**The Creative Process of Composing for Video Games**

***From Pitching to Gold Master and Beyond***

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**Abstract**

(100–150 words)

This chapter explores the composer’s experience of writing music for video games. It does so by following the musical creative process through the cycle of video game development. It begins with the pitching process, examines the factors at play in establishing the musical approach to the game, considers the compositional challenges of the video game medium, outlines approaches to recording the music, and finishes by explaining the role of music in the game’s marketing. While characterizing the creative processes of game music in general, the chapter uses two contrasting racing games as case studies. At each stage, the chapter emphasizes the variety of factors and agents involved in the musical decisions. Ultimately, the chapter suggests that the creative process of game music sits in tension between the financial realities of the marketplace, the practicalities of technology, and the creative ambitions of the producers.

**Keywords**

(5–10 keywords)

videogames, racing games, dynamic music, interactive music, adaptive music, loops, layers, recording, scoring, development

Video games have become increasingly recognized as musically significant cultural sites. The importance of music in video games is particularly obvious in so-called “music games” that are explicitly focused on music in some way. These include games that depict musical performance, like *Guitar Hero* (2005–2015) and *Rock Band* (2007–2017), or those that highlight interaction with music as part of the specific appeal of the games, like *Chime* (2010) or *Crypt of the NecroDancer* (2015) (see, for example, Collins 2013a, 63–68; Miller 2012; Moseley 2013; Roesner 2011; and on music games more generally, Austin 2016). Even beyond games that draw attention to music, critical discourse has used video games more generally to uncover the importance of playful interactivity to both “musicking” and playing games (Moseley 2016, 121–177). While much academic discussion has outlined the modes of engaging with video game music (Donnelly, Gibbons, and Lerner 2014; Kamp 2014), this chapter seeks to consider some of the creative processes at play in the creation of video game music. These decisions and creative dynamics ultimately shape the interactive and musical experiences that the games provide for their players.

Video game music has recently become an active site of scholarly discussion. Since the latter years of the 2000s, academic conferences and publications have built a corpus of knowledge across a diverse variety of topics in the field. In particular, models of interactivity, analytical approaches to game music, and the musical cultures that surround games have been well represented in this lively domain of research. Such endeavours have often proved effective at identifying some of the musical forms and structures that stem from practical necessities of game music (Collins 2008; Medina-Gray 2014), and even the creative activity of game players (Miller 2009; Roesner, Paisley, and Cassidy 2016), but little research has yet documented the process of the game music composer. This topic of discussion has so far largely remained in the realm of publications designed as informative how-to guides for aspiring composers, such as those by Paul Hoffert (2007), Winifred Phillips (2014), Michael Sweet (2015) and Chance Thomas (2016). These guides typically aspire to be practical treatises and take the form of a composer recounting a “what works” approach to game composition, based on their own experiences and inherited industry wisdom. These books, out of necessity, deal with a great variety of games and styles, rather than interrogating one compositional situation in depth. Like any technical domain, game audio is well served by volumes that provide step-by-step instruction in techniques of game production (e.g. Stevens and Raybould 2011). In such cases, while the technical process is clearly outlined, the creative dimension is less specifically explored. Of course, it would be entirely unfair to criticize these books for not fulfilling objectives that they in no way claim or aim to pursue. Our contribution is to provide a specific discussion of the creative process of game music composition.

This chapter takes the form of tracing the production of music for a video game. The discussions within this chapter primarily concern the creation of newly-composed music for games, rather than the activities related to the integration of pre-existing music into games. At each stage of the game’s development, the process of musical creation will be outlined. While characterizing production in general terms, this chapter also uses more specific examples of the creative decisions in practice, drawn from the professional work of one of the authors as a composer and audio director. In this way, it is hoped that the creative issues and their manifestation in practice, will be illuminated. The chapter avoids in-depth technical discussions in favour of a broader perspective on the musical decisions, challenges and opportunities composers face when writing for games.

Though reference will be made to a diverse selection of games, two particular contrasting racing games serve as recurring case studies for this chapter. They are *Project Cars 2* (2017) and a game not yet released at time of writing, which will be referred to as *Delta* (2020). Both were created by London-based Slightly Mad Studios. For these games, Stephen Baysted served as audio director and composer. The audio director is a significant role in a game production, and one without a precise counterpart in film/television production. The audio director is responsible for all sound in a video game, from sound effects to voices and music. Audio directors must craft a coherent soundscape for the game and negotiate between those creating the sonic content for the game (enlisting composers, sound designers, voice artists, and so on), and those responsible for implementing the sounds in the finished interactive product. Audio directors are directly accountable to the senior producers/directors of the game. Often, the audio director will have a hand in the creation of the audio materials, but it is not to be assumed that the composer and audio director would be one and the same. Composers and sound designers normally work independently, co-ordinated by the audio director. Audio directors may be hired on a per-game basis, or, as in the case of the games discussed here, the game company may have permanently-employed audio staff that take the same, or similar, roles from project to project (Phillips 2014, 14; Sweet 2015, 340–343). Slightly Mad Studios (founded 2009) specializes in the production of racing games, and Baysted serves as audio director on all of the titles.

*Project Cars 2* is the sequel to *Project Cars* (2015) and provides players with a vast array of cars (182) and courses (121) upon which to race. It was released for PC, PlayStation 4 and Xbox One home consoles. The game prides itself on accurate simulation of the racing experience, from modelling the cars and real-world racing circuits to advanced physics programming that takes account of a huge number of variables, such as the effect of weather conditions on car handling. In contrast *Delta*, though still a racing game, takes a very different approach to its subject matter*.* *Delta* is the video game incarnation of a well-known car-centered Hollywood film franchise. Rather than emphasizing the realistic simulation of cars and tracks, *Delta* sits in a tradition of street racing games that instead prioritize fantastic scenarios of street racing and criminal activity. Other well-known games in this style include the *Midnight Club* (2000–2008)and most entries of the *Need for Speed* (1994–2017) series. Taking stylistic cues from the film series on which it is based, *Delta* involves narrative missions and distinct characters. Thus, while the two games feature similar subject matter, they provide contrasting creative approaches to the same basic gameplay mechanic of racing. As we shall see, this difference has significant ramifications for the musical-creative process in each game.

