

COMPOSITION AND IMPROVISATION ON THE NET

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ABSTRACT

The interactive network performance environment Quintet.net is a flexible music application, which allows the realization of music and multimedia projects in a local network setting or on the Internet. Special care was taken to accommodate different musical approaches ranging from free improvisation to the performance of compositions with fixed notation. The paper will first give an overview of the notions of improvisation and composition, before describing the environment in some detail. It will conclude with the analysis of select pieces written for Quintet.net.

1. INTRODUCTION

Devising a flexible interactive environment for composition and improvisation presupposes a thorough understanding of the nature of human musical activity and a clear concept of the notions involved [1]. This is not a simple task as the term improvisation operates on different levels including the act of music making as a) a preparatory process, (commonly referred to as composition), b) a performance (including rehearsals leading up to the performance) and c) more recently, as man-machine interaction and network computer performance¹. While it is next to impossible to discuss all aspects of composition vs. improvisation within the frame of this article, I will, in the following paragraphs, point out a few details relevant to performing with Quintet.net

1.1. Composition

Analyzing the nature of the act of composing we realize that the term encompasses a large spectrum of different approaches, ranging from a quasi-architectural design of works to automatic composition and the capture of mental or real improvisations². Symbolic notation plays an eminent role and is being used by composers with a varying degree of precision. Brian Ferneyhough's scores represent one extreme of the composer striving for utmost precision whereas space notation and time brackets à la John Cage are meant to give the performers

a higher degree of freedom³. Text-based scores (e.g. *Aus den Sieben Tagen* by Karlheinz Stockhausen) and graphical notation, where the performer's mind is supposed to be inspired by the graphics through some sort of mental resonance, represents the other extreme.

1.2. Performance

By and large, the main difference between improvisation and the performance of a composition lies in the reliance on, once again, symbolic notation, although this distinction diminishes as soon as a performer a) memorizes the music or b) uses symbolic notation as the basis for his/her improvisation.

In improvisation, memory, that is sensory memory, short-term memory and long-term (declarative and procedural) memory, is equally as important⁴ as in the performance of composed music, but probably to a different extent.

Improvisers are generally concerned with building a repertoire of sounds and structural elements before the actual performance. Therefore, Lachenmann's motto that composing is primarily an act of instrument building ("Komponieren: ein Instrument bauen") can also be applied here [2].

1.3. Computers on the Net

Since the advent of computers, composers have used them for interactive music systems as well as real-time composition environments, typically relying on chance operation (which, on the computer, makes the distinction between the two phenomena all the more problematic)⁵ [4].

With fast computers allowing real-time sound processing, installations and interactive music systems have increasingly been involved in dissolving another boundary: The distinction between composer, performer and audience.

In the 1990s, the invention of the WWW and the widespread availability of broadband Internet connections has spurred the development of network music systems, allowing musicians to make music over large distances [5].

¹ Performance rights organizations such as GEMA are still trying to categorize composition and improvisations based on the amount of time that goes into creating a written score and are openly discriminating against improvisers.

² For instance, a Yamaha Disklavier can be used to capture a piano improvisation, which can be quantized and further edited in a notation program.

³ In case of Ferneyhough, we encounter an interesting paradox as many performers resort to a more approximate interpretation when dealing with his prohibitively difficult scores.

⁴ Which lead Adorno to his famous dismissal of improvisation in Jazz as being the regurgitation of learned patterns [3].

⁵ Non-real-time composition environments such OpenMusic are also striving to make the composition process more intuitive and interactive by offering the possibility to sketch musical processes [6].

2. QUINTET.NET

The interactive network performance environment Quintet.net was designed to capture the aforementioned aspects of composition and improvisation in decentralized musical settings [7].

The environment was programmed with the graphical programming language Max/MSP and consists of four components:

- Server,
- Client,
- Conductor,
- Listener as well as the
- Viewer add-on.

These components exchange data using CNMAT's OSC and outudp objects [8].

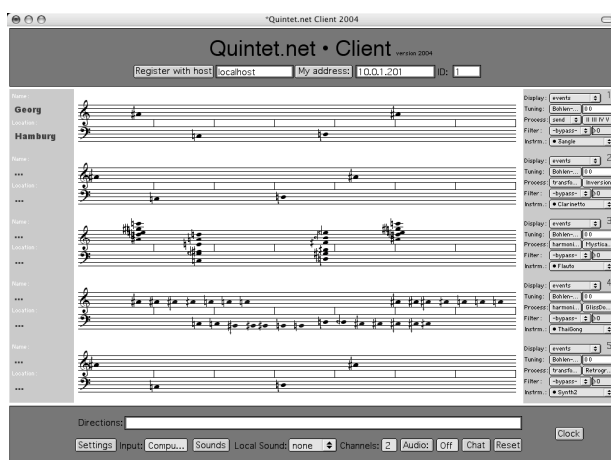


Figure 1. The Quintet.net Client

2.1. Network Interaction

The players interact over the Internet by sending control streams to the Server, either by using a pitch-tracker, MIDI or simply the computer keyboard. On the Server, the streams get copied, processed, and sent back to the Clients as well as to the Listeners (which constitute the network audience). In addition, a conductor can log onto the server and control the musical.

