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Code of Creativity

Now people use computers as a kind of office for handling documents or as a media terminal. I would like to propose that computers should be designed for organizing events for the emerging self in real-time, as a reflection of our lives and an aid in finding a reason for our existence.

Masaki Fujihata, *TAKEOVER. Who is doing the art of tomorrow*, Ars Electronica 2001

Source.Code is the largest project that the Ars Electronica Futurelab has ever been commissioned to carry out completely independently in its 11-year history. The conception, planning and realization that has gone into this assignment constitute a prototypical example of how this atelier-lab for media art goes about its work and of its approach to dealing with content. The project has been conceived as an interactive visitor guidance system that, as an implant into and organic component of the new headquarters facility of the commissioning client, SAP Germany¹, is designed to open up an individualized, artistic view of the complex, abstract business activities of a corporate global player. The interdisciplinarity that is the basis of the Ars Electronica Futurelab's approach to doing a job and the resulting emergence effects

in creative processes situate *Source.Code* within the ranks of commissioned assignments that, precisely because of their conceptual-artistic approach and outcome, have achieved access to international markets. The consciousness of paradigmatically recognizing modern information technologies for the role of art as an essential factor in social innovation is reflected in the needs of private enterprises as well as cultural institutions.

Source.Code—Emergence Effects from the Atelier-Lab

Artists work in ateliers and researchers in laboratories, don't they? The approach to content and to doing a job that has been developed by the Futurelab, Ars Electronica's media art R&D lab, brings together these two concepts in a single workplace that combines the analytical and experimental aspects of a laboratory with the artistry and creativity of an atelier. The result is a space in which the tone is set by activities of transdisciplinary teams and which, depending on the demands of a particular assignment, is continually being reconfigured as a lab-atelier or atelier-lab. Here, these two opposites blend into a way of approaching projects that is most decidedly different from classical working models. The conceptual core can be found in an artistic-creative way of dealing with substantial possibilities of interlinking technologies and content. This is the result of the diversity of the team members involved in and contributing know-how to the particular project, and this diversity, in turn, brings forth, above all, synergies issuing from highly specialized hybrid disciplines including those leading-edge fields that have not yet gotten established in academia. The staff of this 750-m² atelier, lab and workshop currently includes about 50 artists and researchers working on the conception, planning and realization of joint projects and commissioned assignments involving clients and associates worldwide; these men and women are computer artists, computer scientists, physicists, media and product designers, architects, game developers, telematics engineers, sociologists, art historians and scholars in the fields of cultural studies and communications.

The methodology of *shared creativity* that characterizes the entire working process gives rise to the emergence that is typical of the atelier-lab's creations. In phases of intensive, multidirectional processes of exchange, various inspirations, perspectives and approaches crystallize into a concept for the project's content and design. The idea that emerges from the atelier becomes a prototype in the lab; in the lab, the prototype becomes the idea. The results are approaches to solutions, that are, in accordance with the definition of emergence effects, irreducible to the initial configuration of elements and thus more than the sum of the inputs that were added. Another characteristic is the unpredictability that, in this context, describes the originality of the approaches to solutions, since such concepts, with respect to both content and design, are derived from what are often only vaguely formulated demands and wishes of the commissioning client and the individual framework conditions for the specification of the project results. In going about this, Ars Electronica Futurelab staffers work out their project typologies that, as an outgrowth of this approach focused on the process of mediating human-machine interaction in the real world, in screen-based media, and in 3D spaces, do not take the contact nexus as their point of departure in conceptualizing human-computer interfaces, but rather the aesthetic, content-based and functional dramaturgies that develop in the interaction.