This chapter’s focus will be on music, but it should be borne in mind that the music sounds within a complex dynamic soundscape that involves a diversity of other sonic materials and creative labour. The domain of modern video game development is highly varied. Games may be produced by one-person auteur creators as independent projects with no publisher financing (as in the case of Lucas Pope’s *Papers, Please* (2013), for example). At the other end of the spectrum, games may involve budgets in the hundreds of millions of dollars and teams of creators running into the thousands in multiple sites across the globe, all supported by extensive marketing campaigns that aim to capture huge audiences. These blockbuster games are often called AAA/Triple-A games, and represent the largest scale of game production. Games like *Grand Theft Auto* (2013), developed by Rockstar Games, are representative of this kind of development. With such a range of working environments for composers, an overview cannot describe all possible scenarios. This chapter characterizes the archetypal experience of a composer common to most, but certainly by no means all, games. We will trace the production cycle of a game, exploring the musical creative processes at each stage of the development, both generally, and with respect to the two case studies.

**Planning and Musical Pre-Production**

***Pitching and Stylistic Directions***

Composers are typically assigned to a game project either through a competitive pitching process, or through an existing relationship with a game studio. When composers gain work through competitive pitching, they are provided with a set of materials from the game company and asked to provide a musical response. Composers are often individually invited to submit musical proposals for projects—usually because the composer, or their work, is already known to the game’s creative directors.[[1]](#endnote-1) In other cases, composers’ talent agents may put forward their clients to pitch for a project. Video game production relies on drawing together several different domains of art and technology to create the final product, all of which are typically in flux during the game’s development. For this reason, composers are rarely given anything resembling the finished product when assembling a pitch (Sweet 2015, 80). This situation contrasts with, for example, composition for adverts, where composers will pitch in the form of scoring a complete (or near-complete) commercial. Instead, materials provided to composers as prompts for pitching for a game can be fragmentary, incomplete and little more than ambitious descriptions of the game’s final form.

To guide their musical response, composers are given a treatment, assembled by the audio director. As well as a detailed written briefing about the game, the treatment may include materials such as concept art, a mood board with references to other media to suggest the aesthetic style of the game, and even audio examples that indicate the general musical direction that the creators have in mind. Unlike a film temp track, these suggestions of pre-existing music are not typically synchronized to video. Even at this early stage in the game development, composers can be given quite strict parameters for the musical approach.

For instance, when pitching in 2011 for a high-budget stealth game, composers were asked to score a non-interactive cutscene supplied by the game company. The cutscene was not graphically complete but featured placeholder dialogue. The audio director instructed composers that it had already been decided that an orchestral-thematic approach would be taken for the game. The composers were told to produce an identifiable theme for association with the main character, and that this theme should then be suitable for manipulation throughout the game in a leitmotivic fashion. Unlike recent games from the same series, this game would avoid synthesized and EDM-inspired soundworlds in favour of orchestral-cinematic timbres. This example is not atypical; before a composer has been contracted for a project, or a note of music written, significant musical-creative decisions have often been made.

While this brief asked the composer to deliver a static piece of music, in other situations, pitch briefs may seek to test the composer’s skills at creating dynamic music that would respond to action in the game. Composers are sometimes asked to deliver elements of cues that are designed to loop and/or are layered on top of each other. These separate musical fragments that combine to create cues are commonly known as “stems”. We will return to the challenge of writing for dynamic systems later, but it is important to note that some briefs will seek to assess the composer’s capacity to write material appropriate for an interactive music system.

It may be that the composer does not need to specifically audition for the task of composing for a game. Often, if a composer has a pre-existing association with a production company, or a series of games, they may simply be invited to write music for the game. Even in such cases, however, a process akin to pitching is sometimes used to decide the musical approach for that video game. For instance, during the production of *Shift 2: Unleashed* (2011), even though the composers were already contracted as part of the production company, a kind of internal pitch was created to develop a musical strategy for the game and to convince the senior executives at the publisher that such a strategy would be viable and appropriate. Here, rather than pitching for the job as such, it was part of the process of devising, and committing to, a particular approach to music in the game (Baysted 2016, 156–161). This example also illustrates that composers may interact with executive directors at the game publisher (Phillips 2014, 136–137). These executives check that the creative direction of the game’s music is concordant with the corporate strategy of the company.

In the case of sequel games, the musical approach is often dictated by the game’s relationship with its predecessors. Decisions must be made concerning the degree to which a sequel continues, or departs from, the musical approach of the preceding games. When the commercial viability of a sequel game is founded upon the success of the first, creative decisions that propose departure from a well-received aspect of the tried-and-tested original must be carefully negotiated. For *Project Cars 2*, the game director was adamant that the music of the sequel should clearly follow the musical style of the original game, even though the composer was open to new directions. One of the ways in which *Project Cars 2* represented a musical evolution from the earlier game is through the increased budget allocated to music. In this sense, the musical approach from the previous game was understood as successful enough to warrant financial investment in the form of an orchestral recording session. Rather than a primarily computer-performed score (as in the first game), *Project Cars 2*’s producers approved a budget for an orchestral recording of the score (using 40 string players, 19 brass, several soloists, and a large percussion section). As we shall see, this had significant implications for the musical-creative process. This sequel also featured re-recorded, re-orchestrated versions of cues from the original game. *Delta*’s main musical precedent was not set by a game, but rather the film franchise. Since the game’s premise was founded upon its connection with its cinematic sibling, it was necessary to ensure musical conformance between the two media, so that the intertextual connection is bolstered by the music. Whether direct sequels or transmedial franchises, music articulates the game’s relationship with other media texts.