2.2. Audio, music notation and live video processing

Quintet.net uses a sampler or MIDI for instrumental playback. It also features granular synthesis as well as VST plug-ins for sound processing and playback, and has additional video and graphical properties, which permit better interaction and control on a symbolical level: The performers see the music they produce on screen in “space” notation on five grand staves. In addition video clips and/or live video can be displayed by the Viewer add-on and mixed with real-time music notation for an enhanced viewing experience.

2.3. Solo with computer

It goes without say that Quintet.net can be used like any sampler for performance. Sounds can be switched on the fly or by the use of a timeline. As Quintet.net allows multi-timbral polyphony on five channels, a line played by the performer can be sent via the *send* effect to the four other channels. Several MIDI harmonizer and transformation effects modify the outcome to a great extent. By using more sophisticated algorithms, capable of analyzing the performance of the performer and creating complementary lines, the computer becomes a real partner.

2.4. Several performers

Up to five performers can interact either on a local network (LAN) or over the Internet (WAN). The principle is similar to solo performance, except that the players can now also react to each other as well as to the machine. Not seeing your partner in a concert can pose a problem, which can be lessened by taking advantage of real-time music notation⁶.

2.5. Mediated performance

In addition to the five players a sixth performer, the conductor, can join and mediate the performance by changing timbres, processes and/or tunings for each of the five channels, as well as sending instructions and/or parts (in music notation) to the performers⁷. The conductor can also trigger sequences of messages via the timeline.

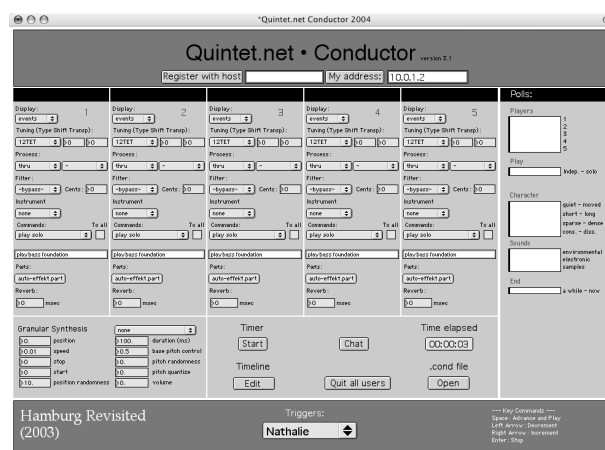


Figure 2. Screenshot of the Quintet.net Conductor

2.6. Audience participation

In performances with audience participation, the listeners are allowed to manipulate the outcome of

⁶ American composer and computer musician Chris Brown wrote about the use of real-time notation: “Sharing a notation space really broke new ground for this kind of music.”

⁷ Just like in traditional settings, the conductor can also be one of the performers.

performance by filling out questionnaires, which are sent to the Conductor and subjected to statistical analysis. By communicating the results to the players, the conductor acts as a link between audience and performers.

2.7. Automatic score generation⁸

A future version of Quintet.net will take advantage of its notation capability with its custom notation format⁹, supporting the creation of scores in real-time. Thus, a complex musical feedback network can set up by combining aspects of site reading, improvisation, analysis, real-time composition and score generation.

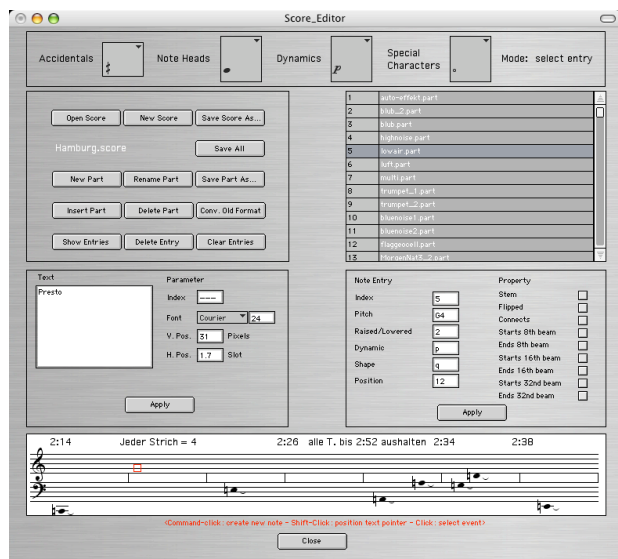


Figure 3. Screenshot of the Quintet.net Score Editor

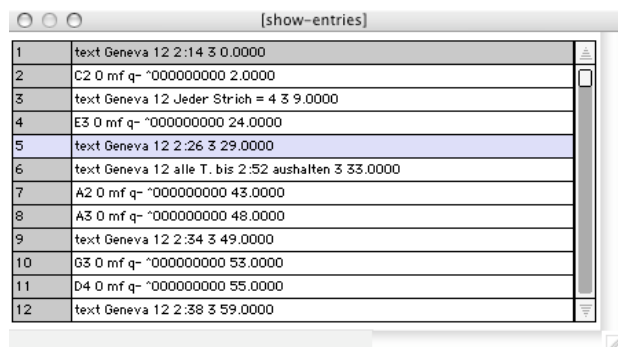


Figure 4. A list of notes and markings in the Quintet.net notation format

2.8. Towards a Gesamtkunstwerk

The Viewer is another Quintet.net component that allows the display and processing of live and

