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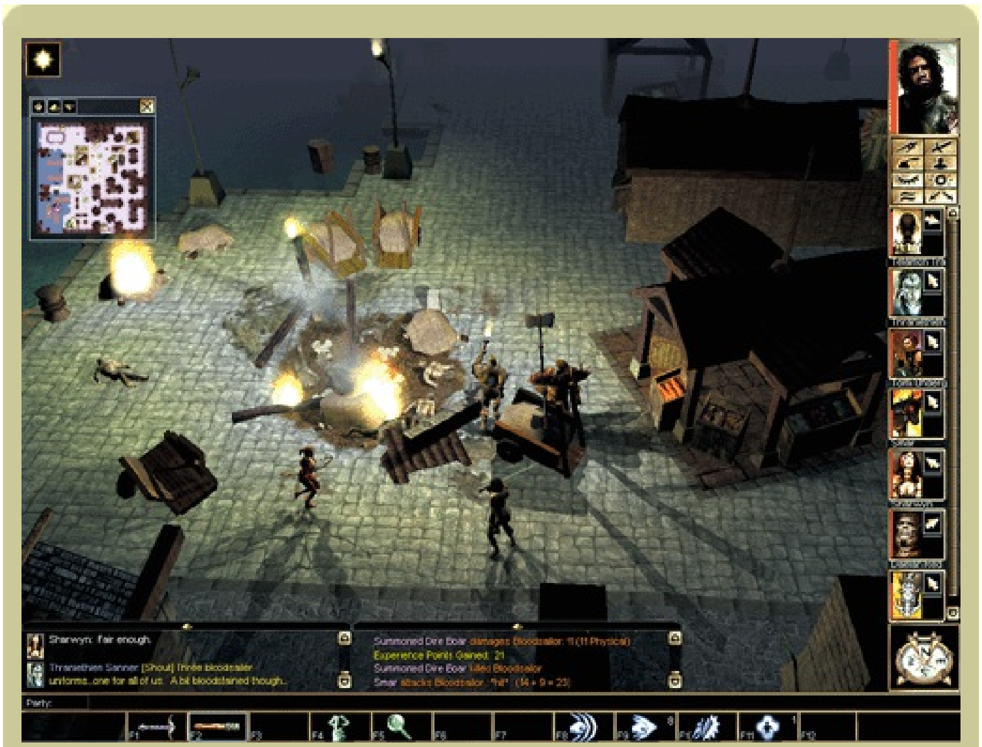
Postmortem: Bioware's *Neverwinter Nights*

By Scott Greig,et al



Sharwyn: fair enough.

Thranethien Sanner: [Shout] Three bloodsailor uniforms...one for all of us. A bit bloodstained though...

Summoned Dire Boar damages Bloodsailor: 11 (11 Physical)

Experience Points Gained: 21

Summoned Dire Boar killed Bloodsailor

Smar attacks Bloodsailor : *hit* : (14 + 9 = 23)

Screenshot of the finished product - Neverwinter Nights

Neverwinter Nights (NWN) was conceived in 1997 as the ultimate pen-and-paper role-playing game simulation. BioWare's goal with the project was to try to capture the subtleties of a pen-and-paper role-playing session in a computer game, including a fully featured Dungeon Master with full control over the game world as it unfolds, and an extremely approachable toolset to allow nontechnical users to make basic content.

Early in BioWare's development of *Baldur's Gate* it became clear to us how the evolution of the role-playing game genre would unfold. We saw the explosion of fan-created content for first-person shooters and we rationalized that the role-playing genre was ready for a similar renaissance. It was going to take a lot of work to do it right, but even near the project's completion, we realized that at the start we had greatly underestimated the effort it would take to complete a project of this size.

Neverwinter Nights was also inspired by the early massively multiplayer games like Ultima Online. Our experience online was that we had the most fun when we were adventuring with a moderate-sized group of friends, with a Game Master creating an adventure for us in real time. This experience was one of the foundations of what we wanted to capture in Neverwinter Nights.

Neverwinter Nights was the largest and most ambitious project BioWare has yet undertaken, beyond the 250-hour*Baldur's Gate II: Shadows of Amn*. Our goal was to create a game with significant impact, while also delivering on all of our goals. As a result, we had an extremely large team working on *Neverwinter Nights*.