The shift in emphasis from the creation of interactive installations for the Ars Electronica Center to carrying out projects for and in collaboration with commissioning clients clearly attests to an opening of the market for this kind of know-how. The areas of application range from culture and education to industry and commerce. On one hand are the artistic productions staged in

concert halls worldwide; on the other hand, there are the architectural designs of the interiors and exteriors of buildings. Both are expressions of the changed social perception of the use of media technologies, of the modes of mediating the public's encounter with content that such use makes possible, as well as of the content itself. For example, a series of projects including *Apparition*², *Das Rheingold Visionized*, *Vision Mahler. Live Visualization of the 2nd Symphony*, *Le Sacre du Printemps. An Interactive Music, Dance and 3D Project*³ and the planned visualization of a Chinese Kunqu opera illustrates an approach that combines classical works with means of expression supported by computer technology to come up with new performance practices in staging artistic productions. Ever since the production of *Apparition* and on the basis of the ongoing enhancement of the tools of artistic depiction that are being made available by media technology, the levels on which a work can be perceived have been successively expanded. Each act of creating an interactive visualization represents a completely new and original approach to the specific narrative structure, aesthetic demands and cultural-historical context of a particular piece of material. Working out visual modes of interpretation for music, song and dance leads to an expansion of the classical concept of artistic genres and, in turn, to the formulation of innovative artforms whose specific characteristics manifest themselves in how the work is produced and performed and how the audience partakes of it.

Parallel to this, the redefinition of Kunst am Bau (art symbiotically integrated into architecture), through the use of interactive media as architectural elements, brings to light a conceptual approach on the basis of which media art becomes the aesthetic, semantic and functional complement of architecture. This means conceiving media art not merely as a decorative accessory but as the nexus of architecture, human user and environment, the interface that makes possible communication and interaction among the three. Here as well, a series of projects—each one with its own specific concept and design—displays emergence effects in the way the individual demands of the structure are combined with the media art approach of the atelier-lab into prototypes of context-sensitive architecture, and these can be used as a visual expression of a company's corporate culture while fulfilling certain functional tasks. For example, *Hidden Worlds*⁴, the Medienkunst am Bau project that the Ars Electronica Futurelab created in 2004 for SAP's Berlin regional headquarters, placed radically different demands on the process of taking into account the conditions of the structure's physical location than *Source.Code*, the most recent project for this client. The setting of *Hidden Worlds* is a neighborhood with a lively art scene; thus, inherent in the construction of an office complex on Rosenthaler Straße in Berlin is the provocation of introducing a foreign body into this portion of the cityscape. Accordingly, the *mise en scène* concept that Futurelab staffers came up with was to link up the building's exterior and interior. The visual world inside is the emotional translation and artistic interpretation of acoustically perceivable life in the city outside. Via multimodal interfaces, the facility's transparent architecture is opened up to interaction with employee/users as well as passers-by. The intuitively manipulable virtual scenography intervenes in this situation as a real-time interface between the architectural substance and cultural life in the neighborhood, and transforms the building from a foreign body to an organic component of its immediate urban surroundings. It becomes a link both between virtual and physical space as well as between SAP's corporate philosophy and its location.

Another project that clearly manifests the Ars Electronica Futurelab's understanding of Medienkunst am Bau is *Unit M—User Sensitive Information Architecture*, a prototype of an intelligent building created for Linz's Institute for Economic Advancement (WIFI) and based on data recorded by sensors hooked up to the facility's automated systems. Events within the building, the

activities of its users, data reflecting the state of its immediate environment and the actions of Internet visitors are captured and, via media implants, interpreted as visual characteristics of the architecture. Architecture thus becomes the reflection of its use in that people who have dealings with WIFI both actively and passively influence the building's appearance over time. *Source.Code*, on the other hand, was a matter of creating a link-up between the functional demands of a visitor guidance system and the artistic-aesthetic demands of SAP's self-representation. The various facets of *Source.Code* are thus derived from the architectural planning and the details of the physical setting of the four-story, star-shaped headquarters of SAP Germany, from the company's business activities and the cornerstones of its corporate philosophy. The approach that was developed to accomplish this conceptualized a guidance system not as a conventional sequence of signs but rather as an architectural implant that people of all nationalities would be able to grasp intuitively, one that interwove state-of-the-art technology and one of the oldest navigational aids in mankind's cultural history.

Source.Code—Kunst am Bau as an Interactive Visitor Guidance System

With approximately 40,500 employees, SAP is the world's largest provider of business software solutions. Complex and abstract descriptions of business process are characteristic of its field of activity and its communications landscape. In order to impart physical forms to these circumstances that would enable visitors to actually walk through them and experience them directly, the dramaturgical elements of the interactive visitor guidance system describe evolutionary steps in the biotope of business activities and, while doing so, symbolically guide and playfully accompany the visitor from the Guest Parking Lot to the 4th Upper Level of the headquarters facility, the Visitor's Lounge.



