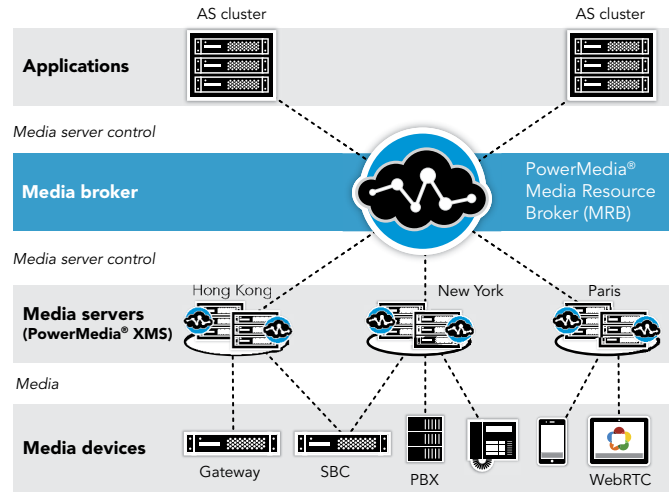


Dialogic® PowerMedia® Media Resource Broker (MRB)

The PowerMedia® Media Resource Broker (MRB), a standards-compliant, software-based Media Resource Broker that allows application developers, service providers and enterprises to dynamically scale and distribute a media server resource pool across disparate applications and datacenters. When used with one or more PowerMedia® XMS media servers, the PowerMedia MRB provides a reliable and resource-efficient software-based media-processing platform for scaling rich media applications such as conferencing, transcoding, and Interactive Voice Response (IVR).

PowerMedia MRB's intelligent load balancing resource allocation features make a clustered pool of media servers appear as a single media server element to the application server. This helps to significantly reduce application complexity while improving application server performance by offloading media load balancing and management functions. High availability, redundancy, and smart failover with call preservation features provide scalability and reliability. Improved resource efficiency, coupled with the flexibility of cloud-ready software deployable in Network Function Virtualization (NFV) environments, translates to low OPEX and CAPEX; and MRB's standards-compliant functionality and media server interfaces promote rapid application integration and system interoperability without sacrificing performance.



PowerMedia® MRB managing in a diverse, highly available network environment

Features	Benefits
Media resource abstraction	Automatic load balancing, resource allocation and re-allocation allow a pool of media servers to appear as a single media server to applications and users, eliminating the need for the application or proprietary load balancers to handle these functions
Rapid application integration	Standards-compliant media server functionality that can be controlled by a multitude of standardized media server interfaces or a simple, yet powerful RESTful API, offering rapid plug-and-play style integration with existing applications for both inbound or outbound calling applications
Increased reliability	High availability, intelligent failover, and stateful call preservation features add local and geographic redundancy options while increasing uptime
Efficient load balancing and resource assignment	Allows for maximal media resource utilization to minimize the media resource CAPEX required
Cloud-ready virtualized software especially suited for Network Function Virtualization (NFV)	Software agility and powerful management interfaces reduce the effort required for operations and maintenance, minimizing OPEX

Standardized Media Resource Broker (MRB) Functionality

Media Resource Brokers (MRBs), including the PowerMedia MRB, are standardized network elements that manage media resource availability and reliability, providing improved utilization and reliability of deployed media resources in the network.

As defined in MRB specifications, these elements perform one or more critical media resource management functions, including:

- Balancing requests from multiple application servers or clusters
- Efficient utilization and allocation of the MRF/Media Server (MS) resource pools
- Providing a monitoring mechanism for media server status and capabilities
- Supporting media control payloads such as MSML

MRBs are formally defined by the IETF in [RFC 6917 – Media Resource Brokering](#). The MRB has also been incorporated in the 3GPP TS 23.218 IP Multimedia System (IMS) architecture as the functional entity responsible for query and management of the Media Resource Function (MRF) in the IMS network.

PowerMedia MRB Benefits

In addition to meeting the functional requirements as specified in the MRB standards referenced above, PowerMedia MRB provides many additional capabilities, including:

- Stateful call preservation
- Intelligent resource control
- MRB high availability
- Local and geographic redundancy
- Broad range of media server interfaces
- Management interfaces
- Software flexibility

Stateful call preservation for seamless reliability

Stateful call preservation importantly minimizes the impact of a media server failover in conferencing applications. PowerMedia MRB provides stateful call preservation so that if a PowerMedia XMS instance should lose power or connectivity, another PowerMedia XMS can quickly take its place with minimal impact to callers.

