where at first you don't control any characters that can carry bodies efficiently«. The levelsheet describes the overall setting and feel and



contains a simple rundown of events. It answers basic questions like difficulty, playtime and also if there are any unique features required.

A very important part of these levelsheets is a section describing each area (usually there are 4 to 5 per mission). We describe the look and feel, but also what the game-play should ACTUALLY be like. This forces designers to think further than that cool sounding idea of »LET'S MAKE A PRISON BREAK MISSION!« and actually worry about how to implement it using the limited game mechanics they have. It also ensures that there is decent pacing to each level, since you quickly see, if you present the same type of challenge too often.

At some point we chose 13 of these levels, put them in order, made some changes that were necessary for the pacing and then started building them.

The Layout

The process for how we made our early level layouts evolved during production and today looks like this: We designers hand our ugly little drawings (or maybe even super rough in-editor blockings) and the levelsheet to Cem [Erdalan], one of our artists. We talk about the vision for the level and what is important to us from a gameplay perspective and off he goes, doing artist-things. You can quickly read about that process in Cem's section on the next page and then come back here.

You're back? Cool! So, once we have the sketch, we use it to block the level in Unity as early as possible. We don't really iterate the sketches themselves anymore, since it takes longer and it's too abstract to see all the actual problems we might face. At this stage we focus on the following aspects:

- Overall layout: how does the size of the areas feel? Do the parts of the level look interesting? Can you read it well?
- Camera: how do the camera angles work, will important parts be hard to see? The goal should be having a map that doesn't require the player to rotate the camera (which sadly never really works).



Like two different games: Below is an early design of Kage Sama's Camp, above a much more detailed version from the final game.



Moritz Wagner
is Design Director at
Mimimi Productions.

As Design Director, Moritz is leading the small but awesome design team at Mimimi Productions. His current goal is to establish »Kopfruss« as an internationally accepted dev-term for stealth enemy setups. [@corugnoll](https://twitter.com/corugnoll)

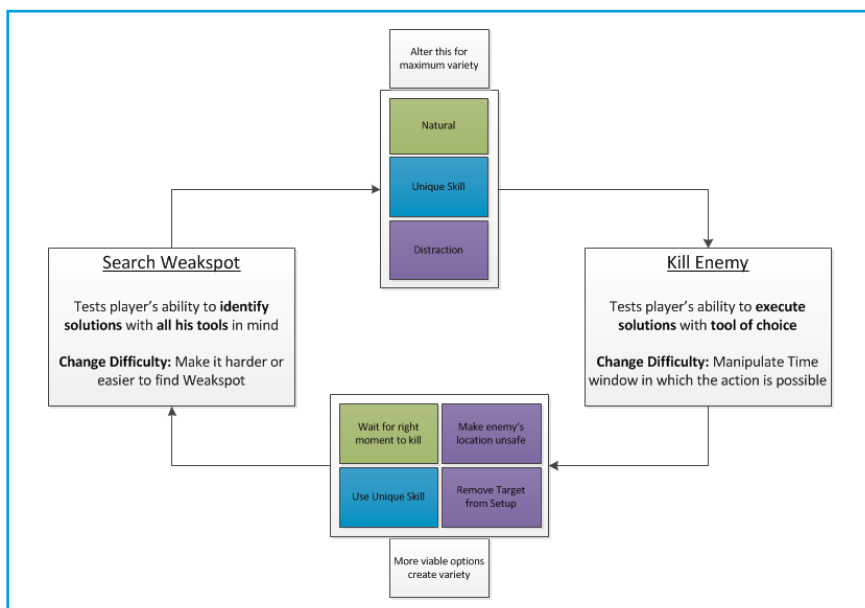


Playing in the snow in Imai Town.

- Reality-check: is our layout plausible? Are there things that just don't make any sense in this game world?

In my opinion, this is one of the most important parts of the process. While we made The Last Tinker, we realized that using grey boxes doesn't quite do it for us. Now we use any assets that we can get our hands on.

The core-loop we defined for Shadow Tactics.



It's dirty, but very efficient. Things get scaled and abused, you see houses built out of wagon-parts and what-not. It's every artist's nightmare ... and in the case of Shadow Tactics, it came back to haunt us later. Today we aren't as reckless anymore, but hey: we were young back then and didn't care.

We talk about each iteration of these blockings with the design and art team and go over it as often as we feel is necessary. The whole process includes lots of communication between these two departments, with everyone chipping in ideas.

In Shadow Tactics I think we only had to do major layout changes to 3 of our 13 maps after this stage, which shows how valuable it is to give this process enough time and do it right in the first place.

The Gameplay Loop

Once the layout is done, the placing of enemy setups begins. During this stage we also make smaller layout changes to areas by adding cover, moving stuff around etc. The overall appeal of a level doesn't usually change, though.

RTT games are very close to puzzle games in their core loop. Players are presented with a problem and have all the time they need to analyze it. Once they have found a solution they like, they can try it and instantly reiterate and optimize their approach through quicksave/quickload ([graphic, left](#)).

The »Kopfnuss«

I talked about each level containing 4 to 5 areas before. Typically, each of these will have one main puzzle, internally we call those a »Kopfnuss«. If it's possible for a player to quickly describe this setup to a friend by mentioning 1 or 2 of its key aspects, that's a good sign.

The process of building a Kopfnuss probably is a little different for each of our designers, so I can only talk about my approach here. I think every area should have its own identity and that's what I try to find first.

I look at the environment and the vibe I want to create in that area. Should the player feel like they are in control? Should the situation feel overwhelming? Claustrophobic? Tense or relaxed? And so on. I try to find an idea that answers these questions in the right way. It could be a small scripted routine («guards interrogating civilians»), something based on the environment («a samurai standing on top of a tower») or something mechanical («4 guards looking at each other, deal with it!»). During this stage I often randomly place guards on the map and press play, just to see if something interesting occurs.

Once the identity and idea for the setup is found, I place the necessary guards, give them the routines they need and start playing. I play it over and over to find things that don't feel right, and eliminate the unwanted problems that always occur: guards looking in from outside, covers having holes for guards to see through, distances being off etc. Due to our mechanics, these setups need to be very precise and just moving or rotating a guard by a small amount can make a huge difference.

If I am happy with how everything plays, I will stop working on it and wait for feedback from the design team. After some early iteration, all team members will get to play and give feedback. Something we have started doing with our new project (which I wish we had done on Shadow Tactics as well) is that everyone records their playthroughs and uploads the video to our server. Now designers see gameplay from different player types and many different approaches. It also helps a lot when talking to someone about their playthrough. Just let the video run in 4x speed and they will remember smaller stuff and details they would forget otherwise.

How we use that feedback to build new iterations of our levels is very important. Each of our puzzles has to have multiple solutions. When we made The Last Tinker, our approach to level design was different: We watched people playing to see if they did something we didn't want them to do and then fixed that part. For Shadow Tactics, we had to change that approach and whenever we saw something unexpected, we tried to support it, not fix it. This means that at some point we »let go« of our urge to control every aspect of a puzzle. It's impossible anyway. Almost anything in Shadow Tactics can be »broken«, it's part of the game's core. Players feel incredible when they get the feeling of outsmarting designers, why should we take that from them? At some point we started thinking »Oh nice« instead of »Oh \$%&\$« whenever something unexpected happened and that was exactly the right mindset.

The Details

When we reached our beta milestones, we had 13 levels with good layouts and challenging

From Sketch to Concept



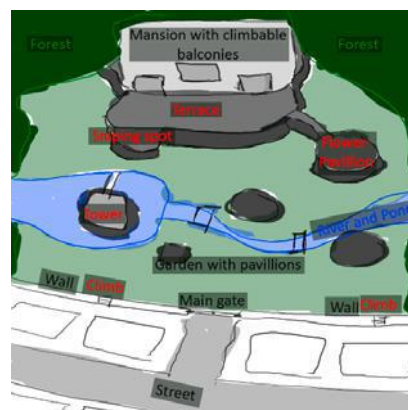
Cem Erdalan
is 3D Artist at
Mimimi Productions.

@cemtleman

Being tasked with the level-layout as a 3D artist certainly is rather unusual. In games like »Commandos« or »Desperados«, spending 2 to 3 three hours on a single map is absolutely normal, and Shadow Tactics isn't any different. The team knew, that because of this aspect every single screen had to offer lots of interesting elements. Therefore, creating a believable setting and level-layout was crucial, to create a rock-solid foundation to build the game upon.

In the game's early days we did a lot of research, looking for interesting historical settings in ancient Japan. We wanted the design of our 13 levels to be as diverse as possible. Next, our game designers Hambo and Mo created levelsheets including the most essential information for each map.

My job now was to create concept drawings for the blocking of the levels. I took the most crucial information right from the respective levelsheets. Prior to creating such a concept drawing, we did an enormous amount of research. We gathered tons of information about the Edo period from books and documentations. The concept for our »mansion mission« was one of my first sketches.



From ugly to pretty: Crude sketches made by designers would then be worked on further by the art department and serve as our first guideline for blocking the level.



Cover Story: Level Design Case Study

Making Games 11-12/17



Early beginnings vs. final game: scenes from the map »Kanazawa City« (top) and Soganuma Village (bottom).

enemy setups. At some point we also added all the story triggers etc, but I'm not sure when exactly that happened.

Now the art team came in to make everything pretty. This was also the time when the crime of reckless scaling and kit-bashing, that we had committed during the layout phase, came back to bite us. Stuff was clipping, not aligned perfectly, there were hidden walls inside of buildings because the layout had changed multiple times and so on. A lot of things had to be fixed during a moment in production when you have way better stuff to do and time is already running out. For our new project we still try to be quick during layouting, but overall we pay a little more attention to this.

So, the art team started placing deco-assets, painting the terrain in a much more beautiful way and doing all these things that make the game look pretty. They had frequent heart-attacks when finding another one of our early layouting abominations and we had frequent heart-attacks fixing Navmesh and line-of-sight problems that occurred, whenever they moved and placed objects. But we all love each other and these small conflicts just made that love run even deeper. So much love!

We also went over all enemy setups and tried to make them feel a little more realistic. Instead of having guards standing around, being »guardy« and all that, we made them do really intense stuff like leaning against walls, talking to each other etc. This phase of polishing was very important for the final game and really helped things to come together. Of course we also fixed a truckload of bugs

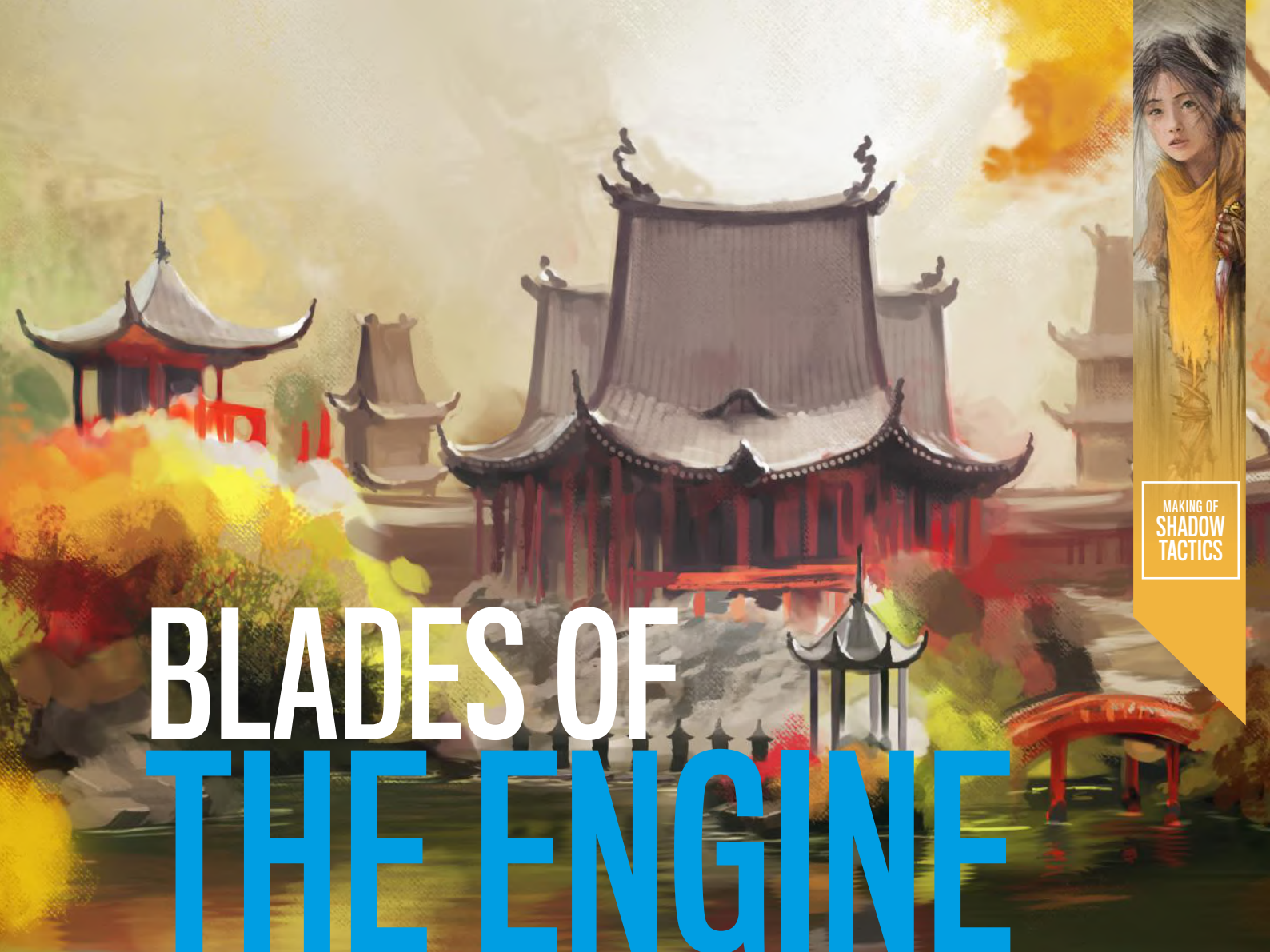
during that time. There are certain assets that made baking Navmesh a total nightmare (I'm looking at you »dec_gn_plank_00«) and our jump-system turned out to be straight from hell. This daimyo dude you have to assassinate in level 5 has been broken from start to finish. A small tip: At some level of complexity, stop trying to script stuff yourself, grab one of the coders and get that thing done properly. It will save you hours of pain, since debugging or changing scripted stuff becomes almost impossible if it's too intricate.

The End

So once we went through these stages, we just kept fixing and polishing stuff. That's all for my basic rundown of how we approached level design in Shadow Tactics. The key to accomplishing this much with such a small team was having great people and lots of honest communication. The more and earlier we talk about things, the better we can prevent problems from spreading and biting us later on. Every person on the team will have a different perspective on the levels you build. Listening to all this input and then deciding what fits and what doesn't will make your levels the best they can be.

I could write a lot more about each of the steps and go into the gritty details, but that would be a little too much. While our process was probably pretty standard, I still hope that there have been some details or small ideas you can incorporate into your own workflows. Keep building, bye bye!

Moritz Wagner



MAKING OF
SHADOW
TACTICS

Tools and optimization, lessons learned and the evolution of code in Shadow Tactics.

With »Shadow Tactics« now also being available on consoles, Mimimi Productions dove right into their next big project. On the following pages Technical Director Frieder Mielke and Game Design Developer Philipp Wittershagen will talk about their work on Shadow Tactics, game assets as well as important and »nice to have« features, but also about what they have learned from working on such a large-scale project and how they can transfer their newly acquired skills and experiences into their upcoming project.

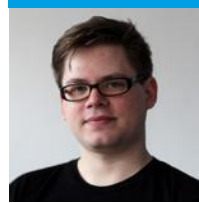
Asset overview

The Asset Pipeline usually is the foundation for a lot of the in-editor work, so it has to be rock-solid. Artists should be able to drop created assets into Unity without worrying about import settings, so they can be used immediately by level designers or coders. With incorrect import settings, inconsistent naming or even just an unstructured assets

folder, the natural workflow will probably be disrupted at some point. While not all of those things can be automated, you can get quite far with custom import systems based on correct naming and a sensible folder structure alone.

Unfortunately we learned this the hard way during the development of »The Last Tinker« where we had to manually change the import settings on a lot of assets based on changing technical requirements. Tracking down assets that needed the new import setting was hard and quite error-prone, and we probably missed some of them in the end.

	The Last Tinker	Shadow Tactics
Models	0.7k	0.8k (some files are whole kits)
Textures	2.2k	4.5k
Materials	2.5k	2.8k
Audio	2.2k	7k (+ 3k Japanese voices)
Prefabs	2.8k	2.7k
Scripts	1.4k	2.7k
Total	11.8k	20.5k + 3k



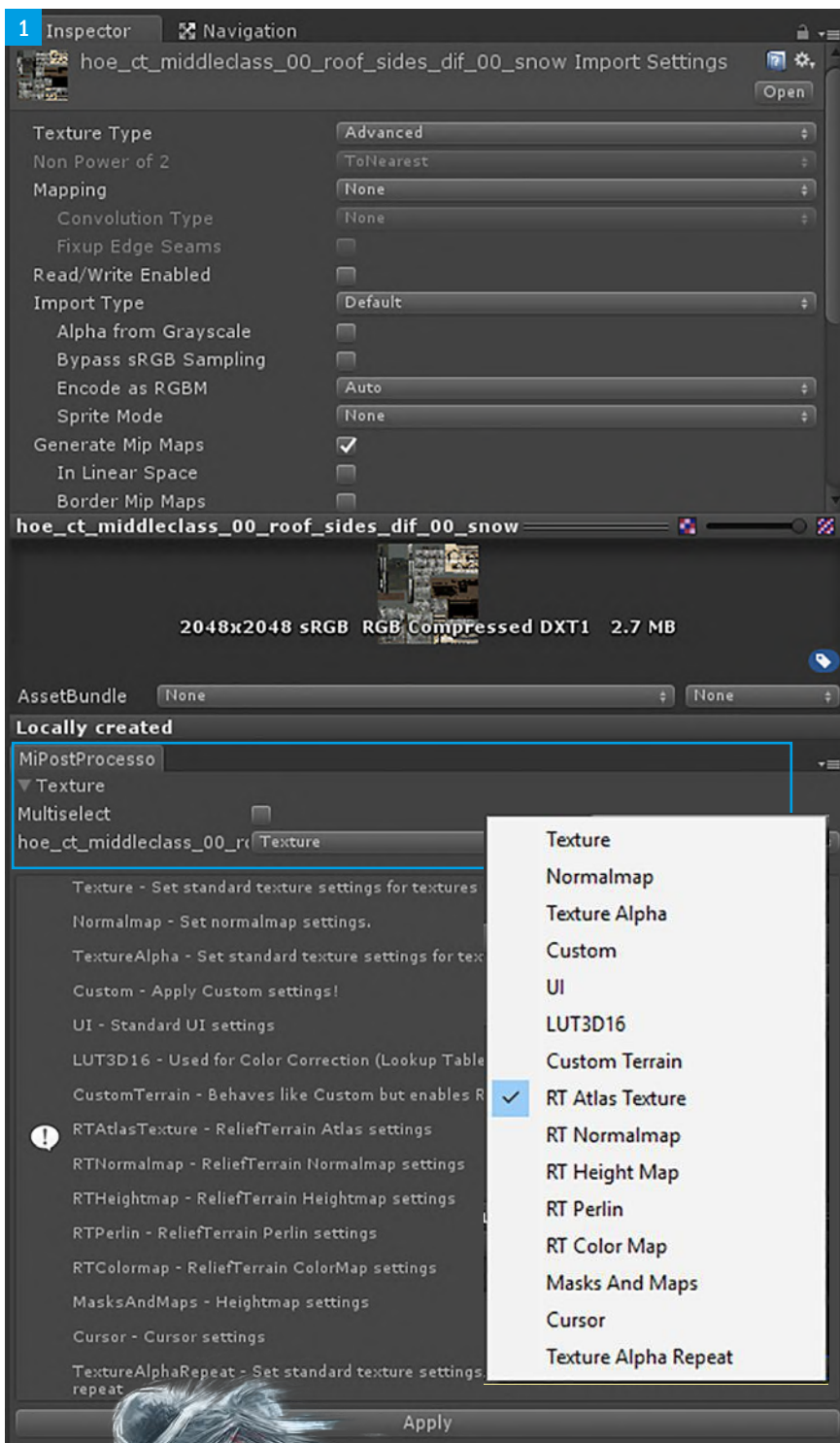
Frieder Mielke
is Technical Director
at Mimimi Productions.

Since 2015, Frieder supports the team at Mimimi Productions with his unique skill-set and knowledge of AI programming and played an essential role in the development of Shadow Tactics: Blades of the Shogun. [@thats_frilke](#)



Philipp Wittershagen
is Gameplay and Tools
Programmer at Mimimi
Productions.

As Mimimi Productions' gameplay programmer, he supports the team with his coding skills and self-coded tools since 2015. [@phwitti](#)



Let's take a quick look at the actual amount of assets we're talking about:

Raw Assets and Materials

As you can see, we have a lot more assets in Shadow Tactics than we had in The Last Tinker, most notably more than twice as many textures and four times the amount of audio clips. The drastic increase in audio files can be attributed to the full voice acting in Shadow Tactics, which amounts to about 5.4k files for English and Japanese

each. The small increase in models stems from the fact that we used models containing whole kits for specific types of building. But in light of these numbers, when manually changing assets was bad in The Last Tinker, it was nearly impossible to do for Shadow Tactics.

Basics

The basic tools Unity gives you for importing assets are the »AssetPostProcessor« and the custom meta data you can write via »AssetImporter.userData«. If your assets follow a strict naming convention, you can do some amazing stuff with this information already. This is what we use as a base for all of our custom imports, so let me go over our texture and audio import systems in more detail.

Textures

When a texture gets imported for the first time we select a texture preset based on the name of the texture, usually via specific prefixes ¹. Unfortunately, there is no way of extending the native Unity texture type (at least none that we know of). Therefore, we set the texture type to »advanced« and handle the rest by ourselves. Although our basic import settings are similar to Unity's, this helps keeping them consistent. Additionally, we are able to change a preset easily during development and automatically reimport all textures that use this preset. There is also still the option to manually change the settings when needed by using the »custom« preset. For all other presets, manual import setting changes are overwritten immediately by our importer. The whole thing is currently its own editor window, since we have not found a way to customize the importer settings inspector so far.

Sound / AudioClips

First, we basically automated most of the suggestions found in the Unity manual. Again, based on naming conventions we know what type of audio we are handling. Primarily we distinguish between sound effects, music and voiceovers. For more advanced import settings we can also look at the length of the clips (e.g. »PCM«: This option offers higher quality at the expense of larger file size and is best for very short sound effects).

MiSfxInfo

We didn't, however, want to stop there because there is a lot more to be done with sounds than just import settings. So we developed our own audio clip container object called »MiSfxInfo« ². Every imported audio clip automatically creates a container for itself and based on naming we can also add variations to a MiSfxInfo. Audio clips are referenced only on MiSfxInfo assets, which are then referenced within the code, but never an audio clip itself.

In order to have everything in one place and to give our sound designers full control without having to touch scenes or gameplay prefabs, we put more and more advanced stuff into the MiSfxInfos. This includes common things like volume, pitch ranges and random settings as well as more advanced things like animation triggers, fades, max clips simultaneously played handling and emitter following.

Going further, we connected the correct audio mixer and audio source to our MiSfxInfo. In total we had 19 audio-source prefabs including 2D and 3D with different ranges, spreads, priorities etc. The importer does the following based on the filename:

- Prefix 1 sfx_gn_med_ -> audio clip import settings e.g. compression
- Prefix 2 sfx_gn_med_ -> audio mixer assignment
- Prefix 3 sfx_gn_med_ -> audio source prefab used for playing

Another benefit was that we could easily implement different spoken languages because we could switch out the audio clips referenced in the MiSfxInfo, which is the only place where the raw files are referenced.

In addition to having everything in one place, we were able to write more powerful tools for manning and editing our audio, e.g. our audio viewer which gives a good overview about which sounds are playing. It even allows easy editing of sounds settings during runtime.

Conclusions

1. **Naming conventions:** Even if your project starts a lot smaller, you can still write a pipeline later, if needed!
2. **Automatisms:** Don't do things manually, if you can have them done automatically – it saves a lot of time and is also less error-prone!
3. **Create your presets/templates:** presets and templates help you maintaining an overview. If you want to, you can still change them later!