***Dynamic (Or Not) Music***

Perhaps the most consequential decisions affecting the compositional process of a game are those concerning the interactivity of the music. Since the ascendency of video games in the 1970s, video game music has often been programmed to change in response to the player’s actions and/or the action of the game. Under Karen Collins’s widely-adopted terminology, “dynamic music”, is a generic term for “changeable” music (Collins 2016, 183–187). Adaptive music changes in reaction to the game state, not in direct response to the player’s actions (such as music that increases in tempo once an in-game countdown timer reaches a certain value) (Collins 2016, 183). Interactive music, however, does change directly as a result of the player’s actions. An interactive cue might play when the player’s avatar moves into a new location. These categories of music are not mutually exclusive; slippage between more and less clear cut examples abound. Far less common are “procedural” music systems, where the computer is programmed to create or assemble music on the fly, using algorithms and programming rules. Procedural music is a “composition that evolves in real time according to a specific set of rules or control logics” (Collins 2009, 13). The composer may be asked to deploy any of these approaches in their composition for a game.

Game music can exhibit dynamic functionality in a range of ways. More straightforward implementation involves simply looping a piece of music until the end of a game round (as in *Tetris* for the Game Boy, 1989), or cycling through a playlist of non-looping cues (similar to *Theme Hospital*, 1997). On the other extreme, a game may feature complex systems with smooth transitions between different cues, or sets of musical materials designed to texturally stack upon one another as different layers. Two of the most common dynamic systems are sequencing and layering. As Winifred Phillips describes, in horizontal sequencing, “the sequence of a musical composition can be arranged” by altering the order in which passages of music are heard (see, for example, *No One Lives Forever*, 2000) (Phillips 2014, 188). In vertical layering, musical elements are stacked upon each other, in response to the game action (*The Maw*, 2009) (Phillips 2014, 193). Even within these broad approaches, there is a huge range of possibility, depending on the number of variations and musical states, the way in which transitions between those states might be managed, and the triggers from the game that prompt these musical changes. The choice to use dynamic music (or not), and the desired interactivity of the music, directly determines possibilities and restrictions for the composer.

The composer’s involvement with the mechanics of the musical system can vary considerably. It may be that composers play no part in the implementation of the music in the game, and are simply asked to deliver musical cues to certain specifications (perhaps with defined durations, tempi, keys, or structures). These cues, or fragments thereof, are then edited and implemented by the audio programming team. When the composers are less involved in the music’s integration into the game, it is not uncommon for the music to be drastically edited by the game developers after delivery, in order to adapt it to the requirements of the game. In other cases, a composer may be introduced to a project in the earlier stages of development and have the opportunity to work closely with the audio programmers to collaboratively develop the musical material and system in tandem. While industry-standard software exists for implementing adaptive and interactive music in game (most notably FMOD and Wwise) (Thomas 2016, 249–253), it may be that the desired interactivity of the music requires significant custom programming, which necessitates the input of the composer earlier in the process. In the case of *Delta*, for example, the audio programmer and composer worked together to develop new software that controlled the adaptive music of the game.

Decisions concerning the interactivity of the music are strongly influenced by the generic parameters and ludic structure of the game. Video games are typically characterized into “interactive genres”, based upon the fundamental way in which players interact with the game (Bates 2004, 39–95; Poole 2000, 29–59; Wolf 2005, 193–204). Such interactive genres, for example, include racing games, first-person shooters, strategy games, fighting games, and so on. This interactive genre is distinct from the setting or narrative genre of the game. A first-person shooter might be set in a science fiction universe (*Star Trek: Elite Force*, 2000), historical context (*Medal of Honor*, 1999), or in the Wild West (*Call of Juarez*, 2006), but the fundamental gameplay would be similar in each. Much the same way, traditions of interactive music tend to be similar within interactive genres (Hoffert 2007, 16; Stevens and Raybould 2011, 162–163). Stealth games, for instance, often provide music that reacts when the player’s avatar is detected by enemies (*Tom Clancy’s Splinter Cell*, 2002; *Metal Gear Solid*, 1998), while music in strategy games, music typically responds to the progress of warfare (*Rome: Total War*, 2004; *Dune II*, 1992). Of course, any individual game may choose to conform to, develop, or depart from, generic precedent, but audio directors and composers are familiar with the musical-interactive norms within those interactive genres.

As intimated above, racing games, taken as a whole, encompass a diversity of interactive genres, from those with unrealistic physics and silly cartoon worlds like *Mario Kart* (1992–2019), to those that aspire to a high degree of aesthetic realism by simulating real-world motorsports like *F-1 World Grand Prix* (1998). Between these extremes lie games that combine (to a greater or lesser extent) fantastic elements with gestures towards realism. There is a clear trend of musical practice within the subgenres of racing games (Baysted 2017). Simulation-style games do not typically use music during the race. The more unrealistic the game, the more likely it is to use newly-composed dynamic music to accompany the driving action (Phillips 2014, 89–91). Those that articulate a middle-ground of realism often use pre-existing music to accompany the race, articulated as a car radio or playlist. This positions the game as less serious than simulation games (since it uses music during the race) but still with a degree of realism, given that real-world music is used. With game companies keenly aware of competing games and player expectations, it is unsurprising that genre precedent plays a large part in determining the interactivity and musical approach to a game.

In keeping with these norms of genre, *Project Cars 2*, a game that prides itself on aesthetic realism, does not include music during the race, but only features music during the game introduction and menus. Cues here are played continuously from beginning to end as a looped playlist. In contrast, since *Delta* is a far less realistic game, and sits in a different generic context, the decision was taken early in the game’s production to feature in-race dynamic music. The principles of the dynamic system for *Delta* proceeded directly from the structure of the game. The gameplay takes the form of individual missions which take between five and eight minutes to complete, featuring three or four objectives within that mission. Having chosen to implement music that responds to gameplay events, the game’s structure helped to define the musical structure – in this case, the creation of looping material with different musical layers that provide variation in response to game action. With the parameters of the gameplay in place, the music can be expected to sound for two or three minutes per objective, itself segmented into loops, which are varied through the addition and removal of musical parts of those cues. The composer in this instance also has to contend with negotiating the transitions between loops and musical passages to start and end the race. While it would be perfectly possible to score the race with one unchanging loop, it was decided that to accentuate the urgent, segmented form of play within these races, shorter loops with more transitions and closer dynamic responses to the gameplay were more appropriate. In both *Delta* and *Project Cars 2*, the way that the developers sought to encourage players to engage with the game determined the nature of the musical mechanics.

