

# Enhancing MPEG DASH Performance Via Server And Network Assistance

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# Pushing or pulling media data ?

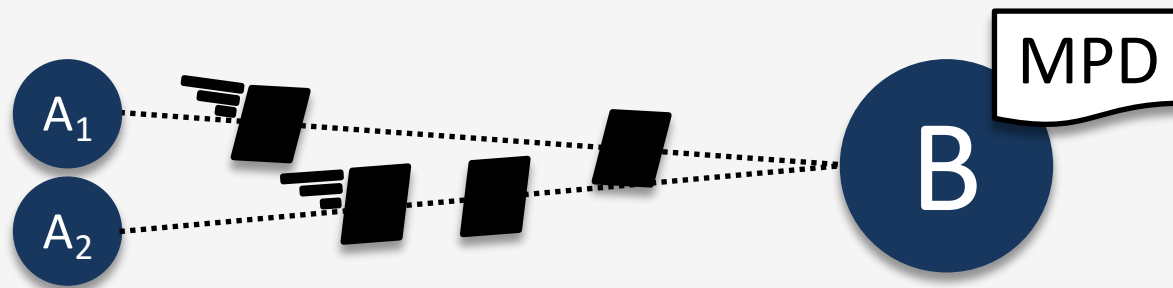


For a long sequence, pulling seems inefficient but **bundling chunks of data** mitigates the network overhead.



For that **MPEG DASH** defines a **Segment Format**.

# Decentralised delivery



Pulling allows to distribute the delivery over several servers which HTTP excels in. But the receiver needs to know **what** to pull, **when** and **from where**.



For that **MPEG DASH** defines the **Media Description Presentation (MPD)**.

# But pulling brings new challenges

How to know the quality of DASH content delivered ?



How to know the quality-of-experience of ISP subscribers ?



How to know that the cheapest distribution is used ?



How to know that ads are viewed ?



How to know that the delivery nodes are properly used ?



# Introducing SAND use cases

MPEG initiated the **Server And Network assisted DASH (SAND)** Core Experiment with the following use cases in scope.

