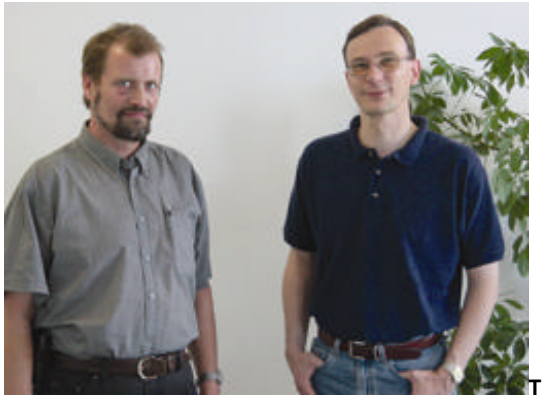
Xtend – a „new“ company in particular

In November 1999, the formation of ThyssenKrupp Information Services (TKIS), the systems house of the ThyssenKrupp consortium, took place. Part of the ThyssenKrupp Information Services is the Xtend broadcast AG, which is a spin-off of the former ThyssenKrupp Multimedia GmbH. Under its roof, formerly all multi-media and e-business subsidiaries of the ThyssenKrupp Information Services have been united.

Established on the market since 1997 as Mediagate, the Krefeld (Germany) based Xtend broadcast GmbH is a service provider for digital TV. Founder member of the formerly Mediagate GmbH, which changed its name in the year 2000 to Xtend broadcast GmbH, is nowadays technical director Claus Beck. Xtend broadcast offers, besides the processing and forwarding of video-, audio and data signals, services as a play-out centre for broadcasters and other platforms. A centralized co-ordination department offers the delivery and mass-production of digital program packages via satellite and its accounting/billing for private cable-network providers. Operated are for example the TV networks of the HypoVereinsbank, of the Bahn AG and the TV programs of the German Government as part of the integrated information system Bonn/Berlin (IVBB).

With the foundation of Mediagate, employees from different departments of the Thyssen Telecom AG shifted into the new company. This new team set the technology standards, which should be used within the new designed broadcasting/play-out infrastructure: no classical broadcast technology but - new IT-based production and transmission units. After intensive in-house planning the new transmission centre was built in conjunction with Dimetis, a German system integrator, in one of the ThyssenGroup administrative buildings in Krefeld, Germany. Thomas Vering-Pirron, with professionalism in the film and video market, signs responsible for the classical video section.



The “classical broadcast engineer” Thomas Vering-Pirron (left) supports and carries all ideas of „IT-thinker“ and company CTO Claus Beck

The future of TV is digital

With this vision in mind, the planning, selection of equipment and installation of „implementing the existing satellite technology within the newly designed server and coding infrastructure“ took place. In Germany, the reception of digital program packages via satellite and cable is possible. Complete migration from analogue to digital TV should be finished at the end of 2010, as the German government decided. Claus Beck, who works in the television, satellite communication and broadcast area since seven years now, says: “Our focus to provide „Services for the multi-media market“ describes the requirements for the basic investment into digital technology.” As a technical Full-Service-Provider of services based around digital TV, Xtend broadcast delivers the complete handling of projects including consulting and continuing support after commission. By combining Internet, multi-media and broadcast a new infrastructure had to be developed, which was able to handle any data, no question if it is video, audio, graphics or computer data. „After Mediagate’s founding, we oriented ourselves in the capital goods market to find equipment which fulfilled our requirements to build a digital playout, transmission and server environment and suited the needs of IT-world employees.“

“Currently, we own no production studio and neither have post-production capacities. Our services focus on the collection, processing and transmission of content. The carrier medium of this content is not of any relevance for us, as long as it is a „broadcast format“, because we have all necessary equipment and interfaces. Our clients deliver their material either via tape or incoming transmission lines (e.g.). All material is checked by our quality control and then

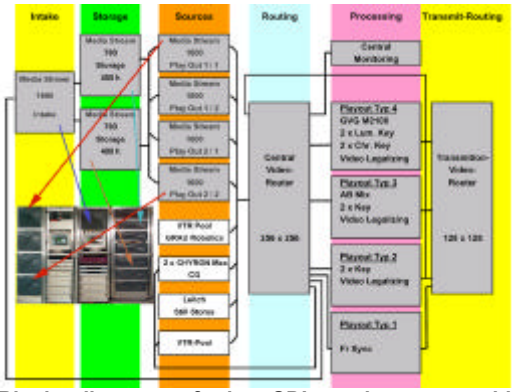
ingested onto our servers. But, we get more and more inquiries if we are able to perform some editing as well. Momentarily, we are in the decision process to extend our services with production and post-production facilities as well", explains Thomas Vering-Pirron the technical production situation at Xtend.

The FC network runs in conjunction with a FC-switch.