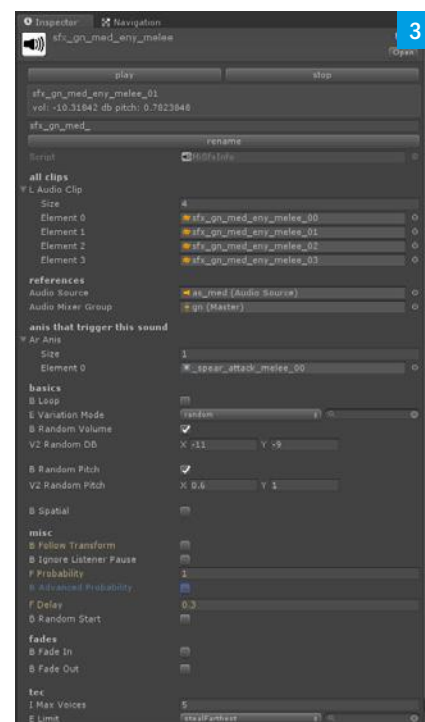
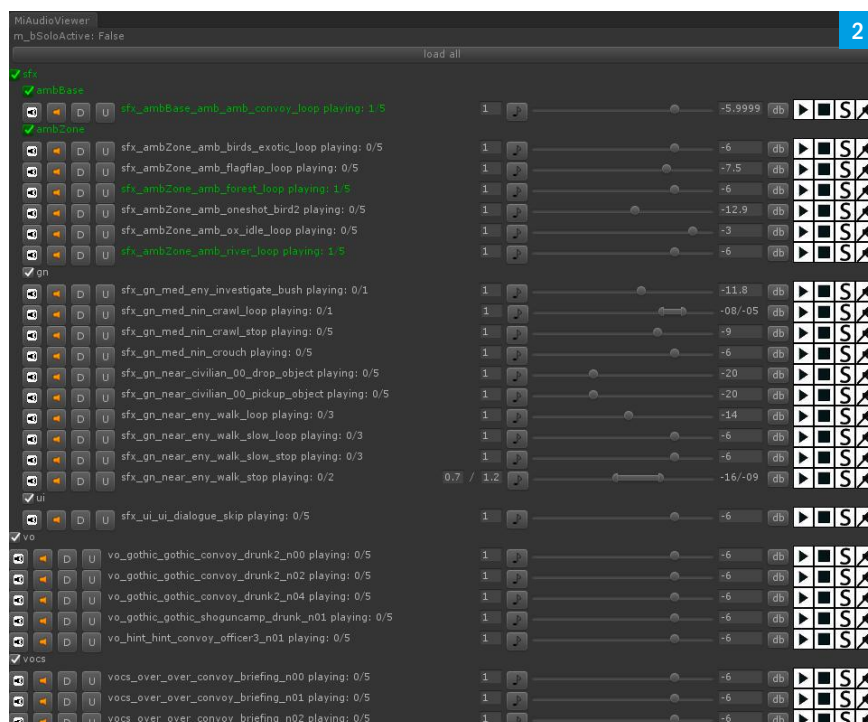
Editor Tools: Working in Mimi-Unity

As soon as the assets are inside Unity [4](#), we can also start working inside the scenes. A scene in Shadow Tactics has an average of 30,000 transforms, with a maximum of 39k. There is an average of 100 NPCs per scene, with a maximum of 161 (e.g. Matsuyama City) and around 50 custom script logics. With scenes of this size, there are a few things to ensure or enforce, to not wake up in some hell of a mess of game GameObjects named anything like »CmdHighlightCharacter(Clone)(Clone)(Clone)«. Therefore we want to share some insights into our use of the Unity scene hierarchy.

Design: How did we do it?

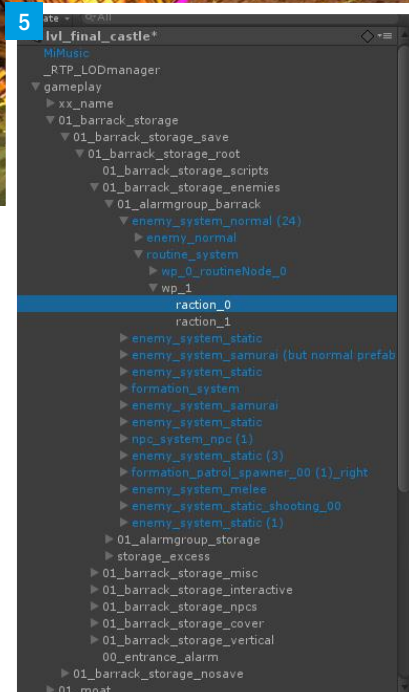
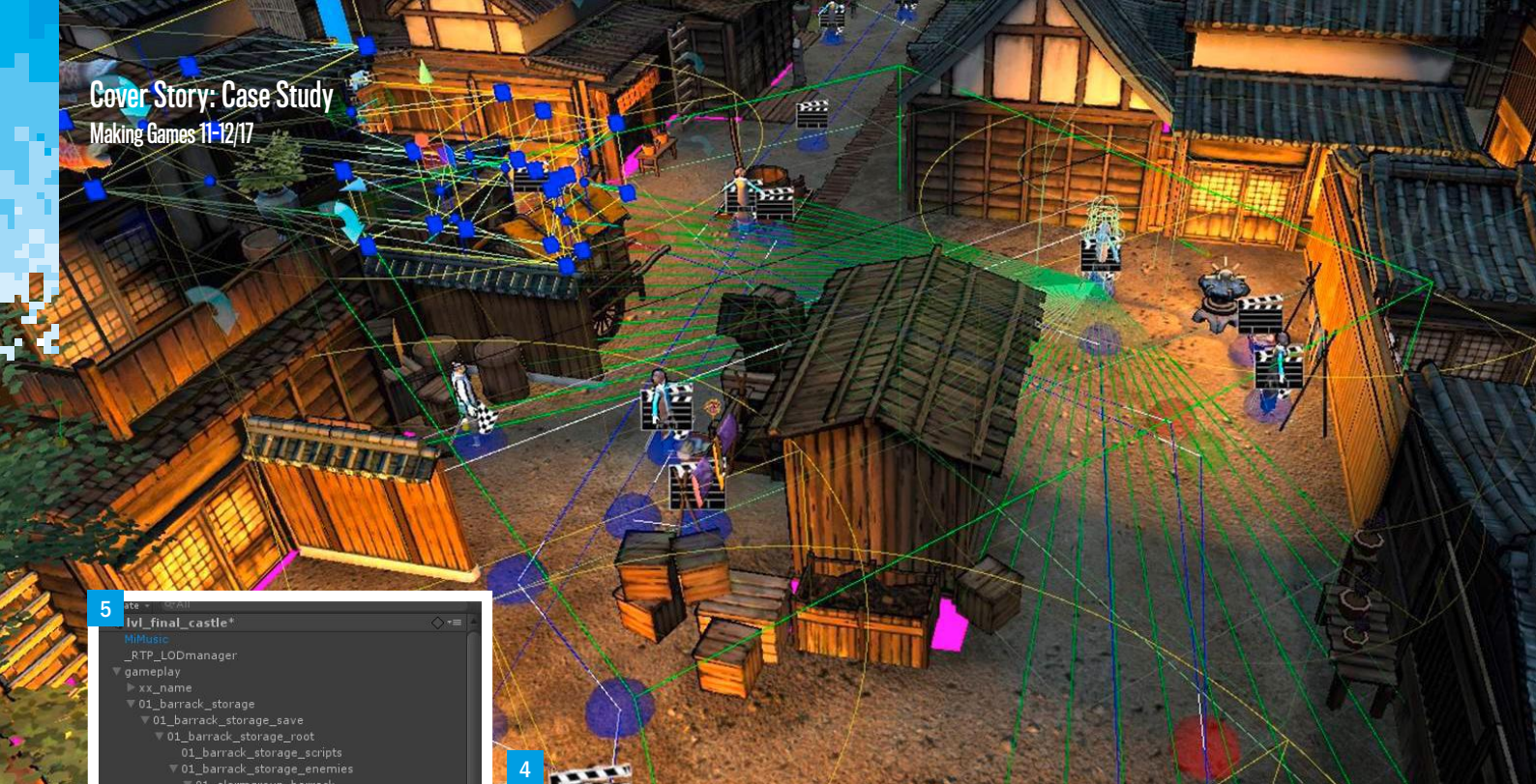
We wanted to have a very well-structured hierarchy that makes it easy to maintain a good overview over a scene by grouping as many things as possible [5](#), which is especially important if multiple persons are working on a scene. We had a base-structure that our game designer had to apply to, as well as some

»If your assets follow a strict naming convention, you can do some amazing stuff with this information.«



Cover Story: Case Study

Making Games 11/12/17



4 Imported assets in Unity: now the work on the scene can start.

5 A well-structured hierarchy and grouping are the key for maintaining an overview for a scene

6 Simple, yet essential: saved transforms will win microseconds of save/load.

»best-practices« of how things were supposed to be structured.

Main folder gameplay (0 depth)

Level area (1)

Save vs No Save (2)

Enemies (3)

Alarm enemies (4)

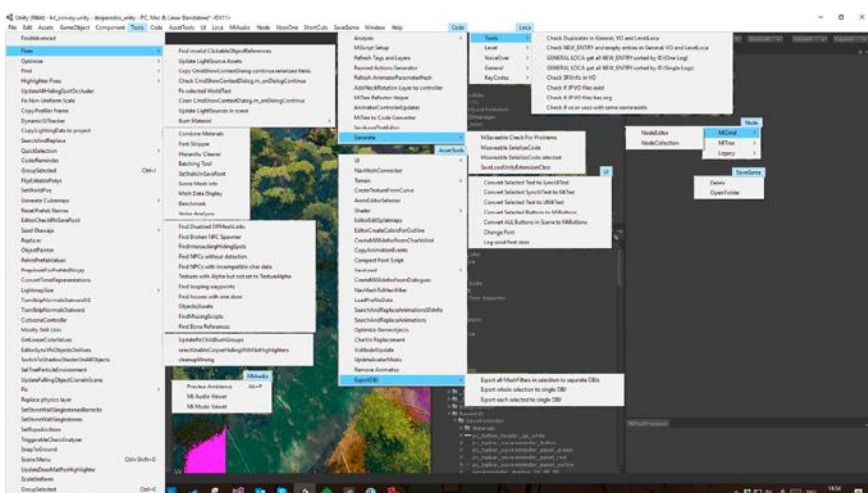
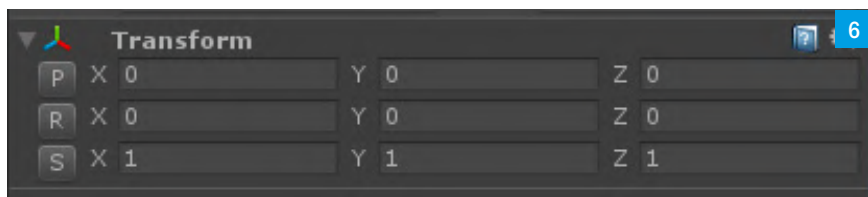
Enemy (5)

Data (6)

Routine

Waypoint (7)

Action (8)



Evolution: How did it work out?

Structuring a scene in that manner and sticking to naming conventions worked very well for us – so why are we talking about this? Well, we did have a problem ... this kind of »over-structuring« using GameObjects had certain shortcomings.

The major issue here was performance: moving a transform with 6 parents is uber-slow. In the beginning we worked around it by trying to flatten the hierarchy, mostly by moving enemies up. Sometimes, however, this can still get really tricky and it isn't something you can do all the time. Another overhead is, that every »folder«-GameObject saves transform information that is not needed. Given, it's a problem that's pretty specific to Shadow Tactics, as we saved the whole hierarchy and had to recreate it when loading. Still, for us every transform we had to save, meant a few more microseconds of save/load. 6

Create Fake Folder? What we were really missing was some kind of »real« folder-structuring – some element which only exists for structuring and which doesn't really exist in

The editor is easily extensible, but at some point enough is enough.

the transform-hierarchy. This is something we are currently looking into – thinking about how to fix this issue in our next project.

Use less transforms? Some of the problems actually arose from an overuse of transforms with often only one component per game object. This kind of structuring was implemented after The Last Tinker, as otherwise it's always hard to see where a reference goes as only the transforms are highlighted and have unique names. Probably we have to take one step back and see, if we can fix this issue another way, e.g. by using custom tools to help maintain a nice structure.

Editor Tools for Every Occasion

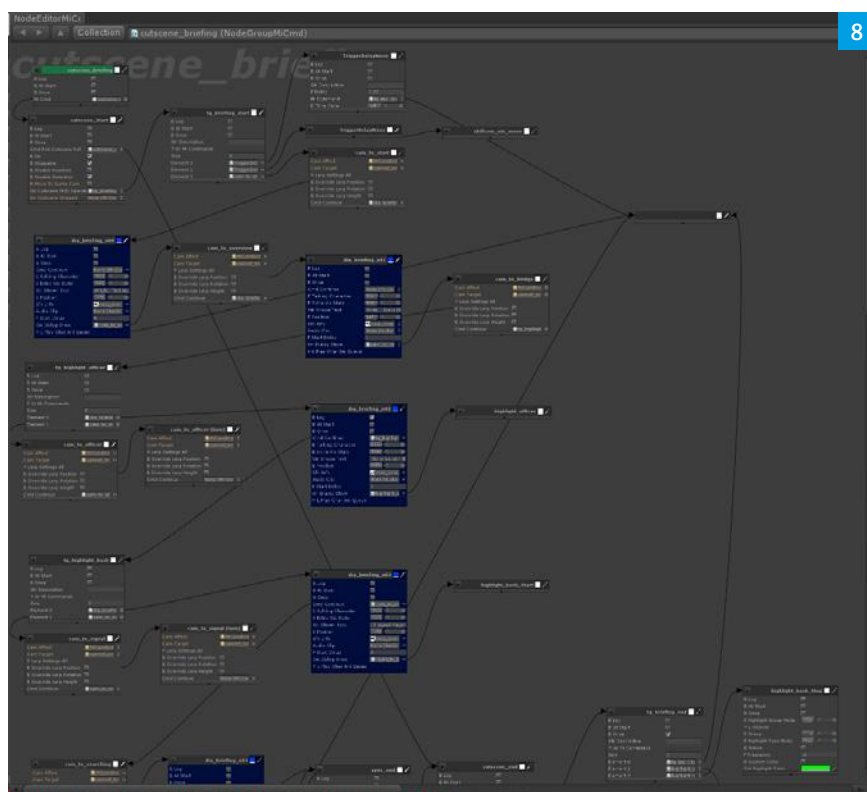
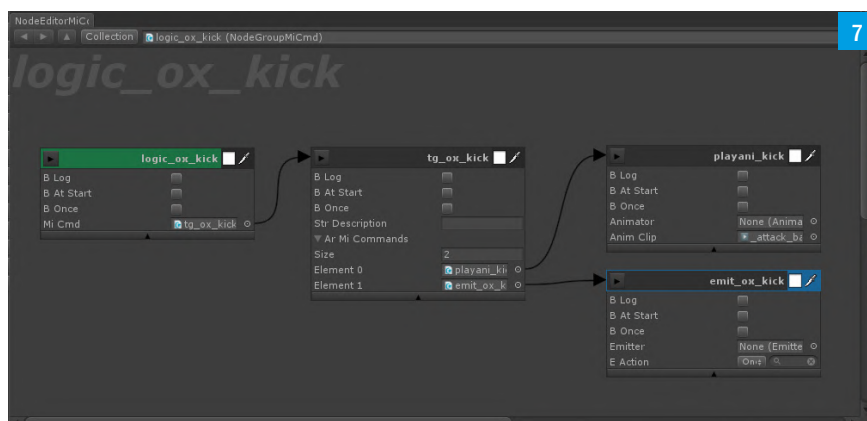
Well, 'Tools' is actually the buzzword that takes us right into the next section: editor tools. We assume that everybody knows how important tools are, no matter the project, so we won't dig into that too deep. What we want to show you though, is quickly things can escalate on a bigger project. We tried to screenshot every tool entry... however, it would have filled the whole screen, had we displayed every subentry. By now we also have a tool for finding other tools! While we prepared this article we cleaned up this whole mess by creating more categories. That was when we also realized how many one-time-use tools we had, that were simply never removed afterwards. And even after the clean-up process a lot of tools remained, in a large variety of categories.

Scene Tools

- Optimize
 - Batch meshes
 - Clean up scene
 - Analyzer
- Game design
 - Place, Replace, advanced transform operations
 - Scripting helper
- Art
 - Model editing
 - Cubemap generation
 - Particle helper
- Search
 - Advanced search
 - Super custom search scripts for fixing and refactoring
- Fixes
 - Fix stuff that level design can do wrong
 - Refactor trough all scenes...

Asset Tools

- Import/export
 - Models
 - Terrain
- Font tools
- Loca tools
- Code generation tools



Special Tool for AI

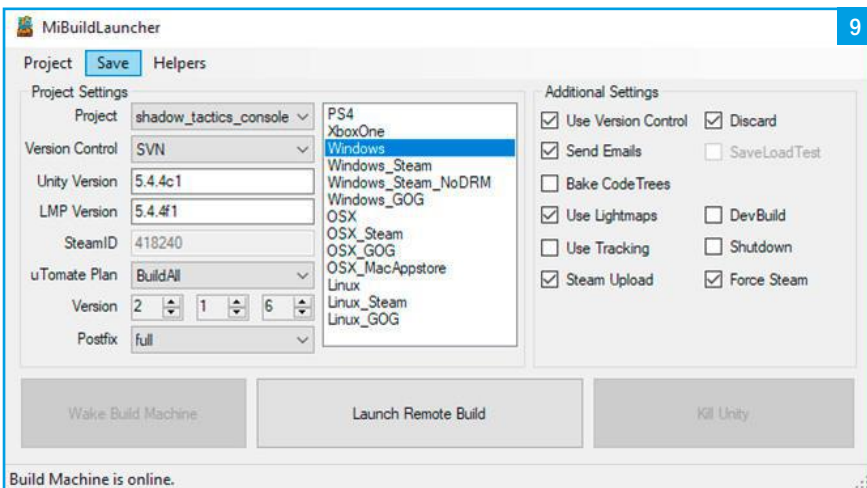
- Routine notes for AI behaviors
 - Visualize in scene

A Node Editor for everything

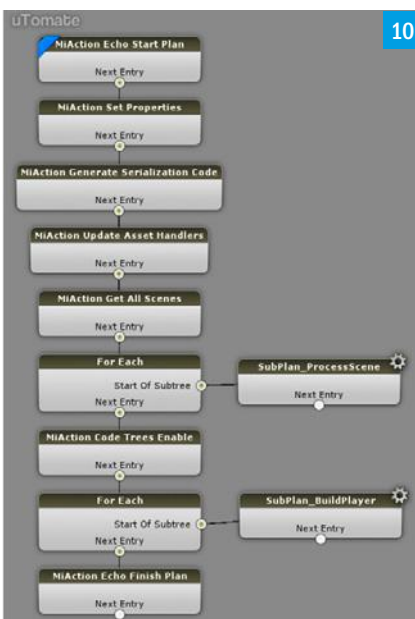
In our earlier project we used our own very simple trigger system, which anonymously receives and send signals to each other. This makes it very easy to extend, however, its use is limited because it cannot forward data from one trigger to the next. Of course, to some extent our trigger system can do it anyways. The major problem was that you couldn't see from where or how a trigger got ... well, triggered and normally that info is visible. In the past, we only had a tool that would look through all the triggers and thereby for a reference to the trigger you needed the info for, so we could actually get some »chain«-information by using it. Knowing that Shadow Tactics would most likely have very complex scripting, we

7 If the logic is triggered, it triggers two other commands in a row: one, that plays an animation on the ox and another emitting some noise.

8 A more complex example of a similar process.



9



10

9 Build launcher
10 uTomate setup

developed a node-based editor that would visualize the connection between our nodes without changing the trigger system itself. The editor is designed to display the inspectors of any script and to visualize connections, if a field inherits any from our trigger base class. As the editor is only drawing Unity inspectors, it was easy to also use it for other purposes, e.g. behavior trees, which we will talk about in the code-section later on.

The thing is: without this editor, we would have had no chance to maintain the level-logics. Unfortunately, the tool is far from perfect. It has bad performance and a lot of bugs, but so far we still don't know about another node editor that is as flexible as our model.

Conclusion: What we think everybody needs

- Create custom tools for what you do most!
- Don't underestimate the potential of tiny helper tools! A simple process might only cost you 10 seconds of your time. If you repeat this process 50 times a day, over a period of more than 2 years, it costs you around 3 days total!
- Look at the asset store: there are so many tools you can simply buy or at least get some inspiration from!
- Create a basic repertoire of tools that you can use for every project!

Creating a Custom Build Pipeline

We talked about assets and tools, now it's time to take a quick look at our build pipeline.

The need for automated builds arose early, when we needed to update certain information of a scene before we could play it. In the editor it happened automatically upon entering play mode, but we couldn't do it in a build. So we had to go through all the scenes, update their specific data holders and then start the build – an incredibly tedious task, so we automated it.

Even early on, running this simple build process could take up to an hour, so we

decided to do it remotely, from a machine – our so-called »build server« – which nobody needed to actively work on all the time. From there on out we found more and more features to add to the build pipeline that would eventually include building for multiple platforms one after another, handling version numbers and even uploading finished builds to our steam repository. We do realize that there are powerful 3rd-party tools that could probably handle all of these processes, but due to the gradual development of our pipeline, there was no point in time where we felt like we needed to switch. In the early stages, there were two batch scripts that handled everything; one for sending the build information to the server, one for actually handling the build process on the server. However, after the process got too complex, we built both systems in C#.

Build Launcher

The build launcher [9](#) was implemented as a C# Windows Forms App, to have a simple UI that is easily extendable when new features need to be added. It has improved a lot since its first incarnation and now has lots of settings and can save settings per project. You can even boot up the build server with the press of a button! When launching a build, a remote task is scheduled on the build server.

Build Server

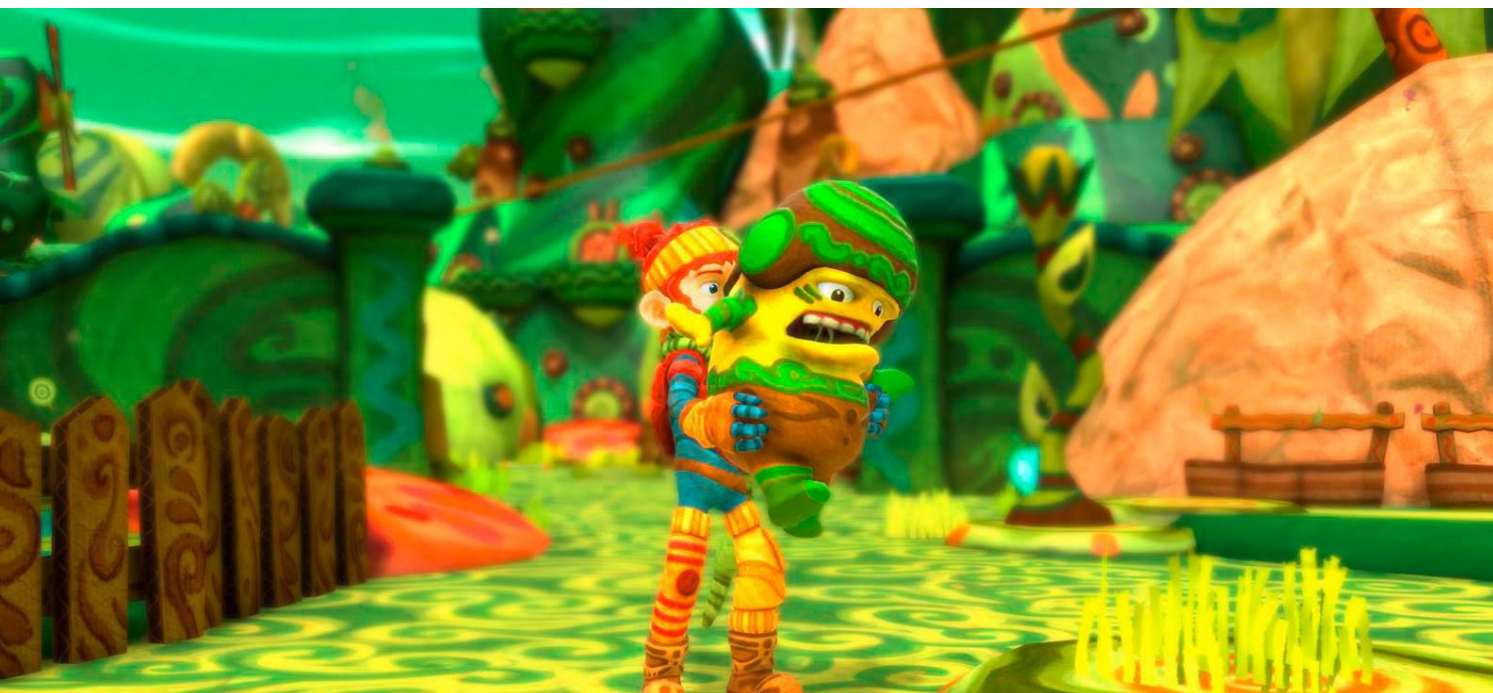
The build server application is implemented as a C# console application. It is the very foundation of our pipeline and it still can be started locally. This was really helpful at times, especially when windows decides to change some security settings after an automatic update and thus block the remote task scheduling commands needed to start a build. Until we figured out what was wrong, we ran the build server application manually on the build server PC.