PowerMedia MRB continually monitors media control state and call script status of all transactions. When the MRB detects a media server outage, it immediately locates another media server and uses the stored state information to reestablish the sessions on a new media server and reconnect all clients within seconds or less. This allows the call to automatically continue without requiring action by or from the application server or users.

Intelligent resource control for resource efficiency

PowerMedia MRB also includes a mechanism to monitor the health and load of PowerMedia XMS media servers in a MRB cluster. This allows the MRB to intelligently load balance traffic to the appropriate media server to pre-emptively avoid overload situations.

PowerMedia MRB is call state aware of all the PowerMedia XMS media servers in its cluster. Leveraging this intelligence, it keeps users in a conference on the same media server and can cascade them across the least loaded media servers in the cluster if the party size starts to reach the limits of original media server's capacity. This happens transparently to the application server, eliminating the need for development of this complex coordination.

High availability configuration for carrier-class reliability

The PowerMedia MRB can be deployed in either standalone or active/standby redundant configuration. In the redundant configuration, the PowerMedia MRB actively checkpoints and replicates call state and session information, providing for no service disruption in case of device or power failure.

Local and geographic redundancy for peak uptime

MRB-controlled media server clustering provides redundancy in case of an individual media server outage. In addition, media servers in an MRB cluster can be geographically distributed -that is, the MRB can distribute load across distinct geographic locations, helping to avoid large-scale outages were an entire datacenter to fail. The PowerMedia MRB can also perform disaster recovery functions, moving calls from one datacenter to another.

Standards-compliant for beneficial interoperability

Dialogic's PowerMedia MRB is compliant with in-line unaware MRB as described in IETF RFC 6917. In-line unaware mode makes the media server cluster appear like a media server to the application server. This means no load balancing capabilities need to be implemented at the application server. PowerMedia MRB performs the critical specified MRB functions, and much more, including:

- Inbound load balancing requests from one or many distinct application servers
- Outbound load balancing across many media servers
- Monitoring the status of all media servers in a cluster
- Supporting common media control payloads and signaling schemes, including MSML, REST, and NETANN

PowerMedia MRB also works in IMS environments to control a pool of Media Resource Function (MRF) resources, as outlined in 3GPP TS 23.218.

Comprehensive media server control interfaces for rapid integration

The PowerMedia MRB supports a wide variety of both traditional telephony and web-oriented media control interfaces. The PowerMedia MRB and PowerMedia XMS media servers can be rapidly integrated into networks with minimal effort - often with little or no modification on the Application Server.

Supported media control interfaces include:

- Media Server Markup Language (MSML)
- RFC 4240 - Basic Network Media Services with SIP (NETANN)
- Java Specification Media Server Control API (JSR 309)
- Web-based Representational State Transfer (RESTful) API

The SIP, MSML, and JSR 309 interfaces are all standards-compliant, meaning they interface seamlessly with application servers that already use these interfaces.

For developers who want more control or to leverage web-oriented mechanisms, Dialogic's PowerMedia XMS RESTful interface has been designed to be fully functional with a minimal learning curve and broad use in nearly any development environment.

Powerful and easy-to-use built in cluster management system

The PowerMedia MRB management offers a web UI to greatly simplify operational tasks associated with configuration and maintenance activities. The MRB's web UI modules manage different aspects of the MRB. Available WebUI management modules include:

- Real-time Service Dashboard
- MRB Configuration, Management, Alarm and Reporting
- Media Server Configuration, Management and Call Statistics
- User Administration
- Logging and Tracing Capabilities

Software-based for maximum flexibility

Like the PowerMedia XMS media server, PowerMedia MRB is 100% software-based and works with popular hypervisors. An entire MRB cluster can be quickly redeployed to another datacenter or scaled up or down as needed within a datacenter without the operational burden of dealing with specialized physical equipment.

PowerMedia MRB is also cloud-ready and suitable for Network Function Virtualization (NFV) environments.

Example Use Case

Media server clustering for large scale transcoding, conferencing, IVR and other applications

Figure 2 illustrates an example of an audio conferencing solution with PowerMedia MRB and PowerMedia XMS for business or social interaction. Users can call into the conferencing solution from any SIP endpoint, softphone, or WebRTC compatible browser or app. In this example, PowerMedia MRB load balances the App Server's audio conference resource request across available media server resources in the cluster to handle high loads.

