DRM ContentServer

Specification

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About This Document

Gospell DRM ContentServer Specification
Gospell DRM ContentServer R6 (doc rev. 1)
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General Description

The Gospell DRM ContentServer R6 is a highly reliable professional broadcast system for Digital Radio Mondiale. It supports the content and signalling options DRM offers and all interfaces for a smooth integration into the broadcast chain.

The Gospell DRM ContentServer R6 provides triple functionality as one system:

- **DRM AudioServer**
  With multi-stream real-time audio encoding (including the MPEG xHE-AAC audio codec)
- **DRM Multimedia DataServer**
  Supporting all standardized as well as broadcaster specific data services; covering import, processing, encoding and broadcast
- **DRM Multiplex Generator**
  Managing the extensive DRM signalling capabilities, generating the full digital DRM Multiplex, scheduling among multiplex configurations and providing standard MDI/DCP output streams

The system is typically located in the studio, at a play-out center or at the transmitter site – with full remote control for administration and data provision, enabling cloud-based operation. The remote web interface featuring in-place-editing technology for quick and convenient system configuration can be accessed through any modern web browser, including individual user login via LDAP.

The output signal of the Gospell DRM ContentServer R6 carries the complete DRM Multiplex (FAC, SDC, MSC) in MDI/DCP format according to ETSI TS 102 820 (Multiplex Distribution Interface) and ETSI TS 102 821 (Distribution and Communications Protocol). This DRM Multiplex can be fed simultaneously to any number of DRM Modulators/transmitter sites (with timing support for SFN single frequency network operation), and monitoring stations.

The Gospell DRM ContentServer R6 is based on a highly reliable and secure operating system (Linux based) and installed on a reliable industrial server.

Product Lines

To complement individual needs and infrastructure requirements, the Gospell DRM ContentServer is available in the form of two different product lines.

- **Gospell DRM ContentServer R6 – DRM30**

  The DRM30 product line is suitable for all DRM broadcasts below 30 MHz, including the SW, MW and LW bands.

  Note that the following functionality option listed in the Editions table can only be combined with this DRM30 product line:
  DRM+ (Robustness Mode E) add-on (in the DRM Multiplex Generator section)

- **Gospell DRM ContentServer R6 – DRM+**

  The DRM+ product line is suitable for all DRM broadcasts above 30 MHz, including the VHF broadcast bands I, II (FM) and III (based on regional regulatory conditions).

Software Specification

Gospell DRM AudioServer

This system component provides real-time encoding of up to 4 audio streams in parallel:

- Live analog and/or digital input (with dynamic resampling option)
- File sources (mp3, wav, playlist)
- Audio over IP (AoIP) input: Livewire and AES67 (e.g. Ravenna)
- Backup Audio Source: auto-switch from missing live input to uploaded audio content
- xHE-AAC encoding (mono, stereo)
- AAC with SBR (mono, stereo, para-metric stereo, 5.1 surround)
- All bitrates, including UEP (unequal error protection)
- All available sampling rates
- MPEG Surround option with automatic real-time stereo-to-5.1 upmix using SX Pro®

Gospell Multimedia DataServer

This component supports the import, collecting, merging, checking, conversion and encoding of data for all standardized DRM and DAB as well as broadcaster-specific individual data applications.

DRM / DAB data applications:

- DRM TextMessages
- Journaline®
- MOT Slideshow (incl. categorized/interactive SLS)
- EPG/SPI (Electronic Programme Guide)
- TMC Traffic Message Channel
- TPEG Traffic Information
- MOT Broadcast Website/Filecasting
- PRBS with internally generated synchronous or asynchronous (standard or user-defined) test patterns

Open interfaces allow the transmission of any custom-tailored individual application at various protocol levels:

- Transparent File Transmission via MOT (with optional MOT Directory compression)
- IP Insertion (Internet Protocol tunneling)
- TDC Transparent Data Channel
- DRM Data Units
- MSC Data Groups
- Synchronous / asynchronous data streams

Versatile data import interfaces and automation features allow for a smooth integration into production environments:

- RSS/Atom import
- Customer-specific XML formats (option)

