The Video Delivery System

*Hitachi VOD Server*

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**HTTP Server**
- HTTP Streaming Server System

**RTP Server**
- RTP Streaming Server System

**Creator**
- Contents Creation Assistance System

**Meta Server**
- Meta File Creation/Delivery System

**CAS/DRM**
- Digital Content Rights Management System
HTTP Server Features:

- **HTTP Streaming and Download**
  - Delivers contents to IPTV terminal via HTTP. (complies with VOD HTTP Streaming/Download)
  - Supports H.264/AVC in addition to MPEG-2 for Video format. (TS & TTS(*1))
  - Supports DRM “Marlin IPTV-ES”(*2) which is the standard to protect Digital Content Rights. (Optional)

- **High Quality Video Play-back Function**
  - Implements GOP(*3) boundary aware Delivery Control System which enables smooth switch of video on IPTV terminal.
  - Monitors TS packet loss and status to enable high quality contents play-back.

- **Illegal access protection**
  - One-Time URL certification function blocks illegal/unauthorized access to the contents.

- **Large-scale Delivery service**
  - Prevents access congestion by automatically selecting appropriate storage according to the traffic status and requests from IPTV terminals.
  - Delivers contents ever efficiently by optimizing the size of reading data and read cycle of storage.
  - Prevents a particular server from over-load (access and bandwidth) by setting thresholds for CPU usage, network rate, and the number of concurrent sessions.

- **Upper limit settings of delivery rate**
  - Upper limit settings of delivery rate for each NIC enables your service to avoid delay of delivery and system down.

- **GUI Interface**
  - Intuitive GUI allows administrator to register content and monitor system status simply & easily.

- **Contents registration interface**
  - Has interface (CSV file format) to integrate with third party systems for contents registration. (besides GUI)

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(*2) Marlin IPTV-ES: Technical Standard to protect Digital Content Rights which technical specification is formulated by the Marlin Developer Community.
(*3) GOP: (Group of Picture) Grouped video data that is compressed or played back in MPEG-2 format.
### Sample configuration

**HTTP Server**

- **Registration Management Server**: Registers and manages content information (e.g., lifetime and expiry of a content) on Contents Information DB.
- **Delivery Server**: Delivers contents to clients via HTTP.
- **Contents Creation Assistance (Optional)**: Automatically generates "double-speed play-back/rewind content) from a source MPEG-2 or H.264/AVC TS files (e.g., scale x2, x4, x8...)
- **Marlin based CAS/DRM System (Optional)**: Generates and distributes licenses to IPTV terminals.

### Specifications

#### Hardware requirements

<table>
<thead>
<tr>
<th></th>
<th>Registration Management server</th>
<th>Delivery server</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>More than Xeon 3.0GHz × 2</td>
<td>More than Xeon 3.0GHz × 2</td>
<td>—</td>
</tr>
<tr>
<td>Memory</td>
<td>More than 4GByte</td>
<td>More than 4GByte</td>
<td>Cache2GByte</td>
</tr>
<tr>
<td>HDD</td>
<td>More than 100GByte</td>
<td>More than 100GByte</td>
<td>860GByte: FC (RAID5) (200hours/10Mbps)</td>
</tr>
</tbody>
</table>

※Storage capacity depends on video quality, amount, duration and retention period of contents.

#### OS and DBMS requirements

<table>
<thead>
<tr>
<th></th>
<th>Registration Management server</th>
<th>Delivery server</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Windows Server 2008</td>
<td>Windows Server 2008</td>
<td>—</td>
</tr>
<tr>
<td>DBMS</td>
<td>SQL Server 2008</td>
<td>SQL Server 2008</td>
<td>—</td>
</tr>
</tbody>
</table>

