Prototyping and Evaluating SDN-based Multicast Architectures for Live Video Streaming

Ahmed Khalid, Ahmed H. Zahran and Cormac J. Sreenan

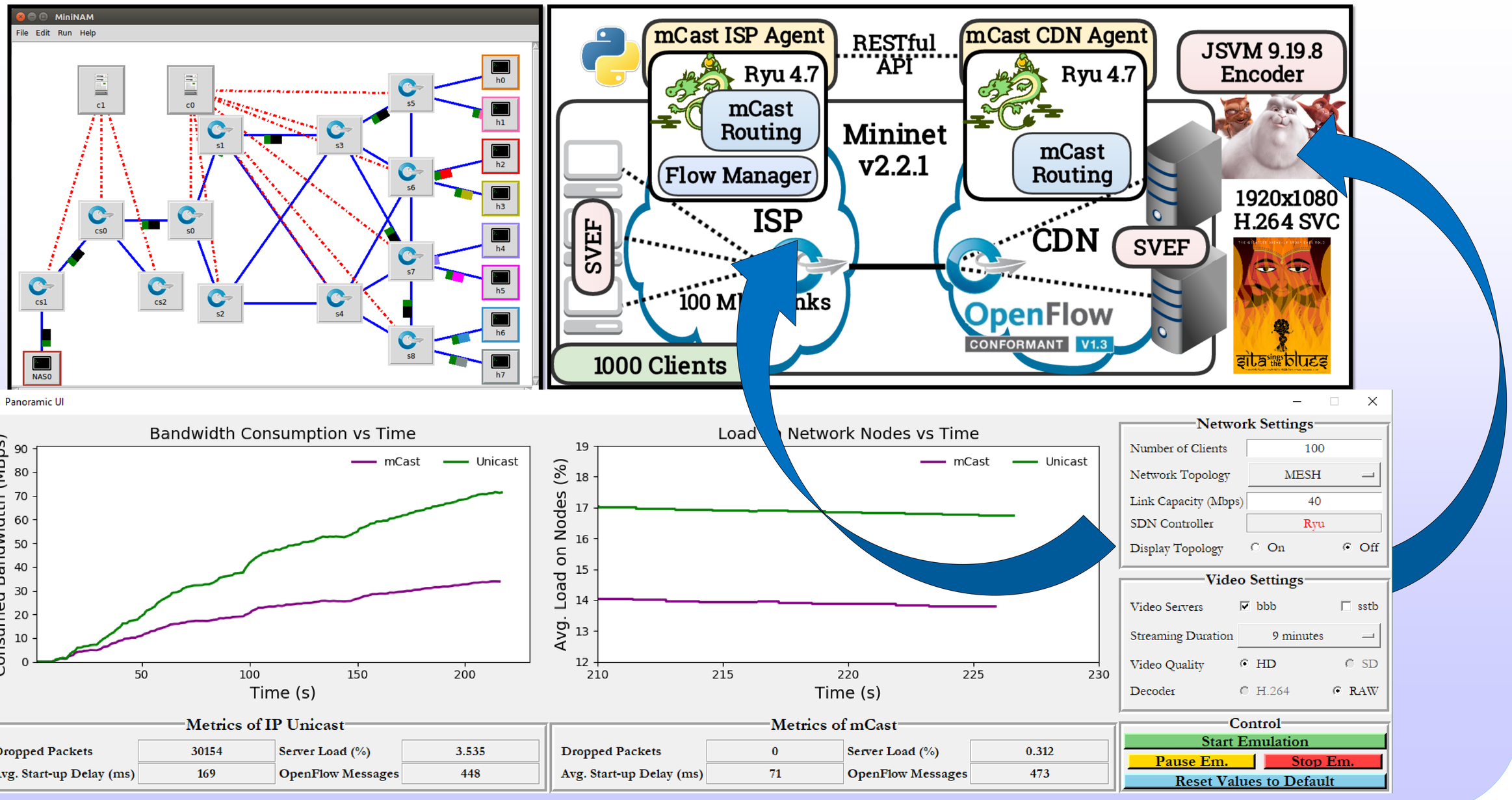
Dept. of Computer Science, University College Cork, Ireland

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**.

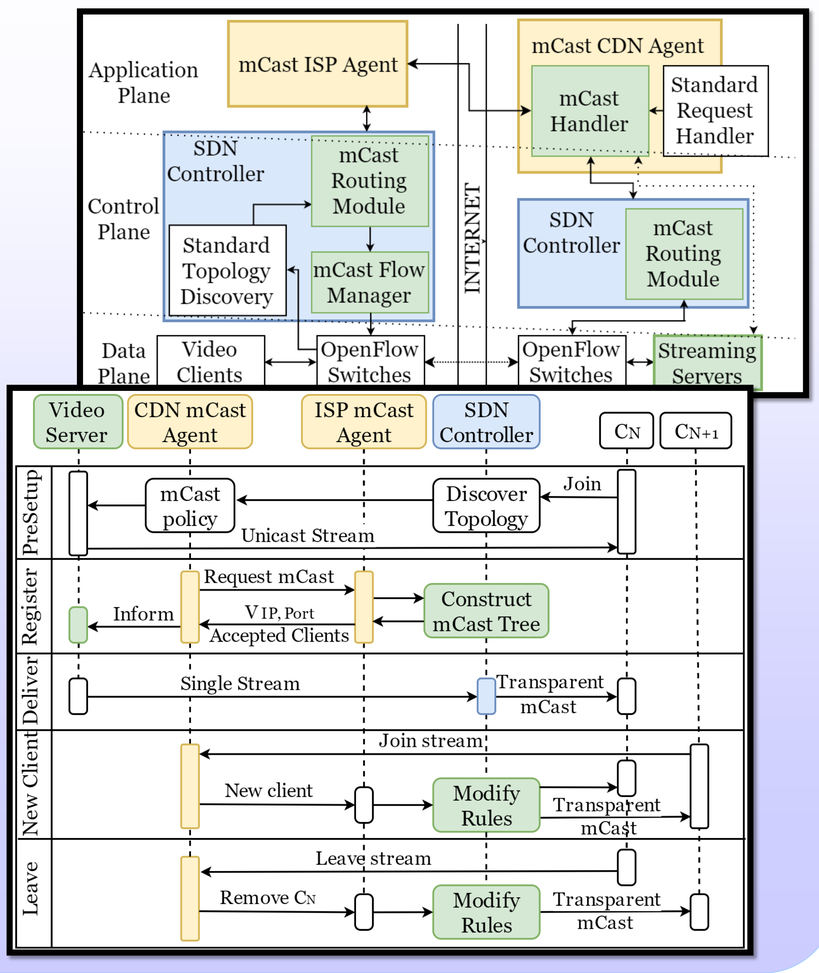
mCast ISP Agent: Interfaces with CDN and orchestrates mCast operations in ISP.

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.

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