# OpenMOQ and MOQ

## A Collaborative Effort to Push the Next Evolution in Streaming

NAB Streaming Summit

Las Vegas, April 2026

OpenMOQ

# What is MOQ?

- A **pub/sub protocol** operating over **QUIC** transport
- Developed over the past 4 years by the **IETF**
- Often called “Media Over QUIC”, but it can move **any binary payload**, of which media is one type.
- **Core technical benefits**:
  - Parallel streams remove Head-Of-Line-Blocking
  - Tunable latency – real-time, to low latency, to VOD
  - Priority control between streams and datagrams
  - Designed for cache support and highly scalable distribution.
  - End-to-end encryption
  - Supports synchronized applications
  - Single protocol for contribution & distribution
  - Multidirectional and VOIP
  - Data agnostic payload support (payments, AI ingest and egress, telemetry)
- **Core business benefits**
  - Quality of media – rich and personalized interactive experiences
  - Reduce distribution cost for real-time streaming
  - Improve scalability
  - Flexibility of deployments & delivery
  - Common protocol stack – lowers dev ops and maintenance costs

# What is OpenMOQ?

- A software consortium founded to develop high performance, open-source MOQ software.
- Founded January 2026
- Get the software at https://github.com/openmoq





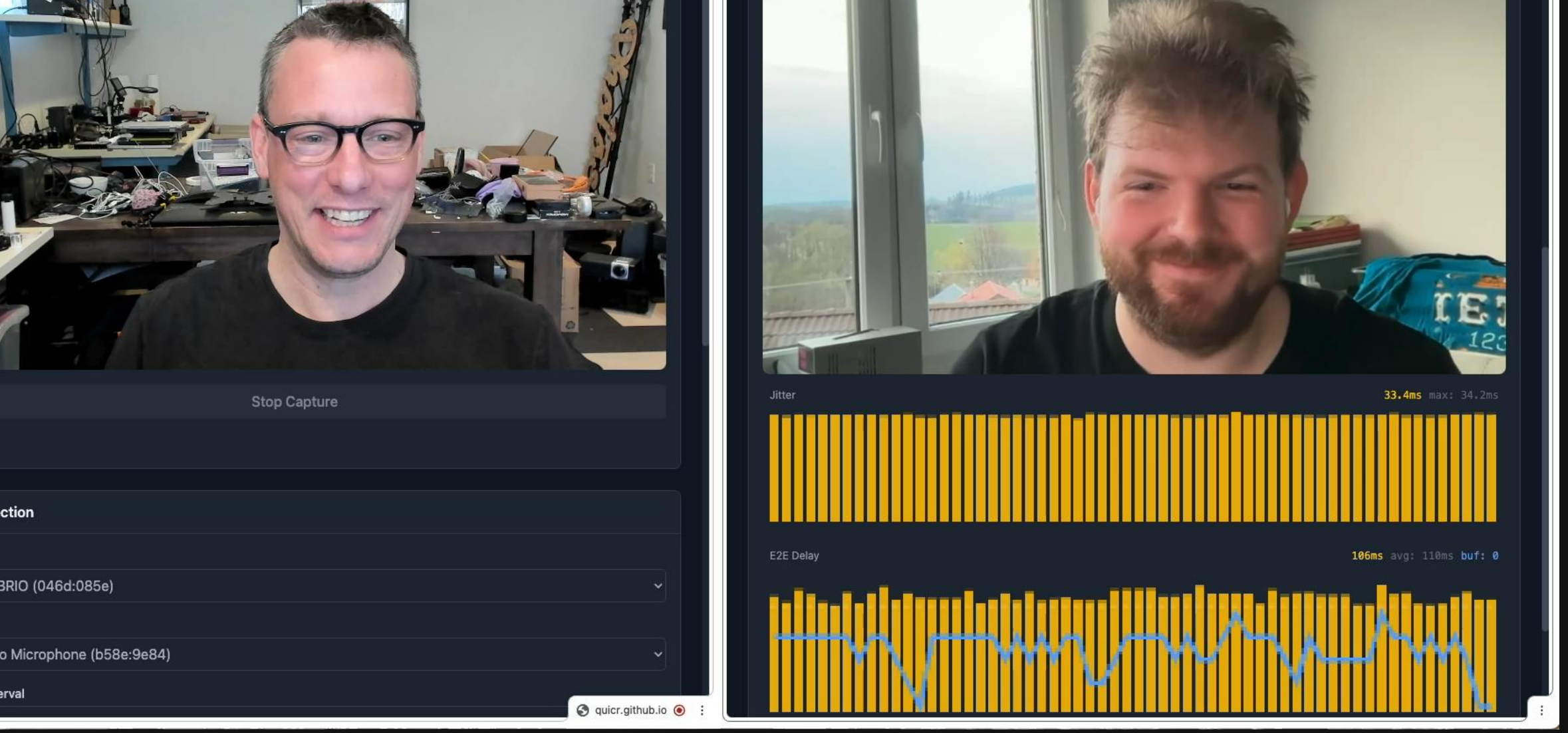
# Why create OpenMOQ?