Network  
mobility

Server failover  
scenario

Real-time user  
reporting

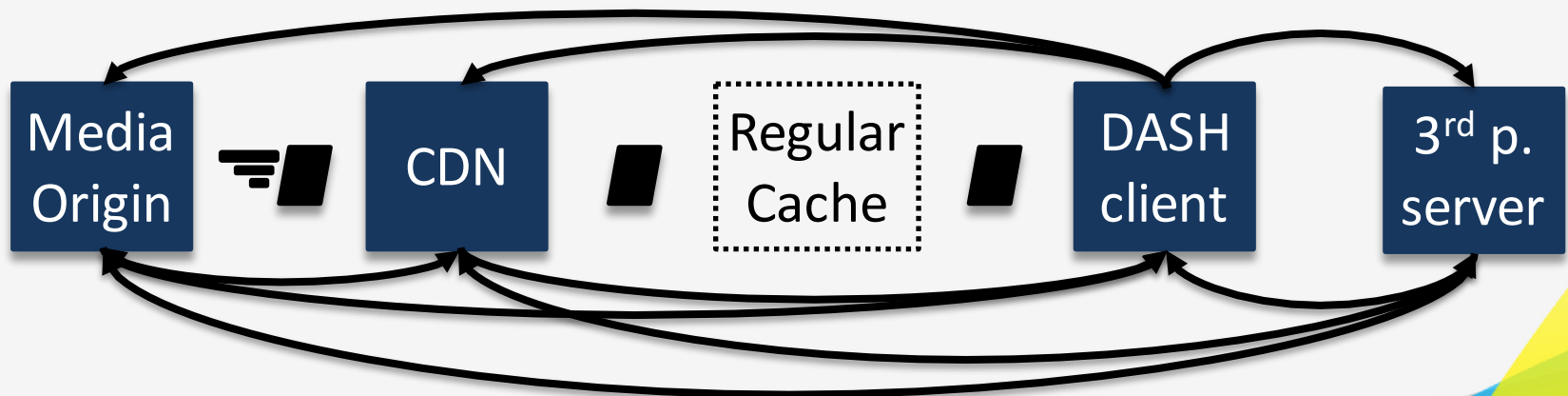
Server and  
clients mutual  
hinting

Server-assisted  
adaptation logic



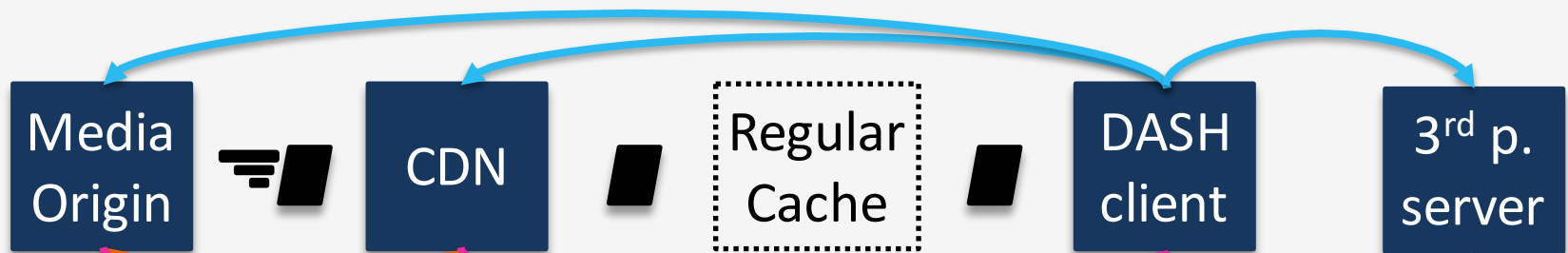
# Introducing SAND architecture

**SAND** messages flow through the network.



# Introducing SAND architecture

**PER messages** are sent to DASH clients while **DASH clients** send **Status and Metrics messages** and **PED messages** are exchanged in the network.



# Introducing SAND architecture

**SAND** defines **DASH Aware Network Elements (DANE)** as network entities capable of sending and/or receiving **SAND messages**.



PER messages  
Status and Metrics messages  
PED messages

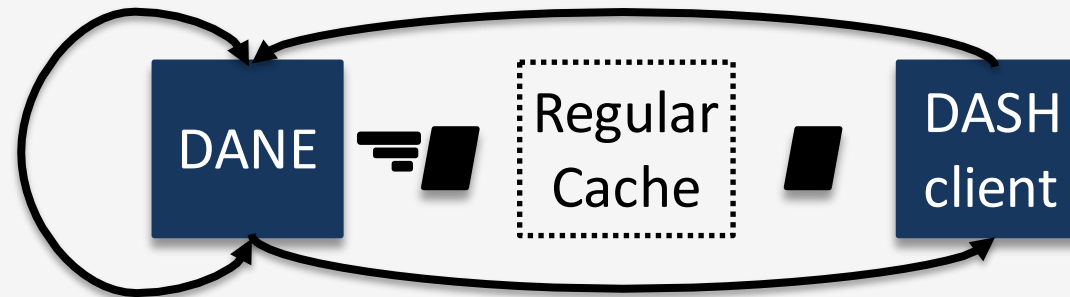




# Introducing SAND architecture

**SAND Messages** are delivered over **HTTP**.

1. Via a URL in a HTTP header
2. Via a SAND channel e.g. Websocket (in progress)



# SAND in practice

During the SAND Core Experiment, actual **experiments** were conducted to bring evidences of the usefulness of network assistance.