#### Software specifications

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<thead>
<tr>
<th></th>
<th>Content</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sessions for contents delivery</td>
<td>max. 1,000 [/server]</td>
<td>—</td>
</tr>
<tr>
<td>Number of registered contents</td>
<td>max. 20,000 titles</td>
<td>—</td>
</tr>
<tr>
<td>Network bit-rate for HTTP</td>
<td>max. 5,000 Mbps [/server]</td>
<td>HTTP streaming with 10Gbps NIC</td>
</tr>
<tr>
<td>Video format</td>
<td>MPEG-2 TS, TTS, H.264/AVC TS, TTS</td>
<td>—</td>
</tr>
<tr>
<td>IP protocol</td>
<td>IPv4 / IPv6</td>
<td>—</td>
</tr>
</tbody>
</table>
**RTP Server**

**RTP Streaming Server System**

**RTP Server Features:**

- **Supports RTP/RTSP Streaming**
  - Delivers contents to IPTV terminals via RTSP/RTP streaming.
  - Supports H.264/AVC in addition to MPEG-2 for Video format. (TS & TTS(*1))
  - Supports DRM “Marlin IPTV-ES”(*2) which is the standard to protect Digital Content Rights. (Optional)

- **High Quality Video Play-back Function**
  - Implements GOP(*3) boundary aware Delivery Control System which enables smooth switch of video on IPTV terminal.
  - FEC(*4) (ProMPEG method) corrects packet-deficit and enables quality and stable contents play-back at IPTV terminals.
  - Monitors TS packet loss and status to enable high quality contents play-back.

- **Illegal access protection**
  - One-Time URL certification function blocks illegal/unauthorized access to the contents.

- **Large-scale Delivery service**
  - Prevents access congestion by automatically selecting appropriate storage according to the traffic status and requests from IPTV terminals.
  - Delivers contents ever efficiently by optimizing the size of reading data and read cycle of storage.
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- **Upper limit settings of delivery rate**
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- **GUI Interface**
  - Intuitive GUI allows administrator to register content and monitor system status simply & easily.

- **Contents registration interface**
  - Has interface (CSV file format) to integrate with third party systems for contents registration. (besides GUI)

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(*2)Marlin IPTV-ES: Technical Standard to protect Digital Content Rights which technical specification is formulated by the Marlin Developer Community.
(*3)GOP (Group of Picture): Grouped video data that is compressed or played back in MPEG2 format.
(*4)FEC (Forward Error Correction): The method which correct packet-deficit on Network.
Sample configuration

**Registration Management Function:** Registers and manages content information (e.g., lifetime and expiry of a content) on Contents Information DB.

**RTSP Server (VOD Delivery Control):** Controls RTP server (Delivery Control) on request from IPTV terminals.

**RTSP Server (Delivery Contents):** Delivers contents registered in storage according to an instruction from Delivery Control.

**Contents Creation Assistance (Optional):** Automatically generates "double-speed play-back/rewind content) from a source MPEG-2 or H.264/AVC TS files. (e.g., scale x2,x4,x8...)

**Marlin based CAS/DRM System (Optional):** Generates and distributes licenses to IPTV terminals.

### Specifications

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<tr>
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<th>Registration Management server</th>
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<th>Storage</th>
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<tr>
<td>CPU</td>
<td>More than Xeon 3.0GHz × 2</td>
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<td>—</td>
</tr>
<tr>
<td>Memory</td>
<td>More than 4GByte</td>
<td>More than 4GByte</td>
<td>Cache2GByte</td>
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※ Storage capacity depends on video quality, amount, duration, and retention period of contents.

#### OS and DBMS requirements

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<th>Registration Management server</th>
<th>Delivery server</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Windows Server 2008</td>
<td>Red Hat Enterprise Linux 5</td>
<td>—</td>
</tr>
<tr>
<td>DBMS</td>
<td>Oracle 11g</td>
<td>Oracle 11g</td>
<td>—</td>
</tr>
</tbody>
</table>

※GUI program works on Windows 2008 Server.