- Streaming has become a **commodity** business
- A new technology such as MOQ is **risky** to introduce.
- By **sharing** the development cost, the financial and technical risk is lowered for collaborators.
- We need to **catalyze this next evolution** in streaming.
- By **pooling the expertise** of the top companies in this space, we can build something better - **democratizing MOQ innovation.**

# Some (QUIC) Demos


Toggle Debug Details

Talking while muted | Stop Video




OpenMOQ

Akamai cisco CDN77

VINDRAL

VINDRAL

# MOQ in production: first numbers

**44%**

faster time to first frame

MEDIAN

**4.2%**

higher session avg. bit rate

MEDIAN

**13%**

less buffering

95TH PERCENTILE

**80%**

player support for MOQ

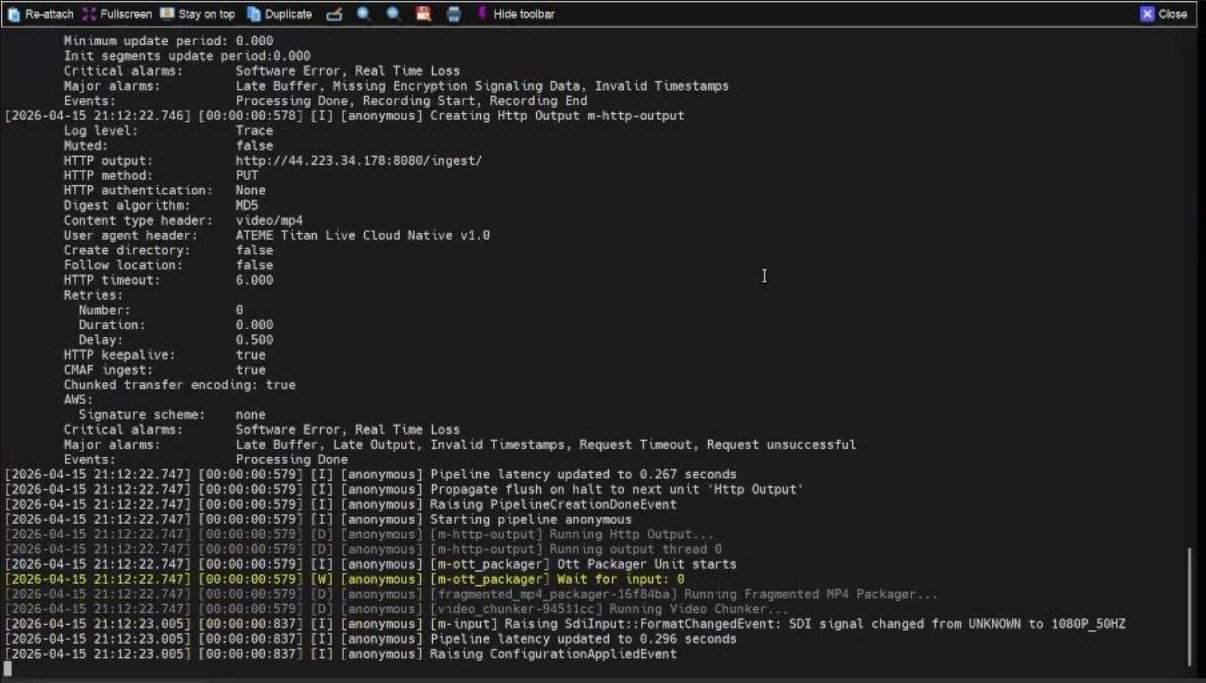
LARGE-SCALE EUROPEAN BROADCASTER

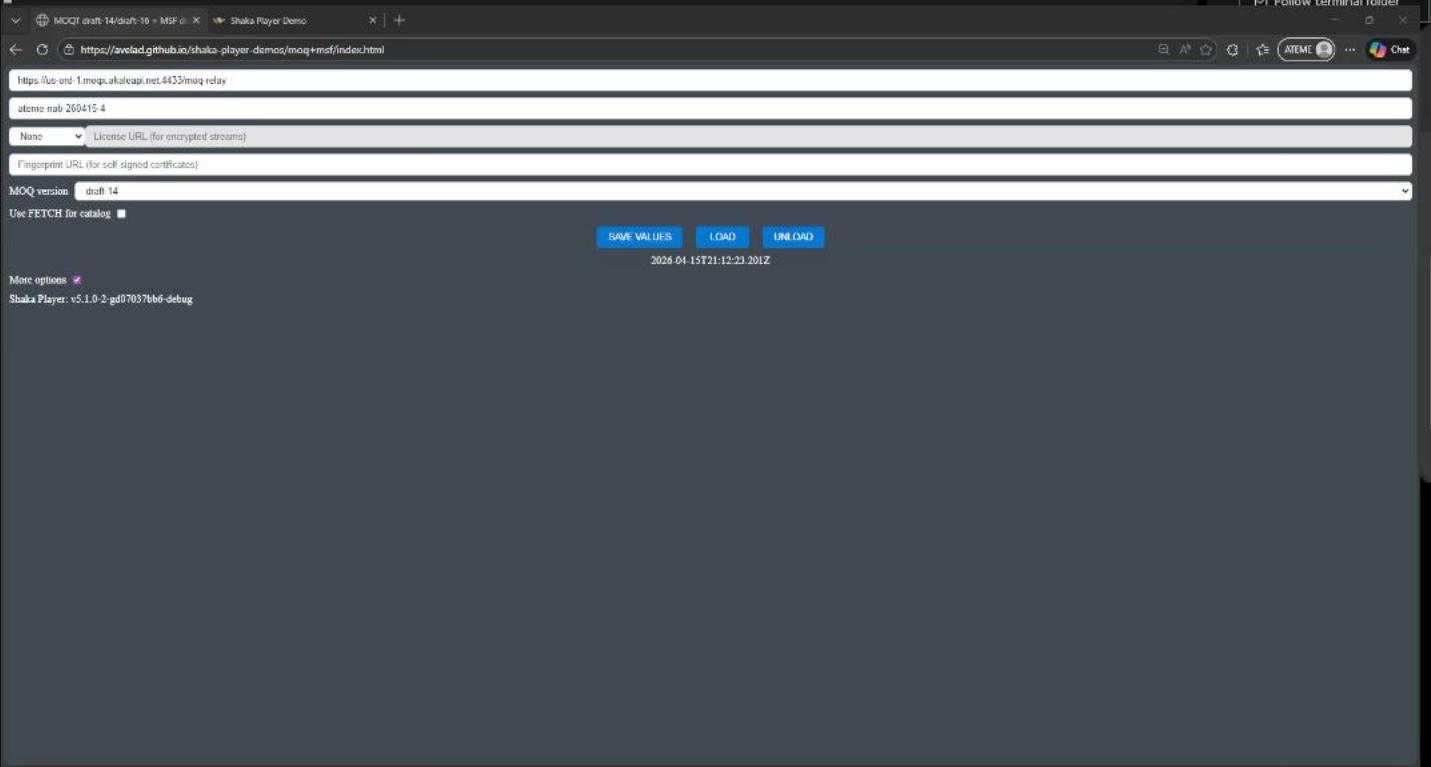

PLAY 1 POINT 2 POINT 3 POINT

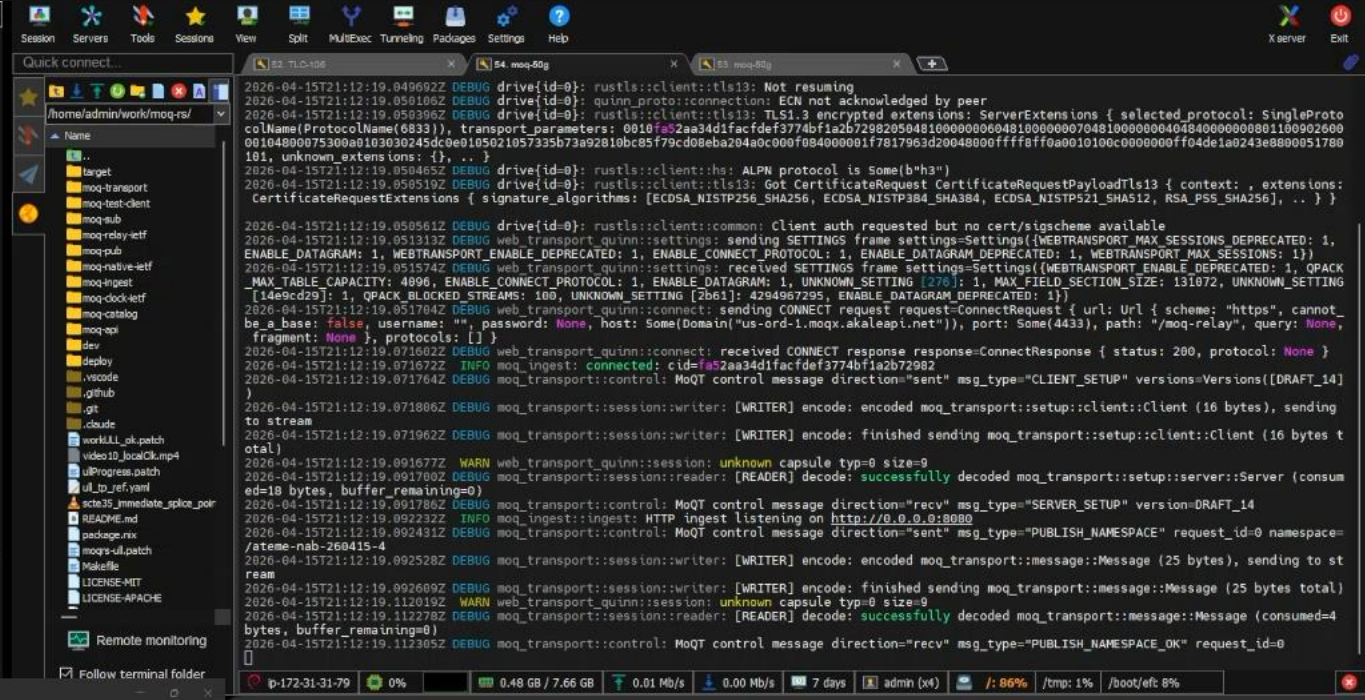
:48:00 1:49:00 1:50:00 1:51:00 1:52:00 1:53:00 1:54:00 1:55:00 1:56:00 1:57:00 1