At its peak, the team numbered more than 75 people - with 22 programmers working on aspects as diverse as the game client, independent servers, the Dungeon Master client, and the world creation tools (the BioWare Aurora Neverwinter Toolset). Not only did the final game feature a large number of programmed features, but we also had hundreds of monsters, thousands of custom scripts, and a substantial single- or multiplayer campaign (featuring 60 to 100 hours of gameplay). Coordination of such a large team presented us with a number of unique management challenges, and in retrospect we learned a number of lessons regarding managing huge projects, many of which are described in this article.

What Went Right

1. Constant communication. With the NWN team growing at the end to upwards of 75 people, communication of the goals of the project, and the day-to-day development decisions, became a critical necessity. We formed a tight communication network, with the leads in each area summarizing daily challenges, potential pitfalls, and areas of concern. Each significant code change required consultation with the various people responsible for the systems that would be touched - a fundamental change required a quick meeting between three to five people simply to make sure everyone who was affected would be aware of how the change would affect them. While this might superficially seem like an inefficient way to work, it did result in a number of benefits for the project and the team. First, the constant communication to achieve difficult goals brought the entire team together, and when difficult problems arose there were always a few knowledgeable people with a familiarity with the problem that could be consulted.

Furthermore, NWN was painstakingly documented, from technical design docs and art style guidelines to rules and level design documents. The team leads created and updated massive schedule documents detailing every aspect of the project. The tools group designed and created a project manager program. This tool facilitated faster and more organized communication between the departments. While documents would sometimes fall out of date, it was still a big step forward compared to our previous projects.

While documentation to this level is probably not required (and might even prove to be a hindrance to progress) on many games, on a role-playing project of the size of NWN, it was critical. With any large project, one of the major challenges is making sure the team works as a unit to achieve a common goal, rather than a number of parallel but unrelated goals. We found that the style and manner of communication on the *Neverwinter Nights* team was instrumental in both building the team spirit and making sure the game was successful.

2. Extensive tool effort. Compared to *Baldur's Gate*, *Neverwinter Nights* allocated five times the manpower to making the game-creation tools suite. Although part of the increase was due to the fact that the Neverwinter Toolset was to be publicly released, we would have still invested fairly heavily into the tools even if they were only intended for internal use. The decision to go forward with a new tool, or a new feature for an existing tool, depends on whether the time required to make the tool will be made up in the time saved by using the tool.

In BioWare's past projects, we have generally found that if a task that could be automated by a tool was going to be performed more than once, then the tool saved time in the long run. Despite problems inherent in using a tool under development, having a large and robust toolset allowed for very rapid implementation of design and art content. We ramped up our tools department during NWN's development, and it has served the company well to have a group that can service the tools, database, and installer needs of the entire company.

3. Multiplayer integration from the outset. Although *Baldur's Gate* was intended to have multiplayer support from the beginning, we did not actually start programming the multiplayer systems until relatively late in that project. As a result, some of the multiplayer aspects in *Baldur's Gate* - such as forcing all players to see all dialogue - were less than optimal.

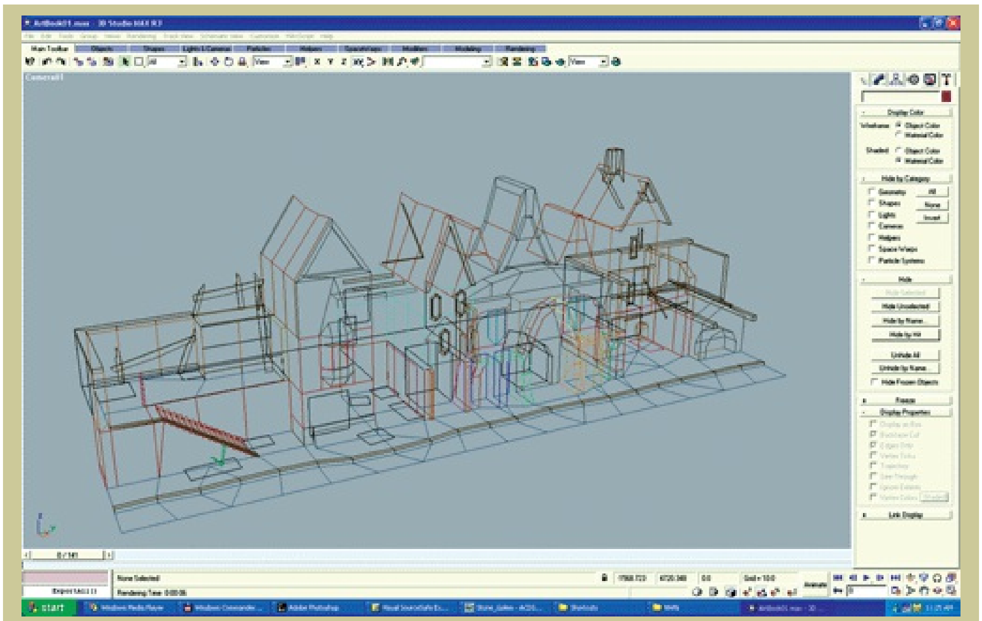
In *Neverwinter Nights*, the multiplayer systems were integrated directly into the original design. Even in single-player, the game acts like a multiplayer game with a single client attached. Although this deep integration increased the time to develop each system (compared to a single-player-only system), it did result in an overall reduction in the time required to integrate multiplayer and ensured that all the systems were optimized for multiplayer play.