So far, we have dealt primarily with the process of planning the music of a game, rather than the composition *per se*. Nevertheless, it is important to here emphasize the number of creative decisions taken and parameters established, even before specific cues have been written. Composition is often understood in terms of problem-solving, as composers seek and define a conceptual space for creation, imagine and propose alternatives, and produce a response that is refined and developed through self-reflexion (Impett 2016; 653–656). In the case of game music composition, the planning stage often provides the composer with a clearly defined conceptual space for creation, very practical compositional challenges to solve, and an imagined player for whom composers must create and manage musical expectations.

**Production/Creation**

***Musical Composition***

Composers are most often given project milestones to complete a given number of cues within a particular timeframe. The number and duration of cues is established by the audio director, who will consider how the musical material will map to the playing time of the game (Phillips 2014, 119; Sweet 2015, 55–56; Thomas 2016, 52). Much like traditional composition, composers typically either sketch a cue from beginning to end in outline, defining important structural/harmonic/melodic features, before refining the detail and inner parts, or work from section to section of a cue, completing the cue in sequence (Sloboda 1986, 123–138; Thomas 2016, 140). Studies of compositional processes often focus on the trajectory from broad ideas of a compositional goal, to the generation of ideas, their refinement/editing/adjustment, and evaluation until the optimum incarnation of the ideas is created (Collins and Dunn 2011; Donin 2012; McAdams 2004; Pohjannoro 2016). The same process occurs in game music, though in the case of interactive music, since the deployment of the music is dependent on the player’s actions, composers are not able to “fix” musical material to the same degree as a traditional linear composition. (It is for this reason that Karen Collins suggests that, in games with dynamic music, players can often gain a degree of compositional authority by organizing the assembly of musical materials (Collins 2013b, 573).)

The composer’s submission of completed work is then generally followed by a discussion of the music with the audio director (and/or other members of the game’s creative team), who will present comments for any changes that they may request of the composer. Even music that is to be recorded acoustically will be presented in draft form as a realistic mock up ahead of the recording. The composer would then alter the music as directed and re-submit the work, continuing in this fashion until the project is complete. Under David Collins’s synthesis model of compositional creativity, in which he describes composition as a “generative process of problem proliferation and successive solution implementation, occurring not only in a linear manner but also recursively” (Collins 2005, 193), this process of revision and recursion happens both in the composer’s own creative process, but also through the engagement with the other game-makers, who propose new problems, and suggest new revisions/solutions to be implemented.

A significant factor in the compositional process of a game will be the planned mode of recording. The first *Project Cars* game had used orchestral samples and synthesizers alongside some acoustically-recorded soloists, but the sequel and *Delta* scheduled live orchestral sessions. In the case of *Project Cars 2*, the use of orchestral recordings by competitor games was part of the motivation for budgeting for an orchestral session, so that the game could sonically match its rivals. As Matthew Sweet notes, “Cues that have live musicians also differentiate themselves from the enormous bulk of synth music in the marketplace. […] Recording can range from being a simple undertaking with only one musician, to quite a challenging endeavor with a larger ensemble or orchestra” (Sweet 2015, 284). For *Delta*, an orchestral session was justified partly because of the use of orchestral recording in the scores for the films, and it was important that the game and films share a similar sonic profile. Even with a willing developer, orchestral sessions are extremely costly, so the composer must be mindful of the amount of music to be recorded in such sessions. For *Project Cars 2*, approximately 40 minutes of music was recorded, while *Delta* demanded more than two hours of music.

Composers will write differently with an orchestral recording in mind, rather than writing specifically for synthetic performance. In particular, timbre and orchestration are tailored to the mode of recording. When the composer knows that the finished product will be performed digitally, they will write with a view to utilizing the samples most effectively, even if the approach to a live session would be very different. Whereas a string sample might involve 20 violins on one pitch, a four-part chord would sound 80 instruments, resources that would be impractical to recreate in a live orchestral setting, even with overdubbing. Similarly, computer performance can stretch the stamina of players beyond human limits of exertion and pitch that would be sustainable in real performance. Instead, composers planning an orchestral session need to be much more mindful of the practicalities of the deployment of orchestral forces. Even if an orchestral session has been planned for a game, it may be that certain types of musical material are better suited to computer-controlled performance through samples. Up-tempo spiccato string ostinati that demand absolute rhythmic precision may be more effectively performed by triggered samples, while longer, legato string parts or expressive solo parts may be best performed by human performers. When composing cues that require looping and layering, it is essential that rhythmic precision is maintained, so that the layers align precisely. In this case, synthetic performance may alleviate the necessity for tricky editing later in the music production process. Human and computer performance may be blended together, even for the same instrumentation, to best take advantage of the strengths of both.

As described earlier, musical-stylistic issues for game composition are often addressed at the moment that the composer is engaged, or with the development of an audio design document/style guide. Even with a distinct point of departure, however, the style will continue to evolve subtly through the act of composition, as the composer develops these initial proposals into music for the game and adapts the musical parameters into a format that is suitable for the planned production of the music and its in-game context.

The precedent for *Project Cars 2* was set by the first game. Both games use orchestral strings and brass alongside, on the one hand, pop/rock instrumentation (electric guitars, drums, synthesizer parts), and on the other, instrumental solo parts (soprano voice, piano, cello solo, acoustic guitar), all underpinned by a large percussion section that emphasizes bass drums (a variety of taiko drums). Many of the cues are characterized by fast string ostinati with distinctive syncopated rhythmic accentuations (often in less common time signatures such as 7/4). These strings lie under chordal brass playing slow-moving progressions that increasingly move through voicings that expand the register. Musical climaxes are built though increasing textural density, incrementally subdivided rhythms, widening register and increasing dynamic level. At the apex of these climaxes, we often encounter a dramatically contrasting passage, with a solo instrument or voice, performing in an expressive rubato above synthesizer background textures. While these structural processes and instrumental styles are shared between the games, the ability to use a live orchestra on *Project Cars 2* allowed the composer to approach the composition differently.