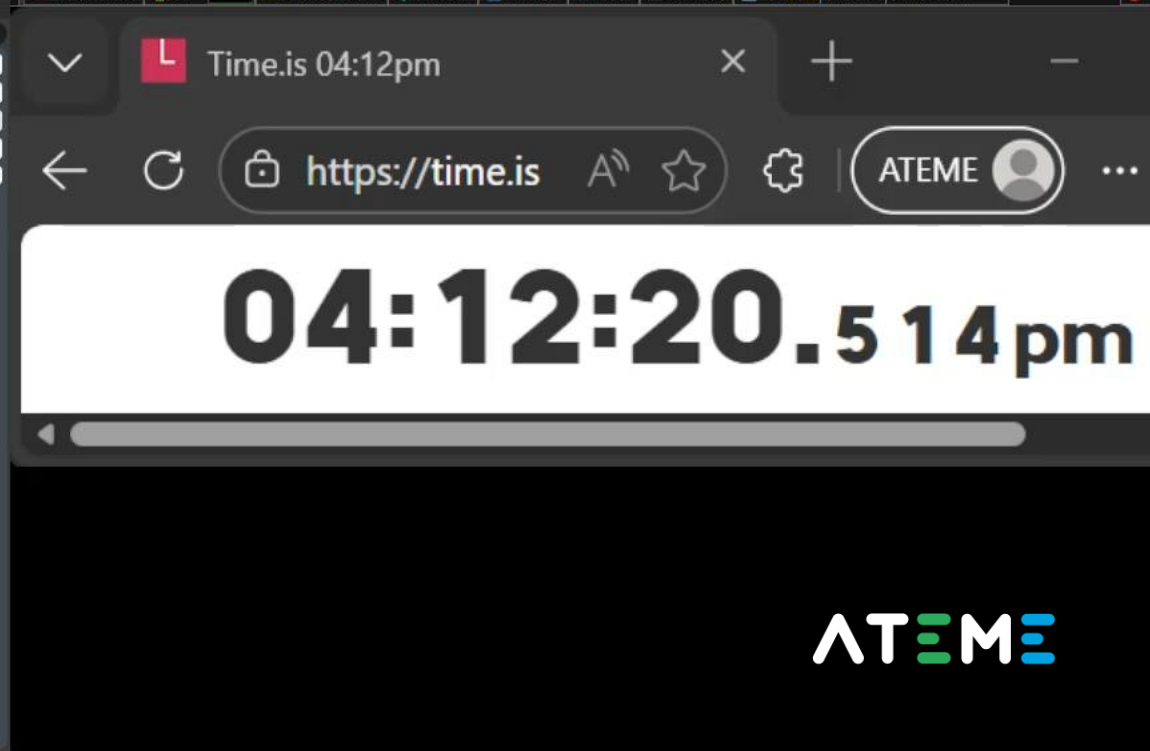
Open Settings

Akamai ÖZYEĞİN UNIVERSITY Six Floor LEADING MEDIA TECH Synamedia

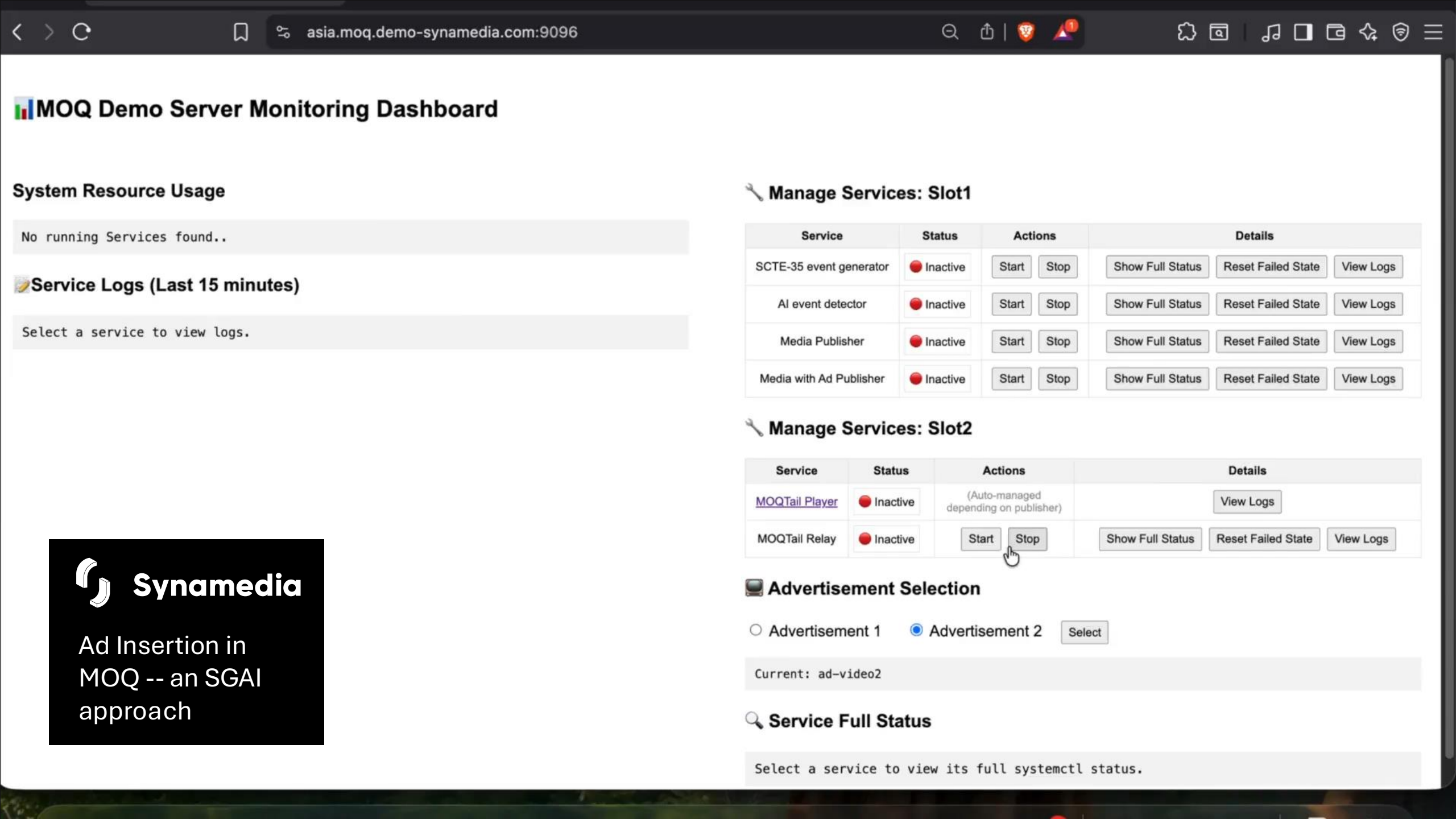

Re-attach
Fullscreen
Stay on top
Duplicate
Hide toolbar
Close
Minimum update period: 0.000
Init segments update period:0.000
Critical alarms: Software Error, Real Time Loss
Major alarms: Late Buffer, Missing Encryption Signaling Data, Invalid Timestamps
Events: Processing Done, Recording Start, Recording End
[2026-04-15 21:12:22.746] [00:00:00:578] [I] [anonymous] Creating Http Output m-http-output
Log level: Trace
Muted: false
HTTP output: http://44.223.34.178:8080/ingest/
HTTP method: PUT
HTTP authentication: None
Digest algorithm: MD5
Content type header: video/mp4
User agent header: ATEME Titan Live Cloud Native v1.0
Create directory: false
Follow location: false
HTTP timeout: 6.000
Retries:
Number: 0
Duration: 0.000
Delay: 0.500
HTTP keepalive: true
CMAF ingest: true
Chunked transfer encoding: true
AWS:
Signature scheme: none
Critical alarms: Software Error, Real Time Loss
Major alarms: Late Buffer, Late Output, Invalid Timestamps, Request Timeout, Request unsuccessful
Events: Processing Done
[2026-04-15 21:12:22.747] [00:00:00:579] [I] [anonymous] Pipeline latency updated to 0.267 seconds