#### Software specifications

<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sessions for RTSP</td>
<td>max. 1,000 [/server]</td>
<td>—</td>
</tr>
<tr>
<td>Number in which registered contents is managed</td>
<td>max. 20,000 titles</td>
<td>—</td>
</tr>
<tr>
<td>Network bit-rate for RTP</td>
<td>max. 700 Mbps [/server]</td>
<td>RTP streaming with 1Gbps NIC</td>
</tr>
<tr>
<td>Video format</td>
<td>MPEG-2 TS, TTS, H.264/AVC TS, TTS</td>
<td>—</td>
</tr>
<tr>
<td>IP protocol</td>
<td>IPv4 / IPv6</td>
<td></td>
</tr>
</tbody>
</table>
Creator

Contents Creation Assistance System

Creator Features:

❖ Converts encoded contents into deliverable contents for IPTV
  ■ Contents creation assistance program converts encoded contents into deliverable contents for IPTV terminals.
  ■ Supports H.264/AVC in addition to MPEG-2 for Video format. (TS & TTS(*1))

❖ Corrects transmission delay in Network
  ■ Generates contents file with time-stamp which allows intelligent IPTV terminal to control play-back timing and correct transmission delay in network.

❖ Smooth and High-quality Trick Play
  ■ Generates multiple-speed contents (besides MPEG-2 speed,H.264/AVC) for smooth and high-quality trick play including fast-forwarding, rewinding, pause and cueing, etc. in IPTV.

❖ Safe Delivery Contents (optional)
  ■ Encrypts contents to prevent illegal play-back and falsification.
  ■ Complies with DRM “Marlin IPTV-ES”(*2) which is the standard to protect Digital Content Rights.

❖ GUI Interface
  ■ Intuitive GUI allows administrator to create content simply & easily.

❖ Contents creation interface
  ■ Has interface (CSV file format) to integrate with third party system for contents creation. (besides GUI)

(*2)Marlin IPTV-ES: Technical Standard to protect Digital Content Rights which technical specification is formulated by the Marlin Developer Community.
Sample Configuration

Contents Delivery system

Content provider

Contents Creation Management Server

Content Creation management function

Content Creation Terminal Server

Content creation function

Storage for content

Streaming Server System

(HTTP Server) (RTP Server)

Delivery Server

Delivery function

Registration Management Server

Registration management function

CAS/DRM System

(Marlin based)

Network

IPTV

Contents Key

Contents Creation Management Server: Controls the flow of contents creation, based on registration parameters described in CSV file or GUI input.

Contents Creation Terminal Server: Generates multiple-speed contents automatically source from MPEG-2 or H.264/AVC TS files according to the instruction from the Content Creation Management Server.

Streaming Server System (option): Delivers contents to IPTV terminals via HTTP or RTP.

Marlin based CAS/DRM System (option): Generates and distributes the licenses to IPTV terminals.

Specifications

Hardware requirements

<table>
<thead>
<tr>
<th></th>
<th>Contents Creation Management server</th>
<th>Contents Creation Terminal server</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>More than Xeon 3.0GHz × 2</td>
<td>More than Xeon 3.0GHz × 2</td>
<td>—</td>
</tr>
<tr>
<td>Memory</td>
<td>More than 4GByte</td>
<td>More than 4GByte</td>
<td>—</td>
</tr>
<tr>
<td>HDD</td>
<td>More than 100GByte</td>
<td>More than 100GByte</td>
<td>—</td>
</tr>
</tbody>
</table>

OS and DBMS requirements

<table>
<thead>
<tr>
<th></th>
<th>Contents Creation Management server</th>
<th>Contents Creation Terminal server</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Windows Server 2008</td>
<td>Windows Server 2008</td>
<td>—</td>
</tr>
<tr>
<td>Middleware</td>
<td>—</td>
<td>—</td>
<td>—</td>
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</table>