One useful lesson from both the *Baldur's Gate* series and *Neverwinter Nights* was how much time QA testing of a multiplayer game takes compared with testing just the single-player game. We have found that three to five times as much testing is needed for multiplayer role-playing games compared with single-player. Thus, we require 30 to 50 testers (including both on-site and external testers) on our multiplayer projects for three- to six-month periods - not a small undertaking.

4. Experienced team members focused on quality. Having numerous BioWare veterans on the*Neverwinter Nights* team was crucial to holding the project together and ensuring the development efforts were successful. We hired a number of new people during the course of the game, practically all of whom had no prior game development experience, but we were very fortunate that a number of people that had worked on the *Baldur's Gate* series also worked key roles on NWN. Their RPG development experience served as the cement that held everything together on the project and enabled them to circumvent many of the pitfalls typically encountered when developing a story-based role-playing game. In addition, their ability to mentor new hires was essential in building a strong team, both for *Neverwinter Nights* and for BioWare.

Even though the majority of the team members were not experienced game developers, after they joined the team they had access to mentors who helped them learn their craft. BioWare's culture - based on a matrix structure with departments of programming, art, QA, and design - encourages learning and aggressive transfer of knowledge, which we believe is the best foundation for building a strong development team.

Many of the core team members worked on the project for a number of years - the entire duration of the project from the idea stage to completion was slightly more than five years. While we pushed aggressively through the entire development, there was never a sense the game would be shipped before it was ready. We set out to achieve all of our goals, and we never wavered from that plan, even during some of the complicated issues that arose in the project moving from Interplay to Infogrames. Fortunately, Infogrames was able to come onto the project late in its lifespan and mobilize the resources required to ensure the quality of the game by our intended launch date.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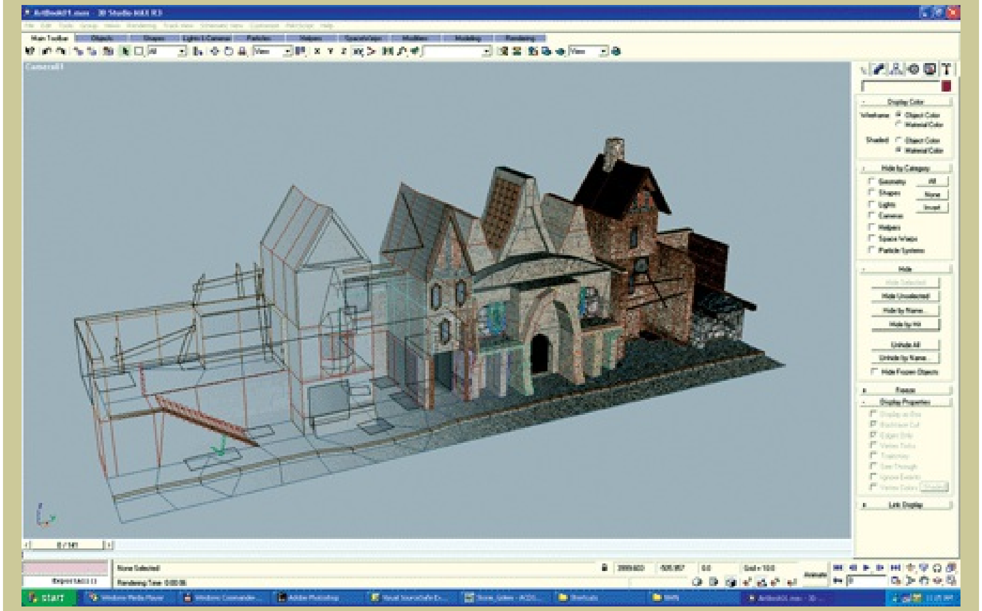
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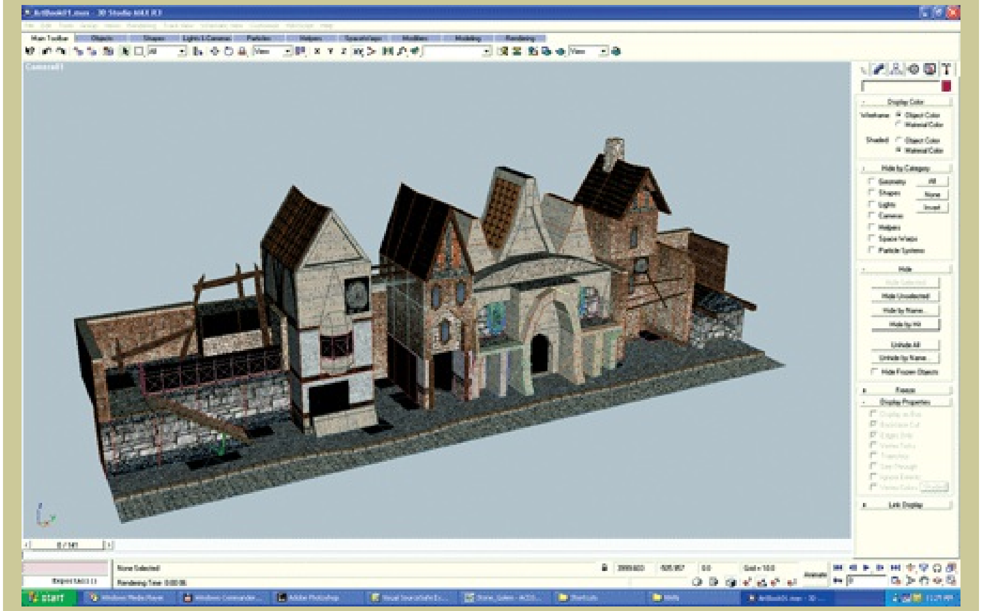
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A set of Neverwinter City tiles progressing from concept to completion.