Four years ago, Mediagate started with its focus on transmission services, whereas business-TV, Conditional Access and similar services - but no play-out - had been offered. At that point no units or even servers had been available, which fitted into such an environment. During that period permanent satellite transmission up- and downlinks or even mobile satellite units serviced their clients (such as Bavaria Film, Deutsche Bahn, etc.). "We have used ‚Trinity' from Play during that period to provide an infrastructure with CG, vision mixer and DVE for live events. Because the system is a 'Studio-out-of-the-Box' and PC-based, it fulfilled all our requirements at that point and could be used by the operators intuitive, because of its Windows GUI, which was very familiar to them", Claus Beck added. "That we finally decided to select a server solution was based on our customers requests for fast availability of huge amounts of material and convenient transfer times, which laid fare behind the potential of a tape based system. Our decision for a specific server system was based on the requirements set by our customers and the experience of our IT-based employees at Xtend broadcast. An employee focused on IT - and with an IT-background - always selects a secure and stabile UNIX-OS instead of depending on a consumer OS." Pinnacle's Mediastream servers have been selected, because of their stabile, industry-proven bus system, which offers security in management and access, even if the LAN connection went down or the terminal cannot be accessed. "The pure I/O control runs on a different path than the control of the copying process of content. The resulting security and reliability lets MediaStream servers from Pinnacle be the right solution. Of course, we have looked at other server products such as EMC², Seachange and GVG too, but finally the mentioned criteria in conjunction with our automation system convinced us. At that point, the overall performance could not be delivered by any other system."

Quality control and monitoring of the satellite transponder parameter takes place in the Network Management department

The system is designed in such a way, that since the beginning the multi-channel playout capabilities have been the main focus. The infrastructure between all servers is solely based on Fibre Channel (FC) to provide best performance results during data transfer between all servers on the network. SDI connections with embedded audio are used for transmission of ingest signals and redundancy purposes. The power and data load was calculated that - at maximum use of the system - no critical network loads would be encountered which decreases the overall performance. "The system from Pinnacle runs on a structured Realtime-OS and dedicated bandwidth. It is very robust and reliable. Each component can be run at its highest expectation without reaching the frontier of its loading capacity, and no other part of the system will be put at risk", says Claus Beck to explain their server decision. "During our test we figured, that even 'full load' of the Fibre Channels would not cause any interference at the outputs. This could not be performed by any other system!"



Block diagram of the SDI environment with embedded audio at Xtend broadcast facilities in Krefeld.

Via a MediaStream 1600 ingest server with a total capacity of 100 hours all signals are recorded. Only at this point SDI signals are delivered, which are - after encoding - transferred via FC onto the MediaStream 700 disk server (disk farm without en-/decoder). This is a pure data-exchange process to eliminate further signal degradation. For playout two mirrored playout sections with MediaStream 1600 are used. A maximum of 26 channels can be played out in parallel from the servers. Altogether, Xtend broadcast is designed for 30 playout and 20

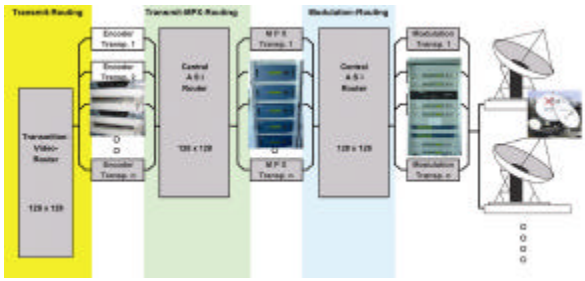
turnaround channels, which equals a basic structure of 50 channels in total. Momentarily, the playout works with 18 and the transmission centre with 26 channels. All playout and coding services are in conformity with DVB-S(atellite) and DVB-C(able). Applications for DigitalTV based von OpenTV and Multimedia Home Plattform (MHP), Conditional Access and additional digital services are offered for management and involvement of additional functionality are available. Currently clients for transmission services are BundTV, BahnTV, the Vietnamese VTV4 and the Bavarian HypoVereinsbank. On customers request all broadcasted programs are scrambled/encrypted, user databases are build and data is ingested, and all necessary billing services are performed.

The playout control in conjunction with a self-developed automation system, completely software based and without control panels for all GVG-2100 master control switchers monitors and controls all playout activities.

Not only the signal structure is separated between ingest and uplink, machine rooms are physically, too. All activities in the area of encoding for DVB-S and DVB-C and the following multiplexing are performed in the uplink area. For signal distribution a 256 x 256 GVG router system is used, which in any case of emergency, can be used as a redundant system, too. For optimised signal capacity and performance, signals are recorded and broadcasted in the MPEG-2 format @ 15 Mbits. The ingest server (one MediaStream 1600) has a storage capacity of 100 hours, the two disk servers (seven MediaStream 700) can record a maximum of 800 hours and both playout servers (four mirrored MediaStream 1600) are providing 100 hours respectively 150 hours (depending on used HDDs) cache capacity. At the moment, all playout servers are running with a 20 hours look-ahead cache.

The program planning is designed to react fast and efficient on keying, mixing and CG requests. One server output signal can be processed by a maximum of five server channels. To perform this, GVG-2100-series master control switchers are implemented.

With a total investment of ten million Euros the digital future was started four years ago.



Overview of the encoding and multiplexing infrastructure at Xtend