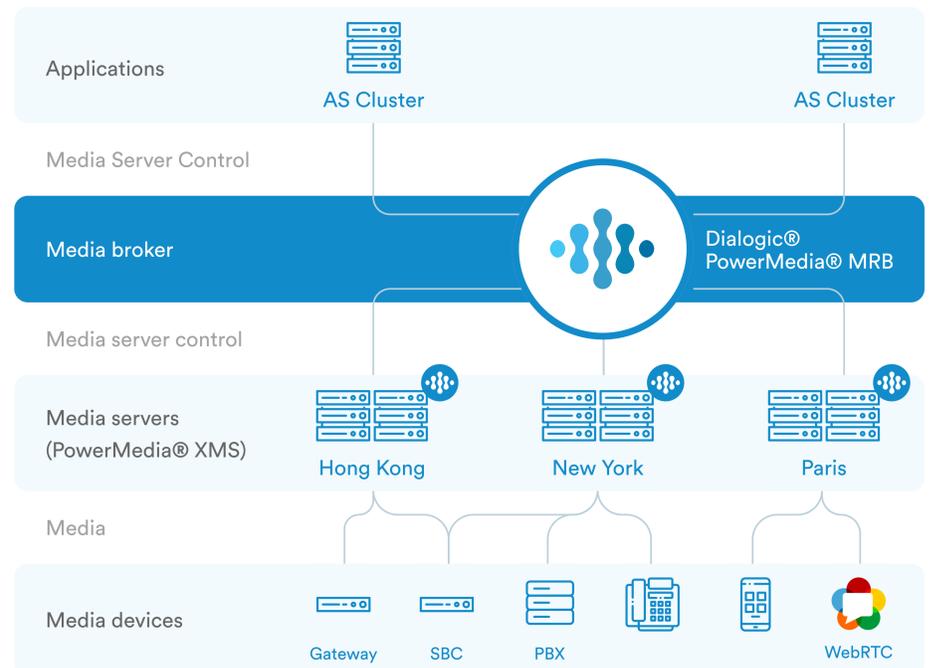


Dialogic® PowerMedia® Media Resource Broker (MRB)

The PowerMedia® Media Resource Broker (MRB) is 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 Dialogic® 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 PowerMedia MRB’s standards-compliant functionality and media server interfaces promote rapid application integration and system interoperability without sacrificing performance.



Dialogic® 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 providing for increased uptime
Efficient load balancing and resource assignment	Allows for maximal media resource utilization to help minimize media resource CAPEX
Cloud-ready virtualized software particularly well-suited for Network Function Virtualization (NFV)	Software agility and powerful management interfaces reduce the effort required for operations and maintenance, helping to minimize 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 defined in the MRB specifications 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 failure in conferencing style applications (including two joined calls). PowerMedia MRB provides stateful call preservation so that if a media server should lose power or connectivity, another media server can quickly take its place with minimal impact to callers.

PowerMedia MRB continually monitors the status of all ongoing calls that are candidates for preservation. When the PowerMedia MRB detects a media server outage, it immediately locates an alternative media server with appropriate resources and uses the stored state information to reestablish the sessions on the 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.

High availability configuration for carrier-class reliability

The PowerMedia MRB component is deployed in an active/standby redundant configuration, actively checkpointing, and replicating call state and session information when appropriate, so as to minimize service disruption in case of device or power failure. A single ingress network point exposed to client application servers allows for rapid detection of failure and for switching to an alternative MRB instance with minimal disruption to service.

Local and geographic media server redundancy for peak uptime

PowerMedia MRB-controlled media server clustering also provides redundancy in case of an individual media server outage. In addition, media servers in a PowerMedia MRB cluster can be geographically distributed -that is, the PowerMedia MRB can distribute load across distinct geographic locations, helping to avoid large-scale outages were an entire datacenter to fail or be starved of capacity to service requests. 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 a media server cluster appear like a single 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 using various harvesting techniques
- 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)
- Web-based Representational State Transfer (RESTful) API

The SIP and MSML interfaces of PowerMedia MRB are 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 is fully functional with a minimal learning curve and broad use in a vast array of development environments.

Example use case

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

The figure below 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.