[2026-04-15 21:12:22.747] [00:00:00:579] [I] [anonymous] Propagate flush on halt to next unit 'Http Output'
[2026-04-15 21:12:22.747] [00:00:00:579] [I] [anonymous] Raising PipelineCreationDoneEvent
[2026-04-15 21:12:22.747] [00:00:00:579] [I] [anonymous] Starting pipeline anonymous
[2026-04-15 21:12:22.747] [00:00:00:579] [D] [anonymous] [m-http-output] Running Http Output...
[2026-04-15 21:12:22.747] [00:00:00:579] [D] [anonymous] [m-http-output] Running output thread 0
[2026-04-15 21:12:22.747] [00:00:00:579] [I] [anonymous] [m-ott_packager] Ott Packager Unit starts
[2026-04-15 21:12:22.747] [00:00:00:579] [W] [anonymous] [m-ott_packager] Wait for input: 0
[2026-04-15 21:12:22.747] [00:00:00:579] [D] [anonymous] [fragmented_mp4_packager-16f84ba] Running Fragmented MP4 Packager...
[2026-04-15 21:12:22.747] [00:00:00:579] [D] [anonymous] [video_chunker-94511cc] Running Video Chunker...
[2026-04-15 21:12:23.005] [00:00:00:837] [I] [anonymous] [m-input] Raising SdiInput::FormatChangedEvent: SDI signal changed from UNKNOWN to 1080P_50HZ
[2026-04-15 21:12:23.005] [00:00:00:837] [I] [anonymous] Pipeline latency updated to 0.296 seconds
[2026-04-15 21:12:23.005] [00:00:00:837] [I] [anonymous] Raising ConfigurationAppliedEvent