5. Sharing resources with other projects. BioWare relies heavily on our ability to draw upon manpower from the rest of the company to help out on a project in the final stages of production. All of our projects have done this in the past, and NWN was no exception. Designers, artists, and programmers came on from the old Infinity engine team as soon as *Baldur's Gate II: Throne of Bhaal* was completed. Many of these people were responsible for key aspects of the project, in the same way that many of the NWN team members had been responsible for systems in *MDK2* and *Baldur's Gate II*. The development teams weren't the only people who helped out at the end; systems administrators, front-office staff, and the PR department also helped test the game.

Even with the help of a lot of people from BioWare, finishing a game the size of *Neverwinter Nights* was a huge undertaking - in addition to our 75-person team working on the game at BioWare, we had 10 on-site testers from Infogrames at our office, eight German and five Korean translators in-office in the last three months of development doing simultaneous translation of the game, and more than 35 external testers between Infogrames' various offices. Coordinating all of these external resources required the combined efforts of five producers at BioWare.

What Went Wrong

1. Resources added at non-optimal times. A large RPG such as *Baldur's Gate* or *Neverwinter Nights* requires a similarly large amount of art, design, and programming resources. One of the problems that we encountered was what to do while the new game engine technology was being developed. Due to our schedule, we needed to start working on art and design assets right from the beginning of the project. The problem was that it took the programming team three and a half years to complete the game systems. Thus the art and design teams had to make assets based on technical specifications derived from early prototypes. As the game progressed, many of these specifications changed, requiring some assets to be rebuilt, or else workarounds had to be adapted in the game code to allow for old and newer assets to work together.

In an ideal world, the length of the project would have been longer, with the programming done at the beginning with only a skeleton team of artists and designers to provide prototypes. Full production would have then gotten underway once the engine was complete. Unfortunately, this was not feasible due to schedule limitations and interproject scheduling pressures. We have found that when we are reusing or building on an existing engine framework, art and design can be completed with little risk of having to rework resources - problems like we encountered on NWN seem to occur mainly when we are creating a new engine from scratch (we encountered similar issues during the creation of *Baldur's Gate*, for example, but not during the various BG derivatives), and we are keeping this in mind as we schedule new projects in the future.

This detailed Minotaur concept was built, textured, and animated in 3DS Max.