[AUDIO EXAMPLE 1: Eau Rouge (Excerpt) from Project Cars 2]

The second game features a larger proportion of orchestral material, along with more instrumental solo passages. Perhaps the most noticeable difference between the games is in the texture and production of the second score. In *Project Cars 2*, the textures tend toward being more transparent with wider spaced-chords and the orchestral choirs are more distinctly segregated. That is, strings and brass are more clearly stratified within their choirs and the two sections remain sonically distinct. The orchestral material is more sonically exposed in the sequel. Here, sound design/*musique concrète* elements (such as sounds of cars and radio communications) and sustained synthesizer parts tend not to blend with the timbres and registers of the orchestral material, as was often the case in the first game. The mixing, too, is subtly different – while the music has been subject to careful production, there is less obvious sonic manipulation of the audio with the application of processing effects. The overall result is that the orchestral parts may be heard more distinctly. This approach has been prompted and facilitated by the decision to hold a live orchestral scoring session, whereas the emphasis on synthesizers and more integrated soundworld of the prequel was better suited to the production method for the first game’s music. When live musicians are being used, composers may showcase that performance through the production and arrangement. Sonically exposed material in orchestral samples (as opposed to live performance) may risk drawing attention to their synthetic nature. This is not a concern when it is known a live scoring session is to be held. *Project Cars* and *Project Cars 2* use slightly different approaches to style, each tailored to most effectively utilize the resources available in each case.

[AUDIO EXAMPLE 2: Le Mans (Excerpt) from Project Cars]

The implementation of the music was not a significant compositional concern in *Project Cars*, nor *Project Cars 2*, since neither use a dynamic system. It is this freedom that facilitates the long-range climaxes and structural organization that operates over several minutes of music. *Delta*, however, does use a dynamic system, which represented another set of practical issues for the composer to confront.

In the case of *Delta*, where the musical-stylistic model was the film series, the composer had to distil the musical characteristics of the film scores into properties that could be applied to the music for the loops and layers of the dynamic system. In particular, attention was paid to the instrumentation of the film cues along with the structural processes, rhythmic profiles and harmonic progressions, so that hallmarks of the film composer’s style might be successfully integrated into the game score, and the dynamic requirements thereof.

***Composing for a Dynamic System***

When the composer is involved in the development of complex music systems, this may require them to deliver music that can be used for the design and testing of the system. Working closely with the programmers, the order of composition may be driven by practical requirements of the production schedule. Rather than scoring the game in an order at the composer’s discretion, less technologically demanding cues (such as cues that play uninterrupted from beginning to end) may be of a lower priority than cues that integrate with music systems which need to be designed, refined and tested to ensure their viability for the game. At the same time, the composer will be learning how to use the software interface and write most effectively for the music system of that particular game.

Unlike *Project Cars 2*, whichdid not involve interactive music, *Delta*’s musical mechanics demanded that the composer and programmers worked closely together from an early stage in the process. Long before the game was publicly announced, the composer was writing material and working with the audio programmers, in order to refine the music system and ensure all possible gameplay scenarios were accommodated by the dynamic music. Several different game variables were explored as potentially altering musical parameters. These included the proximity of the player’s vehicle to mission objectives or sources of danger, the damage sustained by the vehicle, and the time left to complete an objective. As this iterative, experimental process continued, the composer became aware of the capabilities and limitations of the system.

If music is designed to react to the player’s actions in a game, composers have to contend with temporal indeterminacy of events. Unlike the static timings of temporally-fixed media, composers are tasked with writing music that quickly responds to game action, even though it is uncertain precisely when those events will occur. In musical-compositional terms, this presents particular challenges for traditional structural processes, both within parts of cues, and how one section of a cue can transition into another passage. One notable approach to ensuring the sonic compatibility of musical layers was produced by the creators of *Red Dead Redemption* (2010), who composed all of the dynamic underscore in the same key (A minor) and in multiples of 130 bpm, to ensure easy transition (Jeriaska, 2011). The composer’s and programmers’ solution for *Delta* was to create a foundation based on looping segments of cues, to which could be added additional parts in response to game action. These additive parts are known as “synchronized” or “mapped” layers, since the different musical components all conform to the same tempo and harmonic pattern in parallel, so they may be layered without awkward musical disjunction (Sweet 2015, 127). These loops would then transition to other sections, as cued by the gameplay.

Examples 1–4 show four parts of a single cue created as a test for the interactive music system of *Delta*. These are reductions and some synthesizer pads and percussion parts are not shown. In the first loop, the horn part is introduced as a variation, first only sounding bb.2–4, and as a further variation, the additional phrase in bb.7–9. Example 2 is cued to play when the transition to the second loop is required (the next stage of the race) and does not repeat. Example 3 has two layered variations, initially adding trumpets, then adding horns. One bar of drum-kit solo (not shown) is used at the end of Example 3 to transition to the third loop in Example 4. By eliminating pitched material in the transition bar, the problem of awkward modulation is avoided. The final loop has three additional layers of variation. The base layer parts do not include elements that provide the rising pitch profile of the loop – this dimension is only added in subsequent variations. Even if the cue repeats, re-starting the rising line again, the sense of climax is continued by adding instruments in the higher registers.

Taking the cue as a whole, each part of the cue represents a step-change in musical excitement, as the race progresses. As the layers are introduced and the cue moves from section to section, the cue increases rhythmic density, size of the ensemble, tempo and pitch range. The tonal area moves to settle on D minor, before modulating up to E-flat minor for the final loop. The overall progression of the cue is triggered by the player’s journey through the level, so that the pace of the structural climax is tailored to the game action.