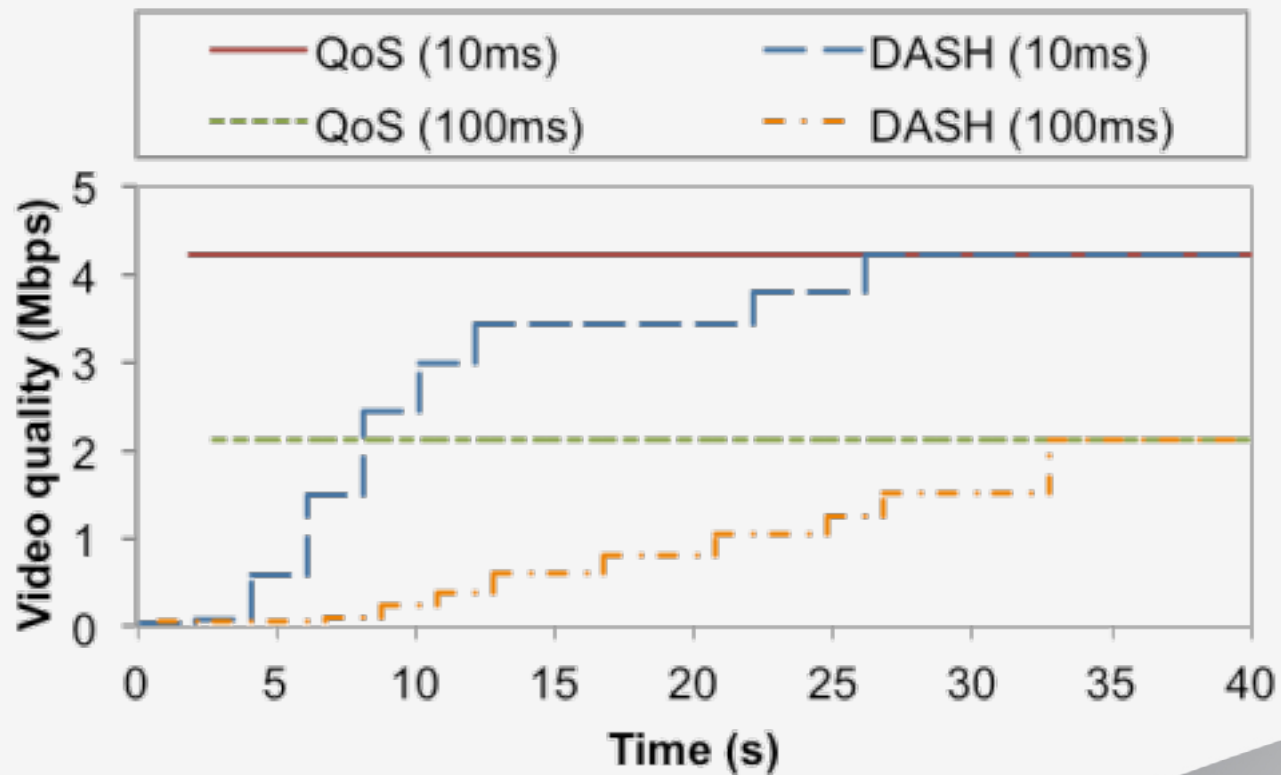
Server-assisted  
adaptation  
logic

One experiment demonstrated how a DASH clients could use **Quality-of-Service (QOS)** information to achieve **faster quality convergence** at start-up.



# SAND in practice

5 Mbps bandwidth, 2-s segments, 10/100 ms latency



Server-assisted  
adaptation  
logic



# SAND in practice

The **optimal quality** is reached much **faster** when DASH clients are assisted in estimating the available bandwidth via **SAND messages**.

Server-assisted  
adaptation  
logic

30s

Traditional  
DASH

2s

SAND-assisted  
DASH



# Snapshot of SAND

Examples of current SAND messages :

**AnticipatedRequest** : Hint from DASH client to DANEs

**ResourceStatus** : Hint from DANEs of what is in cache

**MPDValidityEndTime** : Triggers MPD fetching by DASH clients in live scenario

**Throughput** : Expected to be available for the DASH client



# Snapshot of SAND

Some aspects still need **to be addressed** :

Protocol for DASH clients to send SAND messages

DANE's announcement of supported SAND messages

Security aspects and recommendations

**We welcome everyone willing to get involved !**



# SAND roadmap in MPEG

The SAND Core Experiment started in August 2013 and will remain open for at least a couple of meeting cycles (~end 2016).

Drafting of **MPEG DASH Part 5 SAND** is under progress. First edition of SAND estimated to be published around **Q4 2016**.

Ongoing collaboration with 3GPP SA4 and DASH-IF.



But let's be clear



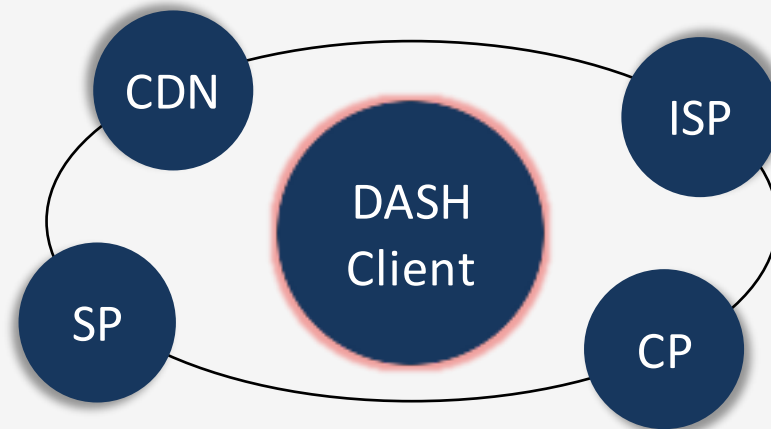
SAND generated **a lot of discussions** among DASH experts in MPEG.

The reason is, experts made sure that the **raison d'être** of DASH was **preserved** each step of the way.





# Client-driven philosophy

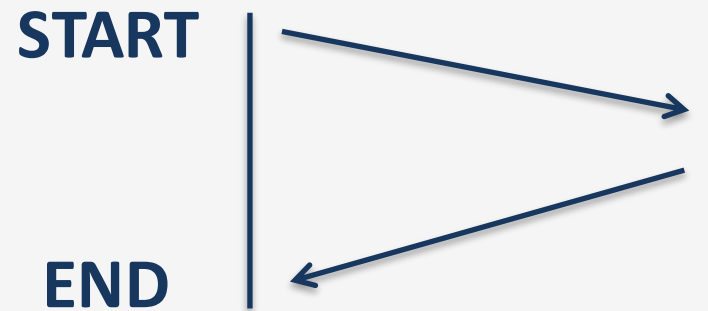


MPEG DASH is a **client-centric technology**.

SAND won't change that.



# Stateless solution



To deliver DASH content, there is **no session** between servers and clients, hence enabling flexibility and rapid scalability.



**SAND messages** are **snapshots** of information which don't require pre or future knowledge.

# In summary, SAND is ...

**Exchanging information** between DASH clients and servers to make **smarter decisions**

**Not mandatory** to deploy DASH solutions and targets more **premium services**

**New part** of MPEG DASH (5<sup>th</sup>) publication expected for **Q4 2016**



Thank you !