Source

SAP's visitors are called upon to literally "Follow the water!" Their path begins at a spring that emerges from underground in the Guest Parking Lot. Water—illuminated at night—bubbles forth and continues on its course in an artificial bed (*Water Flow*). The guidance system's starting point with its metaphoric source is visible from anywhere in the parking lot and fulfills the commissioning client's request to provide intuitive directions to the main entrance, which cannot be seen from that point.



Water Flow

Clear water flows—slightly uphill—beneath a glass covering from the spring to the building's main entrance. Air bubbles and tiny ripples make it easy to see the direction in which the water is flowing. The vertex of the 160-meter-long watercourse to the main entrance is marked by an interactive stele. At dusk, special lighting makes the entire system visible from afar.



Interactive Stele with Pulse Interface

A stele 30 meters in height and only 65x65 centimeters at its base is a prominent landmark on SAP's Walldorf campus, and was designed to complement the architecture of the star-shaped headquarters building. Due to the need to achieve a very high degree of vibration resistance, it was subjected to special dynamic structural tests. A touch sensor makes it possible for visitors to engage in a dialog with the architecture. Made visible by the light impulses that are emitted by the elements of the installation, the visitor's pulse is transmitted in real time to the building and its surroundings. Placing a hand on the stele also activates an audio link to SAP's Berlin Regional Headquarters, which also features a pulse interface.



Data Flow

The watercourse leads visitors to the main entrance; the act of passing through it is marked by a change of media that reflects the duality of exterior and interior: the watercourse morphs into a flow of data/information that extends along a linear array of LCD displays in the floor and signifies the transition from nature to culture. Various living creatures populate the architecture composed of displays, and they consummate the narration via interaction with the visitor. They are sensory interpretations of business activities actually being carried on by SAP-events and their processual characteristics that themselves assume a form via transformation into living ciphers, encoded personalities. A complex AI model breathes life and a personality into the creatures: their appearance, their movements, their voices, and the ways they approach the visitor and convince him/her to follow them, which might be anything from curious, timid or majestically indifferent to overwhelmingly euphoric. Personal contact is the product of 26 cameras and computer-vision software. The creature's physical and intellectual characteristics are the synchronized, real-time outcome of SAP's business activities and the visitor's behavior.

Data Wheel and Data Pool

The data wheel is the technological interpretation of human-triggered events; the lives of the abstract creatures in the data flow—that is, the sum of the activities of SAP's employees worldwide—set it in motion and determine the speed of its rotation. The data wheel also alludes to the duality of water and data, nature and culture, in that it translates the mechanical functional principle of a waterwheel into the circulation of virtual data and gives it concrete form in the innovation metaphor of the data wheel. The inner ring rotates physically, while the actual process of producing kinetic energy is simulated on the displays in the movement of the virtual material. The creatures generated out of the company's activities gather in the data pool, a matrix of 8x3 LCD displays; species of the same family gradually come together, form loose formations, and are especially sociable here in the waiting area in front of the bank of elevators.

Elevator

Various species of process-families follow visitors into their elevator car and accompany them on their ride up along a vertical array of displays. During the ride, the loosely arranged formation of creatures develops into a self-organized community. The transparent architecture at the elevator supports the flow of this narrative—from the creatures' origins and their individual behavior to their grouping while the car is in motion.

Code Diffusion

When the car doors open at the end of the elevator ride, the concatenations of creatures split up and they disperse from the displays in the floor to a matrix of 7x2 displays on the opposite wall, where they diffuse and expose the business activities that had been hidden behind them. What had heretofore accompanied visitors as an artistic-visual code now becomes legible information. Following specification of a particular business activity, this field (as well as others) can be explored in greater detail at the next station: an aquarium.