Example 1: First loop of the cue.

Example 2: Transition between loops.





Example 3: Second loop of the cue.



Example 4: Third loop of the cue.

The techniques of a musical-cinematic climax that were deployed in the cues of the *Project Cars* games – louder musical dynamic, rising pitch and increasing rhythmic subdivisions that create a denser musical texture – are not sustainable in a looped cue, since the apex of musical tension is unlikely to synchronize with game action, and the return to the beginning of the loop would result in the dissipation of the accumulated excitement.[[2]](#endnote-2) Even harmonic progressions of looped cues must return to the initial point of departure so that awkward harmonic disjunction at the point of repetition is avoided (cadences that resolve from the end of the loop are particularly valuable). Chance Thomas notes that modulation cycles by tritones or minor thirds are a common way to provide a sense of continual harmonic movement while returning to the point of departure for looping (Thomas 2016, 87). Orchestration for looping systems also requires a different approach from traditional processes. Timbres and musical statements with sonic impact are often used at the start of a loop, while more reverberant textures feature in the middle of loops (Sweet 2015, 135). When layers are added to a looping foundation stem, care must be taken to control the sonic density in particular registers and timbres so that clarity is maintained. Introducing orchestral choirs or solo instruments of a contrasting timbre and register often serves as a neat way to create terraced dynamics and a sense of musical climax, even if the dynamics of those individual instruments remain unchanged.

In *Delta*, the composition system was designed to give a great deal of freedom of musical parameters within each looping segment – the composer was largely unconstrained in terms of tempo, key/mode, metre, and so on. The trickier creative challenge was negotiating musical transitions. Sometimes cues of radically different tempi and metre had to be musically connected, and with an immediacy to respond effectively to game action. One solution to this problem was to produce transition passages and percussion parts that would help to bridge the musical changes (Example 2). Transitions in dynamic music systems can be as elaborate as transitional miniature cues that mediate between the musical properties of the two cues (a technique used in *No One Lives Forever*), or very short passages that prioritize percussive material that covers the crossfading between cues (as in the drum kit solo between Example 3 and 4). Some composers programme musical transitions to only occur at musically-appropriate moments, so that the transition is as musically seamless as possible, but that approach typically requires the music delay its response to game action, until a musical juncture appears (Sweet 2015, 169). One of the creative decisions facing composers and designers, then, is negotiating the trade-offs between musical seamlessness and immediacy.

By using both loops and layers, the composer for *Delta* had the freedom of musical choice with the short loops (thus providing variety of tempo, rhythmic profile and harmony across the cue) and yet the ability to respond quickly to game developments by introducing layers. The shorter loops also resulted in less demand upon processing power, since keeping long durations of multiple tracks of music running simultaneously can produce additional strain on the computer resources. There are many other possible approaches to the creation of interactive music, but layers and loops remain two of the most popular tools in the game composer’s arsenal.

Composers are not necessarily involved in the experimentation or testing of the implementation of the music. If there is little dynamic music, or the system has already been established (as in, for example, the case where a sequel game simply replicates the musical approach of its forerunner), the composer may have little communication with the audio programmers, and may not have the opportunity to contribute substantially to the musical mechanics of the game. Instead, the composer may simply be given a prototype of the game, the briefing for each cue required, and be asked to deliver the music to the company with relatively little dialogue with the audio programmers.

Independent (indie) game projects typically find the composer in slightly different working conditions. These games are less likely to be part of media franchises, and thus will not require the same degree of stylistic fidelity to another source. Nevertheless, with smaller budgets than major productions, these games are normally unable to afford expensive recording sessions and the time to develop complicated music systems. Unless a composer is an integral member of the games company, it is challenging for small developers to engage a composer for an extended working relationship with a long iterative process. Larger games companies have ready access to larger resources of time and finance when working with composers, though these larger companies come with levels of executive control and corporate strategy that are not normally apparent in indie companies.

***Recording the Music***

Game composers are asked to deliver music in specific formats, depending on the nature of the game. This may be as straightforward as submitting finished audio files to the company, or the audio director may request that the work be produced in rather more atomized forms, so that it can be integrated into the game system. While composers working primarily with computer-performed music will create the sound output themselves, the decision to use a live recording session produces a new dimension to the creative process. Live recordings for games encompass everything from recorded solo performers to folk and pop ensembles, to choirs and orchestras. Here, we will focus on the broader scale of live recording–orchestral sessions.

When the composer works to deliver the sound files directly, there is typically little need to produce a full notated score, though scores and parts are obviously a necessity for orchestral recording sessions. Composers may prepare the score for recording themselves, or an orchestrator may be hired to produce the score from the materials created in the composer’s digital audio workstation (or “DAW”, such as Logic, Cubase, or ProTools). As Ian Sapiro has documented, the modern orchestrator for film is distinctly different from the traditional orchestrator that one might have found employed by a Hollywood studio of the 1930s/40s (Sapiro 2017). Rather than working from a short score or sketch into a full orchestral rendering, the composer’s DAW will already have specified the instrumentation to a far greater degree of specificity than one would find in a short score. Rather, the orchestrator’s role involves developing the composer’s DAW materials into a performable product.

The orchestrator receives the MIDI data from the composer, who would typically have been creating the music using samples (not least so that the draft cues could be played to the game producers for approval prior to recording). This MIDI data, however, still bears the legacy of this original incarnation, and must be adapted before it can be successfully given to live performers. On *Project Cars 2*, Simon Whiteside served as the orchestrator and undertook the myriad editing tasks required to produce a performable score.For example, legato passages for samples often require the overlap of one note to another, to create a smooth melody (and trigger the samples correctly), even though it sounds as a single instrumental line. If copied directly to score, this would be depicted as a series of suspensions or even chords, and so must be reformatted for performance (Example 5).

C:\Users\ucwm009\Documents\Ox Handbook Creative Process\Legato String Line Cubase2.tiff

C:\Users\ucwm009\Documents\Ox Handbook Creative Process\Sibelius Cropped.tiffFigure 5: A legato line from DAW to score, from “Eau Rouge” (*Project Cars 2*). A) The legato figure as it is triggered in the DAW track.

