



RVU

Remote User Interface Technology

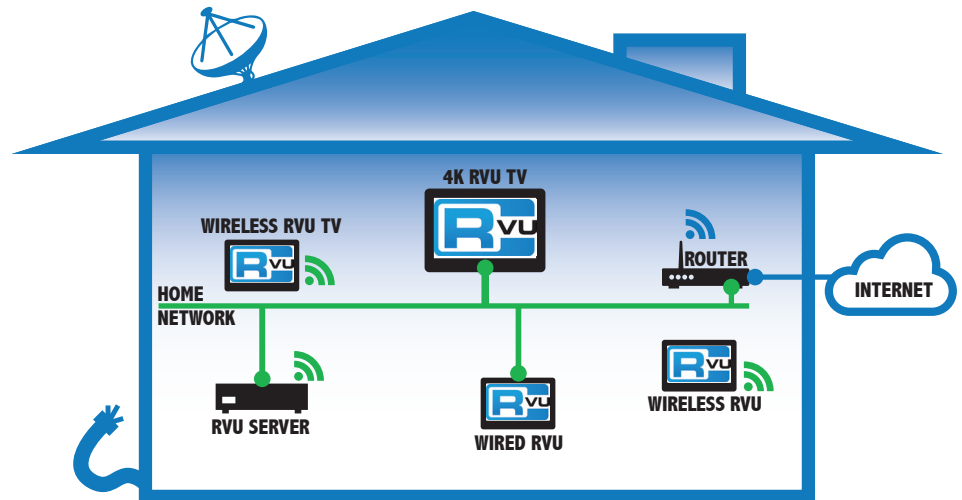
Enabling Whole Home DVR For The Consumer Electronics and Pay TV Industry

Technical Brief

RVU™ is a client/server-based technology that allows the television content viewer to experience a consistent server-generated user interface, providing support for DVR functionality while watching live or recorded programming on various consumer electronics (CE) devices. RVU is the basis of the highly successful DIRECTV™ Genie Whole Home DVR.

The RVU (pronounced “R-View”) protocol uses DLNA® technology as a foundation. RVU-compliant TVs and clients are networked in the home with an RVU server, and once they are connected, the TV viewer can watch live or recorded content on any client in any room. RVU technology offers support for service provider user interfaces that allow a DVR experience at each client, including user interactions such as guide, DVR trick play, interactive applications and Video on Demand content. RVU client technology can be implemented on a variety of CE devices, from basic thin clients to Smart/Connected TVs, gaming platforms and advanced networked devices. RVU is easily expandable and supports new formats like 4K Ultra High Definition now.

The RVU protocol addresses service providers’ needs and users’ expectations for a consistent user interface, enabling DVR experiences on CE devices throughout the home. It is available to CE manufacturers via the publicly available RVU Protocol Specification.



FEATURES OF RVU TECHNOLOGY

- Enables a simple solution for a Whole Home DVR using a single server and standard Consumer Electronics devices.
- Mature specifications developed by leading technology companies.
- Fast development, RVU already supports 4K content delivery.
- Fully independent test and certification path to ensure device interoperability and compliance.

BENEFITS OF RVU TECHNOLOGY

- Accelerates the availability of service provider content throughout the connected home.
- Enables rapid introduction of new features and applications that typically accompany commercial content.
- Increases CE device value add by providing DVR functionality and access to subscriber-based content on compliant standard devices.
- Expandable specification based on open standards providing flexibility and upgradeability for new features.
- Designed to run on existing CE devices with no BOM impact.
- Flexible RVU architecture allows client implementation on multiple devices (TVs, PCs, laptops, tablets, Blu-ray™ players, etc.).

RVU ALLIANCE FOUNDERS





RVU FLEXIBILITY AND FEATURES

- Runs in a lightweight footprint with no Bill of Materials impact on CE devices.
- Utilizes industry-standard protocols such as DLNA and UPNP.
- Maintains the exact look and feel of the User Interface across all devices.
- Provides the full DVR and live TV experience without the need for a set-top box in every room
- Supports advanced video formats such as 4K Ultra High Definition
- Networking technology agnostic, proven on wired and wireless networks
- Supports extensions for advanced UIs and client capabilities, for example 3D.

RVU SPECIFICATIONS — BUILT ON STANDARDS

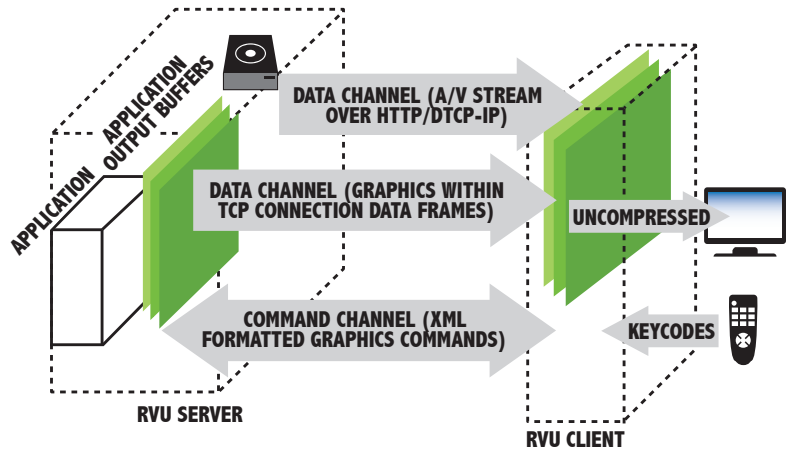
- Device and Service Discovery and Control
 - UPNP SSDP
- Media Management, Distribution, and Control
 - Digital Living Network Alliance® (DLNA®)
 - UPNP
- Content streaming and media format interoperability
 - DLNA AV Transport HTTP
- Digital content protection
 - DTCP-IP link protection
- Remote User Interface
 - Low-overhead remote UI, including remote control commands and status from client devices to the server.

MISSION OF THE RVU ALLIANCE

- To encourage the rapid, broad, and open industry adoption of Remote User Interface (RUI) technology for whole-home television entertainment.

AVAILABILITY OF RVU TECHNICAL SPECIFICATION

Order form/nondisclosure agreement at <http://www.rvualliance.org/specification-availability>



RVU SIGNAL FLOW: Server and Client elements send RUI commands and responses on command channels as XML strings. On data channels, RUI elements send binary or ASCII data, as well as A/V streams, over HTTP/DTCP-IP.

THE RVU ALLIANCE

The RVU Alliance is non-profit organization that maintains and promotes the RVU protocol suite of specifications, associated test tools and certification program. RVU is used by MVPD companies as the communications protocol between a media server and media renderer client devices.

RVU ALLIANCE PROMOTER MEMBERS



RVU ALLIANCE CONTRIBUTORS

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| AwoX | Sandmartin International Holdings Ltd |
| LG Electronics | SHARP Electronics Corporation |
| MStar Semiconductor | Sky Mexico |
| Panasonic Corporation | Sony Corporation |
| Quantenna Communications, Inc. | UNH-IOL |
| Realtek Semiconductor Corp. | Universal Electronics Inc. |
| Red Embedded Consulting | Wistron NeWeb Corporation |

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