- Ftp, ftp-mirroring and http-mirroring (automatically scheduled or manually triggered)
- JSON-RPC and XML-RPC
- Web-interface for quick data editing using a standard web browser
- UECP, Funkhaustelegramm, Leitungsprotokoll and ZENON studio interfaces
- Socket interface for real-time data insertion (API + Win/Linux command line tools for data provision by clients)
- Protected connections for secure data import restricted to the predefined data sources: ftps, ftps-mirroring, https-mirroring Incl. support for DRM Enhanced Packet Mode (FEC protection) and protocol standard MOT 2.1.1 (Multimedia Object Transfer) for enhanced file and directory structure transmissions.

Gospell DRM Multiplex Generator

DRM signalling features are supported according to ETSI ES 201 980 (v.4.1.1) including the DRM dynamic reconfiguration feature. Up to 4 PAD (programme associated data) data Service Components can be linked to each DRM Audio Service.

Transmission channel options for DRM30:

- Robustness modes A, B, C, D
- Spectrum occupancy 4.5, 5, 9, 10, 18, 20 kHz
- MSC modes 16 QAM, 64 QAM, and hierarchical (HMmix, HMsym)
- SDC modes 4 QAM and 16 QAM
- Interleaver length 0.4s and 2s
- EEP (equal error protection) and UEP (unequal error protection) with all possible combinations of protection ratios / code rates

Transmission channel options for DRM+:

- Robustness mode E
- Spectrum occupancy 96 kHz (100 kHz nominal)
- MSC modes 4 and 16 QAM
- SDC modes 4 QAM with code rates 0.5 and 0.25
- Interleaver length 0.6s
- EEP and UEP with all possible combinations of protection ratios / code rates

DRM signalling options:

- Service ID
- Service language (short list for scanning and detailed list covering all worldwide languages)
- Service programme type
- Country of origin
- Emergency warnings/alerts
- Current time and date, incl. local time offset and automatic daylight saving time adjustment
- Alternative frequency signalling (AFS) for the whole DRM Multiplex and for individual DRM services (linking to DRM, AM, AMSS, FM, FM-RDS, DAB services)
- Announcements (traffic, news, weather, alarm, user-defined)

- Full Unicode / UTF-8 support (all international characters, ISO 10646) for DRM TextMessages and DRM service labels

Multiplex Signal Management:

- Extended broadcast info (Multiplex configuration, SDC layout)
- Live monitoring of the DRM Multiplex Generator output signal through the web interface, as a receiver would decode and present the data (DRM Text Messages, Journaline, Slideshow); incl. transmission statistics
- Recording of the DRM Multiplex Generator output signal (as MDI) and file-download through the web interface; the duration can be pre-defined

Advanced System Features

Redundancy Group Feature:

- Connects two or more ContentServers to one Redundancy Group
- Full failover – each group member independently generates frame-synchronous and co-timed MDI
- Group-wide synchronized dynamic reconfigurations
- Single user interface – automatic internal replication of broadcast configurations, schedules, and uploaded broadcast content
- Mutual system health and availability checks among members
- Audio Cross-Redundancy: the encoded audio stream from another Redundancy Group member replaces a failing/missing audio source

EWF – Emergency Warning Functionality:

- Full support of EWF for immediate mass-notification of listeners via DRM in cases of pending disasters: emergency audio programme audio, Journaline for detailed multilingual text instructions and geo-region definition, alarm announcement, AFS signalling, dynamic reconfigurations

Automatic broadcast configuration scheduling:

- Global broadcast calendar
- Multiple weekly calendars
- Manual, SNMP triggered, URL triggered, JSON/XML-RPC triggered or pre-scheduled broadcast activation / reconfiguration

Sound system configuration:

- Live audio level monitoring
- Live audio playback via web browser
- Audio amplification setup
- Continuous and configurable clipping and silence detection for all audio input signals
- Opt'l mp3 normalization on import

Powerful security features:

- Professional firewall to separate the potentially public content contribution from the protected system administration and DRM Multiplex distribution to DRM transmitters

- Secured connections for system administration and data contribution access

Continuous system self-monitoring & status reports:

- System status signalling via e-mail report system, local console and SNMP
- Detailed system status information via HTML web interface
- Web interface access to detailed log files for inspection and download
- System configuration backup and restore mechanism (remote / local)
- Monitoring of attached uninterruptible power supplies (UPS)

Contribution Network Monitoring:

- Short- and long-term statistics of incoming and outgoing data streams
- Covers MDI output & external audio
- Encoders Validity checks and comparisons for redundant input/output streams

Infrastructure and Setup

The Gospell DRM ContentServer is typically deployed as a highly reliable and redundant 24/7 server hardware system.