https://avelad.github.io/shaka-player-demos/moq+msf/index.html
https://us-ord-1.moqx.akaleapi.net:4433/moq-relay
ateme-nab-260415-4
None
License URL (for encrypted streams)
Fingerprint URL (for self signed certificates)
MOQ version
draft-14
Use FETCH for catalog
SAVE VALUES
LOAD
UNLOAD
2026-04-15T21:12:23.201Z
More options
Shaka Player: v5.1.0-2-gd07037bb6-debug


Session
Servers
Tools
Sessions
View
Split
MultiExec
Tunneling
Packages
Settings
Help
X server
Exit
Quick connect...
/home/admin/work/moq-rs/
Remote monitoring
Follow terminal folder
2026-04-15T21:12:19.049692Z DEBUG drive{id=0}: rustls::client::tls13: Not resuming
2026-04-15T21:12:19.050106Z DEBUG drive{id=0}: quinn_proto::connection: ECN not acknowledged by peer
2026-04-15T21:12:19.050396Z DEBUG drive{id=0}: rustls::client::tls13: TLS1.3 encrypted extensions: ServerExtensions { selected_protocol: SingleProtocolName(ProtocolName(6833)), transport_parameters: 0010fa52aa34d1facfdef3774bf1a2b729820504810000000604810000000704810000000404840000000801100902600
2026-04-15T21:12:19.050465Z DEBUG drive{id=0}: rustls::client::hs: ALPN protocol is Some(b"h3")
2026-04-15T21:12:19.050519Z DEBUG drive{id=0}: rustls::client::tls13: Got CertificateRequest CertificateRequestPayloadTls13 { context: , extensions: CertificateRequestExtensions { signature_algorithms: [ECDSA_NISTP256_SHA256, ECDSA_NISTP384_SHA384, ECDSA_NISTP521_SHA512, RSA_PSS_SHA256], .. } }
2026-04-15T21:12:19.050561Z DEBUG drive{id=0}: rustls::client::common: Client auth requested but no cert/sigscheme available
2026-04-15T21:12:19.051313Z DEBUG web_transport_quinn::settings: sending SETTINGS frame settings=Settings({WEBTRANSPORT_MAX_SESSIONS_DEPRECATED: 1, ENABLE_DATAGRAM: 1, WEBTRANSPORT_ENABLE_DEPRECATED: 1, ENABLE_CONNECT_PROTOCOL: 1, ENABLE_DATAGRAM_DEPRECATED: 1, WEBTRANSPORT_MAX_SESSIONS: 1})
2026-04-15T21:12:19.051574Z DEBUG web_transport_quinn::settings: received SETTINGS frame settings=Settings({WEBTRANSPORT_ENABLE_DEPRECATED: 1, QPACK_MAX_TABLE_CAPACITY: 4096, ENABLE_CONNECT_PROTOCOL: 1, ENABLE_DATAGRAM: 1, UNKNOWN_SETTING [276]: 1, MAX_FIELD_SECTION_SIZE: 131072, UNKNOWN_SETTING [14e9cd29]: 1, QPACK_BLOCKED_STREAMS: 100, UNKNOWN_SETTING [2b61]: 4294967295, ENABLE_DATAGRAM_DEPRECATED: 1})
2026-04-15T21:12:19.051704Z DEBUG web_transport_quinn::connect: sending CONNECT request request=ConnectRequest { url: Url { scheme: "https", cannot_be_a_base: false, username: "", password: None, host: Some(Domain("us-ord-1.moqx.akaleapi.net")), port: Some(4433), path: "/moq-relay", query: None, fragment: None }, protocols: [] }
2026-04-15T21:12:19.071602Z DEBUG web_transport_quinn::connect: received CONNECT response response=ConnectResponse { status: 200, protocol: None }
2026-04-15T21:12:19.071672Z INFO moq_ingest: connected: cid=fa52aa34d1facfdef3774bf1a2b72982
2026-04-15T21:12:19.071764Z DEBUG moq_transport::control: MoQT control message direction="sent" msg_type="CLIENT_SETUP" versions=Versions([DRAFT_14])
2026-04-15T21:12:19.071806Z DEBUG moq_transport::session::writer: [WRITER] encode: encoded moq_transport::setup::client::Client (16 bytes), sending to stream
2026-04-15T21:12:19.071962Z DEBUG moq_transport::session::writer: [WRITER] encode: finished sending moq_transport::setup::client::Client (16 bytes total)
2026-04-15T21:12:19.091677Z WARN web_transport_quinn::session: unknown capsule typ=0 size=9
2026-04-15T21:12:19.091700Z DEBUG moq_transport::session::reader: [READER] decode: successfully decoded moq_transport::setup::server::Server (consumed=18 bytes, buffer_remaining=0)
2026-04-15T21:12:19.091786Z DEBUG moq_transport::control: MoQT control message direction="recv" msg_type="SERVER_SETUP" version=DRAFT_14
2026-04-15T21:12:19.092232Z INFO moq_ingest::ingest: HTTP ingest listening on http://0.0.0.0:8080
2026-04-15T21:12:19.092431Z DEBUG moq_transport::control: MoQT control message direction="sent" msg_type="PUBLISH_NAMESPACE" request_id=0 namespace=/ateme-nab-260415-4
2026-04-15T21:12:19.092528Z DEBUG moq_transport::session::writer: [WRITER] encode: encoded moq_transport::message::Message (25 bytes), sending to stream
2026-04-15T21:12:19.092609Z DEBUG moq_transport::session::writer: [WRITER] encode: finished sending moq_transport::message::Message (25 bytes total)
2026-04-15T21:12:19.112019Z WARN web_transport_quinn::session: unknown capsule typ=0 size=9
2026-04-15T21:12:19.112278Z DEBUG moq_transport::session::reader: [READER] decode: successfully decoded moq_transport::message::Message (consumed=4 bytes, buffer_remaining=0)
2026-04-15T21:12:19.112305Z DEBUG moq_transport::control: MoQT control message direction="recv" msg_type="PUBLISH_NAMESPACE_OK" request_id=0
ip-172-31-31-79
0%
0.48 GB / 7.66 GB
0.01 Mb/s
0.00 Mb/s
7 days
admin (x4)
/: 86%
/tmp: 1%
/boot/efi: 8%