The most important steps executed by the server application are as follows:

1. Revert and update the repository
2. Start Unity to generate code, pass #1 (CodeTrees, more on that later)
3. Start Unity to run the selected uTomate plan
4. Pack and store finished builds on network drive
5. Run Steamworks SDK to upload builds

uTomate

uTomate [10](#) is a tool we already used during the development of The Last Tinker, to automate in-editor workflows like bake lighting for several scenes, one after another. It is easily extendable and flexible enough to be able to handle all of our build pipeline's needs. With uTomate, we sequence all the necessary in-engine steps as follows:



The Last Tinker is a colorful third-person action adventure with an estimated playtime of 8 hours.

1. Generate code, pass #2 (Save code, more on that later). Needs compiled code from pass #1
2. Update global asset handlers (audio/input)
3. Iterate scenes
 - a) Bake navmesh
 - b) Run scene cleanup
 - I. Delete level design helpers
 - II. Delete editor data containers
 - III. Update scene save info
 - c) Apply lighting data if present
 - d) Save the scene
4. Iterate platforms
 - a) Revert & delete platform specific assets
 - b) Apply custom build settings
 - c) Build
 - d) Post process build
 - I. Copy libraries to build
 - II. PS4 package creator
 - III. X1 validator + symbols collector

- 1 for player and camera
- 1 for AI
- 1 additional Gameplay
- +1 »unfortunate soul« for light probes and movie plug-in

Too big to handle

During Tinker's development, our approach for dealing with all the player logic was to »divide and conquer«, as the player was too big to handle, although it was divided into a lot of components – 62 scripts in total, to be precise (camera, health, input, jump, animation, sound, effects, combat). Still, the main player script was about 5,000 lines long. The player states were implemented with enums for combat and a jump system plus some Booleans for other states:

Custom Save/Load Test

After all this is done, we usually first tested the builds by running an automated test inside the player. This was designed to spot any save/load errors in the levels, so it opened all levels chronologically and performed a few save- and load operations. By doing this before sending the build to QA, we frequently could iron out lots of the mistakes early on.

The Evolution of Code

Before Shadow Tactics, we developed The Last Tinker for PC and consoles, an 8 hour long third-person action adventure without a jump-button. Back then we had three coders:

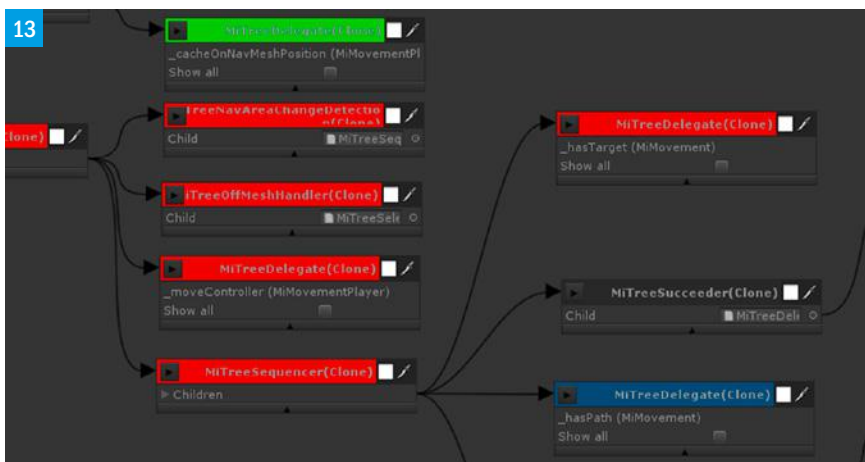
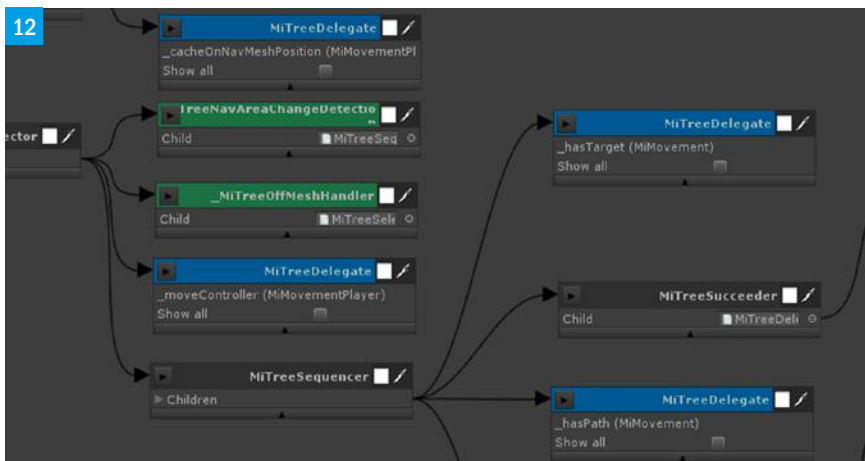


```

11 using MiCore;
12
13 public class MiGameCreator
14 {
15     public Genre m_genre;
16     public Tags[] m_tags;
17
18     private void Awake()
19     {
20         MiGame.makeGame(
21             m_genre,
22             m_tags
23         );
24     }
25 }

```

11 A more advanced AI, five different playable characters and a wide range of individual skills made the work on Shadow Tactics far more complex than on The Last Tinker.



12 Behavior trees in MiTrees

13 Visual debugging

- The main problem here was, that we had no good overview over the player states. Bug fixing and debugging turned out to be rather complicated and the code was nearly impossible to maintain.
- For the future we were certain that we would need to find a way to force the programmer to maintain a better code structure.

Coding in Shadow Tactics

When working on Shadow Tactics, we had a different and larger team of coders, as this project was way more complex. We wanted a more advanced AI as well as different playable characters with individual skill-sets. Furthermore, player characters and NPCs share certain skills, movement and some other types of interaction. So, the risks clearly were too high to do it the same way as in The Last Tinker. Here's what we thought we'd need for more complex characters:

- Fast implementation
- Forcing a structure in the code
- Modularity (player characters & NPCs can use same code parts)
- Performance
- A visual representation

Based on these requirements we ended up implementing our own behavior tree

system – our so-called »MiTrees« – which combines the benefits of visual scripting and the power and performance of classical programming. The MiTrees ¹² are build using the very same node editor we already talked about in the »Tools«-chapter.

Behavior System:

We won't go into detail on how exactly we implemented these behavior trees, because they're actually not that special; we just show you all the default nodes:

- Node-States: Fail / Succeed / Running
- Composite Nodes / Control Flow Nodes: Sequencer / Selector
- Decorator Nodes: Failer / Succeder
- Implementation Nodes / Leafs: actually only delegates to script functions
- Subtrees: to satisfy our requirement of modularity
- Initially all our AI trees were completely processed once per frame

Special Nodes: »Repeat Until Fail«

We felt our game would need some special nodes, particularly as we wanted to set up the player skills inside the behavior trees. These skills are usually build in a structure like the following:

1. Check if the player is already at the target (otherwise the movement subtree is executed)
2. Do something (i.e. remove items from the inventory/execute the skill)
3. Play an animation and wait some time
4. Do something else (i.e. stash weapons)

The key word here is »wait some time«. During some skill animations the player could not take any action. He could neither cancel the skill, nor could any input the player made – like setting a new skill and/or target – change the behavior of the character, until the skill was finished. The behavior tree was kind of meant to be trapped in a state it couldn't leave until certain actions were finished.

So, we ended up adding a »repeat until fail« node, which does exactly what it says ... and what we would later regret quite a few times during development, as the user can actually save the game, while the tree hangs in there. On load, we had to restore this exact state. We therefore had to save the complete state of all AI-trees and all of their nodes – not only some custom picked AI-states! – inside our save-games.

Visual Debugging

After using the trees for some time and being pampered with Visual Studios' debugging features (which are some of the most awesome things ever!), we realized – still early in development – that we would definitely need some kind of visual debugging. Due to all nodes

being objects, it wasn't too hard to implement, but it helped a lot. Without that, these trees were more like black-box systems that were pretty hard to debug ¹³.

Object Oriented (Node Type Class) Stack Iteration

As just mentioned, every tree has its own objects for the nodes inside. They are created on the basis of the tree structure set up in the project and are iterated in a stack.

Problems During Development:

- Performance
 - Execution: stack operations are pretty slow in Unity, additionally one had the default memory overhead that comes with thousands of small objects.)
 - Save/load (all node objects had to be saved – every object has overhead)
- Solution
 - Bake trees into code
 - > Custom IEnumerator.MoveNext(), a whole tree, one function
 - 6 times faster runtime! 6 times smaller save data (bath 6mb – 30mb)! 4 times faster saving (1.5 – 5.2)! 13 times faster loading (2.7 - 3.7)

Conclusion and Future Improvements

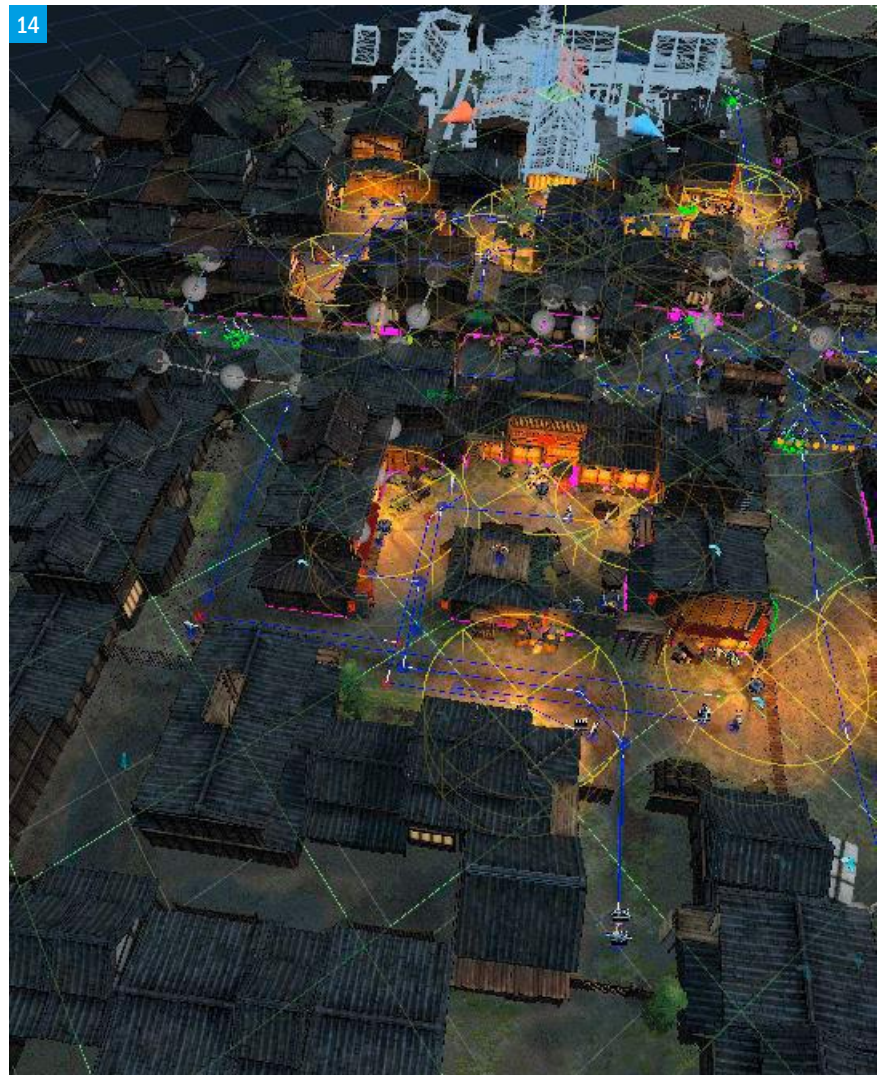
- More consistent implementation
- Better structure and division into subtrees/blocks, now we know what everybody uses and what will change frequently
- Dynamic subtree linking -> modularity
- More back into code if nodes have dependencies
- Slows programmer down
- Make sure to not lose overview
- Improve editor!

What everybody needs ...

... is a way to maintain an overview over growing logic. We think that isn't possible with only plain code in a large project.

Optimizing Shadow Tactics for Consoles

Before we ported Shadow Tactics, we had the following situation: on our development machines [i5-2500K (4x3.3GHz), GTX 660, 16GB RAM] the PC version, that we had released in December 2016, operated at 40 to 70 fps in most cases, while in the worst case it operated just above 30 fps. The main issues we faced during development originated from AI, viewcones and physics – fields, in which we subsequently had to optimize quite a lot. In »worst case« scenarios during our first tests on consoles, the game operated with 15 fps on Xbox One and 16 fps on PlayStation 4. Quick-loading didn't really deserve its name, it easily took 30 to 50 seconds to load a savegame.



¹⁴ Custom settings for specific batches.

So, the following points were the ones we put in most of our optimization work:

- AI performance had several passes. As we already mentioned, we baked behavior trees into the code, with huge gain in performance, but NPCs still needed too much CPU time. That's when we additionally introduced time sliced updates to the AI, which means that only 20% of all AI trees are evaluated each frame, circling through over 5 frames. As soon as an NPC leaves its idle state (detecting something out of the ordinary, performing a skill), it's updated every frame.
- Viewcones also received a few updates during development, as new features were needed or new tech was available. We removed a lot of unnecessary draw calls and render passes by setting up cameras and render layers correctly.
- In the beginning, physics were used for a lot of simple checks and we had several suboptimal collider set-ups on our characters as well. As a result we had a huge amount of constantly moving and potentially colliding



16 Our hierarchy was pretty highly structured by using transforms as »folder« objects, therefore NPCs were deep down in the hierarchy, usually with 5 to 7 parent objects. In addition, each NPC had a quite deep hierarchy in and of itself, containing various colliders, separate GameObjects with logic scripts and of course the animation rig with all its bones.



The problem with this however is, that when a transform is moved or when you request any kind of world space information, all parent transforms have to be iterated to get the correct information on the transform you actually need. So we ...

- ... flattened the entire structure of the hierarchy (by removing parents that were not needed during runtime).
- ... unparented logic objects from the moving parts of the character. A simple guard had about 30 to 40 child GameObject that moved around with the character. Since most of the objects didn't really need to move and had a reference to their owner character anyways, it was easy to decouple them from the moving part of the character.
- ... used the »optimize game object« feature to reduce the overhead created by updating the whole rig as GameObjects and flattening it at the same time.

We still needed to keep a certain amount of structure to support the save-system functionality, but the key point was to reducing the depth and amount of moving objects that helped us free a lot of CPU resources. And by a lot, we mean A LOT – in some scenarios, these hierarchy changes gave us an increase of almost 10 fps on Xbox One!

Off-screen NPCs

This system is based on Unity's CullingGroup API, which lets you define a bunch of objects that you would like to cull depending on where a camera is looking. This would be the simplest use case, but the API is quite a bit more flexible, we just didn't need more.

NPCs in Shadow Tactics need to stay active while they are off-screen (patrol timings, corpse/noise detection, missing buddies etc.), but they don't have to be updated exactly as frequently as when they are on screen. At first, we only disabled obvious things like the animator, but down the line we added more and more systems that would operate on a simpler level when an NPC was off-screen. The biggest change, however, was the movement. We normally use Unity's NavMesh and NavMeshAgent systems to move characters. Unfortunately it gets pretty expensive when running on large maps and for up to a hundred agents simultaneously. So now, when an NPC is off-screen and idle (patrolling), we move it manually every few frames along its predefined path. By doing this only every few frames, we even reduced the amount of moving objects per frame even further, which is great!

Something Unplanned: Detection 2.0

We still had problems with NPC logic costs in large scenes. The system's implementation here was quite naive: it managed a global list of currently detectable objects and every active

NPC would check all those objects, if it detected them – a method that obviously scaled very poorly as the number of NPCs and visible objects across a whole scene could become quite high. We ended up adding a simple grid to each level that stored detectable objects per cell. Every NPC then only had to check the objects inside the cells in his range. This method creates a bit of overhead for populating the cells, but reduces the crazy scaling problem of the previous system by a fair bit.

After having introduced this detection grid, we were also able to use it for a few other systems that still used collider-based approaches. Reducing dynamic physics calculations is always a thing you should look out for.

Something Unplanned: Custom Update Handler

After reading into the subject of Unity's update events, we decided to try our hand at a custom update handler. We had a lot of updates that ran on various systems for each NPC, so at least getting rid of those had to be doable. We didn't want to mess with all of our systems, so the update handler is mainly used for NPC related logic now. In the end, this system allowed us to reduce around 3,000 to 4,000 update calls by only one. Checking each single thing for the need of an update was also supported by existing code, that was used for the save-system. This way we managed to cut a lot of CPU overhead, though we are not quite sure if it's Unity's safety checks or some kind of marshalling cost that makes update events this slow to begin with.

The Final Results

After having done quite a bit more than initially intended, we still have one or two areas where the frame-rate might drop below 30 fps on Xbox One. We had to reduce realtime shadow quality and a few post-processing effects, but otherwise we managed to reach our goal of 1080p and 30 fps.

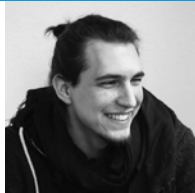
Frieder Mielke, Philipp Wittershagen

FPS	Before	After
Xbox	15	32
PS4	16	36
PC	45	60
Level Load	Before	After
Xbox/PS4	2-3 min	30-60 sec (progress ani)
Save Load	Before	After
Xbox/PS4	30-50 sec	less than 3 sec

EYE CANDY

VISUAL FX IN SHADOW TACTICS

We hardly notice them, when they're in the game, but we instantly know when they're missing and something's off – visual effects are crucial for a game's atmosphere, no matter their size.



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Florian has been at Mimimi Productions for almost five years. Thanks to his outstanding work on daWindci during his studies at university, he secured himself a spot within the team. Since then, his range of tasks and responsibilities grew alongside his technical expertise, which makes him the perfect bridge between art, code and visual effects. [@Smou_](#)

Shadow Tactics is a hardcore real-time stealth game in which you control a small team of specialists, each equipped with a unique skill set. Analyzing the genre, there were quite a lot of cornerstones we had to consider while doing the effects. So, let's take a look at what these cornerstones were exactly.

Visually comforting

In Shadow Tactics you generally have pretty big maps that take you from 1 to 3 hours to play through. So it's essential that these scenes feel natural and are visually appealing. The player has to feel comfortable being there, even if the situation itself is hostile.

On average, the camera is pretty far away from the characters, so you have to carefully exaggerate certain things to ensure readability and meet the player's expectations. For example: if a character uses his samurai sword to take out a target, it would look pretty boring from that distance, although it has to feel rewarding. Also, being a tactical game, the player always has to feel in charge of the situation and has to be able to quickly make out what is happening.

As we chose a realistic approach for the game, there is no black magic, just an advanced technology to suit the gameplay. One of our characters has a long range sniper rifle with insane accuracy. It's neither

historically correct nor too far off, meaning it doesn't stand out in a negative way. Considering there's only limited space, I want to focus on the following aspects:

Environment:

- Ambience
- Physically based

Characters:

- Environment interaction
- Blood

Let's look at environment effects first, with »Ambience VFX« that are independent from the player character. **1** Constant movement on the screen is essential for creating a living scenery. You need omnipresent effects that carry the atmosphere of a level. For example, in a war zone there should be a lot of dust and smoke, maybe some ash and embers flying around. Meanwhile, up in the cold mountains, wind is blowing over the rocks, picking up and blowing away the fine powdery snow.

The thing with ambient effects like this in general is that you need a certain level of density to create an acceptable illusion. It needs to feel volumetric. A density that is too low won't either create the required effect or break the illusion altogether. So how do we achieve the density we need? Well, we could use an emitter **2** that is about the size of



the map, but that's not really an option. Huge map equals thousands of particles at all times, but you only want the ones that you can actually see. So, what about creating an emitter around the camera? Works fine as long as you don't move it. When you move the camera, particles cannot respawn fast enough to reach the required density on your screen, especially when the camera covers great distance after rotating it. Even fast particles can't catch up. Plus, effects on the ground wouldn't work either. So we went with a grid-based solution [3]. First, you create a 2D grid across the map. Then you set up a number of subdivisions. Each of the generated cells will be fitted with a particle system where the box shaped emitter matches the cell size. Then you create a reference point that is parented to the camera. At runtime, the script will ask the reference point [4] for each frame »Hey, where in the grid are you? And are there any neighbouring cells near you? If the answer is 'Yes', on turn the related particle systems and stop the ones which are currently out of range.«

It's also important to set the particle systems to »pre-warm«. That means the particle system pre-simulates a certain state. An example from Destiny [5] shows what happens if you don't pre-warm. The waterfall doesn't start to simulate until you get in range and then slowly builds up. That said, the option to pre-warm doesn't come cheap. I was skeptical at first but it turned out that the performance cost is well inside an acceptable margin.

Be Water, my Friend!

On to the next topic – let's take a closer look at a few interesting points concerning our water, which uses a second camera to create reflections.

- Pro: we get accurate reflections
- Con: it doesn't work with water on different height levels, because you would get an offset in the reflection.

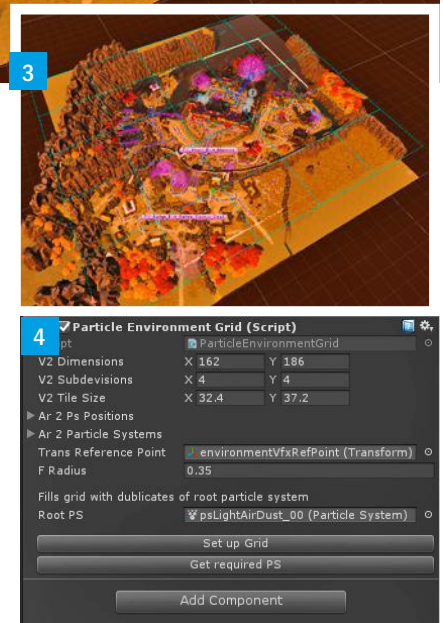
However, the large water bodies tend to be on the same level. On the smaller ones we then used a generic reflection probe. Also, we don't have a real depth fade [6]; I won't go into detail here, just know it didn't work with our implementation of the enemies' view-cones. We just used a simple mask to create transparent areas around shallow spots like shores, then we put a simple ground texture underneath. Yes, we did use transparency and yes, there are shadows on the water [7]. The thing is: transparency and shadows don't get along too well in Unity, which means that you cannot have shadows on transparent objects, at least without pulling some deep tech stunts.

To our advantage, we already had map-sized masks in place for other stuff like blur and fog, so I just used another channel to store a top-down shadow map [8]. Of course we couldn't have changed the light direction during runtime or have big dynamic objects cast shadows on the water, but that hasn't been the case, so a static map worked just fine.

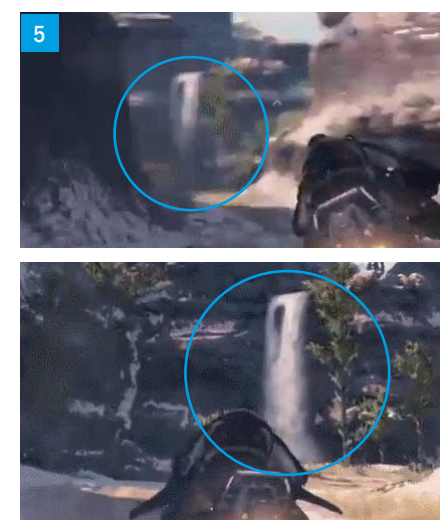
Unfortunately particles and lighting don't get along all too well in Unity. However, now we had a shadow map of all the static main geometry of the level at our disposal, so we used it for some particle effects as well.

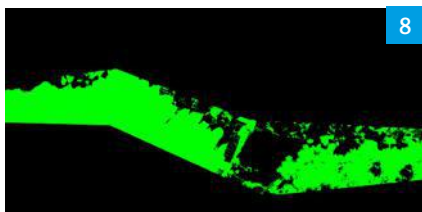
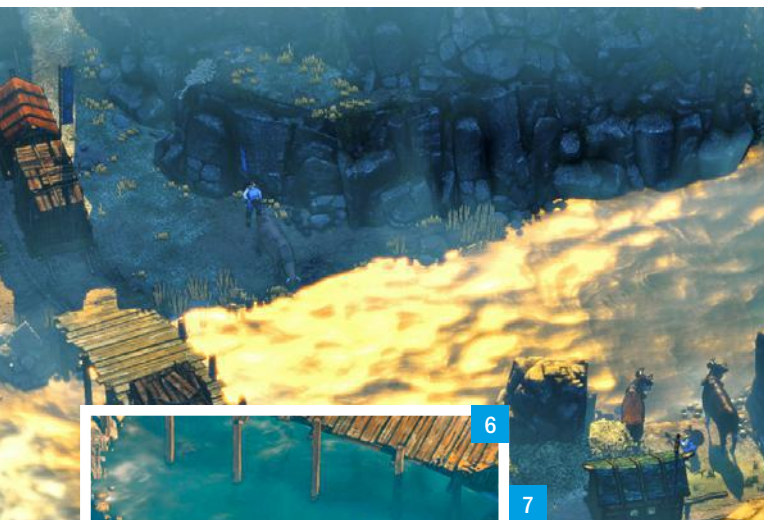
Physically Based Animations

Solid objects need to behave in a physically correct manner. Pretty much all of these animations are prebaked in Unity, using a small tool. I'll explain with the help of barrel racks [9] [10]. Objects are first fitted with colliders



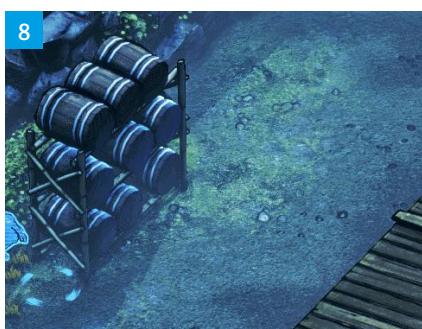
4 The script behind the particle system: we set the dimensions and subdivisions, link a reference point and set the threshold to check for neighbors.