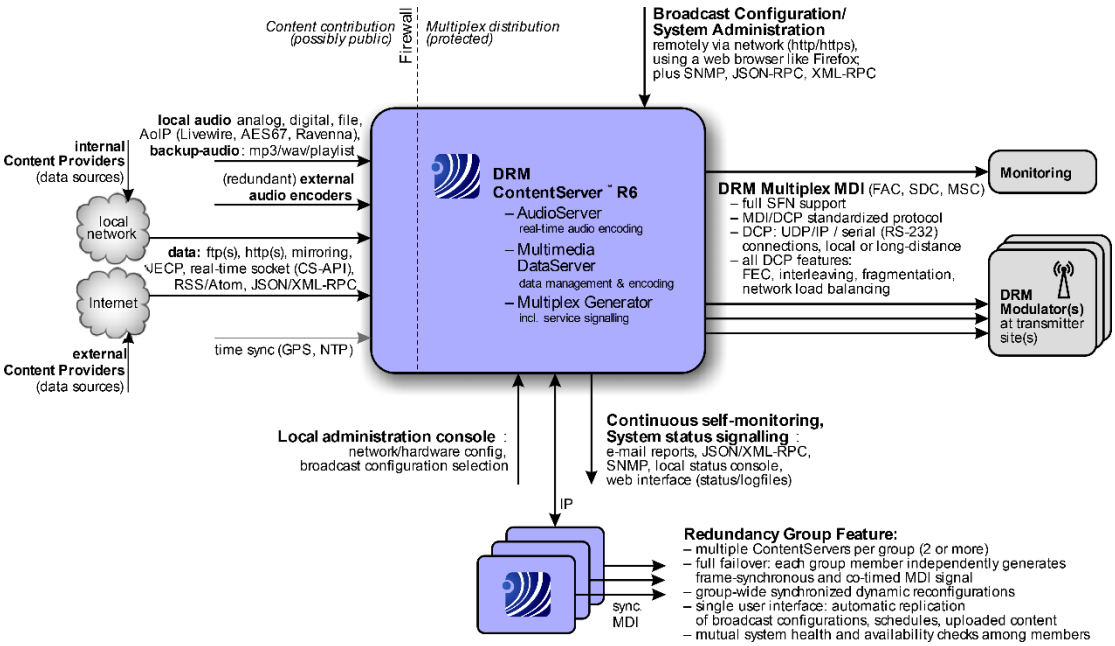
Administration, system configuration and data provision are based on Ethernet network or modem dial-in connections for a completely remote operation. A detailed user management (incl. LDAP integration) is provided to control system access and data contribution sources.

The strong firewall functionality guards access to the system. The Professional Firewall option enables the configuration of multiple network cards, VLAN, multi-homing, and port bonding.

In addition a local console display is supported to locally activate configurations, to monitor the system status and to setup the basic hardware parameters (such as network settings).

If the MDI/DCP output signal of the DRM ContentServer shall be fed simultaneously to a virtually unlimited number of DRM Modulators/transmitters operating in SFN mode (single frequency networking), the system must be time-synchronized. Supported synchronization methods are direct GPS receiver input via serial line (see list of supported models), or NTP access (network timing protocol) via IP network.

Block Diagram



Editions

Each product line of the Gospell DRM ContentServer R6 is available in 4 Editions for regular broadcasting: Compact, Basic, Standard and Professional.
The Developer Edition enables receiver and broadcast equipment development and testing.

All Editions share all basic DRM functionalities, but each Edition provides a different level of enhanced system functionality as a starting point to accomplish typical user scenarios.