Aquarium

The virtual creatures appear as proxies for particular business activities in the *Aquarium*, a cube of mirrors with an open front. The virtually endless replication invites visitors to engage in a playful encounter with visual perception and its deception, but that's only the beginning. This no-touch interface permits direct interaction with the content; these highly diverse creatures perform their dance under the visitor's direction and generate an unusual reflection on the mirrored floor of the open-front cube: beneath the animated creatures, there appears in text form a substantive description of the business activities for which they stand. In this way, visitors can familiarize themselves with the software solutions and services offered by SAP.

DataFall

The final installation, the work of media artist Zachary Lieberman, visualizes the raw material that makes up the generic units of SAP's business activities: binary code. This flows directly back into the *Data Flow* and comprises the medium for new business activities. Reacting to the movements of visitors and their interactions with each other, the visuals on the wall display are visual translations of the socializing going on in the Visitor's Lounge.

Once visitors have experienced the special presentation in the elevator car and reached the Visitor's Lounge, their actual destination, *Code Diffusion*, *Aquarium* and *DataFall* enable them to get better acquainted with SAP's business activities. In accordance with the wishes of the commissioning client, media art becomes a visual expression of transparency and agility. Both are reflected by the natural characteristics of water and their translation into the personalized form of code. This is how *Source.Code* goes about tying together every element of the entire installation both with the building's architecture as well as with the message that SAP wants to get across as a producer of successful products and as a leading, socially conscious corporate citizen.

The Display as Architecture and Sign

Source.Code carries on the idea that conceives of Kunst am Bau as an implant and organic component of the architecture. This implies that the conception of the installation was already integrated into the architectural planning of the structure. Through the use of artistic means—specifically, interactive media elements as architecture—the structural substance becomes the interface between human beings and a physical setting. Horizontal and vertical display surfaces are extensions of the geometric space; they open up virtual windows into what otherwise remains hidden. As physical components, they aren't mediatized furniture but rather a constitutive part of the space. At the core of *Source.Code* is its uniquely configured interrelationship of form and content. The formal signs—the displays making up *Data Flow*, *Data Wheel* and *Data Pool*—are tactics of semantic encoding of the hardware; the form is taken possession

of by the content in an unexpected way and becomes a sign itself.

The use of media technology as architecture and sign leads to a redefinition of the image display surface. This redefinition goes beyond classic forms of screen-based depiction of visual information in that the hardware and the way in which content is presented on it as a derivative of its symbolic use are themselves architecture and materialized information in the form of an intuitive visitor guidance system. The displays comprise this guidance system as scenography—not as a functional means but as installation and performance.

Narration through Interaction

Implementing hardware as a formal sign makes it possible to integrate that hardware into a process of interactive storytelling, on the basis of which visitors are able to find their way from the Guest Parking Lot to the Visitor's Lounge as well as to track a path leading from the origins of a business activity to the comprehension of a business process. The narrative-visual link-up of the starting point (Guest Parking Lot) and the final destination (Visitor's Lounge) creates "fluid spaces" whose dramaturgy is continuously being heightened—from the stream flowing uphill over a vertex marked by an upward-soaring stele, the transformation at the threshold signifying the nexus of interior and exterior, raising the energy level on the Data Wheel, and then redirecting the flow to proceed vertically into the 4th Upper Level. Abstract beings with their specific characteristics increasingly assume control over the direction of the flow.

The interaction possibilities are manifold and multi-layered; the micro-narratives involving visitors and process-based creatures systematically develop under the influence of a variety of different circumstances in the biotope of business activities. A complex AI model makes reciprocal and individual contact possible. The challenge is the simultaneity of narration and interaction. Authors who work at the interface of interactive storytelling and artificial intelligence frequently emphasize that narration and interaction are nearly contradictory and thus irreconcilable poles^{5, 6}; nevertheless, this is precisely what is called for in designing this interactive guidance system for SAP, and this essentially constituted the starting point for the implementation of the mission statement. Linking the behavior of visitors in the real world with the behavior of abstract creatures in the virtual realm keeps the narration flowing; SAP's message is communicated by the creatures' intelligent behavior. In this way, most of the narration in *Source.Code* is carried out via interaction.