2. Incomplete prototypes. Even though we put a lot of effort into prototyping important game systems, on some occasions we completed what we thought were full-featured prototypes of major game systems only to find out later that they didn't address a number of important issues. In our haste to get into full production on *Neverwinter Nights*, we didn't properly analyze all of the questions that needed to be addressed by the prototypes. This resulted in spending time late in the development cycle sorting out problems with key systems of the game.

Development of our new game engine was an extremely long process; as a result, some of the initial prototyping lessons were forgotten or inadequately documented. In some cases, we didn't thoroughly review our original goals when implementing features later in the project.

As with any new-engine game, there was too little time available to prototype gameplay. Our prototypes focused instead on technology and the individual features of the game. While this kind of prototyping was important, it would have been very useful to have early feedback on how the game played, particularly with regard to the interface and story line.

Because NWN was a rule-based game, and rules implementation was at the end of the schedule, we were only able to test actual gameplay near the end of the development cycle. Due to our inability to prototype a number of design components, we ended up reworking them. As a result, we plan to prototype story lines in future games earlier in the development cycle. One of the ways we plan to do this is to reuse the BioWare Aurora Toolset as a rapid prototyping tool for story design, even for games with radically different interfaces and rules systems.

3. Delayed rule implementation (including tools implementation delay). The Dungeons & Dragons rules system in NWN was implemented according to a priority system established by the leads on the project. We failed to take into account how some minor addition to the rules system could have far-reaching effects throughout the game. This forced the designers through an aggressive series of revisions to the areas and characters in the official campaign story. In the end, we were able to tune the game appropriately, but we put the level designers, scripters, and writers through a very trying period.

The delay in rules implementation caused a ripple effect with the tool development. Furthermore, we reworked the tool interface late in the project to make it more approachable to nontechnical developers. This rework had a significant effect on the ability of our designers to finish off content, since they were using the exact same tools to fix bugs and finish up the game's development.

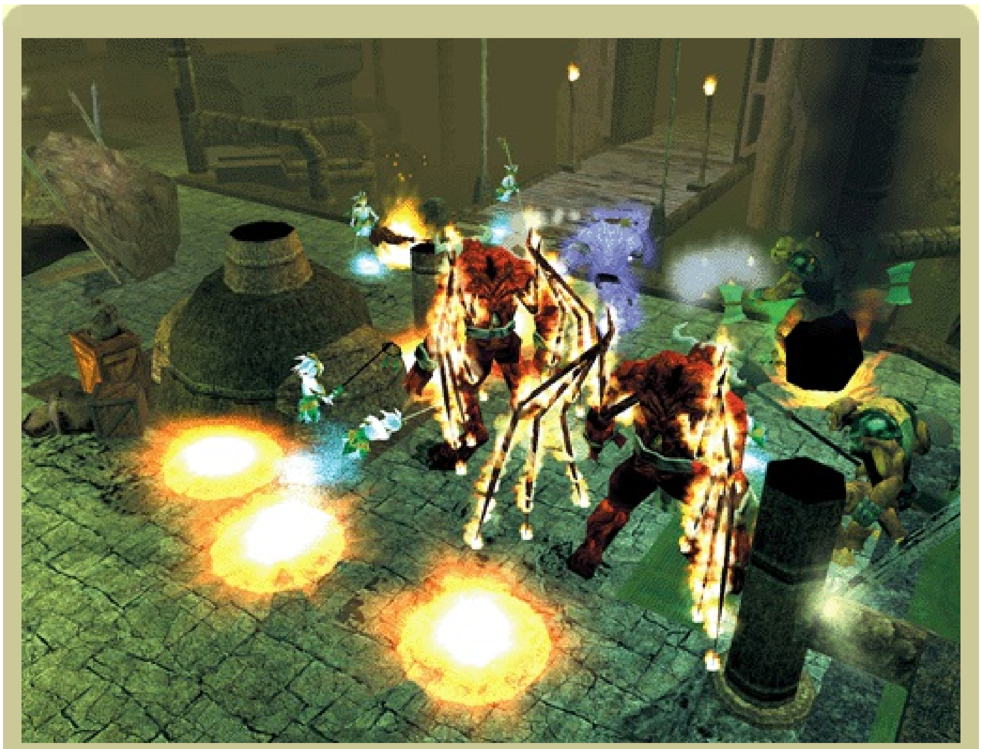
4. Late feature additions; innovation for its own sake. To ship a game that takes five years to develop takes a fair amount of intestinal fortitude. You really can't second-guess your decisions or you'll have no chance of ever completing the project, so the leads of the project agonized over some late feature additions to *Neverwinter Nights*. Given that the game was in development for such a long period, we were all concerned it might look dated by release. To combat this issue we laid out a plan to add a number of high-impact but relatively easy-to-implement features late in the development cycle to improve the game's visual quality. These additions resulted in constant concern among the artists who had to generate the new art required to support the late-added technologies. In the end, it all worked out because of large personal efforts by many team members.

