

Multicast Visualization and Management

Glen Nakamoto

781-271-3032 • nakamoto@mitre.org

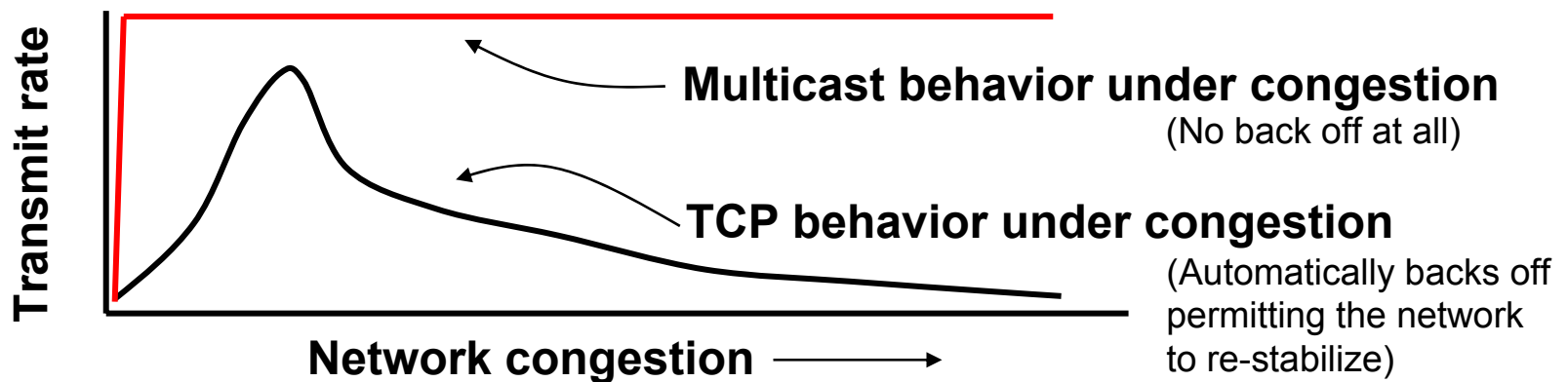
AF MOIE



MITRE
Technology
Program

Problem

- Large-scale use of multicast traffic can create an unstable network leading to potential mission failure.
- Use of multicast enabled applications is increasing rapidly (collaboration, database update, video, etc.).
- There are currently no adequate tools to manage and monitor large, dynamic, multicast networks.



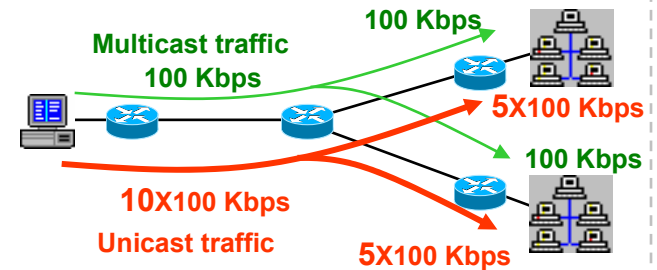
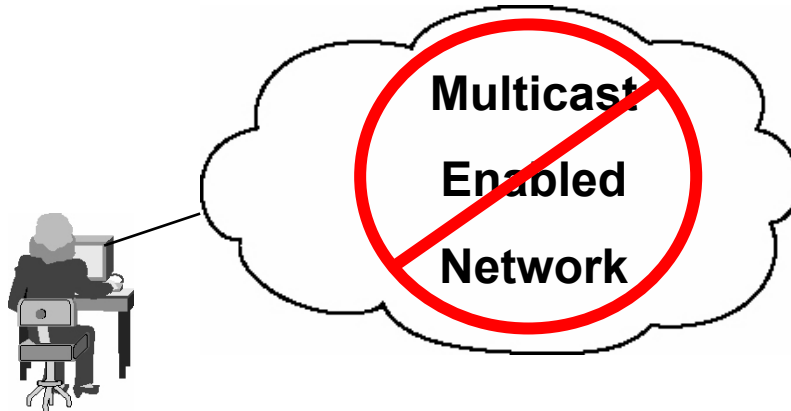
Background

Multicast provides the most efficient means to disseminate traffic when multiple recipients exist.

How do I limit the amount of multicast that enters the network?

How much multicast is traversing the network and where it is going?

How do we manage multicast?



How do I control where multicast is permitted to go?

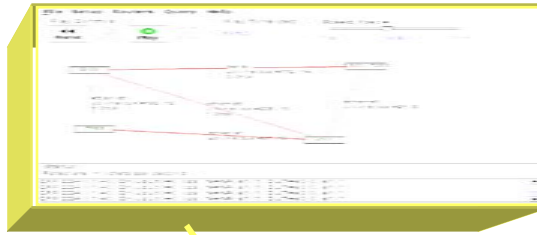
What can I do if the network is overly congested with multicast traffic?

Until we get solid answers to these questions, multicast will not be permitted on most large-scale networks.