Time.is 04:12pm
https://time.is
ATEME
04:12:20.5 14 pm

ATEME


asia.moq.demo-synamedia.com:9096
MOQ Demo Server Monitoring Dashboard
System Resource Usage
No running Services found..
Service Logs (Last 15 minutes)
Select a service to view logs.
Manage Services: Slot1
Service
Status
Actions
Details
SCTE-35 event generator
Inactive
Start
Stop
Show Full Status
Reset Failed State
View Logs
AI event detector
Inactive
Start
Stop
Show Full Status
Reset Failed State
View Logs
Media Publisher
Inactive
Start
Stop
Show Full Status
Reset Failed State
View Logs
Media with Ad Publisher
Inactive
Start
Stop
Show Full Status
Reset Failed State
View Logs
Manage Services: Slot2
Service
Status
Actions
Details
MOQTail Player
Inactive
(Auto-managed depending on publisher)
View Logs
MOQTail Relay
Inactive
Start
Stop
Show Full Status
Reset Failed State
View Logs
Advertisement Selection
Advertisement 1
Advertisement 2
Select
Current: ad-video2
Service Full Status
Select a service to view its full systemctl status.
Synamedia
Ad Insertion in MOQ -- an SGAI approach

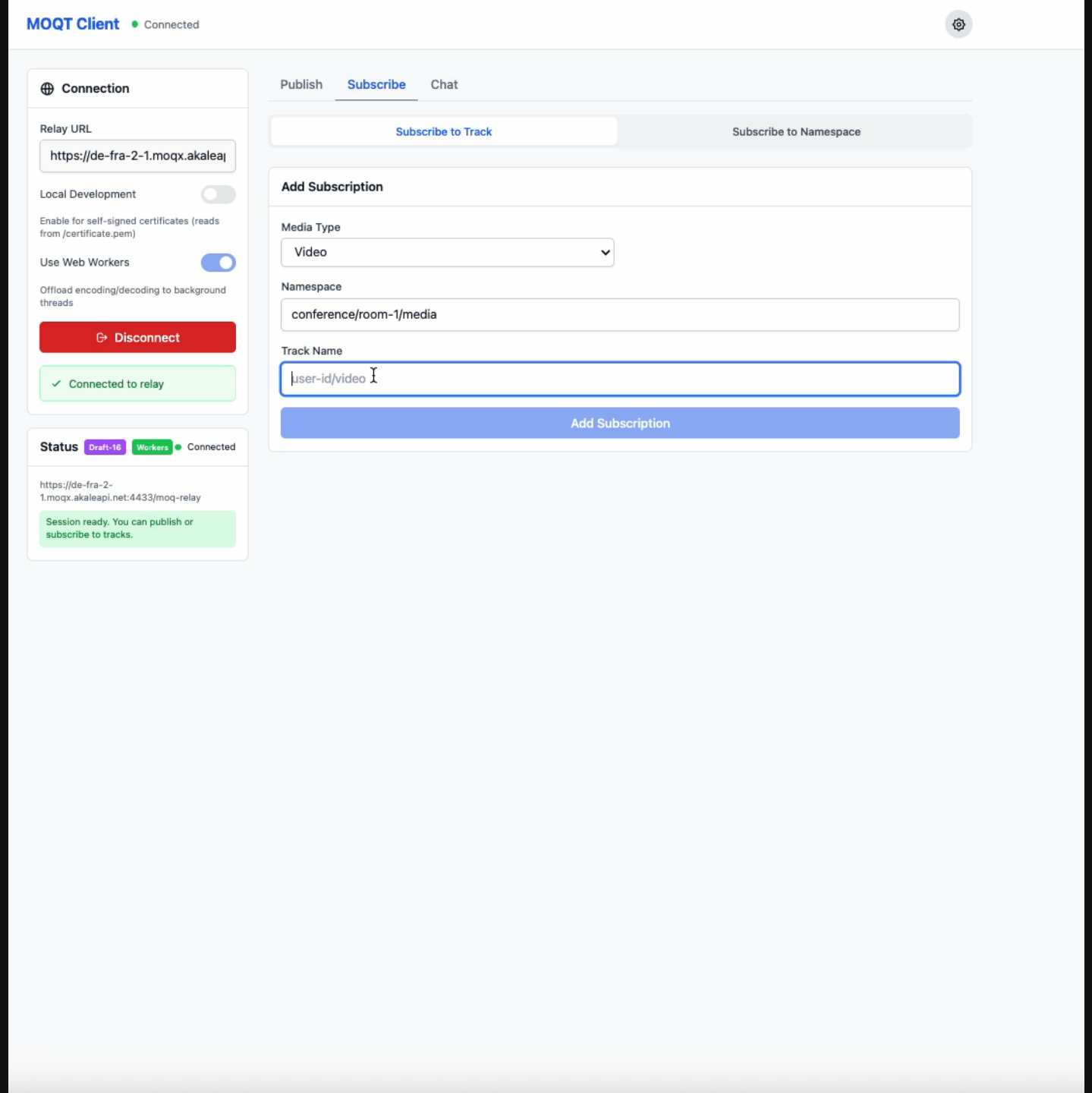
# moqx Deployment Summary

**High-Level Load Balancer:** lb.moqx.akaleapi.net
**MoQT Endpoint:** https://lb.moqx.akaleapi.net:4433/moq-relay
**Total Nodes:** 20
**Generated:** 2026-04-16 13:54:15 UTC

## Routing Map


## Individual Nodes

| Provider | Region | Node | MoQT Endpoint | Running Image | Upstream | Downstream | Details |
|---|---|---|---|---|---|---|---|
| Akamai | São Paulo, Brazil | br-gru-1 | https://br-gru-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | us-mia-1 | — | Details |
| Akamai | Chennai, India | in-maa-1 | https://in-maa-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | sg-sin-2-1 | — | Details |
| Akamai | Osaka, Japan | jp-osa-1 | https://jp-osa-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | us-lax-1 | sg-sin-2-1 | Details |
| Akamai | Amsterdam, Netherlands | nl-ams-1 | https://nl-ams-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | us-ord-1 | — | Details |
| Akamai | Singapore | sg-sin-2-1 | https://sg-sin-2-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | jp-osa-1 | in-maa-1 | Details |