From the start, there was a strong desire to make NWN a unique game distinct from the *Baldur's Gate* experience. While this did lead to the development of new systems that were better than those of *Baldur's Gate*, it also led to an excessive amount of time spent on design and prototyping of features that ultimately could not be implemented. We'd often sink a considerable amount of research into creating an innovative system, only to fall back on a similar system that worked better in the earlier Infinity engine.

Too often, we were determined to start at square one, instead of expanding on what had worked with our previous games. We learned that it is important to choose our battles. In the future, when designing a game set in a genre that we have experience with, we will look more closely at what has worked well previously and aim to innovate only in the areas of our past games that our fans and critics perceived as weak.

5. A lot of demos. A side effect of the attention *Neverwinter Nights* received in the years prior to its release was that we built a number of demos for trade shows and press visits, more than typically occur for most major releases. We probably announced the game too early in its development cycle, and it took a long time to complete the game with the promised feature set. Each time we built a demo there was an impact on the team in terms of both focus as well as schedule.

We felt the demos were successful overall and that the incremental PR received from these demos was helpful to the game's market success, but each of these demos consumed considerable team resources. In spite of this impact, the team recognized that demos are a necessary and vital part of the development process - however, they should be part of the schedule and planned accordingly from the start. In our future projects, we are booking more time for demos in our schedules, since they always seem to take up more time than originally anticipated.



Some of the visual effects available to players as they explore the vast Neverwinter world and engage in combat.

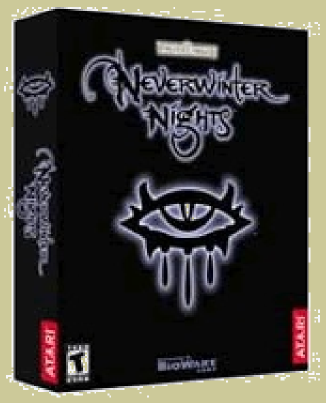
Everwinter Nights

Though BioWare considers *Neverwinter Nights* a critically and commercially successful product by most generally accepted standards, it is still far from perfect in our eyes. We try hard to learn from our mistakes, and when we run across a hurdle or a challenge we try to avoid getting caught in the details of what happened and focus on the solution. We cast a critical eye on everything from process to user perception. This critical approach often allows us to spot trouble areas ahead of time and plan for solutions before a trouble area becomes a project blockage.

In the end, BioWare is a reflection of the people who work at the company; *Neverwinter Nights* was completed by people devoted to a project they believed in completely; as with many similarly successful products, without their hard work it never would have been possible. But we still have a lot to learn, and we can only try to improve each game in relation to the ones that we released before. Our future games must and will be better still than *Neverwinter Nights*.

Our hope is that the game will help open - and keep open - the door to user-created content for role-playing games. So far things seem to be going well in this regard. As of this writing, there are more than 1,000 user-created modules on the Internet, and this is just a starting point for the hundreds of thousands of players who have purchased the game and who are now using the BioWare Aurora Toolset to make Neverwinter modules. We're hopeful that our players will continue to make new content to grow the game's community, and BioWare's Live/Community team will continue to support them in this effort.

Game Data



Neverwinter Nights
Infogrames

Publisher: Infogrames

Number of Full-time Developers: 75 at peak, representing approximately 160 man-years of development

Number of External Staff and Contractors: Approximately 40 QA testers at Infogrames, 5 sound contractors, and 20 translators

Project Length : Approximately 5 years

Release date: June 2002

Platform: PC, with Mac and Linux clients forthcoming

Average Development Hardware Used: P3-600MHz to P4-2000MHz with Geforce 3s, 512MB RAM, and 30GB hard drives.

Development Software Used: Visual Studio C++, 3DS Max 3 & 4, Adobe Photoshop

Notable Technologies: Bink, Miles Sound System, Gamespy, BioWare Aurora Engine, BioWare Neverwinter Aurora Toolset

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