Software specifications

<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Note</th>
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<tbody>
<tr>
<td>Number of sessions for creation terminal server</td>
<td>3 servers</td>
<td>Standard license</td>
</tr>
<tr>
<td>multiple-speed contents</td>
<td>normal speed, 5 time speed, 10 time speed, -5 time speed, -10 time speed,</td>
<td>When four types or more contents are produced at the same time, an additional license is needed.</td>
</tr>
<tr>
<td>Output format</td>
<td>MPEG-2 TS, TTS, H.264/AVC TS, TTS</td>
<td>—</td>
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<tr>
<td>IP protocol</td>
<td>IPv4 / IPv6</td>
<td>—</td>
</tr>
<tr>
<td>Others</td>
<td>Encryption library</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Meta Server Features:

- **Generates and delivers meta file for contents playback**
  - IPTV terminals need information to play-back contents, such as content URL and license URL including encoding key for encrypted contents.
  - Generates and delivers XML based meta file. (*1)
  - Reduce workload for the delivery of the information such as contents URL, license URL and etc to IPTV terminals.

- **Supports HTTP and RTP protocol**
  - Generates a meta file for contents delivery system through HTTP and RTP protocol.

- **Support for service using encrypted contents**
  - Supports service using encrypted contents by setting license related information in the meta file.

- **Cooperation with Hitachi VOD Server series**
  - Meta data is automatically generated by cooperation with Hitachi VOD Server series.
  - Without load-balancing system, it selects appropriate HTTP delivery server. (Hitach VOD Server/HTTP Server) based on work-load information such as CPU usage rate, the number of sessions etc. (Load balance function)
  - Generates and provides One-Time URL to block illegal/unauthorized access to the contents.

- **GUI Interface**
  - Intuitive GUI allows administrator to generate meta files simply & easily.

- **Meta file generation interfaces**
  - Has interface (CSV file format) to integrate with third party systems for Meta file generation. (besides GUI)

(*1)meta file: Format of the file complies with specification in Japan.
Specifications

Hardware requirement

<table>
<thead>
<tr>
<th></th>
<th>Meta file Creation Server</th>
<th>Meta file Delivery Server</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Xeon 3.0GHz × 2</td>
<td>Xeon 3.0GHz × 2</td>
<td>—</td>
</tr>
<tr>
<td>Memory</td>
<td>4GByte</td>
<td>4GByte</td>
<td>—</td>
</tr>
<tr>
<td>HDD</td>
<td>100GByte</td>
<td>100GByte</td>
<td>—</td>
</tr>
</tbody>
</table>

OS and DBMS requirement

<table>
<thead>
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<th></th>
<th>Meta file Creation Server</th>
<th>Meta file Delivery Server</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Windows Server 2008</td>
<td>Windows Server 2008</td>
<td>—</td>
</tr>
<tr>
<td>DBMS</td>
<td>—</td>
<td>SQL Server 2008</td>
<td>—</td>
</tr>
</tbody>
</table>

Software specifications

<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support service</td>
<td>HTTP(Streaming/Download)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>RTSP/RTP(Streaming)</td>
<td>—</td>
</tr>
<tr>
<td>Network</td>
<td>IPv4 / IPv6</td>
<td>—</td>
</tr>
</tbody>
</table>

Meta file Creation Server: Generates a meta file based on input parameters from GUI or CSV.

Meta file Delivery Server: Delivers a meta file generated by Meta file Creation Server to IPTV on request from IPTV.

Contents Creation Assistance (Optional): Generates double speed Play-back content from source MPEG-2 or H.264/AVC TS files. (e.g., scale x2, x4, x8…)

Streaming Server System (optional): Delivers Contents on request from IPTV terminals.

CAS/DRM System (Marlin based)(option): Generates and delivers to IPTV the licenses compliant to Marlin IPTV-ES.
CAS/DRM Features:

- **CAS/DRM software compliant to Marlin technical spec**
  - Generates and distributes license compliant to Marlin IPTV-ES(*1) on request from IPTV terminals.

- **Supports various contents delivery services**
  - Supports various type of delivery service such as VOD, Live VOD, IP multicast, video downloading, etc.

- **Offers encryption for various contents delivery services**
  - Encrypts contents delivered under various type of delivery service such as IP multicast or digital TV service in real-time.
  - Encrypts contents for VOD service.
  - Delivers scramble function and real-time encryption function as program library so that encrypted functions can be integrated into other systems.