Whereas the specific qualities of the abstract creatures' appearance and intelligence as initially generated are completely dependent upon the activities of SAP employees, these creatures come to develop their own mode of behavior and interaction with each other (group formation, avoidance tactics, influencing the prevailing mood) in accordance with enterprise services and on the basis of certain parameters governing their presence in the flow of data. The mood of individual creatures or groups of related species influences the behavioral pattern with which they confront visitors. They "seek" and "see" them, and arouse their curiosity through certain types of behavior (*interactor awareness*). The position, movements and posture of individual visitors are additional parameters that influence the way the creatures establish contact with visitors. Thus, SAP interacts in a playful way with its guests. The AI model on which this is based performs a narrative visualization of SAP's workflow by recourse to evolutionary and learning processes.

The dramaturgical and spatial turning points ultimately coincide: The release of the virtual

material's stored-up energy through the second shift in the overall state of the information takes place immediately after the opening of the elevator doors—i.e. at the moment in which the guest enters the Visitor's Lounge. The creatures' "domestication" in the *Aquarium* and the subsequent revelation of the binary code and its return to the data flow via the *Data Fall* completes the cycle of alternating elements of tension and irritation that function as stimulators of a successive process of acquisition of the SAP environment. The redefinition of the image display surfaces is also evident from their content: They constitute performative components of the architecture in a narrative system of signification instead of merely functioning as infrastructure displaying fixed content.

The Enterprise as Performance

The activities of SAP's workforce become not only the dynamic content of *Source.Code* (represented by the flow of data populated by system events generated in real time), but also artistic design elements and components of the architecture. The process of decoding the encoded personalities of the process-based creatures is a part of the dramaturgy; providing visitors with intuitive guidance is done by means of multiple shifts in the aggregate state of the information as well as the accompanying/guiding interaction with digital creatures. SAP as performance manifests itself in an interlinked sequence of actions, movements and processes that are engendered by the interplay of the business activities being carried out by SAP personnel, the architecture of the facility and the visitors to it. *Source.Code* regards SAP's headquarters not as a location but rather as a process, which implies, at the same time, a conceptual approach involving transferral of artistic authority to the company and its visitors—"the work" that takes shape is the result of the simultaneous activities of both groups. Essential traits of the performance character are thus the continual transformation of the work, the inseparability of creator, participant and observer, the interplay of the basic elements time, space and body (in the form of virtual and physical characters) and the indissoluble relationship between the performance and the reception accorded to it. In this way, a narrative is inscribed upon the visitors' path from a transitional zone to a place of personal experience. *Source.Code* creates a venue for encounter and transfer that is in keeping with the times, one that mediates between the encoding systems of art and business, between a company's conception of itself and the perceptions of its visitors.

Translated from German by Mel Greenwald

- 1 SAP Deutschland AG & Co. KG Walldorf
- 2 Schöpf, Christine / Stocker, Gerfried (Eds.): *Ars Electronica 2004: Timeshift. The World in 25 Years*, Ostfildern, Hatje Cantz 2004, 317–18
- 3 Schöpf, Christine / Stocker, Gerfried (Eds.): *Ars Electronica 2006: Simplicity. The Art of Complexity*, Ostfildern, Hatje Cantz 2006, 293–5, 298–9, 301, 305–7
- 4 Leopoldseder, Hannes / Schöpf, Christine / Stocker, Gerfried (Eds.): *1979 – 2004 Ars Electronica*, Ostfildern, Hatje Cantz 2004, 198–9
- 5 See, for example, Shaw, David: *Aspects of Interactive Storytelling Systems*. Master Thesis, Department of Computer Science and Software Engineering, University of Melbourne 2004, and Mateas, Michael: *Interactive Drama, Art and Artificial Intelligence*. Ph.D. Thesis, School of Computer Science, CMU-CS-02-206, Computer Science Department, Carnegie Mellon University 2002
- 6 "I won't go so far as to say that interactivity and storytelling are mutually exclusive, but I do believe that they exist in an inverse relationship to one another. [...] Interactivity is almost the opposite of narrative; narrative flows under the direction of the author, while interactivity depends on the player for motive power.", so Adams, Ernest: "Three Problems for Interactive Storytellers. Designer's Notebook Column," *Gamasutra*, December 29, 1999

