

Title	Prototyping and evaluating SDN-based multicast architectures for live video streaming [poster presentation]				
Authors	Khalid, Ahmed;Zahran, Ahmed H.;Sreenan, Cormac J.				
Publication date	2017-10				
Original Citation	Khalid, A., Zahran, A. H. and Sreenan, C. J. (2017) Prototyping and Evaluating SDN-based Multicast Architectures for Live Video Streaming [Poster Presentation] 42nd IEEE Conference on Local Computer Networks (LCN) Singapore, 9-12 October.				
Type of publication	Conference item				
Link to publisher's version	https://www.ieeelcn.org/prior/LCN42/Program_demos.html, http://hdl.handle.net/10468/5309				
Rights	© 2017 the authors.				
Download date	2024-07-17 12:33:21				
Item downloaded from	https://hdl.handle.net/10468/5308				



University College Cork, Ireland Coláiste na hOllscoile Corcaigh



# Prototyping and Evaluating SDN-based Multicast Architectures for Live Video Streaming Ahmed Khalid, Ahmed H. Zahran and Cormac J. Sreenan

Dept. of Computer Science, University College Cork, Ireland

## Introduction

Significance: Internet video to TV will continue to grow at a rapid pace, increasing 3.6-fold by 2020. Live video streaming services constitute of **40 percent of consumer Internet video traffic.** [Cisco2015]

**Contribution**: A generic platform to evaluate and compare various SDN-based multicast architectures or algorithms. Benchmark the performance against standard IP unicast. Provide a mechanism to modify various evaluation parameters and monitor the effect on output in form of graphs and live statistics. Implement a prototype of mCast and compare it with IP unicast.

# **Evaluation Platform: Testbed Setup and GUIs**



# mCast: An SDN-based Resource-Efficient Live Video Streaming Architecture with ISP-CDN Collaboration

#### **Key Features**

**Inter-domain** network layer multicast – Dynamic multicast tree construction

**Full control of CDNs over their clients – Transparent delivery to clients** 

## **Components and Functions**

mCast CDN Agent: Identifies clients and triggers mCast.

mCast ISP Agent: Interfaces with CDN and orchestrates mCast operations in ISP.

mCast Streaming Server: Implements an API to communicate with mCast CDN Agent. mCast CDN Routing Module: Consults mCast CDN Agent before proceeding with the default routing.

	Application Plane		mCast ISP Agent ←		<		mCast CDN mCast Handler	lard iest	
	Control Plane	SDI Contro Stand Topo Disco	oller dard ology overy	mCast Routing → Module ↓ mCast Flo Manager	•W	INTERNET	SDN Controller	Module	dler
Vide	Data Plane eo er	Vide Clien N mCa Agent	o ts	OpenFlov Switches	w s t Co	SDN	OpenFlow Switches	Stream Serve	ning ers

mCast ISP Routing Module: Constructs multicast trees based on the routing logic.

**mCast Flow Manager:** Installs multicast entries in network nodes with **higher priority** than IP unicast and installs **transparency rules** on the egress switch.

## **Results and Benefits**

Reduced load on CDN servers - Energy savings for CDNs Reduced inter-domain and intra-domain traffic for ISPs - Better video quality

## **Evaluating other algorithms**

**The platform consists of discrete scalable and reusable modules**, with every module independent of others. **To implement any other algorithm, its code can be added to the relevant module of the platform as a plug-in.** For very large scale evaluations, real-time statistics can be disabled and **logs can be gathered for post-processing.** 



**QR code** for a link to details, examples and videos of the platform.

**Contact:** 

a.khalid@cs.ucc.ie



This work has emanated from research conducted with the financial support of Science Foundation Ireland (SFI) under Grant Number 13/IA/1892