- **Consolidated license management for various contents delivery services**
  - Controls scramble function, encryption function and real-time encryption function through the key management server and enables consolidated management of licenses of each service.
  - Each service can share license delivery server which is more efficient use of server resources.

(*1)Marlin IPTV-ES: Technical Standard to protect Digital Content Rights which technical specification is formulated by the Marlin Developer Community.

(*2)ECM (Entitlement Control Message): Information of use to release scramble. This is provided by Marlin IPTV-ES.
Sample Configuration

- **Key Management Server**: Manages and generates content key and work key.
- **License Delivery Server**: License is generated and distributed on request from IPTV terminal.
- **Scramble Function**(*3): Encrypts content for IP multicast service.
- **Encrypt Function**(*3): Encrypts content for VOD/downloading service.
- **Streaming Server System**(*4): Delivers contents on request from IPTV client.
- **Contents Creation Assistance System (Option)**: Generates double speed Play-back content from source MPEG-2 or H.264/AVC TS files. (e.g. scale x2,x4,x8...)

**Specifications**

- **Hardware requirements**
  - **CPU**: License Delivery Server - More than Quadcore Xeon 2.33GHz, Key Management Server - More than Dualcore Xeon 3.0GHz, Real-time Encrypt Server - More than Quadcore Xeon 2.33GHz
  - **memory**: License Delivery Server - More than 4GByte, Key Management Server - More than 4GByte, Real-time Encrypt Server - More than 4GByte
  - **HDD**: License Delivery Server - More than 40GByte, Key Management Server - More than 40GByte, Real-time Encrypt Server - More than 40GByte

- **OS and DBMS requirements**
  - **OS**: License Delivery Server - Red Hat Enterprise Linux 5, Key Management Server - Red Hat Enterprise Linux 5, DBMS - Oracle 11g or PostgreSQL
  - **DBMS**: License Delivery Server - Oracle 11g or PostgreSQL, Key Management Server - Oracle 11g or PostgreSQL

- **Software specifications**
  - **Digital contents copyright protection method**: Marlin IPTV-ES
  - **Correspondence service**: VOD, Live VOD, Download, IP multicast
  - **IP protocol**: IPv4 / IPv6

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## Correspondence between Hitachi VOD Server and contents delivery service

<table>
<thead>
<tr>
<th>Major functions</th>
<th>Network</th>
<th>VOD</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents Delivery</td>
<td>NGN/CDN</td>
<td>RTP Server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internet</td>
<td></td>
<td>HTTP Server</td>
</tr>
<tr>
<td>Contents Creation Assistance</td>
<td>NGN/CDN</td>
<td></td>
<td>Creator</td>
</tr>
<tr>
<td></td>
<td>Internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meta File Creation/Delivery</td>
<td>NGN/CDN</td>
<td></td>
<td>Meta Server</td>
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<td></td>
<td>Internet</td>
<td></td>
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<tr>
<td>Digital Content Rights Management</td>
<td>NGN/CDN</td>
<td></td>
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</tr>
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<td></td>
<td>Internet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*We can provide IP multicast, retransmission of terrestrial digital broadcasting as a solution with our package.*

## Other examples of contents delivery service

### In company training

![In company training](image1.png)

### Self-learning

![Self-learning](image2.png)

### Promotion

![Promotion](image3.png)

### Facility Guide

![Facility Guide](image4.png)

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- SQL Server is trademark or registered trademark of Microsoft Corporation in U.S.A and other countries.
- Oracle is trademark or registered trademark of Oracle Corporation and its affiliates in U.S.A and other countries.
- Other company name and products name are trademark or registered trademark of each company.

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### Information service

Information on Hitachi VOD Server series is available at the following website:  

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- The content described in this document concerns functions and specifications of product lineup of Hitachi VOD Server series in February, 2012. Functions and specifications are subject to change without notice.