B) The unedited exported MIDI data.

C:\Users\ucwm009\Documents\Ox Handbook Creative Process\ScorePart1.tif

C) The formatted line as it is shown in the orchestrated conductor’s score used for the recording sessions for *Project Cars 2*.

Similarly, different ways of performing the same instrument are normally assigned different tracks in the DAW: string pizzicati are programmed separately from arco passages, for instance, since they use different musical samples. Spiccato, tenuto and marcato are also given individual tracks. Here, the orchestrator condenses the tracks into the appropriate string parts and provides performance directions based on the technique, articulation and phrasing from the supplied data. Some samples use one note to trigger a chord. In these cases, the orchestrator must “write out” the whole chord to achieve the correct sounding in live performance. The DAW layout normally also requires revision to match a traditional orchestral score. The orchestrator and composer may also add expression markings, as well as technical instructions (Thomas 2016, 165).

The orchestrator’s task is to edit the music for optimum live performance. To do so, they may also draw upon their expertise to make suggestions to the composer concerning subtleties of orchestration, such as chord voicing and register, especially where the direct translation of the data might not make for the best result by live musicians. Orchestrators will prepare the orchestral parts and conductor’s score, and remain responsible for the notated score during the recording session. They may have to rectify any errors or challenges that come to light. It may be that an orchestrator will be called upon to produce an instrumental part at short notice, if proposals for alternative orchestration arise while the recording is taking place.

For the recording of the orchestra, a composer will collaborate with engineers and mixers at the studio, employ an orchestral fixer/contractor to book the musicians, and a conductor, though some composers still prefer to conduct their own music. When planning for the session, composers will brief the conductor on the appropriate click tracks for recording, while the fixer will provide guidance on the organization of the session: for *Project Cars 2*, the fixer suggested using a “split session”, recording brass and strings separately, rather than a full orchestral combined session to allow for greater control for mixing in post-production. The fixer also advised on the scheduling of the session. Sessions are organized to avoid beginning with the most complicated cues while the musicians are still warming up, though these should be recorded in the earlier part of the session. The schedule must also accommodate legal union requirements of the number of minutes of music that may be recorded per hour. More practically, performer fatigue must be managed carefully, to avoid overexertion and poor performance. Different instruments come with particular demands – a brass ensemble is less robust for repeated takes without breaks than a string ensemble, for example. Accounting for these requirements is essential for a successful creative output.

The engineer will be briefed by the composer in advance of the session. For *Project Cars 2*, the composer played the engineer (Jake Jackson) the mock-up version of the score as well as other stylistically similar recordings. By understanding the soundworld desired by the composer, Jackson was able to draw upon this knowledge to inform the recording, especially for decisions concerning the placement of microphones for the session, the layout of the recording space, as well as the mixing. During recording, beyond ensuring accurate error-free recordings, the engineer may provide creative input too, such as suggesting alternative takes of cues. Typical suggestions might include changes in register, adjusting the number of instruments per part, or timbral changes such as alternative percussion mallets. A mastering engineer will also take a significant role in the mastering of the music following the session. Engineers and the mixing staff define the balance between instrumental parts, create the dynamic contour of the cues, and forge the mixing and audio processing of the music into the stereo or surround sonic space in which it will ultimately be heard.

During the recording session, it is not uncommon for composers to take a relatively non-interventionist role, instead trusting in the technical expertise of the engineers and musicians. Given the relatively solitary process of much of the composition, the recording session is also an opportunity for other musically-proficient individuals to give their input on the composer’s work. These other perspectives can provide valuable advice, especially when the close intimacy with the music can inhibit the composer’s ability to maintain critical distance. These trusted other pairs of ears are essential for ensuring the successful completion of an error-free recording that makes the most of the resources afforded the music by the games company.

The final stage of the game’s production phase is the creation of the ‘Gold Master’: the finished version of the game ready for distribution, and to which no further changes can be made. In an ideal situation, the composer will also be able to check that the music has been implemented into the game correctly, and report any errors to the programmers prior to the creation of the Gold Master. Oftentimes, this is a luxury not afforded the composer, who may simply have to hope that the implementation is correct, perhaps by providing notes to the game testers about how the music should sound (Sweet 2015, 329; Thomas 2016, 187–192).

**Promotion, Release and Afterlife**

Game music often plays an important role in the marketing of a game. Like Hollywood films, modern games have a promotion cycle that begins many months, even years, ahead of release, and encompasses trailers, documentaries and merchandise.

Composers may create or arrange music specifically for trailers of a game, but in many cases, companies entirely separate from the game development team (trailer houses) are employed to create them. As part of this process, trailer houses will organize the scoring of the trailer, most often through editing library cues and pre-existing music from other sources (Deaville 2017; Summers 2018). Sometimes remixes or scores will be commissioned for trailers, though is typically only available to larger-budget projects.

Slightly Mad Studios has chosen to produce all trailers in-house, including the audio. A study of music for game trailers is beyond the scope of this chapter, but it is worth noting the variety of music used for trailers of the same game – for *Project Cars*, trailers were produced that used pre-existing pop songs, music written for the game, and, in one particularly distinctive example, a Liszt piano transcription of the second movement of Beethoven’s Seventh Symphony.[[3]](#endnote-3) Much like film trailers, the first trailers for a project may be produced before the music has been written or recorded, thus necessitating pre-existing music or newly-written score. Trailers are normally produced to promote subsequent expansion packs for games, even if the initial release of the game was months or years in the past. Though not trailers as such, the music (and especially orchestral recording sessions) are often used as the focus of behind-the-scenes documentaries. The orchestral recording session for *Project Cars 2* was filmed, and later used to create a video highlighting the game’s music as point of promotion for the game.[[4]](#endnote-4)