Our water looked like this for most of the production time. Quite romantic, indeed, but there really shouldn't be any light on the water – simply because there's a giant wall blocking the sun!.

9 10 11 Physics of objects like barrels or dropping logs tend to be a bit random. Still, their behavior has to be predictable by the players.



and rigid bodies. During runtime you apply a force and let physics handle the rest. The tool will then just save each frame of the object's transformations and store them within an animation file. In this case the rack is being pushed by this long box collider with a simple forward motion to make the rack topple over.

But why go through all that trouble and prebake everything? Well, because physics tend to be a bit random. The outcome has to be predictable because every time the player interacts with such an object, it has to react in the same way **11**. It's crucial that the player is in charge of the situation and able to calculate the result of his actions. For us it's important, that there are no objects where they aren't supposed to be any – obstructed pathways for example.

Destructibles – Bringing Us Joy Since ...

Destructible objects are a ton of fun, but a nightmare for developers **12** – so much work for only a few seconds of fun. Every object is pre-sliced by using Blender, but there's still a lot of manual labor involved. You have to prepare the object **13** and make sure that there are no open parts of the model. Also, I had problems with the newly created faces, the tool didn't really handle the unwrapping in an acceptable way. Eventually I ended

up unwrapping every single piece by hand, because I didn't have the time to look for a better solution. Well, it wasn't fun ...

In general, every destructible object has two states **14**:

- whole
- destroyed, fragmented

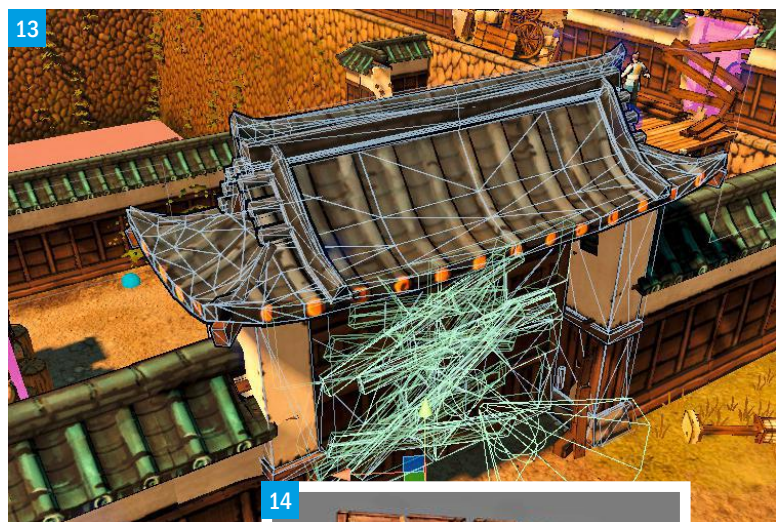
When an object is being destroyed, you simply switch the states and play the prebaked animation.

Of course, later on you don't have the colliders anymore, that's why we prebake after all. The gate **13**, for example, has a »pusher« object – just like the barrel rack – that drives the other objects in a certain direction. Explosion-like setups are relatively easy to make because every rigid body can be turned on from the beginning. With the force being applied instantly, the objects don't really have a chance to just drop down like they normally would. Cascading motions, however, are much harder to achieve. If all rigid bodies were turned on and gravity was affecting them from the beginning (which they have to), they would simply fall down. So, I wrote myself a script that is applied to each rigid body and checks its neighbours for movement. If any of them move over a given threshold, they switch themselves on. Now, when you push away your first object, it cascades from that point over the whole object.

Character Related Effects

Next topic: visual effects that are related to characters within the game. First, we will take a look at environmental effects that are triggered by players. Characters always need to feel like they're connected to world. They should blend in – of course not to the extent that you cannot see them anymore, but just enough to make them look like they belong to where they are. Adding effects that simulate interaction with the





environment helps binding them to the world, but it brings us to another problem. When your character stirs up dust while walking, for example, you'd also expect splashes while running through water; the same goes for snowy areas [15](#). If that doesn't happen, it can easily reflect badly on the immersion. That's where terrain-dependent VFX come into play. Unfortunately, that's the kind of stuff people hardly notice when it's there – but it would look and feel strange, if they weren't. Nobody will come up to you and say »Hey dude, what an amazing job you did on these dust clouds. They're absolutely sensational!« Still, most of the times it's worth going the extra mile for stuff like this, but once you start there's literally no end [16](#). You stumble from one tiny detail into the next one. Fun fact: While preparing this article one of my colleagues came up to me and actually said »Wow, I didn't know that there were different effects for that.« So much for people noticing.

Let There Be Blood!

Talking about complex issues, let's move on to »blood«. Blood is a fluid and fluids

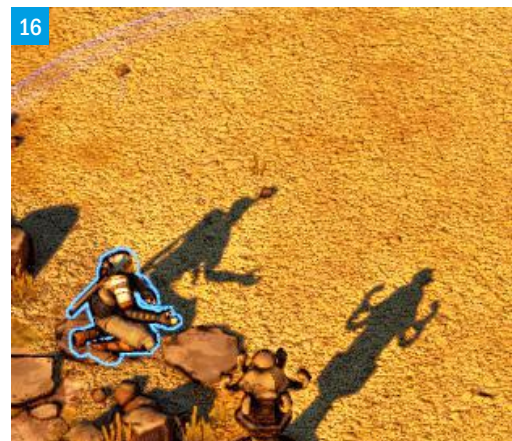
tend to behave in a complex way. When approaching a (fluid) substance like blood, it helps to break it down into its fundamental components and think about their defining characteristics.

Let's start with a simple blood splash particle [17](#). First, I set up a fluid simulation in Blender and created a nice splash shape. Later on, however, we didn't just want this particle to fade out to make it disappear. It was supposed to dissolve in a more natural way, like getting thinner and reshape into small drops [18](#). So, in order to create kind of a dissolving motion, we needed to make a base for a threshold animation in Unity.

For those who don't know how it works, please let me explain real quick: At the beginning, every pixel that carries a tiny bit of color information will be shown. Over time you raise a value from 0 to 1 and cut away everything that's lower than this value at this very moment. So, the »brighter« a pixel is, the longer the texture will be shown at the same position (To see how it works in detail, please check out this website:

<http://www.alkemi-games.com/a-game-of-tricks-iii-particles-fun-part1/>)

Destructibles are a joy to look at,
but a real pain to create.





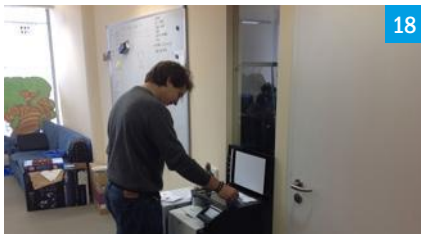
17

So, I created a mask by spawning metaball particles inside the shape in Blender and animating their size over time with a bit of an offset. What gave me the idea was a talk by Eben Cook about the Blood in »The Last of Us« at GDC. Of course he had different tools like Houdini at his disposal, but it gave me a helping push into the right direction.

If we now take what we already have, throw it into Unity and write a small shader, we're off to a good start, but it's obviously not enough. Liquid that sprays into the air splits into small droplets that shape and shift around and – due to constantly changing surface angles – reflect the light in absolutely crazy ways. To simulate this effect I could have used a normal map but that would have eventually been sort of an overkill for such a small splash. Plus, it would have taken up valuable memory space. So I used a simple dotted texture that scrolls around in world space really fast. It's actually a bit stronger around the edges for which I used another mask, but we can ignore that for explanatory purposes. The good thing is that you can't really make out what's happening in detail while playing, because everything happens really fast, but it does a good job simulating the sputtering of droplets in the air.



18



18



20

19 20 Drawing blood splashes by hand and making them look realistic would have been very difficult. So, Florian reused some assets he originally created for The Last Tinker, back in his early days at Mimimi Productions. In order to create some special effects, he let watercolors drop on paper, then he scanned the stains. These assets never made it into The Last Tinker, but worked perfectly for Shadow Tactics. The lesson learned: never throw away stuff you created, just because you didn't have any use for it yet – it might come in handy some day!

We need ... more blood!

Yuki's melee **21** attack was actually the first I created because it has a nice flow to it and was therefore perfect to test things. Once I was finished with the first draft I showed it to my colleagues and they said »Ok, this looks nice, but where's the blood? There needs to be much more of it!« And I was like: What did they just say? More blood? Well, you don't hear that every day – but they were right. I first went with a normal amount of blood which was hardly visible from further away, so I had to find the sweet spot between »unrealistic« and »convincing«.

To better illustrate the impact of an attack we used some blood »decals« on the floor. The reason why 'decals' is put in quotation marks, is because we didn't have actual decals. They were just simple quads spawned just a bit above the ground.

Whenever one of these blood splashes spawns, a script roughly checks the quad's bounds for ground underneath – if there's none, then the splash will not be shown. If the check results come in positive, it will pass the normal version of the surface underneath to the quad and rotate it accordingly. Spawn and despawn are basically done with the same technique that I mentioned before, only with a softer threshold and different maps.

No Gore Fest

We never wanted our game to be a virtual bloodbath. The use of blood was always meant to be justified and to give the game a realistic touch, at least to a certain degree. It was important for us never to use blood for the sake of brutality, there had to be a reason for its use. Like the scene in which a samurai who has brought great shame over his daimyo, is asking for permission to commit seppuku (ritual suicide) and thereby restore his honor – that's pretty much as bloody as it gets in Shadow Tactics. Yes, it is brutal and messy BUT slicing open your stomach and be being decapitated afterwards ... well, that's exactly what it is: messy and gruesome. It simply underlines how desperate someone must have been to go through with an act like this. So much from me about VFX in Shadow Tactics – hopefully I did not bring shame over my house.

Florian Smolka

Yuki's melee attack from left to right, from afar and from a close distance.



21



THE SHOGUN'S BLADES

WATASHI-TACHI WA NINJA DESU

Five specialists against the shogun and his army – about the history of the assassins, their unique skills, personalities and stories.

Those who have sneaked and planned their way through real-time strategy games like »Commandos« know about the importance of every single team member. If you wanted to master the toughest missions, you were completely dependent on your specialists, and losing someone in a bullet storm basically meant »Mission over«. Only a few hours into the game, the Commandos' skills became your second nature. You would instinctively send forward the Green Beret, but you also knew when to let the pioneer look for land mines first. You would also recognize each of the five characters by their way of saying »Yes, Sir!«.

When the time came to come up with a new team for Shadow Tactics, we knew that this was one of the requirements. Our focus was on creating the feeling of playing real people with strong, individual personalities. We wanted each character to be unique and play their special role in completing the missions. Since we had never worked in that genre before, we obviously had a lot of questions: What archetypes are there? What skills does each character need to master? What personalities should they have? How can we combine story and gameplay? And above all: How many characters do we need in total?

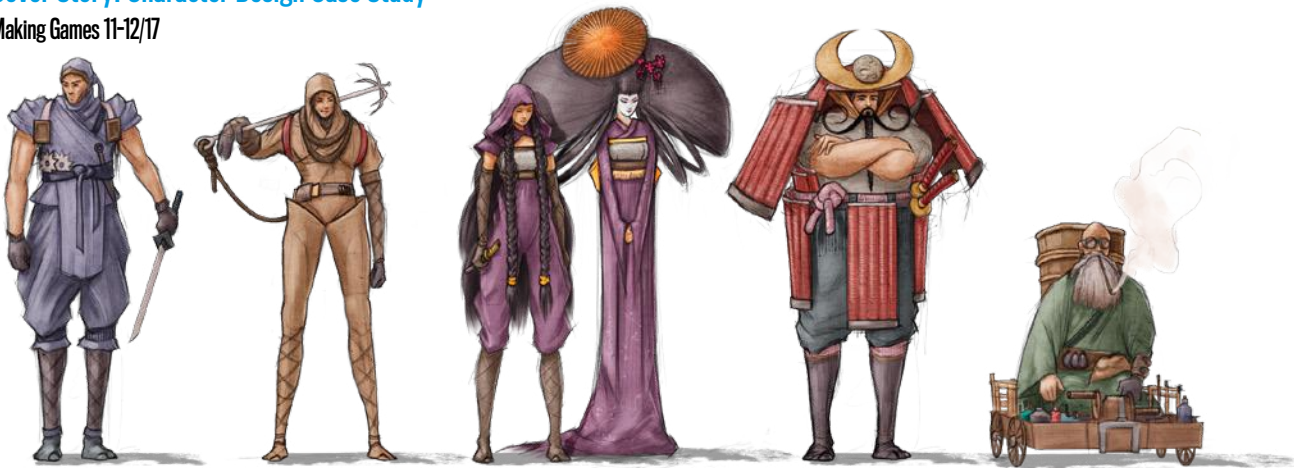
A handful of ninjas

It all started out with the decision to have five characters – no more and no less. Upfront, we had thoroughly examined old titles like »Commandos« and »Desperados« to get a feeling for the genre. Our analysis quickly resulted in diverse character archetypes. Also, the allocation of skills required the consideration of a few details, for example when skills were overlapping or when basic skills like close combat or the carrying of bodies were allocated to only one character. All of the titles mentioned had more than five characters though, which is why we were still a little unsure about our decision despite the research. In hindsight it was the right one – as former Desperados developer Ralf Adam confirmed. From then on, our goal was to create the most diverse team possible. Each member was to have a certain strength which was to be visible right away. The players should never have to ask themselves »What can I do with this one?« or »Why is he part of the mission?« The gameplay was our top priority during development. Even a good story wouldn't make up for the team controls not being perfect. Hence, we knew that the story would have to come second! Of course, we wanted the characters to develop a personality as the game advanced. We also wanted a



Martin "Hambo" Hamberger
Game and Level Designer at
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Martin has been Game and Level Designer at Mimimi Productions ever since the studio was founded. As Storywriter he has also breathed life into all sorts of characters of every game the studio has published so far.
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The setting of our choice – Japan during the Edo period – made it easy for us: samurai, honor, treason and bloody intrigues – that was our setting. We focused on strong character types like the skillful ninja, the deadly geisha and the elder who is more than meets the eye... They were all characters who were immediately tangible and who we could add depth to over the course of the game.

We want no driver!

When we began to design the skills of the characters, we had a clear goal in mind: The individual team members had to work well together, everyone in the group had to be useful for the entire duration of the mission. One thing the team would say again and again was »We want no driver!« The driver was a character who would always just be standing around in the old Commandos game until he had to drive the getaway car at the end of the mission. This may sound a bit exaggerated, but it explains quite well what we were after.

At first, we wanted to make the interaction between the individual team members an additional feature. Like in *Desperados*, we wanted operations which could only be carried out by several characters, e.g. building a leg-up or pretending to be an innocent couple. We had very specific ideas which we quickly discarded again. In the end, we designed the skills in an open way and supported the simultaneous use of several characters through special timings in the opponents' behavior and features like the »Shadow Mode«. Until we got there, all

skills went through an iteration process. New skills were implemented, tested and adjusted. Then we built the first levels and were able to gain experience in the opponents' behavior and the interaction between the characters. A lot of ideas

Assassins then: Besides Mugen and Aiko, the original ensemble consisted of a pair of ninja brothers and an alchemist in a wheelchair who dealt with bombs and gas grenades.

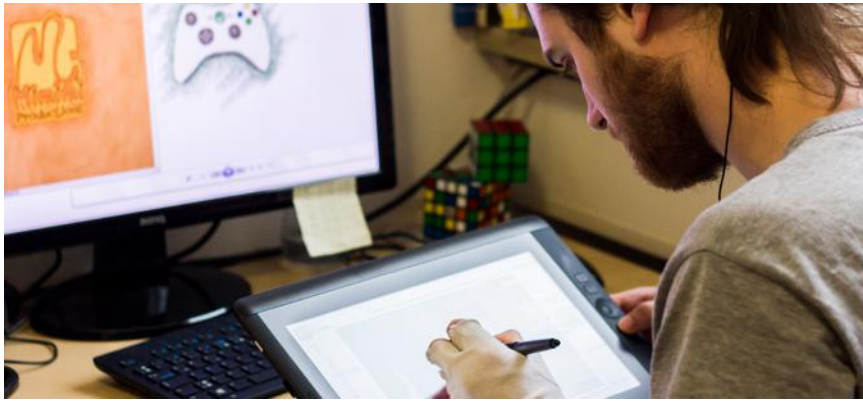
Assassins today: Instead of the second ninja, we added thief Yuki, while the former alchemist Takuma now strikes a pose with a rifle, a racoon dog and a wooden leg.

background story which would develop from the gameplay. But a few things needed to be clarified for that – for example the attitude towards people who would inevitably stab several dozens of guards during the game...

Killing is part of the job

It's a strange feeling when you move from child-friendly games like »The Last Tinker« or »The Trip to Panama« on to a project where it's common procedure to sneak, assassinate and hide bodies. We had discussions about how to deal with the violence and what attitude our characters or – even more importantly – the player would have towards that. We didn't want to take on the role of cruel murderers. We wanted to play characters who fight for their own goals and ideals. In the end we decided to clearly indicate the limits: It's not exactly a nice thing, but unfortunately, killing is part of the job. Our protagonists know and accept that, each in their own way. The enemies are always superior in numbers, and the people you fight against all have a skeleton in their closet. All that helped us strike the right note.

»The individual team members had to work well together, everyone in the group had to be useful for the entire duration of the mission.«



Sometimes popular characters like The End from Metal Gear Solid 3 or actor Ken Watanabe can be seen behind the designs of Concept Artist Lucas.

had to be discarded, either because they didn't work or simply because they didn't fit into the game. That's nothing unusual, especially when tackling a new genre.

Less is more

When designing the skills, there was another factor we had to take into consideration: Each skill and each feature had to be executable through controller as well as through mouse and keyboard. Of course, this caused some limitations for us, but eventually it benefited the design. We were forced to focus on a few distinctive skills which could easily be operated and still guaranteed enough freedom for creative problem solving.

Based on these requirements we created our template for the skill sets. Each character received two signature skills which define them and which you always have in the back of your mind whenever you're confronted with an enemy setup. Our goal was for players to immediately think »Sure, for this task I need the samurai since he can take out the entire group at a single blow while the ninja is distracting them.« Each of our five characters roughly follows this signature template and they each receive a special skill like the shuriken, the multi-kill, the trap or the disguise as well as another skill to distract enemies, including the stone's throw, the flute or a sake bottle. Each assassin will also receive one close combat kill, a hidden firearm and a healing ability. These skills vary only slightly from character to character though since they are part of the basic equipment. There's more variation in the passive skills. Agile characters like ninja Hayato or thief Yuki can climb and jump on roofs. The strong samurai Mugen, on the other hand, can carry heavy objects or even two bodies at once and kill even the strongest enemies by himself.

Of course, we also experiment with active and passive skills: The elder Takuma, the sniper of the team, is neither strong nor

agile, and he doesn't have a close combat kill either. To make up for it, his rifle, his grenades and his Tanuki, the small Japanese racoon dog who distracts enemies on command, are very powerful compared to all other skills – as long as you know when and how to use them.

Two half-ninjas

As mentioned already, we discarded a lot of our skill ideas during the iteration process, which again affected our original character line-up. We used to have two ninjas on the team who turned out to be brothers as the story advanced. The basic idea was that one of them could only kill and the other one could only climb and infiltrate. But we quickly realized that this decision wouldn't have made much sense with regard to gameplay, and the Art department regularly commented it with »What kind of ninja is he if he can't climb?!«. So, we merged our two half-ninjas into one, and we had a slot available again, which was eventually taken by our young thief Yuki who we gave the trapper skill set which we wanted to include anyway in one way or the other.

The old sniper was a bit more advanced already, although he was still in a feudal wheelchair in the first concepts. His original title was »alchemist« because he was going to deal with gas grenades, poisons, and bombs. When we had a bit more experience we realized though that the wheelchair was causing too many problems for the gameplay and the visualization, which is why the alchemist was upgraded to a sniper with a wooden leg.

Wild animations

As the gameplay and the look gradually took shape, everyone on the team slowly got a better feeling for the characters. We often discussed about what attributes certain characters should have and what their style should be. This was mostly based on their archetypes since we hadn't

Character Art at its Best



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reiner.92

f /lucas.reiner.92

Yuki's portrait was the first of its kind, and it was created in my spare time. Her character already existed, but not that detailed yet, and her eyes were still looking all the way down. Later I added the brush style and started merging the colors more and more towards the bottom. It was similar with Mugen. After having worked on the sketches for several days, I took them to the studio and showed them to the team who simply said »Cool – now do the other ones!«

The protagonists

In **Yuki's** case, I had to make her look up more since the characters had to be recognizable from the portraits in the game. When I was finished with the picture, the team unanimously said that Yuki looked like my girlfriend – however, I never used her as a reference, it happened unconsciously. So, my girlfriend was the unofficial model for Yuki.

For **Aiko** I had the least references, but her face is covered for the most part anyway. In her case, it suited her character though.

Takuma is inspired by Mister Miyagi and The End from »Metal Gear Solid 3 – Snake Eater«. The beard, the green clothing, just a racoon dog instead of a parrot. This was never our original idea, but Hambo, too, is a huge Metal Gear fan. We never did it intentionally, but at some point we said »Hey, he actually looks like The End...!«

Ninja **Hayato** had several influences, one of them was Metal Gear as well, but also classic characters like Hanzo from »Samurai Showdown«. In case of **Mugen's** face I clearly used Ken Watanabe (»The Last Samurai«) as a reference.

The biggest challenge for me was indeed the brush style since I usually am more of a fan of clear lines as you'd find in comic books. I like the style very much, but to be honest, I was struggling a bit.



Hayato is strong and a versed assassin, hence a close combat kill only takes him two seconds.

worked on the story and the personalities yet. A good example for this is again the young thief and her close combat animation: We knew that she grew up on the street and that she had learned to make up for her physical weakness with skill and fierceness. The first suggestion for her close combat kill therefore was that she would jump on her opponents' shoulders and strangle them with her legs. The idea was that it should happen slowly and quietly. We realized though that many on our team weren't happy with this concept since it didn't quite suit the little wild girl. Then we had the idea to give her a small dagger. Due to her petite stature, she'd have to cut her opponents' legs first and then quickly ram the knife into their neck to stop them from screaming. This was, admittedly, rather brutal, but everyone immediately saw how well this revealed her wild side. From that moment on, we also knew that our Yuki had some issue.

Finding the voice

The interplay of art and game design shaped the characters in a way that the first dialogues were ready to be written. Since there wasn't a real story yet, we focused on finding a voice for everyone first, which also caused some dissent within the team. For a while, ninja Hayato was a rough and humorless character whose only focus was the mission. Sniper Takuma, too, was also a very grumpy and bitter character in early iterations; half of his text consisted of grumbling and monosyllabic replies. Later, when we had a clearer idea about the tone, we developed an urge for more colorful characters. Hayato turned into a bragging daredevil, the sniper into an odd fellow full of zest for life. The basic tone remained serious, but had a more human touch in the end.

Until we had found the voices of our characters, we regularly discussed every written line. We then had to work out

how the characters were connected to one another, how much you learn about them, how you get to know them, etc. We based all that depending on which characters worked well together in terms of gameplay, in what constellations they appeared, and the situations our missions would place them in.

Sneaking and talking

When we started telling the story to the game, we knew that we had to avoid interrupting the game flow as much as possible. Instead, we wanted our characters to talk a lot during a mission. Since we designed our missions in a very open way, the problem was that most times we couldn't predict where the players would place the characters or in what way they would complete the mission objectives. Our solution to this was to focus on short dialogues resulting from the players' actions. The characters comment on everyone's actions and thus indirectly react to everything the player does. This way we strengthen the relations between the team members in a natural way and also create the impression that they complete the mission together. An example: In the second mission, our ninja bumps into the young thief for the first time. A cutscene at the beginning makes it clear that they are dependent on one another, even though the assassin would rather work by himself. The rest of the mission is told without cutscenes. In the further course of the level the player learns about the thief's skills, while Hayato comments on them. At the same time, the thief reacts to all the ninja's replies. The longer you play, the more you get the feeling that the two get along better and respect each other more until Hayato even advocates Yuki joining the team. It's in situations like this that the story-writing works best, but of course, there are a few negative examples, too, that we learned a few lessons from



The iconic character portraits of the five assassins were penned (or rather brushed) by Concept Artist Lucas Rainer.

– e.g. when Yuki and the sniper have a quiet conversation in the middle of a raging battle. Since the story was finalized quite late, we couldn't completely do it without cutscenes. Yet, these conversations are an important reason why our characters are so well-perceived by the audience.

English or Japanese tea?