| Akamai | Los Angeles, US | us-lax-1 | https://us-lax-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | — | jp-osa-1, us-ord-1, us-sea-1 | Details |
| Akamai | Los Angeles, US | us-lax-2 | https://us-lax-2.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | — | — | Details |
| Akamai | Los Angeles, US | us-lax-3 | https://us-lax-3.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | — | sjc1 | Details |
| Akamai | Los Angeles, US | us-lax-4 | https://us-lax-4.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | — | — | Details |
| Akamai | Miami, US | us-mia-1 | https://us-mia-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | us-ord-1 | br-gru-1 | Details |
| Akamai | Chicago, US | us-ord-1 | https://us-ord-1.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:d8141b7 | us-lax-1 | nl-ams-1, us-mia-1 | Details |
| Akamai | Chicago, US | us-ord-2 | https://us-ord-2.moqx.akaleapi.net:4433/moq-relay | ghcr.io/openmoq/moqx:8ac0214 | — | — | Details |


MOQT Client
Connected
Connection
Relay URL
https://de-fra-2-1.moqx.akalea
Local Development
Enable for self-signed certificates (reads from /certificate.pem)
Use Web Workers
Offload encoding/decoding to background threads
Disconnect
Connected to relay
Status
Draft-16
Workers
Connected
https://de-fra-2-1.moqx.akaleapi.net:4433/moq-relay
Session ready. You can publish or subscribe to tracks.
Publish
Subscribe
Chat
Subscribe to Track
Subscribe to Namespace
Add Subscription
Media Type
Video
Namespace
conference/room-1/media
Track Name
user-id/video
Add Subscription

OpenMOQ

# Take-aways

- Code: https://github.com/openmoq/moqx (v0.1.0)
- Web: https://openmoq.org/
- At NAB
  - Red5 W2357, W1701, W3129
  - Synamedia W2851
  - Oracle W1073HS
  - YouTube W2601
  - Akamai: Aria
  - CDN77: W208

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Red5

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Synamedia

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CDN77

**Sean McCarthy**
Head of OTT Live Engineering
YouTube

OpenMOQ