All Editions can be extended easily with additional features at any time after the initial purchase.

Compact Edition
A carefully-devised selection of essential DRM functionalities to support an initial exploration of the DRM broadcasting world.

Basic Edition
The perfect starter kit for smaller broadcasters or for installation as a backup-encoder at the transmitter site (accompanying a DRM Modulator), with the option of future extension to satisfy new requirements.

Standard Edition
Combines the most important DRM features (such as AFS) and functionality (like broadcast scheduling) for easy integration into a studio or playout center environment.

Professional Edition
Extends the Standard Edition by adding professional automation features, and provides the full range of broadcaster-specific data transmissions as well as standardized multimedia applications.

Developer Edition
The Developer Edition is available to support the quick and efficient development and testing of DRM receivers and broadcast equipment. It makes the complete functionality of the DRM system with regards to signalling and transmittable content available for laboratory use (including dynamic reconfigurations), enabling a close to 100% test coverage. A full broadcast chain with RF output can be set up quickly and easily in combination with a DRM Modulator.

Available options	Edition (option package) Compact	Basic	Standard	Professional	Developer
General System Features					
Firewall Basic	-	✓	×	×	×
Firewall Professional (config. of multiple network cards, VLAN, multi-homing, network port bonding)	-	-	✓	✓	×
Support for serial devices (GPS, modem, …)	-	✓	✓	✓	-
Automatic leap second handling	✓	✓	✓	✓	✓
System checks (continuous self-monitoring)	-	✓	✓	✓	×
System config backup (at console)	✓	✓	✓	✓	✓
System configuration remote up-/download	-	-	-	✓	×
E-mail reports (admin & Content Providers)	-	✓	✓	✓	×
SNMP interface	-	-	✓	✓	×
Security Summary (network conf. overview)	-	-	-	✓	×
Remote System Update (via web GUI)	-	-	✓	✓	×
Redundancy Group Feature	-	-	-	✓	×
Audio Cross-Redundancy (requ. Red. Grp.)	-	-	-	✓	×
DCP in/out monitoring (network analyzer)	-	-	-	-	-
DRM Multiplex Generator & Management					
Unlimited simultaneous DRM Multiplex configuration definitions	-	✓	✓	✓	✓
SFN Timing Support (Single Frequency Network)	-	-	✓	✓	✓
AFS – Alternative Frequency Editor	-	-	✓	✓	✓
Broadcast Scheduler (weekly/calendar)	-	-	✓	✓	-
Announcement support (via UECP, Funkhaustelegramm, Leitungsprotokoll, HTML interface, [JSON/XML-RPC])	-	-	-	✓	✓
Multiplexer output live monitoring (Text Messages, Journaline, Slideshow decoding)	-	-	-	✓	✓
Multiplex MDI recording	-	-	-	✓	✓
Extended broadcast info (detailed SDC structure and layout)	-	-	-	✓	✓
Support for external audio encoders *	-	-	-	✓	×
Upload of AFS information from external sources	-	-	-	✓	×
Support for 4x PAD with Audio Services	-	-	✓	✓	✓
DRM+ (Robustness Mode E) option (for DRM30 product line only)	×	×	-	-	✓
DRM AudioServer(1)					
Audio input live analog and/or digital	✓	✓	✓	✓	×
Audio-over-IP input: Livewire and AES67	✓	✓	✓	✓	×
Audio file source: mp3, wav, playlist	-	✓	✓	✓	✓
Backup/Standby Audio Source	-	-	✓	✓	×
Silence/clipping detection and configuration	-	-	✓	✓	-
Audio input signal amplification/ mp3 normalization	-	-	✓	✓	-
xHE-AAC / AAC encoders [max. 4]	1	1	1	2	1
MPEG Surround option incl. SX Pro	-	✓	✓	✓	✓
DRM Multimedia DataServer					
Data Application Types					
DRM TextMessages	✓	✓	✓	✓	✓
Journaline®	✓	✓	✓	✓	✓
SPI / EPG – Electronic Programme Guide	-	-	-	✓	✓
MOT Slideshow	-	-	-	✓	✓
MOT Broadcast Website/ Transparent File Transmission	-	-	-	✓	✓
TPEG Traffic Information	-	-	-	✓	✓
TMC – Traffic Message Channel	-	-	-	✓	✓
PRBS Generator (sync/async)	-	-	-	✓	✓
IP Insertion	-	-	-	✓	✓
TDC – raw data on various protocol levels	-	-	-	✓	✓