The last few months of the development were dominated by script revisions. For a project of this size we have a comparably low number of lines, hence every single one had to be even punchier. The voice acting, which was next, was again something completely new that the team had to deal with. Upfront, we had sent some character sheets and sample texts to our recording studio OMUK, based on which we picked the voice actors. We then went to London where we worked closely with voice directors and actors in the studio. Being on site turned out to be extremely valuable since we were able to make last-minute adjustments to the script and the characters. Also, it was helpful to be able to show the current build of the game as a reference and support the agnized voice actors with one or the other complicated Japanese name.

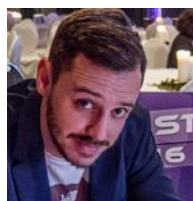
Which one is your favorite?

Following the release, we were obviously extremely happy about the praise the game received. A lot of people fell in love with our characters; on YouTube we even discovered ways to use their skills we hadn't even thought of ourselves. On the Steam forums we followed discussions about which character was the best. What makes us most happy? Well, that there is no clear answer to the question and everyone has a different favorite character.

In hindsight, we can say that our approach to develop the characters based on the gameplay was the right one. For our next project in this genre we are planning to keep the story more on character level and tailor each moment in the gameplay even more to the tone and the setting of the missions.

Martin Hamberger

Captivatingly deadly animations



Cem Erdalan
3D Artist at Mimimi
Productions

[@cemtlem](#)

Each protagonist has their own story, personality and skills, which we also wanted to reflect in their appearance through the silhouette, stature, posture and animations. Our thief Yuki lost her parents during early childhood and grew up on the streets all on her own. Thieves taught her how to steal; she's very agile and avoids any direct combat, so she'd rather sneak up to her enemies to quickly cut their throat. When she moves, she bends forward and always keeps her dagger ready to use.

The animation style

In Shadow Tactics, the focus is clearly on the gameplay – kill animations and character movement play a subordinate role. The animations primarily serve their purpose, they're simple, clearly readable and suit the personality of the respective character. More detailed animations like moving individual fingers were unnecessary since the camera distance wouldn't allow to notice them anyway.

In games like »Diablo«, »Dota« and »League of Legends«, just to mention a few examples, the characters are often »over-animated«. In Shadow Tactics, the animations were kept rather simple, natural and above all realistic.

Animation aids

Internet references

The richest source for references is obviously

the internet. For the creation of the swimming animations of our main characters I watched videos of Olympic swimmers, which I could even load in the backgrounds of blenders and roughly animate them manually. I did the same thing for the moving animation of our ox.

“Do the Denzel”

Being an Animator, acting often helps me put myself in a character's situation to get a feeling for them. Sometimes I even record myself doing so, but I'd rather not show it to you! We'd also often reenact a situation as a group. I still remember the meeting with the Game Designers and Artists. We'd discuss, for example, how Yuki would attack and kill a guard who is considerably taller and stronger than herself. One of us would act as the guard, while the other ones would stand around in a circle and considered the different ways to attack. We pretty much agreed that she'd sneak up from behind, crouching, to quickly and effectively subdue her opponent.

The result can be seen in the final game: Yuki sneaks up from behind, pulls out her dagger, slashes the back of her victims' knees, causing the victims to collapse, and then finishes them off by stabbing them in the neck.

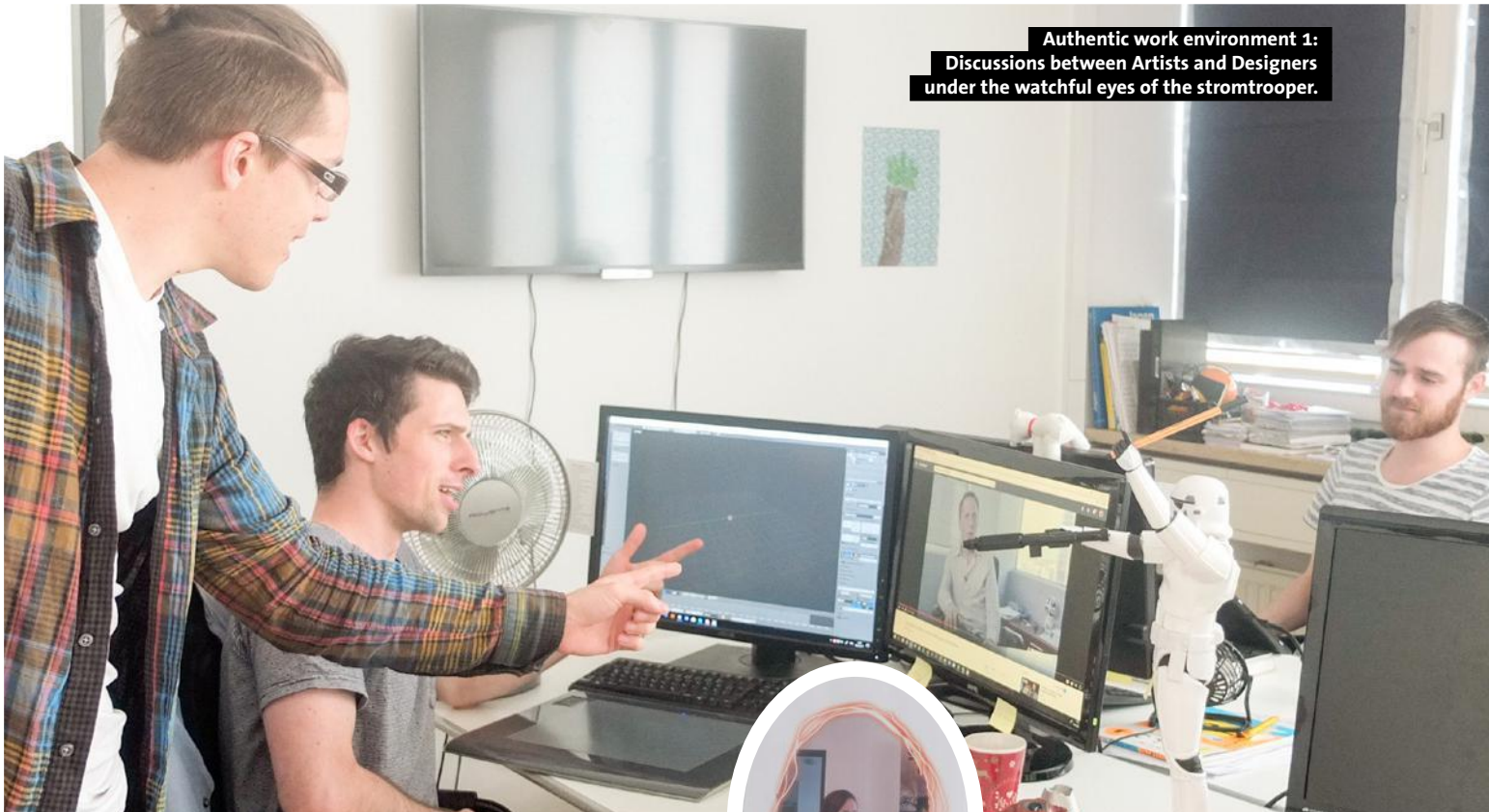
Gameplay & art go “hand in hand”

As Animator I received certain prerequisites from our Game Designers. The kill animations, to stick to our example, were to have different lengths. While the unexperienced street kid Yuki has to fight for her advantage and needs about 3 seconds for a »kill«, the experienced ninja Hayato only needs 2 seconds to finish off his opponents. For this reason, we often only created prototype animations for the time being, which were implemented by our coders. This helped us assess whether the feature was fun, whether the timings worked with the gameplay and whether the animation suited our character.

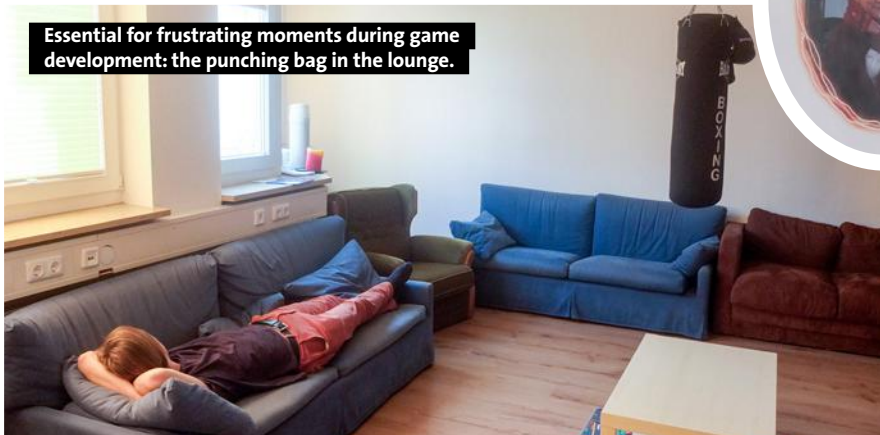


MIMIMI PRODUCTIONS

A day at...



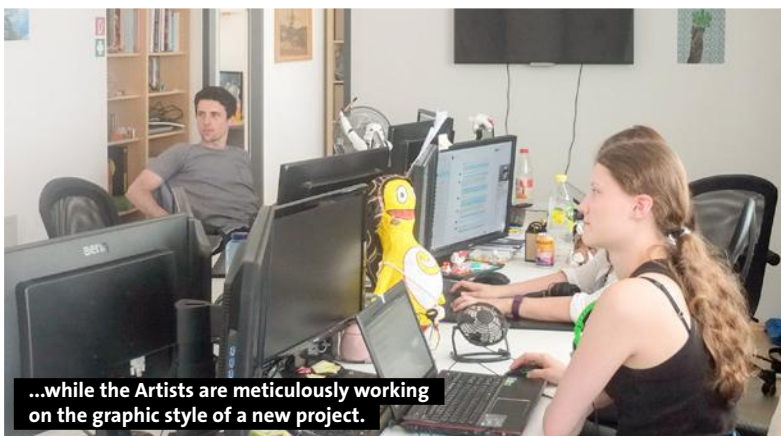
Essential for frustrating moments during game development: the punching bag in the lounge.



Authentic work environment 2: Hambo strikes a completely natural pose in the Designers' office...



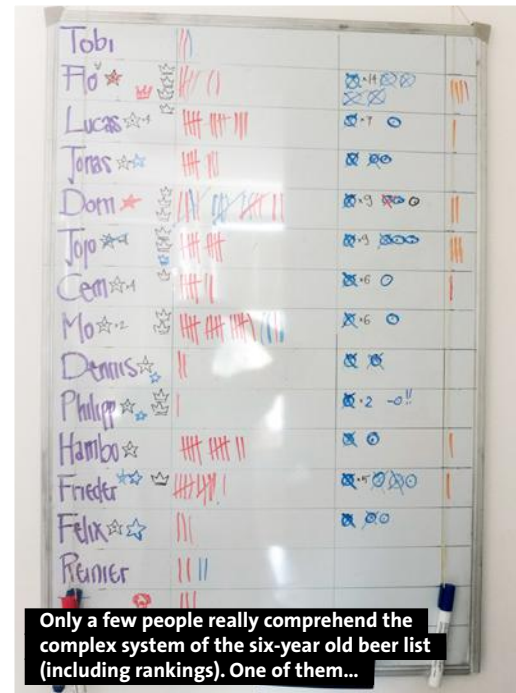
...while the Artists are meticulously working on the graphic style of a new project.



The mighty »Shadow Tactics« marketing plan has now been put up in the second kitchen which now serves a different purpose.



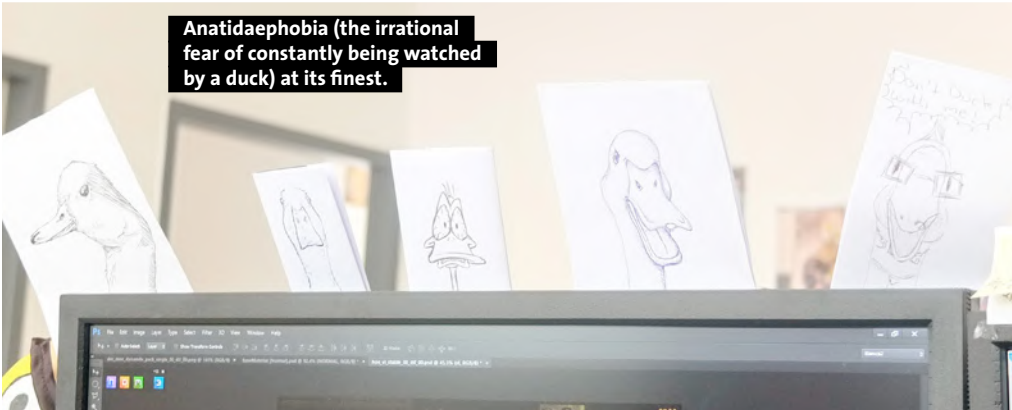
While stopping by in Munich to watch the guys at Mimimi Productions in their natural habitat, we might as well take a few pictures and keep the developers from taking their well-deserved vacation.



Name	Stars	Symbols	Rankings
Tobi			
Flo	★		14
Lucas	★		7
Tomas	★		
Dorn	★		3
Topo	★		3
Cem	★		6
Mo	★		6
Dennis	★		
Philipp	★		2
Hanno	★		
Friedr	★		5
Felix	★		
Renier			

Only a few people really comprehend the complex system of the six-year old beer list (including rankings). One of them...

Anatidaephobia (the irrational fear of constantly being watched by a duck) at its finest.



...is second placed Managing Director Johannes Roth.



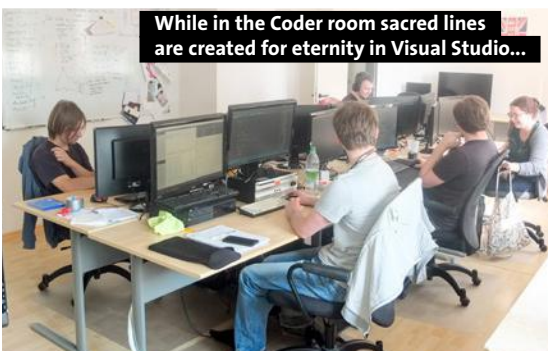
Hunting trophies from shooting galleries at Oktoberfest and the Kühnbach brewery festival.



Award wall: The meeting room is a shrine of past projects and awards.



While in the Coder room sacred lines are created for eternity in Visual Studio...



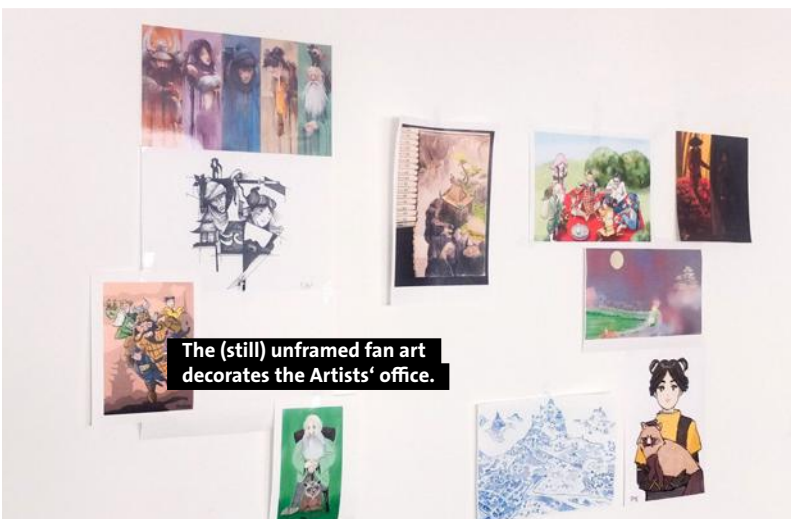
...studio manager Anna lends her unstinting support.



Authentic work environment 3: our marketing genius Dennis.



The (still) unframed fan art decorates the Artists' office.





FLEXIBLE, SAFE AND RELIABLE!

IMPLEMENTATION OF A PAYMENT SYSTEM

A payment system for online games must process purchases via many different payment methods safely and reliably. What does this system need to look like to meet these requirements?

In the first part of the series we learned about the economic benefit of having your own payment system, but also about the complexity associated with providing a range of possible payment methods [1]. In this issue, we're going to talk about the technical implementation.

Requirement analysis

The payment method is the link between the online games of the company and the payment service providers. On the one hand, it should be available for all games, even if they belong to different genres and accordingly sell different services – premium times in freemium models, virtual currency in microtransaction models, virtual items or special services. On the other hand, it should support a lot of different payment methods, even if each of them requires different data, is processed differently and has different attributes in terms of the maximum amounts, periodic repeatability for subscriptions or reversibility.

This central role of the payment system brings about higher requirements in terms of availability and reliability. If a

company's game has a critical error, only the players of this particular game are affected. However, if the payment system fails, the whole company is losing out! Of course, payments as well as repayments (refunds by the company) and chargebacks (withdrawal from payments through the payer) also need to be processed correctly: a single transaction in the right amount and for the right customer.

Payment details are very delicate data which require special protection against unauthorized access. Credit card organizations have even created their own set of rules («Payment Card Industry Data Security Standard», in short: PCI-DSS) for the processing of credit card data, which includes specifications for the network architecture, encryption, access control and monitoring [2]. If you don't stick to these rules, you have to pay penalties, or you may even lose the right to process credit card payments.

Architecture

The payment system by CipSoft tries to meet these requirements by means of a modular architecture (see image 1). It consists of several active components



Stephan Payer
Co-Founder of online game
developer and provider CipSoft

At CipSoft, Stephan is responsible for finance, HR and internal organization. After having developed the game servers of the online RPGs Tibia and TibiaME for many years, he is now mainly in charge of the central payment system for all CipSoft games. He appreciates if you share your experience on this topic with him at payer@cipsoft.com.

[1] Stephan Payer: Payment systems for online games; Making Games 07-08/2017, pages 30-33

[2] PCI Security Standards Council: Data Security Standard, version 3.2, April 2016; https://www.pcisecuritystandards.org/documents/PCI_DSS_v3-2.pdf



(processes), each of which fulfill a subtask of the payment processing procedure, as well as a database for the data retention which is only accessible by the components of the payment system.

Each component is defined by the tasks it can fulfill – also by using other components:

- A »core component« provides the central tasks which are independent of certain payment service providers:
- Information about services and prices, payment histories of players, statistics, completion of orders, and much more.
- For each payment service provider there is a »PSP Handler« which processes the payments via this payment service provider and receives the order to do so from the core component.
- Every game provides a component beyond the payment system (»Proxy«) which handles the communication with this game and forwards inquiries of the payment system – e.g., the notification about a successful payment – within the game to the right addressee.
- A »directory component« provides information about all available components. Each component that wants to provide services for other components is registered in the directory component. This means the other components only need to know the address of the directory where they can get the addresses of all other components.
- A »Support Tool« gives an administration access to the monitoring and control of the payment system.

Cardinality and flexibility

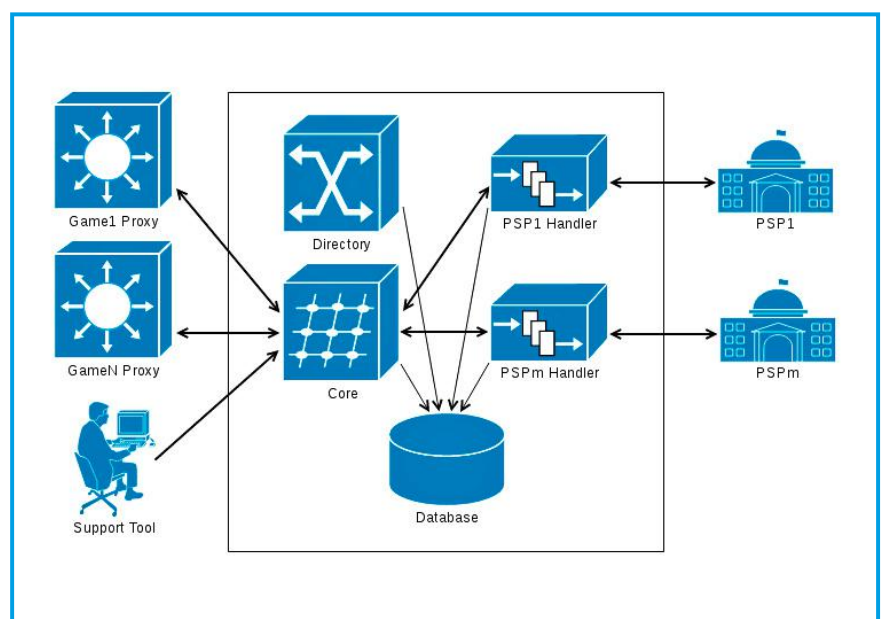
The usability of the payment system for various services and the support of a range of payment methods brings about a high level of complexity. This complexity reduces CipSoft's payment system through

a consequent abstraction which includes a clear separation of the task areas of games and payment system: The games don't know any details about individual payment methods, the payment system doesn't know anything about the specific attributes of the games' performances. For this reason, new payment methods can be added without the games having to be re-programmed, and the games can accommodate new types of services without the payment system having to be changed. Only the configuration of the database needs to be adjusted.

A generic dialogue system has been developed for the order process. The payment system tells the order dialogue only which dialogue elements need to be displayed, and the order dialogue sends back the entered data without checking the content. While for payments via PayPal only the entry of an email address which designates the PayPal account that's being used is required, payments via credit card require the following parameters: text boxes of various lengths for name, street, zip code and city of the customer, an email address, a selection box for the card type, a number box for the card number, additional selection boxes for the expiration date and another number box for the security code. Some of these parameters can be pre-filled with the data of the previous order. The successful completion of the order is followed either by the immediate payment confirmation (e.g. when using credit cards), the forwarding screen to the website of the payment service provider (e.g. when using PayPal) or a notification for action for the customer (e.g. when using offline transfers). Hence, changes in the order process are usually not required for new payment methods.

»Payment details are very delicate data which require special protection against unauthorized access.«

Image 1: Logical setup of CipSoft's payment system.



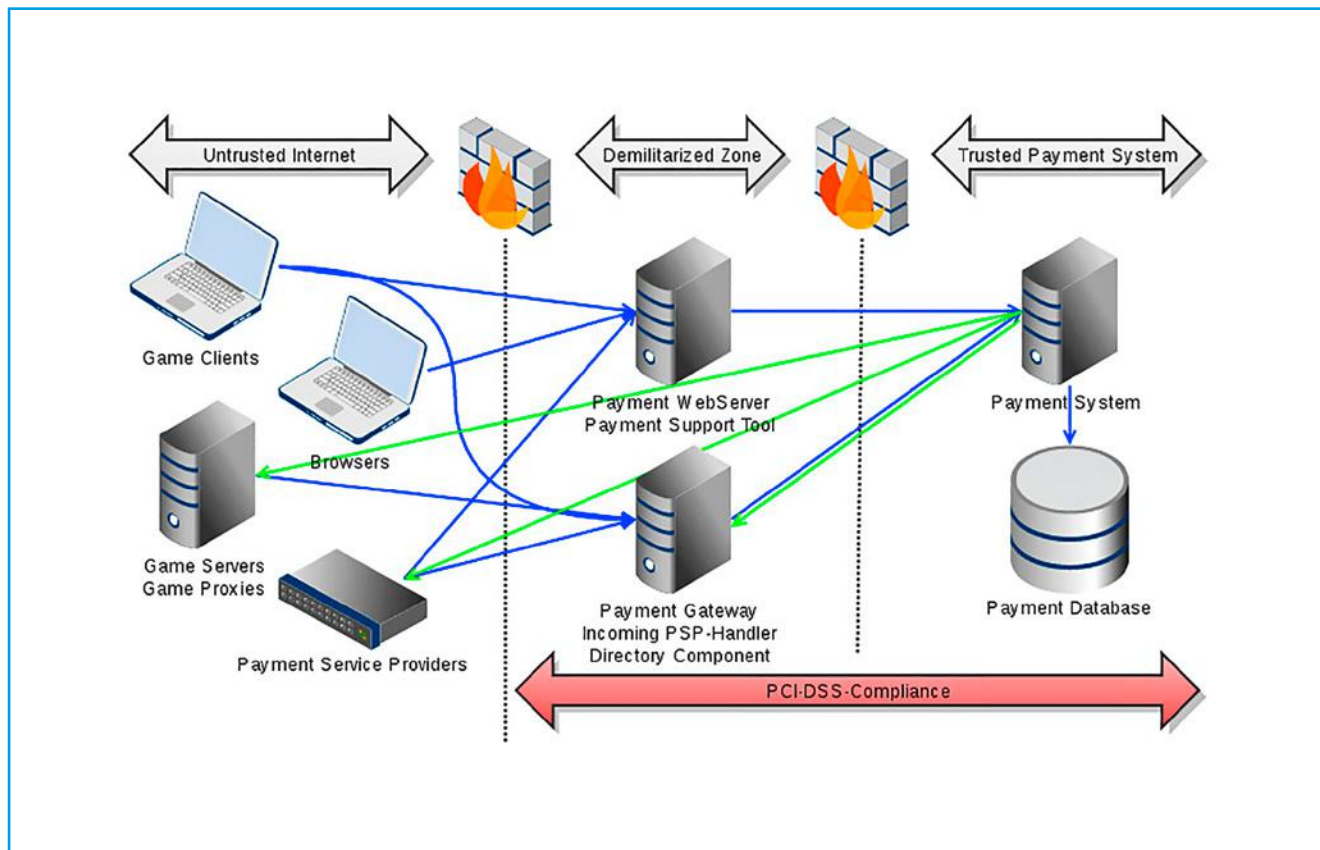


Image 2: Technical setup of CipSoft's payment system.

