

AES74-2019

STANDARDS AND INFORMATION DOCUMENTS



**AES standard for
audio applications of networks -
Requirements for Media Network
Directories and Directory Services**

Users of this standard are encouraged to determine if they are using the latest printing incorporating all current amendments and editorial corrections. Information on the latest status, edition, and printing of a standard can be found at:
<http://www.aes.org/standards>

AUDIO ENGINEERING SOCIETY, INC.
551 Fifth Avenue, Room 1225, New York, NY 10176. US.



The AES Standards Committee is the organization responsible for the standards program of the Audio Engineering Society. It publishes technical standards, information documents and technical reports. Working groups and task groups with a fully international membership are engaged in writing standards covering fields that include topics of specific relevance to professional audio. Membership of any AES standards working group is open to all individuals who are materially and directly affected by the documents that may be issued under the scope of that working group.

Complete information, including working group scopes and project status is available at <http://www.aes.org/standards>. Enquiries may be addressed to standards@aes.org

The AES Standards Committee is supported in part by those listed below who, as Standards Sustainers, make significant financial contribution to its operation.



THE TELOS ALLIANCE*



audio-technica



CLAIR



WEISS



LAWO



This list is current as of 2019/9/30

AES standard for audio applications of networks - Requirements for Media Network Directories and Directory Services

Published by
Audio Engineering Society, Inc.
Copyright ©2019 by the Audio Engineering Society

Abstract

This document sets forth technical recommendations for media network directories and directory-related services and mechanisms such as network discovery. It is hoped that this document will inform future industry directory and directory services standards that cover at least the following topics:

1. Registration, query, and administration protocols;
2. Security mechanisms;
3. Directory data model;
4. Query language and related semantics; and
5. Scalability strategies.

An AES standard implies a consensus of those directly and materially affected by its scope and provisions and is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an AES standard does not in any respect preclude anyone, whether or not he or she has approved the document, from manufacturing, marketing, purchasing, or using products, processes, or procedures not in agreement with the standard. Prior to approval, all parties were provided opportunities to comment or object to any provision. Attention is drawn to the possibility that some of the elements of this AES standard or information document may be the subject of patent rights. AES shall not be held responsible for identifying any or all such patents. Approval does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the standards document. Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation. This document is subject to periodic review and users are cautioned to obtain the latest edition.

Audio Engineering Society Inc. 551 Fifth Avenue, Room 1225, New York, NY, US.
www.aes.org/standards - standards@aes.org

Contents

0.	Introduction	4
0.1.	General.....	4
0.2.	Document conventions.....	4
1.	Scope	4
2.	Normative references	5
3.	Definitions.....	6
3.1.	Application Program Interface (API).....	6
3.2.	Application network	6
3.3.	Client	6
3.4.	Data network	6
3.5.	Database	6
3.6.	Deregister (entity).....	6
3.7.	Device	6
3.8.	Directory	7
3.9.	Directory access protocol.....	7
3.10.	Directory service.....	7
3.11.	Discovery.....	7
3.12.	Entity	7
3.13.	Entity attribute	7
3.14.	Entity connection data.....	7
3.15.	Entity name	7
3.16.	Entity name resolution.....	7
3.17.	Entity path	7
3.18.	Entity type.....	7
3.19.	Entry	8
3.20.	Media network	8
3.21.	Network service.....	8
3.22.	Persisting query.....	8
3.23.	Query.....	8
3.24.	Query language.....	8
3.25.	Register (entity)	8
3.26.	Server.....	8
3.27.	Simple media network.....	8
3.28.	Subnet	8
3.29.	Subscription.....	8
4.	Functionality	9
4.1.	Registration / deregistration	9
4.2.	Querying.....	9
4.3.	Subscriptions.....	9
4.4.	Persisting queries.....	9
4.5.	Discovery.....	9
4.6.	Representational capability	10
5.	Directory access	10
5.1.	Directory services.....	10
5.2.	Directory access protocols	11
6.	Coexistence of multiple directories	11
7.	Nested directories.....	11
7.1.	Entity path	11

7.2.	Multiple ancestry	11
7.3.	Entity name resolution.....	12
8.	Data network considerations	12
8.1.	Data network type independence.....	12
8.2.	Data network topology independence.....	12
8.3.	Minimal effect on infrastructure	12
8.4.	Shared data networks	13
8.5.	Discoverability	13
9.	Security and access control	13
9.1.	Security	13
9.2.	Access control	13
10.	Scalability	14
10.1.	Performance	14
10.2.	Centralized and distributed implementations	14
11.	Reliability and robustness	15
12.	Ease of use	15
Annex A.	(normative) IP-based directories	16
A.1.	Directory addressing	16
A.2.	Entity addressing.....	16
A.3.	Serverless operation	16
A.4.	Multiple directories in the same network.....	16
A.5.	Directory access protocol agility.....	16
A.6.	SDP media profiles.....	17
Annex B.	Bibliography	18

Foreword

This foreword is not part of this document, AES74, *AES standard for audio applications of networks - requirements for Media Network Directories and Directory Services*.