Available options	Edition (option package) Compact	Basic	Standard	Professional	Developer
Support for multiple transmission priority classes	-	-	-	✓	✓
Data Import Methods					
Import via HTML interface (web GUI)	✓	✓	✓	✓	✓
Import via file FTP upload	-	✓	✓	✓	✓
Import from existing RSS/Atom sources (Journaline®)	-	✓	✓	✓	✓
Import from existing RSS/Atom sources (TextMessages)	-	-	✓	✓	-
Import via JSON-RPC, XML-RPC	-	-	✓	✓	-
Import via live socket connection (API)	-	-	✓	✓	✓
Import via HTTP/FTP mirroring	-	-	✓	✓	-
Import from Funkhaustelegramm, UECP, Zenon, Leitungsprotokoll (TextMessages + Journaline®)	-	-	✓	✓	-
Automatic Scheduled Mirroring option	-	-	✓	✓	-
Secure data import connections	-	-	-	✓	×

(1) DRM AudioServer options are available when at least one (internal) audio encoder license is activated for the system

*) Under development – as soon as option is available in a system update, it will automatically be active for the indicated Editions.

Symbols:		
	✓	Option is included in the package
	-	Option is not included but can be added to the package
	×	Option cannot be combined with the package

Hardware Specification

Platform

- Industrial server, reliable 24/7 operation
- Intel XEON quad core processor
- IPMI 2.0 compliant

Connectivity

- 2 x 1Gb Ethernet
- 1 x analog or digital audio input

Mechanical and environmental specifications

- Chassis dimensions: 434 mm x 42.8 x 625 mm
- 1U rack mount chassis
- Storage temperature: – 40°C to 65°C
- Operation temperature: 10°C to 35°C
- Humidity: 10% to 80%
- EMC EMISSIONS CLASS: A

Electrical specifications

- 100–240 V AC, 50/60 Hz, 350W

Optional features

- Up to 4x Analog audio input
- Up to 4x Digital audio input
- RAID
- Hot-swap front access hard drives
- Hot plug 1+1 redundant power supplies

Remarks

Software Maintenance Options

Every ContentServer license listed above **includes 24 months of free SUS – Software Update Support.**
After this period, the software maintenance can easily be continued on an annual basis.

If Software Update Support shall be enabled for a system that is not currently covered, please contact us for an individual quotation.

Spare System License (Redundancy)

A spare system is a fully functional Gospell DRM ContentServer standby system for backup purposes, typically operated as part of a Redundancy Group with a regular system.
The spare system may be used to replace any standard system licensed to the same company.
Depending on the backup philosophy of the company, one spare system may be sufficient to cover multiple standard systems.

The following license restrictions apply:

- Spare system licenses are not supported for the Developer Edition.
- The spare system must not be operated except as a replacement for a regularly licensed standard system. It must not be operated by another company than the one owning the standard system's license.
- The replaced standard system must be non-functional during the time of the replacement (e.g. hardware failure). It is not sufficient to just manually or temporarily switch off a standard system.
- The spare system must not be sold or lent to any third party.

Spare System License (Redundancy)

- The 'Editions' table only mentions those features that are different among the available Editions.
  The standard features shared between all Editions of the Gospell DRM ContentServer are contained in the general product description above ('Feature List').

- All Editions can be installed on suitable server system.
  A list of required and recommended hardware components is available upon request.

- All Editions can easily be extended by additional options (features).
- Special license restrictions apply to the Developer Edition:
  - The system is licensed for development purposes only.
  - The system must not be used for regular or commercial broadcasts on air.
  - The system must not be sold or lent to any third party.

- Customer training on the Gospell DRM ContentServer, on Digital Radio Mondiale and Multimedia Services is available upon request.