The database stores the supported payment methods with their attributes, the services provided and all countries with their currencies and tax rates. Internationally valid standard prices as well as special prices for certain countries (e.g. fixed prices in the national currency, lower prices for marketing actions) or for certain payment methods (e.g. higher prices for expensive payment methods) can be configured individually and equipped with a validity period. The payment system always looks for the best suitable price at the time of the order.

Availability and reliability

The components are stateless, which means that the result of an inquiry is either reported back to the sender or saved in the database, but not in the component itself. This prevents information getting lost in case of a component crashing (apart from active inquiries), and the component can simply be restarted again. Redundancy and load distribution are possible by registering several identical components – which ideally run on different servers – at the directory (which can be run redundantly as well). The directory then randomly returns one of these components during search queries. The components can gradually be replaced through updates, while the payment system always remains functional. Depending on the system used,

the database, too, supports replication. Altogether the architecture described here considerably reduces the risk of a total system failure.

The communication between the components of the payment system as well as between the payment system and the payment service providers is prone to failures though: Services may be cancelled and wires may be blocked. However, it is still indispensable that all transactions are processed correctly and consistency is ensured between all parties involved. The following procedure may be applied here: If the sender can't reach the required service (receiver), the inquiry will be repeated at a later time. If the sender doesn't receive a reply within a set period of time, the inquiry is cancelled and repeated again. Since it's not clear though whether the inquiry has not been received at all or whether it may have been received and processed, but the response got lost, the receiver needs to recognize repeated inquiries (e.g. via clear transaction numbers) and refrain from processing them. So, the sender makes sure that each inquiry is transmitted at least once, and the receiver needs to make sure that it is processed only once.

But the payment system also needs to deal with all sorts of possible failures during the payment processing. For offline transfers, customers may use wrong amounts or currencies, indicate wrongly intended

»The services of the demilitarized zone help forward inquiries from the untrusted zone to the trusted zone.«

PCI Data Security Standard – High Level Overview		
Build and Maintain a Secure Network and Systems	1.	Install and maintain a firewall configuration to protect cardholder data
	2.	Do not use vendor-supplied defaults for system passwords and other security parameters
Protect Cardholder Data	3.	Protect stored cardholder data
	4.	Encrypt transmission of cardholder data across open, public networks
Maintain a Vulnerability Management Program	5.	Protect all systems against malware and regularly update anti-virus software or programs
	6.	Develop and maintain secure systems and applications
Implement Strong Access Control Measures	7.	Restrict access to cardholder data by business need to know
	8.	Identify and authenticate access to system components
	9.	Restrict physical access to cardholder data
Regularly Monitor and Test Networks	10.	Track and monitor all access to network resources and cardholder data
	11.	Regularly test security systems and processes
Maintain an Information Security Policy	12.	Maintain a policy that addresses information security for all personnel

Image 3: Requirements of the PCI-DSS (from [2]).

purposes, so that the payment won't be assigned or the wrong one will be assigned, or pay several times for one order. For credit card payments, the owners can charge back the payment if they didn't authorize it. Every now and then, these chargebacks initiated by the customer coincide with refunds initiated by the company as part of the right of cancellation, and will be corrected again later by the bank. All these exceptional cases must be processed correctly, but be hidden from the games in all their complexity. The games only receive the information that a service has been paid for (if necessary with a factor, so that the player can be assigned a smaller or bigger service) or that a service is no longer paid for.

Security and confidentiality

The official set of rules for processing credit card data is »Payment Card Industry Data Security Standard« (PCI-DSS, [2]), which is obviously just as useful for the security of sensitive data of other methods of payment. It demands an infrastructure with three zones: the untrusted internet, a demilitarized zone and the trusted payment system (see image 2). These zones are separated by firewalls which monitor the connection between the zones.

The servers which process the credit card data – i.e. all components of the payment system including the database – must not be accessible from the untrusted internet, but only by a predefined number of services from the demilitarized zone (blue arrows). The servers of the trusted zone themselves are allowed to access services in the untrusted internet, but also only a predefined amount (green arrows). Any communication with credit card data must be encrypted.

The services of the demilitarized zone help forward inquiries from the untrusted

zone to the trusted zone. Although they only forward credit card data, they are subject to the PCI-DSS. Therefore, credit card data entered by the customer must not run via the product servers, but must be transmitted directly (and encrypted!) from the client or browser to a service of the demilitarized zone (Payment-Web-Server or Payment-Gateway).

Apart from these demands on the infrastructure, the PCI-DSS requires the encrypted transmission and secure storage of credit card data, protection of the system against hacking and the regular inspection of this protection through penetration tests, access control to the system, a screening of the system for irregularities, and a training of the staff working with the system (see image 3).

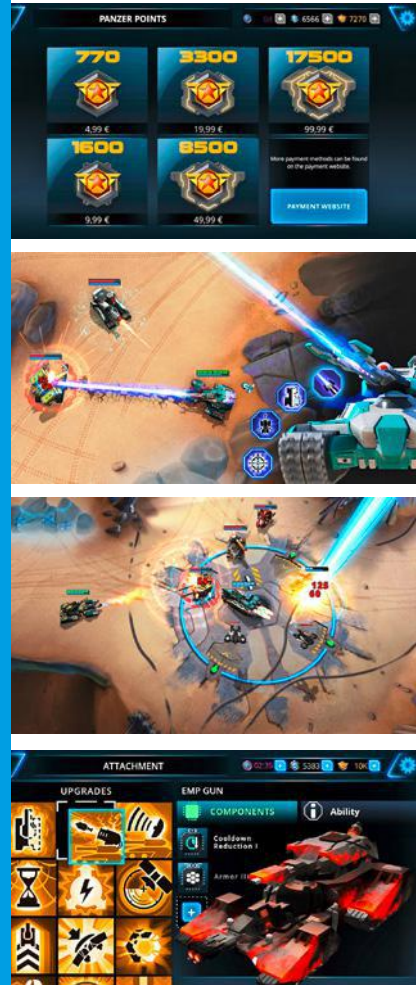
What's just as important is the protection against fraudulent payments, but that will be the topic of the next part of the series.

Stephan Payer

Panzer League

»Panzer League«, the latest game by CipSoft, is currently in soft launch in selected countries in South-East Asia. It's a synchronized online multiplayer game for iOS and Android where two teams of four players each meet in a sci-fi scenario. The game combines the complex gameplay principles of an MOBA with tactical battles designed for smartphones and tablets.

Thanks to the modular architecture, it didn't take too much effort to link »Panzer League« to CipSoft's payment system. Regional payment methods could be provided from the start, without the need to implement every single one of them first. Of course, this is especially beneficial during the soft launch where the monetization of a game is also being tested.



ELLIPSIS

WHEN MOBILE GOES STATIONARY

Bringing mobile titles to PC is a challenging task - one which Salmi Games mastered brilliantly.

In February 2016 we at Salmi Games released the mobile title »Ellipsis – Touch. Explore. Survive.« on iOS and ported the game to Apple TV, Android and PC by February 2017. Considering that games are usually released on PC first and only afterwards on mobile devices, our approach was rather unusual. On the following pages we would like to talk about the challenges which come about when porting a game for PC and Steam, which was originally designed for mobile devices and touch controls.

Ellipsis is a minimalistic Avoid 'em up where you have to collect five points in each level and then reach a portal. Of course, a plethora of enemies makes this job a lot harder. Your finger becomes the player once you touch the screen. This basic concept was turned into a complex game with over 150 levels in which you explore an abstract universe consisting of eight different worlds, which we worked on for more than two years.

Varying gameplay experience

Players often have different gameplay expectations from a PC game than from a mobile game. The latter ones are more often played on the go, while you usually

use the PC only at home and for a longer period of time. The most important difference between a PC and a mobile title is therefore also the playing time and the average session length. On a mobile device, a player should be able to complete a level in roughly one minute (between subway stops). Also, you should be able to pause the game at any time. In Ellipsis the game is paused as soon as the finger is no longer touching the screen. It's for exactly this reason that mobile is so well suited for turn-based games. A good example is »Hitman«, a turn-based version of which was implemented for Android. On PC, on the other hand, you expect longer and continuous levels; an average play session usually lasts a lot longer, and the difficulty level, too, should be harder. Since we were to stick to single-screen levels, we created zoomed-out levels for the PC version, which are much longer and more complex.

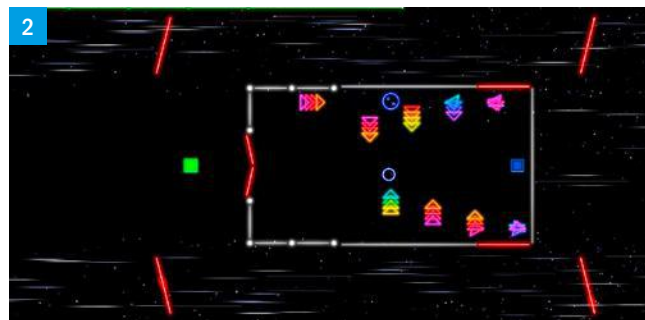
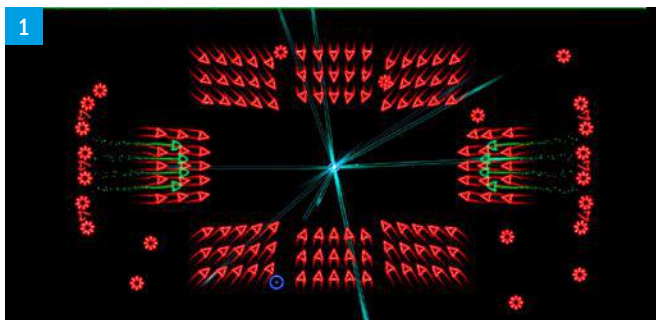
Adjusted controls

On a tablet, the controls are clear. The character is always positioned wherever the finger touches the touch display. Once you remove your finger from the display, the game is paused. On PC, however, we support three different kinds of controls:



Stefan Hell
Developer at Salmi Games

Stefan studied Games Engineering at the Technical University of Munich and has since been working as a developer at Munich-based indie studio Salmi Games. Apart from working on »Ellipsis« he's also involved in several VR prototypes. Salmi Games are currently developing the VR title »Late For Work«. [@hellei92](#)



touch, mouse and gamepad. This fact caused some obstacles for us since game elements, menus and level selection had to be adjusted for each control method, but the player should still be able to easily switch between these methods.

Transferring the touch controls to mouse and gamepad was by far the biggest challenge of the port. The direct controls with the finger on a tablet or mobile allows for exact movements with quick direction changes and precise maneuvers through narrowly placed obstacles. Only the mouse controls achieve a similar precision. The gamepad makes it a lot harder to control the game. For the PC version we therefore had to adjust a few levels and even replace some, while others were suddenly much too easy with mouse and gamepad. The biggest disadvantage of touch controls, however, is that your finger always covers part of the screen. We tried to minimize moments of frustration, where you simply couldn't see the enemies, through a partly symmetric design of the levels and an easy way to pause the game. Hence, some levels are much easier if you have an unobstructed view of the entire screen.

As mentioned the game only runs with touch controls as long as the finger touches the screen – if this contact is interrupted, the game pauses. We thought this was the most obvious thing to do, but received a surprising amount of positive feedback for it. For this reason, we tried to transfer the concept to the mouse controls. Initially, you had to hold down the left mouse

button to move. After a while this became rather uncomfortable though, which is why in the final version a left click »activates« the player, and a right click pauses the game.

Another interesting aspect about the mouse and gamepad controls is that you can change the position of the mouse pointer and thus the player via code without the user having to move the mouse, while with touch controls the player is always exactly positioned wherever the finger is located. This allowed us to add new levels for the PC version where the player character is maneuvered through external conditions, like wind blowing the player away or ice the player slips on.

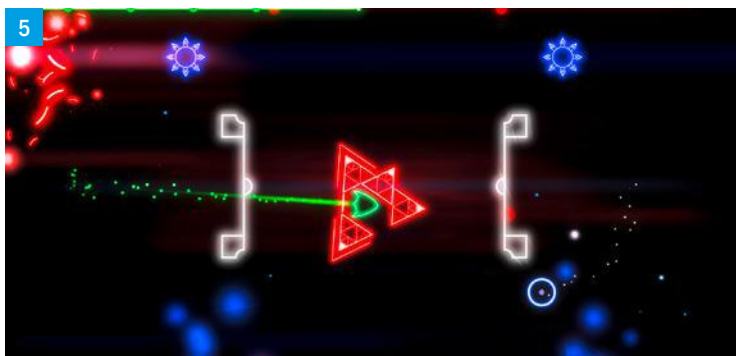
Technical challenges

Due to the considerably higher hardware resources, the port of a mobile game to PC is, from a mere technical point of view, obviously a lot easier than porting a PC game to mobile. And yet there are some obstacles that need to be taken into consideration.

Due to the better hardware, PC players also expect better graphics, for example, which is why PC ports of mobile games sometimes receive negative reviews. Especially on Greenlight, users often reject games that are ported from mobile. Ideally, users should not be able to tell that a game was originally designed for mobile, hence the time should be taken to address a few particularly typical mobile attributes.

Complex particle effects quickly lead to performance issues on mobile devices. On

1 and **2** : For the PC version the developers designed brand-new levels since some mobile levels didn't work well on the screen. **3** Disadvantage of the touch controls: The finger always covers part of the level – a problem PC players don't have with mouse or controller.



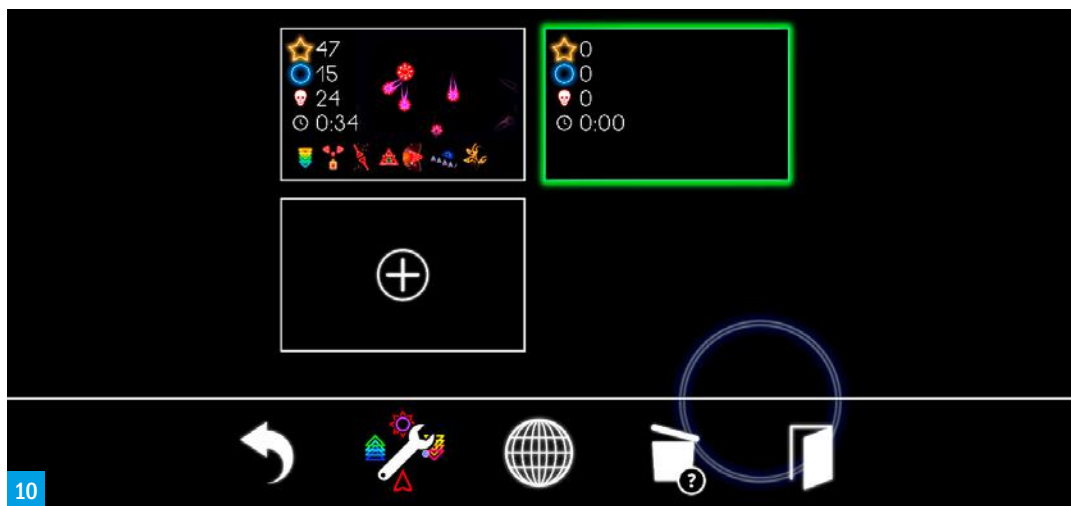
4 and **5** : On PC, players expect better graphics than on mobile devices. Hence, the developers later pimped the game with additional optical effects.



6 and 7 : A try to adjust mobile-typical star icons to PC.

10 PC menu with several save games, level editor, online world and the possibility to delete save games - everything completely without text.

8 Ellipsis at the Tokyo Game Show... 9 ... and at gamescom.



PC you can often generate a much bigger number of particles than on mobile. It's important to generate smaller, more delicate particle effects for the PC.

Post-processing effects on mobile should be avoided if possible, or be rendered in lower resolution since mobile devices often have a very high screen resolution, but low hardware performance. Post-processing effects are an integral part of most games on PC though – like Color Grading, Motion Blur or Depth of Field. We use Bloom and Lens Flares which emphasize the typical neon look.

Mobile vs. PC version

Last but not least there are some icons which instantly reveal a mobile game. For the mobile version we used stars in a typical mobile look (images 6&7, left), which you receive for each level completed, and we also used them for the PC version. At trade shows, the first thing almost all players criticized was the look of the stars, which is why we re-created them in an update for PC.

One factor we overlooked for a long time during the port was the importance of complex configuration options for PC

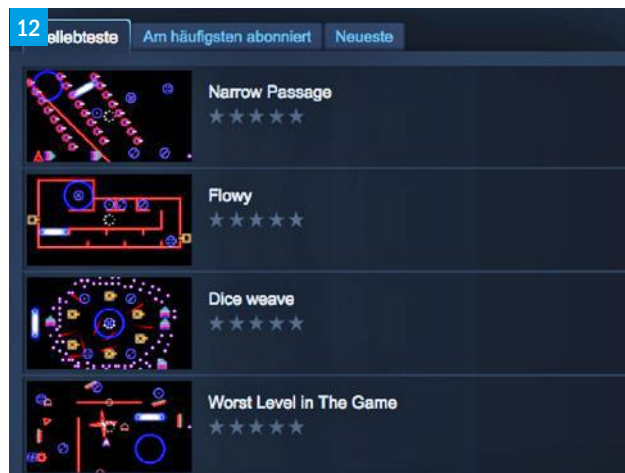
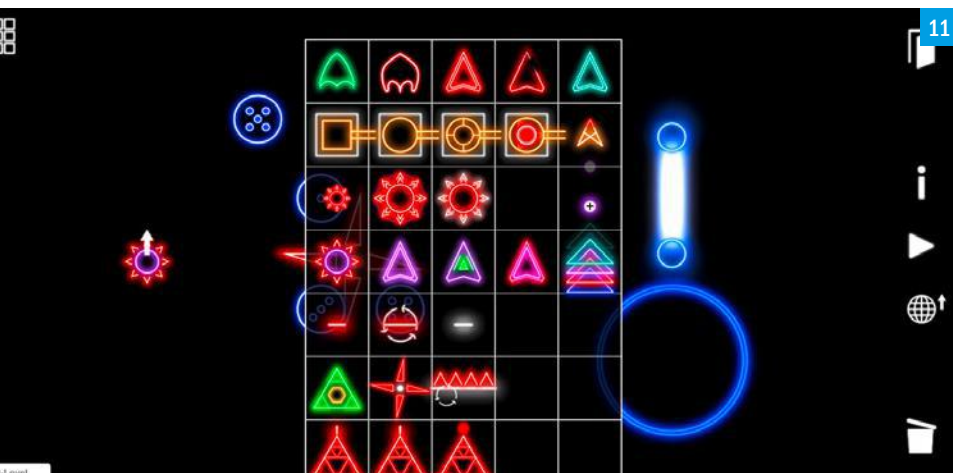
players. There are no quality settings in the mobile version – the graphic quality automatically adjusts to the hardware. Also, there is only one save game which can't be deleted. While this wasn't criticized on mobile, there are some YouTubers who would always access the settings of a PC game first and give a bad review, if it didn't offer enough configuration options. Players expect at least to be able to adjust the Resolution, V-Sync and Anti-Aliasing settings. The volume also needs to be adjustable, just like the mouse sensitivity. Plus, there should be an option to create several save games.

Our game has no text at all, which caused an almost impossible task for us in this respect. How should we display »V-Sync« or »Anti-Aliasing« with icons only? In the end, we opted for a compromise: Before the start of the game, there's a launcher (with text) where the player can adjust the game settings, while the game itself still has no text.

The sound of music

Mobile games are often played without sound, the audio is generally less

11 Level editor of Ellipsis 12 Steam-Workshop



important. Hence, in Ellipsis we decided for a very minimalistic sound: Sounds are only triggered by movements and actions of the opponents; only the menu has quiet background music. While the sound on mobile was perceived very positively, it was criticized as being too weak on PC.

Successes, cloud saves and leaderboards

When porting a game for PC, there's a good chance you also release it on Steam. It's therefore advisable to take advantage of the special features of this platform, like Achievements, Leaderboards or Trading Cards. We also decided to implement a level editor. Steam Workshop makes it very easy to allow uploads and downloads of user-generated content. Steam provides the servers, infrastructure, rating systems, and offers an API which regulates all upload and download processes. You can even create a shop where users can sell content for money.

The marketing

Finally, let's talk about the unavoidable topic, which is marketing. Since Ellipsis was our first game, we didn't expect a lot of publicity. We created a list of over one hundred journalists though and tried to send each of them a personalized introduction. You can, for example, mention a similar game which received a positive review by the author in a prior article.

We also had a contact at Apple whom we sent an email a few weeks prior to release. And indeed, the game was featured worldwide under »Best New Games« and in the category »Minimalist Games« alongside games like »Monument Valley« and »Blek«. Unfortunately, the selection criteria are a real black box – we didn't even receive an email that we were featured. However, it helps to implement iOS-specific features like iCloud, Achievements or tvOS support or to release the game exclusively on iOS. You should also keep in mind that every Thursday the front page of the App Store is being updated. We therefore released Ellipsis on a Wednesday.

We owe the biggest part of the downloads to the features, and they also got us more press coverage, which generated comparably few downloads though. When

German news magazine Spiegel Online featured us, we noticed a spike though, and for a short while we were even ranked number one in »Paid Puzzle Games« in Germany.

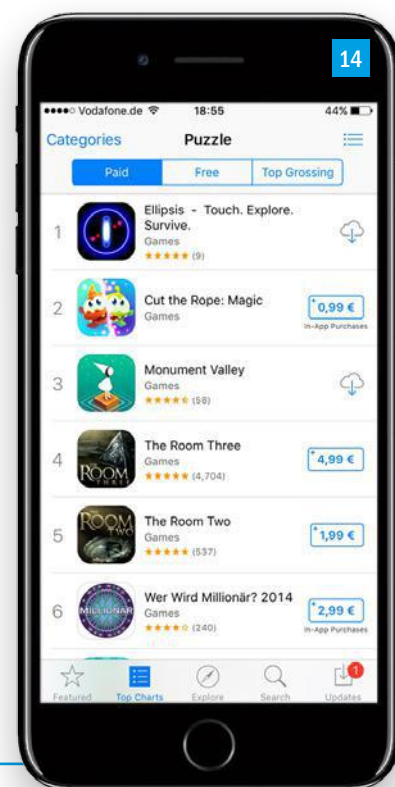
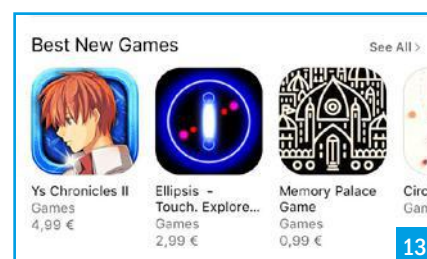
On Steam, all new games are published in a separate category and are rated according to their sales figures which decide whether you get additional features or not. While Apple has a jury to make these decisions upfront, on Steam it's important to generate a lot of sales at release. We also presented Ellipsis at a lot of festivals, of which we can highly recommend Busan Indie Connect, the indie section at the Tokyo Game Show and Casual Connect, where we could always present our game for free. You should be prepared for every festival though and let the press know upfront whenever possible. Generally, we also learned that PC games attract a lot more attention at trade shows than mobile games which should at least be presented on a tablet in a tablet mount.

Conclusion

It was a very interesting experience for us to port the game to PC, however you should always thoroughly consider upfront whether a PC version of your own game makes any sense at all. On the one hand, a PC version taps into new player groups, and users prefer to spend money on PC games. On the other hand, your PC game also competes with AAA games and bigger indie studios. Mobile ports are often associated with less quality, and you should not expect to be able to transfer the gameplay to PC without having to make any adjustments.

Stefan Hell

13 The front page of the App Store at the time of the release of Ellipsis. **14** Ellipsis made it number one in Paid Puzzle in Germany. **15** The number of sales on iOS: The biggest part was generated through the features, the spike around February 25 through German news magazine Spiegel Online.





Wer Those who remember classics like »Super Ghouls'n Ghosts« or »Wonder Boy in Monster Land«, will know immediately which kind of games inspired us to develop

»FOX n FORESTS«. FOX n FORESTS wants to revive the 16-bit era and add many additional elements; not only from the games just mentioned, but also from classic series like Mario, Sonic and Zelda. FOX n FORESTS is a modern 2D action platformer in a 16-bit look with role-playing and puzzle elements as well as a core mechanic linked to them, giving the player seamless control of the seasons by the press of a button. The whole thing is rounded off by a fun story in the style of a fable.

Successful Kickstarter

FOX n FORESTS' Game Director Rupert Ochsner and Executive Producer Holger Kuchling founded the studio Bonus Level Entertainment in 2016. Together with Independent Arts Software from the German town of Hamm as well as talented freelancers from all over Europe, the company intends to revive the heyday of 16-bit games. For this reason, the developers already think beyond FOX n FORESTS and plan to build their so-called »pixel pipeline« consisting of structures that allow the studio to effectively turn a series of ideas and genres into high-quality software in pixel-style. To get their idea going, the team consisting of long-time programmers and artists ran a successful Kickstarter campaign for FOX n FORESTS, which earned them as much as 107,875 euros in August 2016, clearly exceeding the targeted amount of 95,000 euros.