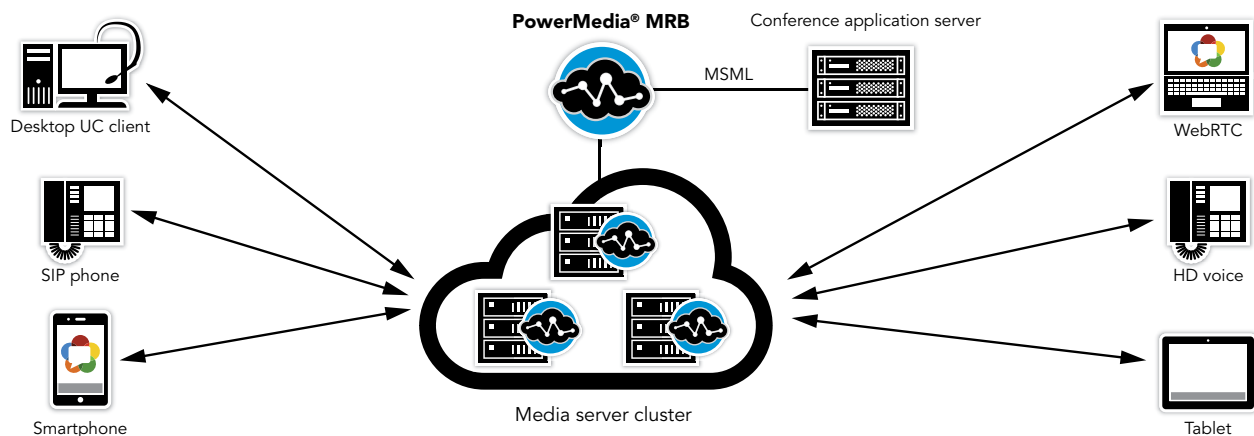


Figure 2 - High-scale audio conference example using a variety of SIP and WebRTC endpoints

Other use cases

Other common MRB use case examples include:

- Media server high availability and call preservation
- Geographic Redundancy and Disaster Recovery
- Network expansion including "cap and grow" deployment strategy

Technical Specifications

Control Protocol and Specification (i.e., standards) Compatibility

IETF RFC 6917
3GPP TS 23.218
GSMA IR.92, IR.94
SIP Global Session Identifier (RFC 7329)

Control interfaces

Media control

MSML (SIP)
REST (inbound and outbound)
JSR 309 (MSML)
NETANN

Security Features

TLS
Inbound overload control
Media pinhole management

Admission Control

License control
Codec-based routing

Traffic Distribution Algorithms

Round Robin
Media Server Availability (Real time-monitoring)
Least loaded
Location aware

QoS and Statistics

Real time call statistics for each managed Media Server:

Identity and location
CPU & memory utilization
Audio and video codec support & licensing
Number of signaling & media sessions

Scalability

Maximum Call Attempts Capacity (Conferencing):	500 sessions per second
Maximum Call Attempts Capacity(IVR):	700 sessions per second
Maximum INVITE sessions:	50,000

Management

Integrated web-based management (https) and real-time dashboard and analytics
SNMP based-alarms
Historical and real-time statistics and reports
Media Server Configuration and Management
Role-based User Management
Configuration Import/Export

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Redundancy

- 1+1 (active/standby) MRB Redundancy
- Lossless call preservation for conference and joined calls
- Local and Geographic Media Server redundancy

Virtualization Support

- VMWare ESXi 5.x and 6.x
- Kernel-based Virtual Machine (KVM)
- Oracle VM
- OpenStack/NFV
- Amazon Web Services (AWS)¹
- Rackspace Cloud Servers¹

Hardware Support and Minimum System Requirements

Hardware: Intel Architecture-based server

Operating System (64-bit OS):	CentOS Release 6.4 (or higher) and 7.x RedHat Enterprise Linux 6.4 (or higher) and 7.x Oracle Enterprise Linux 7.2 with UEKv4 Oracle Enterprise Linux 6.4
Dependency:	Java Runtime Environment (JRE) 1.8 or higher
Processor:	Intel Xeon E5-1620 or greater
Memory:	12 GB RAM minimum
Storage:	60 GB HD minimum
Network Interfaces (Recommended)	Signaling and Media - 2x1 Gigabit Ethernet (1000 Base-T) Management - 1x Gigabit Ethernet (1000 Base-T) High Availability - 1x Gigabit Ethernet (1000 Base-T)

¹ Planned Future Feature

For More Information

For more information about the product discussed in this datasheet, contact your local Dialogic representative. Worldwide contact information is available online at www.dialogic.com/contact.



www.dialogic.com

For a list of Dialogic locations and offices, please visit: <https://www.dialogic.com/contact.aspx>

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