⁸ Also see Gerhard E. Winkler SMC04 lecture „The Realtime-Score: A Missing Link in Computer Music Performance“

⁹ A future version of Quintet.net will consider MusicXML as an alternative standard for music notation, making it possible to import scores and parts from music editors such as Finale or Sibelius.

prerecorded video. The processing can either be controlled by a timeline, by the actions of an additional player (performing on the CM Labs MotorMix) or by mapping frequency, amplitude and spectral information to visual parameters. By creating a complementary, yet independent visual layer, Quintet.net can be used to create *Gesamtkunstwerke*.

3. BUILDING AN INSTRUMENT: THE COMPOSITION DEVELOPMENT KIT

Whether to be used for free improvisation or precise performance of notated music, a piece written for Quintet.net requires “instrument building”. A Composition Development Kit serves this purpose: Its four components (Bank Editor, Score Editor, Timeline and Condmaker) are graphical editors, which facilitate the creation of compositions for Quintet.net.

The composer will make careful choices about how much freedom he or she wants to allow in the performance of his/her piece. After creating a specific bank of instruments (made available to the players beforehand), the composer will decide to either have a unmediated or a mediated performance; in the latter case by devising and sending instructions in real-time or by entering messages into a timeline. The timeline can be segmented into sections of flexible length to be triggered in free or predetermined order.

4. ANALYSIS OF SELECT PIECES

4.1. John Cage: Five

John Cage’s 1988 composition *Five* for flexible instrumentation uses the concept of time brackets, which is ideal for long-range Internet performance. Typically, even with broadband Internet, network jitter won’t permit the exact synchronization of musical events and for this reason, promoting the development of a specific Internet music aesthetic.

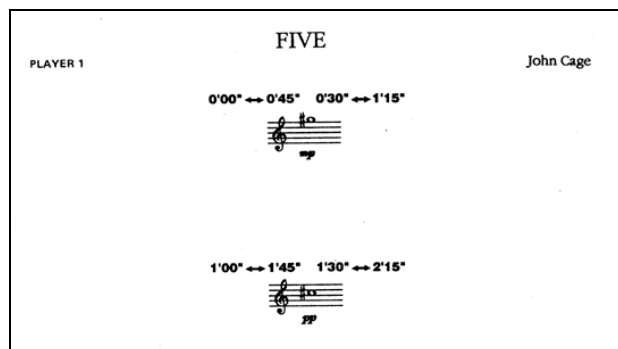


Figure 5. Excerpt form *Five* by John Cage

4.2. Anne La Berge: Vamp.Net

Anne La Berge’s *Vamp.net* is a multimedia composition of 20 minutes length about five Dutch cities, which are represented in the piece by their specific sounds and

images. The performance is a mediated improvisation, which is controlled by a conductor sending text-based instructions to the performers.

	Bart	Carl
00.00	text samples improv	play a few notes and stop
01.00	text improv until 2'	play a few high notes and stop
02.00	stop playing	play one long note once
03.00	don't play -Georg solo until 4'	don't play -Georg solo until 4'

Table 1. Text-based instructions in *Vamp.net* by Anne La Berge

4.3. Hamburg Revisited

The 15-minute composition *Hamburg Revisited*, on the other hand, is a piece written by five young Hamburg composers, in which the freedom of improvisation is traded for more control of the musical outcome. The pitch sets and rhythms are carefully worked out and communicated via timeline entries.

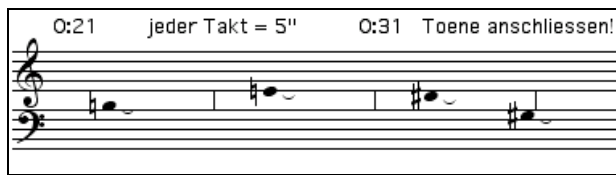


Figure 6. Excerpt from *Hamburg Revisited*

4.4. Manfred Stahnke: Orpheus Kristall

Quintet.net was also used in the performance of Manfred Stahnke's Munich Biennale opera *Orpheus Kristall* opera, in which the free improvisation of performers located at four different location in the Netherlands and the United States were invited into the opera by "opening musical windows" in certain moments. Harmonic coordination with the orchestral music was achieved by filtering the actions of the performers through harmonic filters.

5. OUTLOOK

Since its inception in 1999 the interactive network performance environment Quintet.net has continuously grown by increasingly paying tribute to musical phenomena such as microtonality or interactive multimedia performance. Thus, Quintet.net will also find its application, outside of network and Internet concerts, in interactive solo and group performances. By creating and using open standards (e.g. OSC and XML) as well as a plug-in architecture, it will be even easier to customize the environment.

6. REFERENCES

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