Beyond the trailers and promotional videos, music is used in other aspects of marketing. The music for *Shift 2: Unleashed* was primarily based on adaptations of pre-existing pop songs from several different bands (Baysted 2016, 156–167). This aspect of the game was used as part of the marketing campaign for the game,[[5]](#endnote-5) though the complexities for clearing the rights for a soundtrack album for independent release proved to be prohibitive. Nevertheless, within a week of the game’s release, industrious fans had extracted and uploaded the game’s music to YouTube, some of which have attracted over 271,000 views.[[6]](#endnote-6) Some fans also redistributed the music by inserting download links within video descriptions. Of course, the more striking the music of a game, the more likely fans are to undertake such activity, inadvertently feeding into the promotion of the game, despite the illicit nature of the dissemination. The *Project Cars* games had official soundtrack album releases, published simultaneously with the game, and made available through streaming services and digital music stores. Soundtrack albums regularly form part of premium “Collectors’ Edition” versions of games that include bonus materials designed to appeal to particularly keen gamers.[[7]](#endnote-7) While this did not occur for *Project Cars 2*, the orchestral sessions were documented in a book accompanying the premium edition of the game. As noted above, the decision to use a live recording has motivations beyond simply the musical opportunities it presents.

**Conclusions**

Surveying the creative process of composing for video games, it becomes apparent that, not only are musical decisions taken (or at least influenced by) a large number of individuals, but many of these other actors are not primarily musicians. The decisions about recording budgets, programming possibilities and aesthetics are dispersed across creative, technical, and executive staff. This is by no means to claim that the composer is disenfranchised or powerless, but that fundamental aspects of the creative output are the result of input from individuals who may seem superficially far removed from the label of “composer”. Such a disparate group of stakeholders and decision-makers testifies to the way that composed game music can engage with so many aspects of the video game, from concerns about genre, to interactivity, and to marketing. While studies of composition have increasingly recognized the distributed and collaborative nature of the developmental process of musical creation (Clarke, Doffman, and Lim 2013; Clarke, Doffman, and Timmers 2016), game music highlights that the creative actors may be at some distance from the detail of the compositional process.

There are specific challenges to composers presented by the interactive video game. These are especially clear in situations where music has to deal with the temporally indeterminate aspect of the medium. Even in non-interactive music, however, the player’s mode of engagement remains a fundamental musical concern, both when music is sounding and (as in the case of some of the games discussed here) when it is specifically chosen not to sound.

This chapter has painted a broad outline of the creative process of the composer in a video game. Several sites within this general topology present themselves as potential areas of future research, with the aim of elucidating the mechanics of creation in more detail. So far, we have emphasized that the composer must negotiate with many other agents. Of particular interest is how composers and programmers communicate and negotiate the evolving music of the game, especially when technological and compositional components of a game’s music develop together in a complex interdependent way. We could also further interrogate how marketing and promotional concerns of the corporate machines become expressed musically. Such discussion would also better distinguish compositional experiences of those in indie game development from those writing for bigger-budget projects.

Like any artistic-commercial enterprise, game music sits in tension between the financial realities of the marketplace, the practicalities of technology, and the creative ambitions of the producers. As each of these components both motivates, and constrains, the other two, we are reminded not to oversimplify the reality of this creative labour. It is essential that we avoid reductive misrepresentations that propose, on the one hand, composers exploited into imitation as part of merciless drive for financial gain, or on the other, unconstrained artistic pursuit detached from cultural-commercial contexts. The reality is far more subtle and variable than either of these pictures would allow. For one, novel and bold artistic approaches aspire to generate the kind of affecting player experience which would aid the critical and commercial success of a game. The creative process of game music, then, is fundamentally one of dynamic play, both within these interactive games, and in the sites of production.

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1. It is for this reason that Michael Sweet and Chance Thomas both emphasize the importance of networking, so that composers may find the opportunity to pitch for work (Sweet 2015, 392; Thomas 2016, 232). [↑](#endnote-ref-1)
2. Richard Stevens has recently suggested that musical techniques that approximate Shepard–Risset glissandi and Risset rhythms may be useful solutions for creating loops, to provide the illusion of a continuously increasing musical climax. Stevens notes, however, that these are not suitable for ubiquitous deployment, because of the sometimes uncomfortable effect of continually-delayed resolution (Stevens, 2018). [↑](#endnote-ref-2)
3. *Project Cars*, trailer produced for Gamescom 2014 (13–17 August 2014, Cologne, Germany). [↑](#endnote-ref-3)
4. Stephen Baysted, “Project Cars 2 BTS Soundtrack Recording Sessions” https://www.youtube.com/watch?v=RckNDaRviek posted 12 August 2017. [↑](#endnote-ref-4)
5. See, for example, this promotional news coverage: IGN Staff, “Experience The Driver’s Emotional Journey With The Shift 2 Unleashed Soundtrack”, *IGN.com* (23 March 2011), http://uk.ign.com/articles/2011/03/23/experience-the-drivers-emotional-journey-with-the-shift-2-unleashed-soundtrack, accessed 31 May 2018. [↑](#endnote-ref-5)
6. For example channel azx posted “30 Seconds To Mars - Night Of The Hunter (NFS SHIFT 2 'Gladiator Remix' Menu Anthem)” https://youtu.be/f1thgdNvzDs on 4th April 2011. It has 271,618 views as of 31 July 2019. *Shift 2* was released between 29th March and 1st April 2011, depending on region. More than one fan did the same. See, for example, Sotoris Gaming, “NFS Shift 2 Unleashed OST - 30 Seconds To Mars - Night Of The Hunter (Shift 2 Cinematic Remix)” https://youtu.be/OfXw3\_BK6V0 posted 3 May 2011. It has 93,197 views as of 31 July 2019. [↑](#endnote-ref-6)
7. Special editions of *Alone in the Dark* (2008), *Assassin’s Creed IV: Black Flag* (2013), and *The Legend of Zelda: Twilight Princess HD* (2016)are among the many games to include soundtrack albums as part of premium “Collector’s Edition” versions of the game. [↑](#endnote-ref-7)