New interpretation of the 16-bit look and feel

The core mechanic and basic idea of the game is the change of the seasons, which

FOX N FORESTS

A BLAST FROM THE PAST

With their colorful platformer FOX n FORESTS, Bonus Level Entertainment intend to revive the 16-bit era and at the same time build a »pixel pipeline« to be able to produce games of various genres with a pixel look more effectively and quickly - assembly line nostalgia at its best.



is seamlessly integrated into the game-play. Apart from close combat and ranged attacks, protagonist Rick the Fox is also able to manipulate the seasons from moment to moment in each level. With the press of a button the player switches from spring to fall, from summer to winter etc., depending on the level. But as enthusiastic as the team was about this special feature, they thought hard about how to transfer the 16-bit look and feel to today's time.

The requirements were clear from the start: Nostalgia, yes, but in combination with modern game design. So, they made sure to exactly imitate the color range of the Super Nintendo and also to adjust the sound to the technical limitations of the 16-bit machine; however, elements like the then predominant ratio of 4:3 had to be discarded; FOX n FORESTS will feature a 16:9 look. There were a lot of other factors which required attention, especially in terms of game design, look & feel and technology.

Game design

If you take a look at the development of the gaming genres since the rise of the 16-bit consoles, you can spot one trend across all genres: A lot of games feature RPG elements, no matter whether platformers, racing games, action-adventures or shooters. Even sports games today include complex career modes. This development is comprehensible since the elements mentioned are a great asset for most of the games as they generate additional depth and, above all, long-time motivation.

This depth can also be found in FOX n FORESTS. The developers have integrated a currency system and created a hub area which offers various shops and where you can learn new moves, find hidden bottles and fill them with potions as well as expand your life and magic meters. As a further adjustment to modern gaming

behavior, the classic »Game over« was discarded. The backtracking embedded in the game concept is entertaining and integrated in a contemporary fashion, and the so-called »reward system«, too, follows a modern approach. Ideally, the players are to be rewarded for every single minute they spend with FOX n FORESTS. These rewards include the integration of a number of super secrets, well-hidden secret paths and hard-to-unlock bonus levels. On top of all this, the game still also caters to passionate core gamers who are looking for a real challenge.

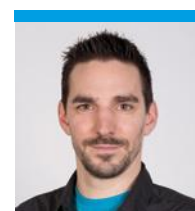
Despite all kinds of modernization measures, the retro character is kept up in a lot of other situations, for example through the use of cheat codes which you can unlock via gamepad input in the main menu, or via classic »mode 7« effects (a texture-mapping mode of the Super NES console and the Game Boy Advance handheld, which allows to rotate and scale a background level, among other things), a feature most players will still remember from Super Nintendo.

In order to achieve the aspired fast platformer gameplay in the style of »Mega Man« or »Castlevania« without restraining the change of seasons, the team decided during the pre-production phase to switch between two pre-defined rather than four possible seasons per level. This allows for a number of creative possibilities without causing a »trial and error« feeling in the gamer. The result: The player doesn't have to stand in one spot for too long and go through all sorts of decision options, but seamlessly integrates the change of seasons in his game. Obviously, there are still a few puzzles, but it's now more about finding them than taking ages to solve them.

In one world you can change from spring to winter, in another one you can switch from spring to fall or from winter to summer. Water will freeze and thus become passable, fog will clear, wind



Bonus Level Entertainment have a special passion for the 16-bit era. FOX n FORESTS is only one of many planned games in a number of different genres.



Rupert Ochsner
Co-Founder, CEO and Game
Director at Bonus Level
Entertainment

After jobs at Independent Software Arts, Beta Film and Deep Silver, Rupert founded the Munich-based studio Bonus Level Entertainment together with Holger Kuchling (image below). The CEO and Co-Founder is currently working as Game Director on the pixel platformer FOX n FORESTS. Prior to that, the Austrian-born used to work on a number of notable titles like Saints Row, Sacred und Risen.
@FOXnFORESTS





1



2

1 The core team of Bonus Level Entertainment. 2 For FOX n FORESTS the studio uses Unity 5. 3 The targeted change of the four seasons is not only a neat effect, but the core mechanic of the platformer.



3

will blow, rain will put out flames, etc. Animals, too, are affected by the change of seasons: Aggressive wasps sleep in winter, while vigilant crows rather hatch their eggs in spring. So, there are a lot of secrets to uncover, skill tasks to complete, and hidden paths to be found without affecting the fast gameplay experience in a negative way.

Look and feel

One of the basic questions arising from the decision to imitate 16-bit consoles was: »Super Nintendo or Mega Drive?«. The choice was quickly made in favor of the Nintendo console since the graphic possibilities offered more freedom compared to the competition from Sega – apart from the processor. This factor is irrelevant though in case of today's platforms. Apart from a few exceptions, the team strictly sticks to the requirements of the time back then, like the number of animation frames, the maximum number of color ranges or the customary sprite sizes. So, there are legitimate reasons why the boss enemies in FOX n FORESTS were deliberately animated less smoothly than, e.g., standard opponents.

A similar decision was made with regard to the sound: Unlike the Mega Drive sound chip, which was set up like an autonomous synthesizer, Nintendo used soundbanks for the Super Nintendo, which could be fed with imported sounds. Plus, the number of the simultaneously useable soundbanks was limited. Since the team experienced the 16-bit era to a large part also from a professional point of view, it's actually possible to achieve this level of authenticity.

For this reason, we also made sure to include a lot of references and easter

eggs. One of these elements is the level »Foggy Fable«, which pays homage to the »Ghosts 'n Goblins« series. Hence, it's no question why the first chest was placed on the left at the start of the level!

Technology

Apart from the adjustments to today's standards like the 16:9 widescreen format and a comfortable save game system, technology and programming mainly focused on sustainability and flexibility. This approach was enabled by building the so-called »pixel pipeline«.

The pixel pipeline

For us at Bonus Level Entertainment, the pixel pipeline is more than just a tool chain. In fact, it includes the complete process and structures required to develop creative and diverse 16-bit games as efficiently as possible. FOX n FORESTS is not only a creative dream come true, but also a means to an end – a basis to establish and hone required workflows.

The engine

This decision was accompanied by the essential question about which engine to use. Bonus Level Entertainment works with Unity 5, not only because Unity is supported by all current platforms – be it PC, console or mobile. Apart from the comparably easy port to other systems, it was the long-term experience of the team, the large Unity community and a number of useful tools and plug-ins which led to this decision. For example, there are a large number of competent and especially affordable »engines« for Unity, which can already be used as a solid basis for the development of a platformer, shooter or RPG. You can then

The Kickstarter campaign 2016

The Kickstarter campaign for FOX n FORESTS was successfully completed in August 2016. The original goal of 95,000 euros was exceeded with a total of 107,875 euros. Some of the most prominent supporters were YouTubers Erik »Gronkh« Range, Jim Sterling and Lutz Osterkorn of Factor 5.

The most important tool: Twitter – in addition to professionally managed Kickstarter updates, which were planned ahead, more than 1,000 tweets were posted within just four weeks!





build on this basis, without having to develop or program every single essential mechanic from scratch. The tool chain, which was developed thanks to and with FOX n FORESTS, and the flexibility of the joint development between Bonus Level Entertainment, Independent Arts Software and talented freelancers provides the possibility to develop games in a 16-bit style not only efficiently but, above all, simultaneously, thus optimizing quality, time management and budget planning.

The pixel pipeline is therefore not only of a technical, but also of an organizational nature. Once the graphics for a game have been finalized, the respective team members can already start with the pre-production for the next project. The game and level design work similarly. Both are closely linked at Bonus Level Entertainment. Other areas like the sound are outsourced though and processed by freelancers to guarantee economic flexibility.

What comes after FOX n FORESTS?

In addition to a potential successor of FOX n FORESTS there are also plans for a shooter in the style of »Gradius«,

»Axelay« or »Super Aleste«. An action-adventure similar to »The Legend of Zelda: A Link to the Past« is also possible. Thanks to the pixel pipeline, all of these elements were already considered during the production of FOX n FORESTS, which is also clearly visible: FOX n FORESTS contains two shooter levels, which not only exist to add some variety to the gameplay, but also to provide for useful empirical values for future ideas. The RPG elements of the game have similar functions.

From the start, the entire development environment was set up to be able to consider various genres, so the motto of Bonus Level Entertainment – »Reinventing 16 Bit« – could be put into practice as efficiently as possible.

Rupert Ochsner

One level, two seasons: With the press of a button, the summerlike warm ponds and rivers can suddenly freeze and thus be passed.

Foxes at gamescom 2017

FOX n FORESTS had the honor to be part of the Indie Arena Booth at gamescom 2017. Thanks to the brilliant organization and a large number of PR opportunities provided by the very committed team of the Indie Arena Booth, the FOX n FORESTS booth was always very busy, and the controller was constantly in the hands of interested gamers. 2,500 stickers were given away, and the feedback by the community was very much appreciated.





MASTER X MASTER

HOW TO BALANCE AN ARMY

The more options a game offers, the harder it is to balance – NCSOFT's »Master X Master« is no different.

In June 2017 NCSOFT released their latest title »Master X Master« (short: MXM), an action-MOBA type of game with an incredibly huge hero roster – the so-called »Masters« – who work in tag-teams to either fight their way through PvE dungeons or defeat their enemies in thrilling multiplayer battles. Jiho Lee, Hyung-Min Lee, Seungho So, Moon Seop Lee and Bonhak Koo from NCSOFT took the time to talk about one of the major tasks: balancing Master X Master.

So Much More Than Just a MOBA

»MXM is a bit too complex of a game for one genre«, Jiho Lee explains. »The main mode features traditional tri-lane MOBA battles,

but it also has lots of PvE content and 3v3 PvP as well as several addictive mini-games. Each mode was designed to have depth rather than be a superficial assortment. If you wanted to sum it up, you could describe it as a character game where various characters' abilities are highlighted in each mode.«

»The shooting-action is MXM's main element and most of it is done through a non-target method, which makes control and aim very important«, Bonhak Koo adds. »The core features of the gameplay involve aiming, the distance to the target and the geographic features of all the maps.« Given, there is a ton of MOBAs out there. In order to stand out of the crowd, a game has to offer some unique extras or at least gameplay features that provide a title with an individual touch. MXM got several of these features. »The biggest difference between regular MOBAs and MXM«, Jiho explains, »are the controls. The game uses 'WASD' movement, enemies are targeted with the mouse. We wanted to go without the typical click-and-go mechanic you know from regular MOBAs. That way the characters move quicker. Plus, it highlights the depth of the users' ability to instinctively judge a situation and strategically adapt with the help of the tag-system, which allows you to switch between two pre-selected masters.«

An Army at Your Disposal

Master X Masters' character roster includes 36 different characters, each equipped with

From left to right: Bonhak Koo, Seungho So, Jiho Lee, Moonseop Lee and Hyungmin Lee.



so-called helixes and kinetics, which sort of define a master's role in combat. »Depending on the character, we categorize them as tanker (attacker type, defender type), dealer (dealer, nuker, assassin) or supporter (reinforcement type, control type, containment type), but these distinctions are made according to skill composition and combat styles,« Seungho So goes into detail.

These kinetics and helixes, however, are only the icing on the cake. »Every character carries an individual weapon fitting their combat style (melee or range), with three different weapon enhancements per character,« Hyung-Min Lee continues. »On top of that, each master comes with four active skills to choose from, in addition to one ultimate skill, one evasion skill as well as multiple passive skills.«

The sheer number of possible combinations for a single master is already absolutely overwhelming, but it goes even further. The tag-system lets you select two different characters before starting a PvE dungeon or PvP match. Depending on which characters and therefore roles you choose, you can either strengthen your defense and survivability, your offense or build a well-balanced but rather unspecialized team. In terms of balancing the number of possible combinations increases even further, up to a point where one has to ask: How on earth will this game ever be balanced properly?

Balancing on a Huge Scale

When asked about the stages of the balancing process and each stage's focus, Hyung-Min Lee responds: »We start off with a character's settings and decide what role a character will play or what kind of weapon he or she will use. Then we start designing their specific skills. Next, we set the basic stats. This includes the character's attack, defense, health, attack speed as well as the attack of a character's skills. After that we go through play testings to refine all of these figures.

From time to time the concept of a skill changes slightly over the course of this process, but we rarely make changes to a character's basic settings. After the character is put into the game, we track each character for any modifications it may need in regards to individual skills or specific characteristics using user statistics. If we decide that a character needs modification, we figure out the cause and make the changes.«

That's all fine, but where do you even start a monstrously huge task like balancing a game of this scale: from macro to micro or the other way around? »I would have to say that we start on the macro level,« Hyung-Min says. »After setting the value in accordance with the balance, we adjust the details for each master and skill.« »We try to reflect the intention of

the developer who created the character, then we set this very intention as the basis of our balancing of the character,« Bonhak Koo adds.

»We can find out the specific statistics, but it is indeed an endless number of possible combinations. There are also combinations that simply aren't played enough to have

statistical relevance or that actually aren't played at all.

Therefore, it's often the case that we use separate statistics for each master/skill and mainly track only those combinations that users use the most,« Hyung-Min continues. »We have a statistics

tool at NCSOFT, that we commonly use to create queries regarding the statistics we want to evaluate directly. It also allows us to extract these statistics almost in real time, and as long as you know how these queries work, you can extract any statistic you want.«

»It's also incredibly easy to learn how to use this tool,« Bonhak throws in. However, you can only analyze data that you have already collected, but how do you get your hands on it? Through internal testing, hands-on sessions, alphas, betas or maybe even bringing in pro-gamers? »Well, it's actually all of those methods,« Hyung-Min Lee clarifies. »The people who are in charge of each master and balance do their tests, and feedback is collected through hands-on testing within the development team. We conducted approximately 10 Alpha and Beta tests in Korea, Taiwan, Japan, China and the United States. In addition to the test done by the general public, we also invite semi pro-gamers from other MOBA games to conduct group tests as well as members from the development team who have pro-gamer backgrounds from other games.«

All Killer, no Filler?

Of course, some of the 36 different masters are designed to specifically fill certain gameplay gaps. Other aspects are personal preferences as well as skill. Not every player wants to play a melee or range class, and not every player has the necessary skill to play every master, as

»In order to stand out of the crowd, a game has to offer some unique extras and gameplay features.«



Jiho Lee
is Captain of MXM Camp
for MXM at NCSOFT.



Seungho So
is Lead of System Design
for MXM at NCSOFT.



Bonhak Koo
is Lead of Game Design
for MXM at NCSOFT.



Moonseop Lee
is Lead of Level Design
for MXM at NCSOFT.



Hyungmin Lee
is Lead of Balance Design
for MXM at NCSOFT.





The roster of masters in MXM includes numerous characters from other NCsoft games like »Blade & Soul«, »Guild Wars«, »Lineage« or »WildStar«.



The tag-system allows you to choose two masters prior to a match, in PvE as well as in PvP.

their handling varies quite a lot. »Lua, for example, is a mid-ranged master who's weapon does not overheat – a feature that's especially cool for beginners,« Hyung-Min explains. »She was also developed with the purpose of being a bit easier to control than Taejin, who also has similar targeting and escape skill.«

»Tulam's 'Landslide' and 'Knuckle Duster' skills originally belonged to Koom,« Seunggho So notes. »We developed Koom to play the role as a hard tanker, but due to his skills' damage output being too powerful and the fact they are rather attack-based than defensive, we decided to develop a new separate master, that specialised on the offensive.« »It's also mentionable,« so Jiho, »that each master has a very powerful skill. If you look carefully, however, there are characters that can counterattack each master's specific skills. For instance, thanks to her 'Lens Focus' skill Lorraine can still see Sizuka, even when she uses her 'Cloak' to become invisible.

»As soon as we have decided on a new master, we configure the character itself as well as his attack methods and skills all at the same time,« Seunggho So explains. »Basically, each master is developed independently, but how they start being developed may differ completely. Sometimes we begin with the outer concept, sometimes we begin with a role type that is lacking in the game, and sometimes we begin making a master just because someone has an idea that he or she really, really wants to realize. If so, we test and refine it together to achieve the final product.«

MXM goes eSports ... maybe?

Does bringing in pro-gamers mean that NCsoft planned on making Master X Master an esports title right from the beginning? »Well, MXM's 'Titan Ruins' was developed with the goal of making it an esports mode. But even if it hadn't been that way, users prefer fair and easy to watch and understand games

– intuitive games. From that point of view making MXM an esports title didn't influence the balance. However, if MXM eventually does become an esports game, maintaining the balance at a pro-gamer's as well as a general users' level will become an important issue,« Hyung-Min Lee stresses.

»For example, if 'Master A', a character that's rather difficult to handle, is a powerful pick at the pro-gamer level, it could still be considered trash among general users. But it also works the other way: 'Master B' might not appear in pro-matches, while it could be considered over-powered by regular users. In that case, of course, we would have to consider buffing or nerfing depending on the situation.«

Stage Design and Dedicated PvE

Master X Master isn't a pure multiplayer title. Besides its MOBA mode and 3v3 PvP, it offers lots of dedicated PvE content, including several stages in which players can go on the hunt for time records and rare items. But wherein exactly lies the difference between balancing PvE and PvP content? And how does having an active combat system make it more difficult?

»Naturally, there is the difficulty, that – compared to a game where the hit depends on the number – the user's ability must be reflected in the balancing process. If you set the balance by assuming a user is at a certain level, the master will become 'OP' to more skilled users but hard to control for low-level players. Ultimately, masters must constantly go through the process of being refined with one control point so that none of them become too strong or too weak.«

Besides the matter of balancing playable characters as well as enemy NPCs, there's also the matter of level and arena design and therefore balancing. In the end it's not only about what comes »out of a player's gun«, but also what and where it hits. In addition, the design of an arena or dungeon additionally

»A master that wasn't used before can rise as the perfect counter for a new character.«

influences the final difficulty, for example by defining how much space players and enemies have to move around. Moonseop Lee explains:

»Sometimes, new masters break the balance at the stage level. However, if the over-value of the basic balance is not equal (i.e., an excessively long range), it often converges within the existing balance range and usually does not create a big problem. On the other hand, if a master does have a significant influence on the stage level due to a new combat method, we replace the attack with another effect or change the effect in PvP if it is too significant.

An important aspect in level design is to ensure that a stage does not become 'too powerful'. It's crucial to make a stage enjoyable and for users to be able feel the difference for each master in order for a stage to have a good reason to exist. Still, multiplayer arenas will always include far more variables and will therefore always be harder to balance.«

Of Masters and Titans

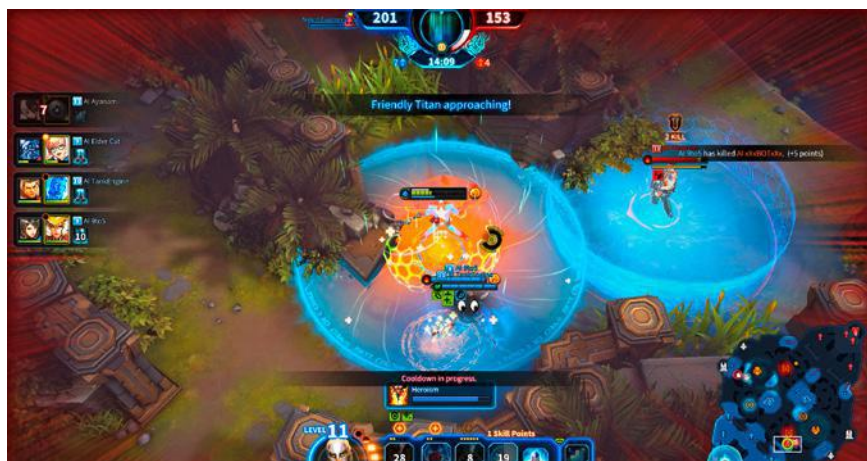
Whenever there's competition, proper balancing is crucial. That said, Master X Master is already tough on its developers. And as if weapons, loadouts, skills and the tag-system weren't enough already, NCsoft throws in temporary enhancements and buffs.

»Of course, we also provide players with buffs that create certain synergies with the masters' characteristics and sometimes these effects become too powerful. In such a case we adjust the buff and even re-evaluate the ability in its entirety,« Hyung-Min Lee says. »Some ability enhancements,« Bonhak adds, »may already be limited by the system. Take skills, for example: if a cooldown becomes 0 seconds, it would cause severe problems in the game.«

So, what about the Titans that can be summoned and controlled during MXM's 5v5 MOBA matches? »Titan Incarnation basically follows the player character balance, but it can feel weaker or significantly stronger depending on the range between the characters. The development team tests the 'Titan Ruins' almost on a daily basis and through this process we try to converge within a reasonable range, even if the change is difficult to notice,« Moonseop Lee explains. »The Titan Incarnate must destroy the buildings quickly, but it also needs to be killable by the other players. The fine balance of the Titan Incarnate has to make sure that it's not too invincible and can be destroyed by 2 to 3 masters. This status is continuously modified over the course of countless test,« Bonhak adds.

... and no End in Sight

Reaching a state in which the game seems fine, is already a ton of work – and still there's no end in sight when it comes to balancing a multiplayer title like MXM. »We do not think that the game is ever closed or well-balanced. The appearance of a new master can provide



a new vigor in a game that may have been somewhat stagnant,« says Hyung-Min. »A master that wasn't used before can rise as the perfect counter for a new character, while an already popular master might suddenly face severe difficulties caused by such a counter-part. The process of balancing a MOBA genre game is not a process of achieving a finalized ideal, its charm rather lies in continuously changing with the life of the game. In other words: new masters are always welcome!«

The Future of Master X Master

»Our plans and wishes for MXM's future?«

Jiho Lee ponders. »Well, we want to inform as many people as possible about our game and show them the gameplay. There are still many aspects that we haven't revealed yet, since the game is not in an activation phase at its full scale. We conducted countless tests and if you research each master's skills and try different combinations, you will be able to create more fun and interesting matches. The short-term goal is to make MXM an esports title and to create various external contents, so users can learn about each master's features. It'll be awesome – stay tuned!«

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MXM's 5v5 MOBA battles take place on traditional tri-lane maps. Teams have to summon so-called Titans, to help in destroying the enemy's base.

Besides its classic MOBA matches, Master X Master offers a 3v3 deathmatch-mode.



THE INDUSTRY AT A GLANCE

COMPANY INDEX

Forget about the directory assistance! Here you will find all known publishers, developers, service providers, educational institutions and unions of the German speaking games industry.