A media network contains two primary sets of services: (1) a *media transport set*, which is responsible for transporting synchronous media samples, and a (2) *system control set*, which is responsible for the remote control of devices and the control of media transport traffic.

These primary service sets require at least two support services: (a) a *time* service, which allows synchronization of samples between devices, and (b) a *directory*, which allows devices, device services, and media streams to be recorded in a common database that may be queried as required for network operation.

This standard specifies a set of functional requirements for media network directories in professional audio applications in the fields of sound reinforcement, public address, sound recording, electronic music, broadcasting, and cinema. The standard does not address consumer, automotive, or telecommunications applications.

The principal writing group members who contributed to this document were: F. Bergholtz, R. Cabot, J. Berryman, S. Jones, A. Kuzub, M. Lave, G. Linis, S. Price, A. Rosen, S. Scott, G. Shay, M. Smaak, P. Stevens, P. Treleaven, and P. Waddell. Additional contributions were received from the OCA Alliance Technical Committee and SMPTE TC34cs.

J. Berryman led the writing group.

Morten Lave
Chair, working group SC-02-12

2019-10-28

Note on normative language

In AES standards documents, sentences containing the word “shall” are requirements for compliance with the document. Sentences containing the verb “should” are strong suggestions (recommendations). Sentences giving permission use the verb “may”. Sentences expressing a possibility use the verb “can”.

AES standard for Audio applications of networks - Requirements for Media Network Directories and Directory Services

0. Introduction

0.1. General

This document specifies technical requirements for media network directories and directory-related services. It has been compiled from various sources, and the contents have been offered for public comment via a Call for Comment document first circulated by the AES in 2017.

Media network directories are application-layer mechanisms that collect, store and disseminate information about devices, application services, and other elements of media networks. They are used for connection management, network supervision, and other purposes.

0.2. Document conventions

Numerical values are decimal unless otherwise stated.

A `Courier` typeface is used to identify programmatic names to distinguish them from regular text.

Where a term is first introduced in body text, the term will be set in an *italic typeface*.

When references are cited in the text they are [enclosed in brackets].

1. Scope

The requirements given here address the following aspects of media network directories:

This document is a requirements guide. It does not specify implementation design.

- Data model;
- Registration;
- Querying;
- Administration;
- Scalability;
- Security.

The scope of this document excludes directory service implementation architectures, application protocols for accessing the Directory data, and internal mechanisms the services may use to maintain the directory data.

Also excluded is connection management. In this context, "connection management" means the protocols and processes in a media network by which signal flows are set up, monitored, and taken down. Although directories are *used* by connection management, connection management mechanisms themselves are outside this document's scope.

2. Normative references

AES67 *AES67-2015: AES standard for audio applications of networks - High-performance streaming audio-over-IP interoperability*. Audio Engineering Society (AES), 2015.

RFC 1034 *Domain Names - Concepts and Facilities*. Internet Engineering Task Force (IETF), 1987.

RFC 1035 *Domain Names - Implementation and Specification*. Internet Engineering Task Force (IETF), 1987.

RFC 2131 *Dynamic Host Configuration Protocol*. Internet Engineering Task Force (IETF), 1997.

RFC 2606 *Reserved Top Level DNS Names*. Internet Engineering Task Force (IETF), 1999.

RFC 2782 *A DNS RR for specifying the location of services (DNS SRV)*. Internet Engineering Task Force (IETF), 2000.

RFC 2818 *HTTP Over TLS*. Internet Engineering Task Force (IETF), 2000.

RFC 3986 *Uniform Resource Identifier (URI): Generic Syntax*. Internet Engineering Task Force (IETF), 2005

RFC 4566 *SDP: Session Description Protocol*. Internet Engineering Task Force (IETF), 2006

RFC 6455 *The WebSocket Protocol*. Internet Engineering Task Force (IETF), 2011

RFC 6762 *Multicast DNS*. Internet Engineering Task Force (IETF), 2013.

RFC 7230 *Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing*. Internet Engineering Task Force (IETF), 2014.

RFC 7231 *Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content*. Internet Engineering Task Force (IETF), 2014

RFC 7232 *Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests*. Internet Engineering Task Force (IETF), 2014.

RFC 7233 *Hypertext Transfer Protocol (HTTP/1.1): Range Requests*. Internet Engineering Task Force (IETF), 2014.