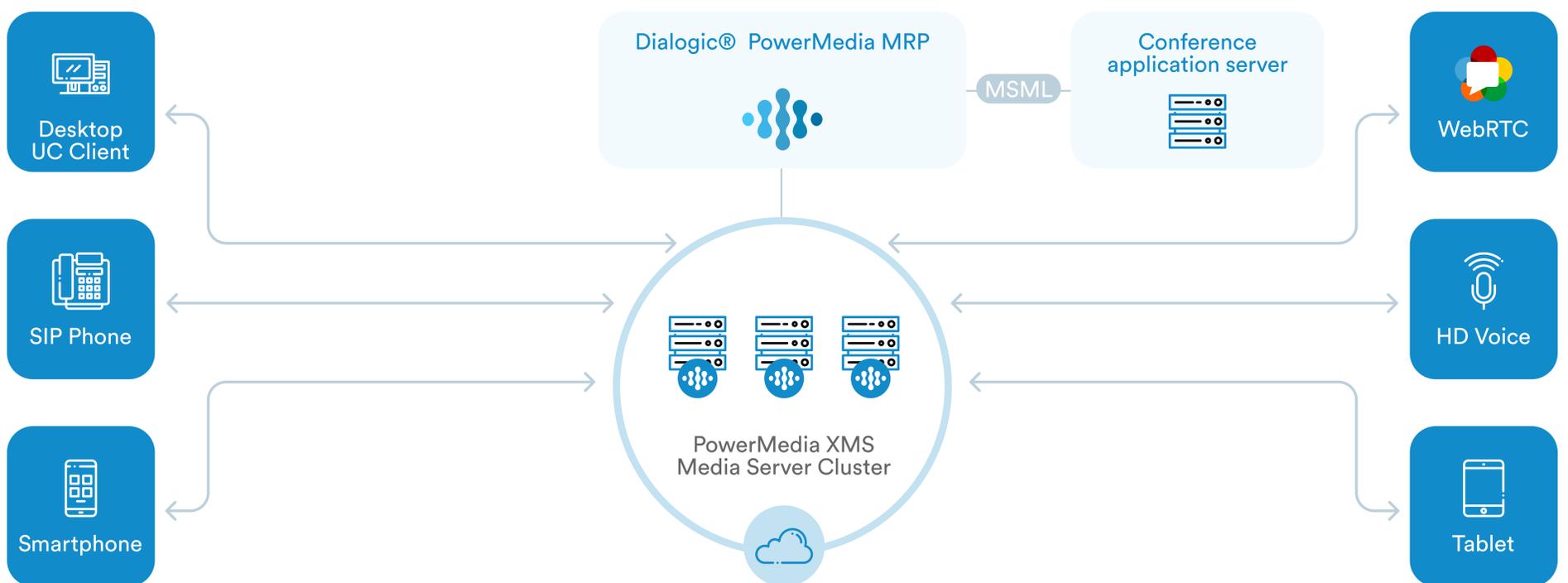


Figure 1 - High-scale audio conference example using a variety of SIP and WebRTC endpoints

Other use cases

Other common PowerMedia 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	<ul style="list-style-type: none"> • IETF RFC 6917 • IETF RFC 6230 • 3GPP TS 23.218 • GSMA IR.92, IR.94 • SIP Global Session Identifier (RFC 7329)
Control interfaces	<p>Media control:</p> <ul style="list-style-type: none"> • MSML (SIP) • REST (inbound and outbound) • NETANN
Security Features	<ul style="list-style-type: none"> • TLS • NAT Signaling and media pinhole traversal
Administration Control	<ul style="list-style-type: none"> • License control • Codec-based routing
Traffic Distribution Algorithms	<ul style="list-style-type: none"> • Round Robin • Media Server Availability (Real time-monitoring) • Least loaded • Location aware • Call steering via SIP header
QoS and Statistics	<p>Real time call statistics for each managed Media Server:</p> <ul style="list-style-type: none"> • Identity and location • CPU and memory utilization • Audio and video codec support and licensing • Number of signaling and media sessions • Consolidated Media Server resource view
Scalability	<p>Maximum Call Attempts Capacity *: 2,000 sessions per second Maximum INVITE sessions: 150,000</p> <p>*dependent on factors such as application scenario and mode of operation</p>
Management	<ul style="list-style-type: none"> • Integrated web-based management (https) and real-time dashboard and analytics • SNMPv2/v3 based-alarms • Historical and real-time statistics and reports • Media Server Configuration and Management • Role-based User Management • Configuration Import/Export

<p>Redundancy</p>	<ul style="list-style-type: none"> • 1+1 (active/standby) MRB Redundancy • Lossless call preservation for conference and joined calls • Local and Geographic Media Server redundancy
<p>Cloud & Virtualization Support</p>	<ul style="list-style-type: none"> • VMWare ESXi 6.x & 7.x • Kernel-based Virtual Machine (KVM) • Oracle VM/Oracle Cloud • Amazon Web Services (AWS) • Google Cloud Platform (GCP) • Microsoft Azure • OpenStack • NFV • Rackspace Cloud Servers
<p>Hardware Support and Minimum System Requirements</p>	<p>Hardware: Intel Architecture-based server</p> <ul style="list-style-type: none"> • Operating System (64-bit OS): <ul style="list-style-type: none"> CentOS Release 7.x RedHat Enterprise Linux 7.x & 8.1 (or later) Rocky Linux 8.1 (or later) Oracle Linux 7.7 & Oracle 8.1 Oracle Linux 8.5 (or later) • Dependency: Java Runtime Environment (JRE) 1.8 or higher • Processor: Intel Xeon E5-1620 or greater • Memory: 8 GB RAM minimum • Storage: 40 GB HD minimum • Network Interfaces (Recommended) <ul style="list-style-type: none"> Signaling - 2x1 Gigabit Ethernet (1000 Base-T) Management - 1x Gigabit Ethernet (1000 Base-T) High Availability - 1x Gigabit Ethernet (1000 Base-T)

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: www.dialogic.com/contact

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