DEVELOPMENT					
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GameDuell	Taubenstraße 24-25	10117	Berlin	030 / 288768211	impressum@gameduell.de
Gameforge	Albert-Nestler-Straße 8	76131	Karlsruhe	0721 / 3548080	info@gameforge.de
GameTwist	Wiedner Hauptstraße 94	A-1050	Wien	+43 / 1494 / 5056	3rdparty@gametwist.com
GamesInFlames	Karlstraße 68	80335	München	089 / 210205715	info@gamesinflames.com
gamigo	Behringstraße 16b	22765	Hamburg	040 / 4118850	info@gamigo.com
Halycon Media	An der Autobahn 24	23858	Reinfeld	04533 / 61090	infomail@halycon.de
Headup Games	Nordstraße 102	52353	Düren	02421 / 4868700	info@headupgames.com
HitFox Group	Rosa-Luxemburg-Straße 2	10178	Berlin	030 / 240888200	info@hitfoxgroup.com
IME - Interactive Media & Entertainment GmbH	Lerchenstraße 28a	22767	Hamburg	040 / 28472903	
InnoGames	Friesenstraße 13	20097	Hamburg	040 / 78893350	info@innogames.de

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Koch Media	Lochhamer Straße 9	82152	Planegg/München	089 / 242450	office@kochmedia.de
Konami	Berner Straße 103-105	60437	Frankfurt am Main	069 / 9855730	support@konami.de
McGame.com	Mansfelder Straße 56	06108	Halle (Saale)	0345 / 51646001	support-de@mcgame.com
mediaTest digital	Goseriede 4	30159	Hannover	0511 / 35399422	contact@mediatest-digital.com
Microsoft	Walter-Gropius-Straße 5	80807	München	089 / 31764900	kunden@microsoft.com
mixtvision Digital	Leopoldstraße 25	80802	München	089 / 38370920	info@mixtvision.de
morphicon media AG	Lindwurmstraße 88	80337	München	089 / 452354610	info@morphicon.com
NBG	Brunnfeld 2-6	93133	Burglengenfeld	09471 / 70170	info@nbg-online.de
Nintendo of Europe	Herriotstraße 4	60528	Frankfurt am Main	06026 / 9500	info@nintendo.de
Playa Games	Alstertor 9	20095	Hamburg	040 / 33313375	info@playa-games.com
Ravensburger Digital	Kaflerstraße 8	81241	München	089 / 12228180	tellme@ravensburger-digital.com
Reality Twist	Franz-Joseph-Straße 11	80801	München	089 / 380129500	mail@reality-twist.com
Rumble Media	Kriegsstraße 5	76137	Karlsruhe	0721 / 2018020	info@fettspielen.de
S.A.D.	Leibnizstraße 5	89231	Neu-Ulm	0731 / 8803300	kontakt@s-a-d.de
SERU	Industriestraße 8	24589	Nortorf	04392 / 84900	info@seru.de
Simplaex	Klosterstraße 62	10179	Berlin		info@simplaex.com
Sony Computer Entertainment	Frankfurter Straße 190a	63263	Neu-Isenburg	06102 / 4330	scee_presscentre@scee.net
Square Enix	Domstraße 17	20095	Hamburg	040 / 30633400	
Take-Two Interactive	Ganghoferstraße 70	80339	München	089 / 278220	info@take2.de
THQ Nordic	Landstraßer Hauptstraße 1/Top 23	A-1030	Wien	+43 / 720 / 518790	
Tivola Publishing	Oeverseestraße 10-12	22769	Hamburg	040 / 7070063	mail@tivola.de
TopWare Interactive	Rittnerstraße 36	76227	Karlsruhe	0721 / 9151010	info@topware.de
Travian Games	Wilhelm-Wagenfeld-Straße 22	80807	München	089 / 3249150	mail@traviangames.com
Ubisoft	Adlerstraße 74	40211	Düsseldorf	0211 / 338000	info@ubisoft.de
United Soft Media Verlag	Thomas-Wimmer-Ring 11	80539	München	089 / 29088175	info@usm.de
upjers	Hafenstraße 13	96052	Bamberg	0951 / 510908100	mail@upjers.com
YEPS! GmbH	Methweg 22	50823	Köln	0221 / 30191824	kontakt@yeps.de
ZeniMax Germany	Schillerstraße 15/17	60313	Frankfurt am Main	069 / 450924500	kontakt.de@zenimax.com
PUBLIC SECTOR					
BIU	Charlottenstraße 62	10179	Berlin	030 / 24087790	info@biu-online.de
BIU.Dev/BIU.Net	Charlottenstraße 62	10117	Berlin	030 / 24087790	info@biu-online.de
FilmFernsehFonds Bayern	Sonnenstraße 21	80331	München	089 / 5446020	filmfoerderung@fff-bayern.de
Film- und Medienstiftung NRW	Kaistrasse 14	40221	Düsseldorf	0211 / 9305000	info@filmstiftung.de
G.A.M.E.	Französische Straße 48	10117	Berlin	030 / 346550980	info@game-bundesverband.de
gamearea-FRM e.V.	Gutleutstraße 82	60329	Frankfurt am Main	069 / 71671660	info@gamearea-frm.de
gamecity-Hamburg	Im Gaußhof, Gaußstraße 136	22765	Hamburg	040 / 80004630	info@gamecity-hamburg.de
GAMEplaces	Hanauer Landstraße 126-128	60314	Frankfurt am Main	069 / 21236209	info@frankfurt-business.net
games.net berlinbrandenburg	Ackerstraße 3A	10115	Berlin	030 / 24628570	games.net@medianet-bb.de
Games Factory Ruhr	Wiesenstraße 35	45473	Mülheim an der Ruhr	0208 / 484848	info@muelheim-business.de
Hessen-IT	Konradinerallee 9	65189	Wiesbaden	0611 / 950178600	info@hessen-it.de
Leipzig eSports e.V.	Postfach 301507	04257	Leipzig	0157 / 54 35 9223	info@leipzig-esports.de
medienboard berlin-brandenburg	August-Bebel-Straße 26-53	14482	Potsdam-Babelsberg	0331 / 743870	info@medienboard.de
MFG Medien- und Filmgesellschaft Baden-Württemberg	Breitscheidstraße 4	70174	Stuttgart	0711 / 90715300	info@mfg.de
Mitteldeutsche Medienförderung	Hainstraße 17-19	04109	Leipzig	0341 / 269870	info@mdm-online.de
nordmedia	Expo Plaza 1	30539	Hannover	0511 / 1234560	info@nordmedia.de
ÖVUS	Mauerbachstraße 160	A-1140	Wien	+43 / 1810 / 328912	office@ovus.at
Stiftung Digitale Spielkultur	Torstraße 6	10119	Berlin	030 / 29049290	kontakt@stiftung-digitale-spielekultur.de
USK	Torstraße 6	10119	Berlin	030 / 24088660	kontakt@usk.de
WERK1 München	Grafinger Straße 6	81671	München	089 / 99529922	info@werk1muenchen.de
EDUCATION					
Acagamics e.V.	Otto-von-Guericke-Universität	39106	Magdeburg		info@acagamics.de
BTK - Hochschule für Gestaltung	Dessauer Straße 3-5	10963	Berlin	030 / 338539500	berlin@btk-fh.de
Cologne Game Lab / TH Köln	Schanzenstraße 28	51063	Köln		info@colognegamelab.de
Designschule Leipzig	Nordstraße 3-15	04105	Leipzig	0341 / 35540841	info@designschule.de
Designschule Schwerin	Bergstraße 38	19055	Schwerin	0385 / 5559775	info@designschule.de
Europa Campus Frankfurt/Main	Lyoner Straße 34	60528	Frankfurt am Main	069 / 66056680	info@ec-europa-campus.com
Europa Campus Karlsruhe	Blicherstraße 20	76185	Karlsruhe	0721 / 8600390	info@ec-europa-campus.com
Europa Campus Mannheim	Janderstraße 1	68199	Mannheim	0621 / 8425660	info@ec-europa-campus.com
FH OÖ Studienbetriebs GmbH	Franz-Fritsch-Str. 11/Top 3	A-4600	Wels	+43 / 508 / 0410	info@fh-ooe.at
FH Technikum Wien	Mariahilfer Straße 37-39	A-1060	Wien	+43 / 1 / 588390	info@technikum-wien.at
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Games Academy Frankfurt	Hanauer Landstraße 146	60314	Frankfurt	069 / 42696460	info@games-academy.de
Gesellschaft für Personalentwicklung und Bildung	Beuthstraße 7-8	10117	Berlin	030 / 9339480	info@gpb.de
Hochschule der Medien	Nobelstraße 10	70569	Stuttgart	0711 / 892310	
Hochschule Harz - Standort Halberstadt	Domplatz 16	38820	Halberstadt	03943 / 659400	info@hs-harz.de
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Hochschule Trier	Schneidershof	54293	Trier	0651 / 8103345	sek@informatik.hochschule-trier.de
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Macromedia Akademie Berlin	M33 Höfe, Mehringdamm 33	10961	Berlin	030 / 20215120	info.b@macromedia.de
Macromedia Akademie Hamburg	Gertrudenstraße 3	20095	Hamburg	040 / 30030890	info.h@macromedia.de
Macromedia Akademie Köln	Brüderstraße 17	50667	Köln	0221 / 3108223	akademie.koeln@macromedia.de
Macromedia Akademie München	Sandstraße 9	80335	München	089 / 5441510	info.muc.akademie@macromedia.de
Macromedia Akademie Stuttgart	Naststraße 11	70376	Stuttgart	0711 / 2807380	bildungsberatungstuttgart@macromedia.de
mAHS, media Akademie - Hochschule Stuttgart	Tübinger Straße 12-16	70178	Stuttgart	0711 / 925430	info@media-hs.de
Mediadesign Hochschule Berlin	Franklinstraße 28-29	10587	Berlin	030 / 3992660	info-ber@mediadesign.de
Mediadesign Hochschule Düsseldorf	Werdener Straße 4	40227	Düsseldorf	0211 / 793930	info-dus@mediadesign.de
Mediadesign Hochschule München	Claudius-Keller-Straße 7	81669	München	089 / 4506050	info-muc@mediadesign.de
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SAE Institute Bochum	 Springerplatz 1	44793	Bochum	0234 / 93451310	bochum@sae.edu
SAE Institute Frankfurt	 Homburger Landstraße 182	60435	Frankfurt am Main	069 / 543262	frankfurt@sae.edu
SAE Institute Hamburg	 Feldstraße 66	20359	Hamburg	040 / 23688080	hamburg@sae.edu
SAE Institute Köln	 Medienzentr. Ost, Carlswerkstr. 11c	51063	Köln	0221 / 9541220	koeln@sae.edu
SAE Institute Leipzig	 Dittrichring 10	04109	Leipzig	0341 / 3085160	leipzig@sae.edu
SAE Institute München	 Bayerwaldstraße 43	81737	München	089 / 5506860	muenchen@sae.edu
SAE Institute Stuttgart	 Stuttgarter Straße 23	70469	Stuttgart	0711 / 81473690	stuttgart@sae.edu
SRH Hochschule für Kommunikation und Design	 Prinzenstraße 84.1	10969	Berlin	030 / 6165480	info@design-akademie-berlin.de
SRH Hochschule Heidelberg	 Ludwig-Guttman-Straße 6	69123	Heidelberg	06221 / 882790	Daniel.Goerlich@Hochschule-Heidelberg.de
Zürcher Universität der Künste	 Pfingstweidstrasse 96	CH-8031	Zürich	+41 / 43 / 4464646	hs.admin@zhdk.ch
BUSINESS SERVICE					
4-REAL INTERMEDIA (Lokalisation)	Ludwigstraße 32	63067	Offenbach	069 / 8090880	info@4-real.com
adjust	Saarbrücker Strasse 38a	10405	Berlin	030 / 91460083	
Anakan (Lokalisation)	Pfuhlstraße 5	10997	Berlin	030 / 531420450	contact@anakan.de
Aruba Events	 Marsiliusstr. 36	50937	Köln	0221 / 96026057	info@aruba-events.de
arvato Bertelsmann	Carl-Bertelsmann-Straße 270	33311	Gütersloh	05241 / 5276000	info@arvato.de
Beiten Burkhardt Rechtsanwältsogellschaft mbH	Westhafen Tower, Westhafenplatz 1	60327	Frankfurt	069 / 7560950	bblaw-frankfurt@bblaw.com
Brehm & v. Moers	Anna-Louisa-Karsch-Straße 2	10178	Berlin	030 / 2693950	berlin@bvm-law.de
Die Hobrechts (Game Thinking)	Weigandufer 45	12059	Berlin	030 / 62901232	info@diehobrechts.de
Buschbaum Media & PR	Emanuel-Leutze Straße 21	40547	Düsseldorf	0211 / 5988140	presse@buschbaum-media.com
Clans.de (Network)	Pinnsberg 47	20359	Hamburg	040 / 78800990	info@clans.de
Computec Media GmbH	 Dr.-Mack-Str. 83	90762	Fürth	0911 / 2872100	info@computec.de
Conflutainment (Consulting)	Rodenberg Straße 9	10439	Berlin	0171 / 6486720	arg@conflutainment.com
CULTURETRANSLATE	Niederurseler Allee 8-10	65760	Eschborn	06196 / 9549355	info@culturetranslate.com
DELASOCIAL Berlin	Chauseest. 49	10115	Berlin	030 / 35510180	contact@delasocial.com
DELASOCIAL Hamburg	Christoph-Probst-Weg 31	20251	Hamburg	040 / 87979890	contact@delasocial.com
Digital River	Scheidtweilerstrasse 4	50933	Köln	0221 / 310 88614	sales@digitalriver.com
Effective Media	Jung-Stilling-Straße 61	44867	Bochum	02327 / 22310	info@effective-media.de
Frankfurter Buchmesse	Braubachstraße 16	60311	Frankfurt am Main	069 / 21020	servicecenter@book-fair.com
Freaks 4U Gaming	An der Spreeschanze 10	13599	Berlin	030 / 41719113	info@freaks4u.de
Friedmann Kommunikation	Schanzenstraße 36	51063	Köln	0221 / 45580210	support(at)fr-k.de
Gärtner PR	Mühlenstraße 10	85567	Grafring bei München	08902 / 3379980	info@gaertner-pr.de
gamesbusiness.de	 Dr.-Mack-Str. 83	90762	Fürth	0911 / 2872360	gamesbusiness-red@computec.de
gamescom	 Messeplatz 1	50679	Köln	0221 / 8210	info@koelnmesse.de
Games Foundation	Lessingplatz 1	24116	Kiel		info@gamesfoundation.com
Games Quality	Zum Wasserwerk 15	15537	Erkner	03362 / 885688	info@games-quality.com
Gamify Now!	Karlstraße 68	80335	München	089 / 210205715	info@gamify-now.de
GAMINSIDE	Mariahilferstraße 93/2/20	A-1060	Wien	+43 / 0676 / 5379776	office@gaminside.com
Ganz & Stock (Personnel Consulting)	Kappellenweg 11a	63654	Büdingen		info@ganz-stock.de
GDC - Game Developers Conference	303 Second Street, Suite 900, South Tower	CA-94107	San Francisco	+1 / 415 / 9476000	info@gdceurope.com
Globaloc	Revaler Straße 100	10245	Berlin	030 / 46995338	info@globaloc.de
GRAEF Rechtsanwälte Berlin	Einstein Palais, Friedrichstraße 171	10117	Berlin	030 / 9203830776	berlin@graef.eu
GRAEF Rechtsanwälte Hamburg	Jungfrauenhof 8	20149	Hamburg	040 / 80600090	hamburg@graef.eu
HoneyTracks (Game Analytics)	Grafinger Straße 6	81671	München	089 / 28723995	info@honeytracks.com
IEM Consulting (Business Development, Finanzierung)	Jaegerstraße 12E	63322	Roedermark	0172 / 5856780	info@iem-consulting.com
IHDE & Partner (Rechtsberatung)	Schoenhauser Allee 10-11	10119	Berlin	030 / 403680000	info@ihde.de
INPROMO	Große Elbstraße 160	22767	Hamburg	040 / 23881771	kontakt@inpromo.de
iVentureGroup	Wendenstraße 21b	20097	Hamburg	040 / 8081250	info@iventuregroup.com
LaterPay (Zahlungsdienstleister)	Sonnenstraße 23	80331	München	089 / 416137310	info@laterpay.net
LOVOO	Prager Straße 20	01069	Dresden	0351 / 41889939	contact@lovo.net
Making Games	 Dr.-Mack-Str. 83	90762	Fürth	0911 / 2872100	info@makinggames.de
Marchsreiter Communications (PR)	Guldeinstraße 41a	80339	München	089 / 51919942	dm@marchsreiter.com
Medienachse (Full-Service, Businessplanung)	St.-Paul-Straße 9	80336	München	089 / 53297965	info@medienachse.de
M.I.T. - Media Info Transfer	Holstenwall 10	20355	Hamburg	040 / 30066890	info@mediainfotransfer.de
MOTHERSHIP - free2play Agency GmbH	 Oskar-Jäger-Straße 173	50825	Köln	0221 / 95437305	contact@mothership.de
MOTION AREA	Sommerstraße 3	65197	Wiesbaden	0611 / 56597577	info@motionarea.de
Osborne Clarke (Anwaltskanzlei)	Innere Kanalstraße 15	50823	Köln	0221 / 51084000	info@osborneclarke.de
Partnertrans (Lokalisation)	Neuer Zollhof 3	40221	Düsseldorf	0211 / 22059150	info@partnertrans.com
paysafecard.com Deutschland	Roßstraße 92	40476	Düsseldorf		info@paysafecard.com
Phénix Noir Productions / Patrick Nevian	 Postfach 110136	46121	Oberhausen	0208 / 3042216	info@phenix-noir.de
Pixel Vienna / IG Computergrafik	Favoritenstraße 9/186	A-1040	Wien	+43 / 1 / 5880118698	info@pixelvienna.com
Poppe Rechtsanwälte (Rechtsberatung)	Rübekamp 14-16	25421	Pinneberg	04101 / 5600	info@kanzlei-poppe.eu
Quinke Networks (PR, Marketing)	Bei den Mühren 70	20457	Hamburg	040 / 43093949	mail@quinke.com
Rechtsanwalt Marian Härtel	Kantstraße 98	10627	Berlin	030 / 319984920	info@rahaertel.com
remote control productions (Producing)	 Karlstraße 68	80335	München	089 / 21020570	info@r-control.de
ROESSLER PR (Marketing, PR, Consulting)	Walter-Leiske-Straße 2	60320	Frankfurt am Main	069 / 514461	communicate@roesslerpr.de
S&H Entertainment Localization (Lokalisation)	Weidenstraße 10a	82110	Germering	089 / 80076290	stefan@shentloc.com
Schulte Riesenkampff (Rechtsberatung)	An der Hauptwache 7	60313	Frankfurt am Main	069 / 900266	schulte@schulte-lawyers.de
Selected Minds (Personalberatung)	Walther-Rathenau-Straße 16	64521	Groß-Gerau	06152 / 1871830	info@selected-minds.de
Serious Games Conference	Expo Plaza 1	30539	Hannover	0511 / 1234560	sgc@nordmedia.de
Sputnic Consulting	Kolde Pst 76-76	EST-10321	Tallinn		media@sputnic-consulting.com
swordfish PR (PR, Marketing)	Habsburgerplatz 2	80801	München	089 / 96160840	info@swordfish-pr.de
Tiger Team Productions	Am Katzengraben 37	63546	Hammersbach	0152 / 5173 0000	info@tigerteam-productions.com
Turtle Entertainment (eSport)	Siegburger Straße 189	50679	Köln	0221 / 8804490	info@turtle-entertainment.de
Two Pi Team	Otto-Hahn-Straße 8	40721	Hilden	02103 / 9295550	info@two-pi-team.de
Visibility Communications (PR, Text)	Wichertstraße 16/17	10439	Berlin	030 / 44714527	hi@visi.bi
waza!	Borsigstraße 9	10115	Berlin	0178 / 5223697	contact@wazagames.com
Webedia Gaming	Ridderstraße 55	80339	München	089 / 244136600	info@gamestar.de
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Augenpulver (Grafik)	Dotzheimerstraße 164, 4.06	65197	Wiesbaden	0611 / 94574340	info@augenpulver-design.de
Augmented Minds, Ambrus & Lonau GbR	Königinstr. 9	80539	München	089 / 909002233	info@augmented-minds.com
BiteTheBytes (Middleware)	Mainzer Straße 9	36039	Fulda	0661 / 90010676	support@bitethebytes.com
B.TON Medien (Audio, Musik)	Maisinger Weg 24a	82319	Starnberg	08151 / 9713582	mix@bton.de
Chromatrix (Mobile Gaming)	Kalkofenstraße 2	72411	Bodelshausen	07471 / 740828	info@chromatrix.com
Codecult (3D-Engine)	Kennastraße 21a	44866	Bochum	02327 / 35474	info@codecult.com
Contentainer (Leveldesign)	Eichelkopfstraße 17	63584	Gründau	06058 / 9178150	info@contentainer.de
Creature Factory	Weberstraße 51	28203	Bremen	0421 / 84736895	info@creature-factory.com
Crytek (3D-Engine)	Grüneburgweg 16-18	60322	Frankfurt am Main	069 / 21977660	cryengine@crytek.com
DICO Deutschland	Freiburger Straße 5	51107	Köln	0221 / 20430504	info@ dico4u.com
Doublesmith (Art/Animation)	Wiener Straße 20, Haus 4	A-3100	St. Pölten	+43 / 699 / 19447880	mail@doublesmith.com
Dutyfarm	Oranienstraße 6	10997	Berlin	030 / 30368430	info@dutyfarm.com
Dynamedion (Sounddesign)	Kästrich 6	55116	Mainz	06131 / 5847895	info@dynamedion.com
eurosimtec	Mündelheimer Weg 37	40472	Düsseldorf	0211 / 3018560	info@eurosimtec.de
Exit Games (Network Engine)	Hongkongstraße 7	20457	Hamburg	040 / 4135960	business@exitgames.com
Eye Rock Media (Design, Animation)	Rüsterweg 10	46147	Oberhausen	0208 / 74127515	contact@eyerock.de
fadeout (Audio Design)	Güterstraße 187	CH-4053	Basel	+41 / 61 / 5717177	info@fadeout.ch
Games Quality	Zum Wasserwerk 15	15537	Erkner	03362 / 885688	info@games-quality.com
Glare Productions (Grafik)	Herner Straße 67	45699	Herten	02366 / 9502120	contact@glare-productions.com
Goal Games	Lindenstraße 24	29223	Celle		info@goal-games.de
GreenMamba-Studios (Animation)	Aloysstraße 7	48249	Dülmen	02594 / 7928217	carsten@greenmamba-studios.de
Hans HiScore (Audio)	Kohlbrandstraße 20	60385	Frankfurt		info@hanshiscare.com
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01-02|18

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Promoting Peace in Video Games

Games are meant to be fun, entertaining, a nice way to spend your free time, and also to challenge your brain. And then there are titles which deliberately cause uneasy feelings in us and make us think. A topic inspired by Tsahi Liebermann, which we are going to delve in deeper in the next issue with exciting reports about »Orwell«, »The Unstoppables«, »This War of Mine«, »60 Seconds«, »Hearts Papers Borders« and many others.

Mesh Modification

Markus Tessmann (InnoGames) explains when it's advisable to fall back on CPU or GPU in case of real-time mesh modifications.

Pacing is Paramount!

Finding and controlling the right pace in multiplayer matches can be really tricky. Marc Rutschle has a few tips to share.

The Story of Motiga

The third-person multiplayer game »Gigantic« nearly drove the small studio into bankruptcy. CEO Chris Chung explains how things got that far and how a movie-like twist eventually led to a happy end.

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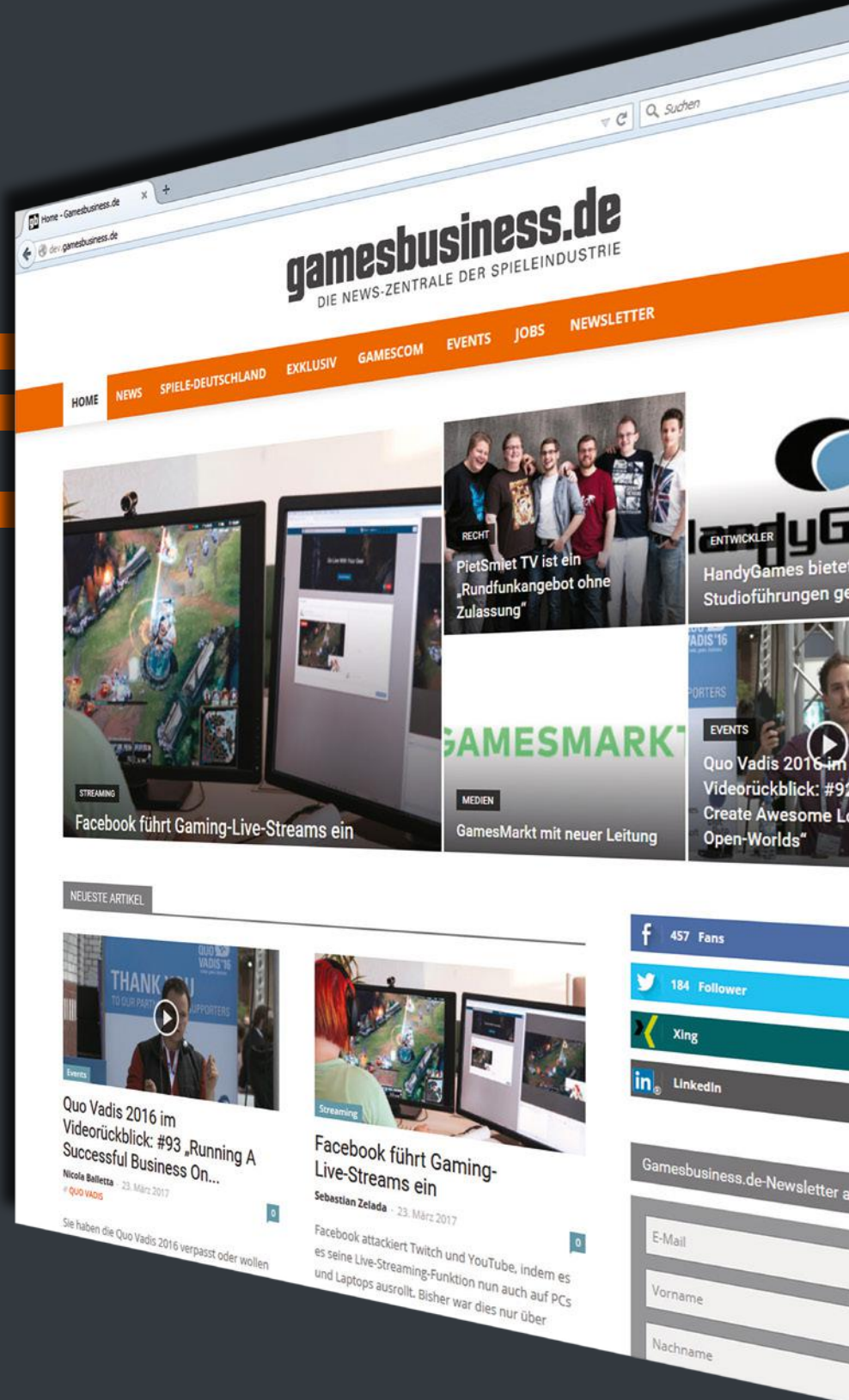
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