Objective

- **Characterize and understand the multicast behavior across the enterprise network**
 - Utilization, priority of activity (or source), bandwidth use of multicast group(s), directionality of flow, scope, source activity level
- **Develop multicast management concepts that proactively and intelligently control multicast traffic**
 - Admission control, address de-confliction, bandwidth allocation, prioritization, quality-of-service, management vs. avoidance, rate limiting at source or point-of-congestion, policy-based access control (vice subscriber-based)

Activities

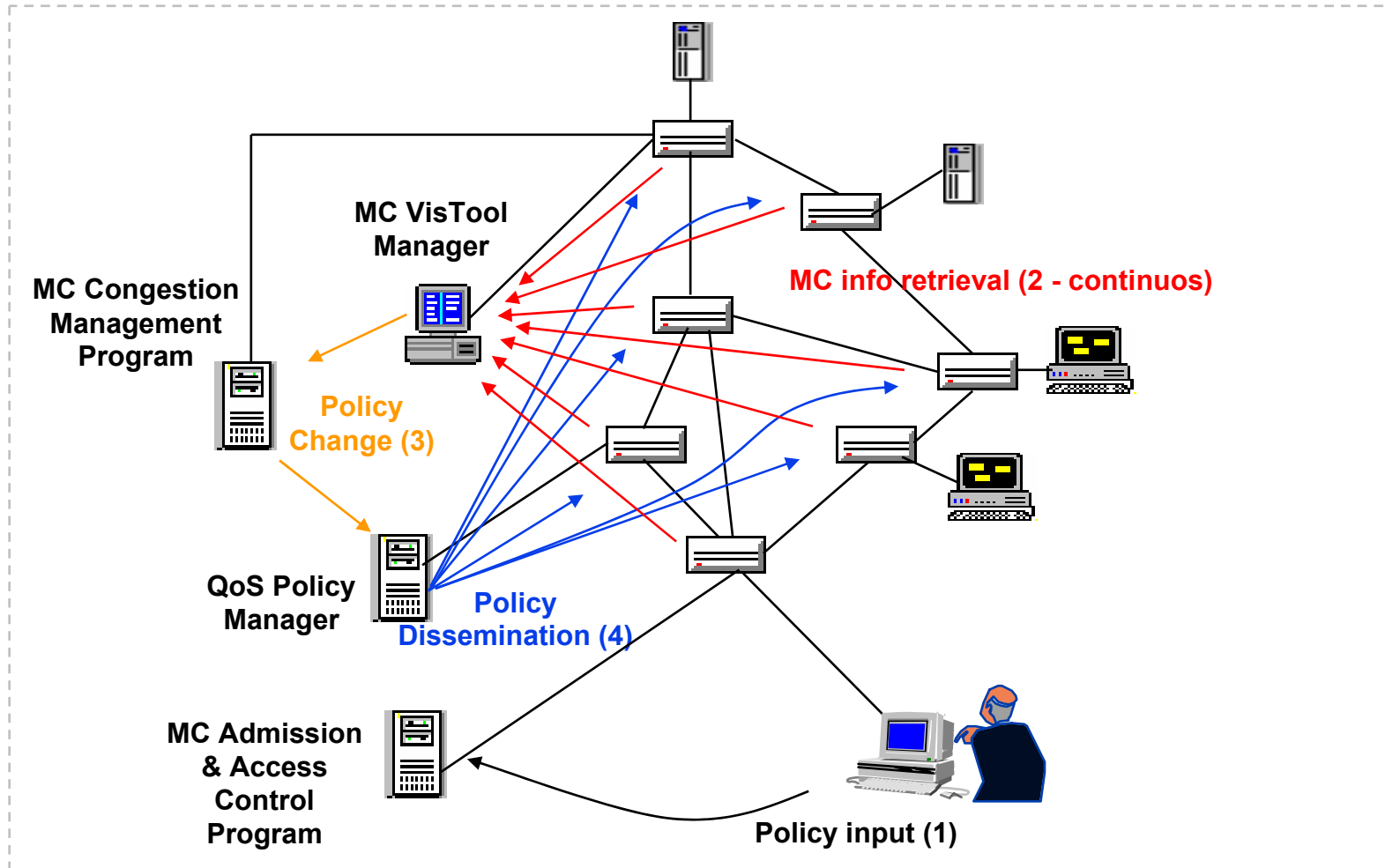


- Develop a Multicast Admission Control Program to register and characterize multicast applications (bandwidth, priority, scope, etc.)
- Develop a Multicast Management Program to dynamically control multicast traffic flows (using QoS mechanisms)
- Develop an Access Control Program to create policies that can limit where multicast is permitted to travel
- Establish a testbed for evaluating and studying concepts for MC traffic management

Time	SourceID	Octet Count	Incoming Interface	UpTime	Other Interface Octets
63.81	0.0.0.0	0	0	114465972	0
63.81	192.168.1.17	922560	3	114494928	4807
123.99	0.0.0.0	0	0	114471939	0
123.99	192.168.1.17	922808	3	114470843	4808
184.11	0.0.0.0	0	0	114479000	0
184.11	192.168.1.17	922656	3	114476856	4808
244.24	0.0.0.0	0	0	114484014	0
244.24	192.168.1.17	922704	3	114482869	4808
304.38	0.0.0.0	0	0	114490027	0

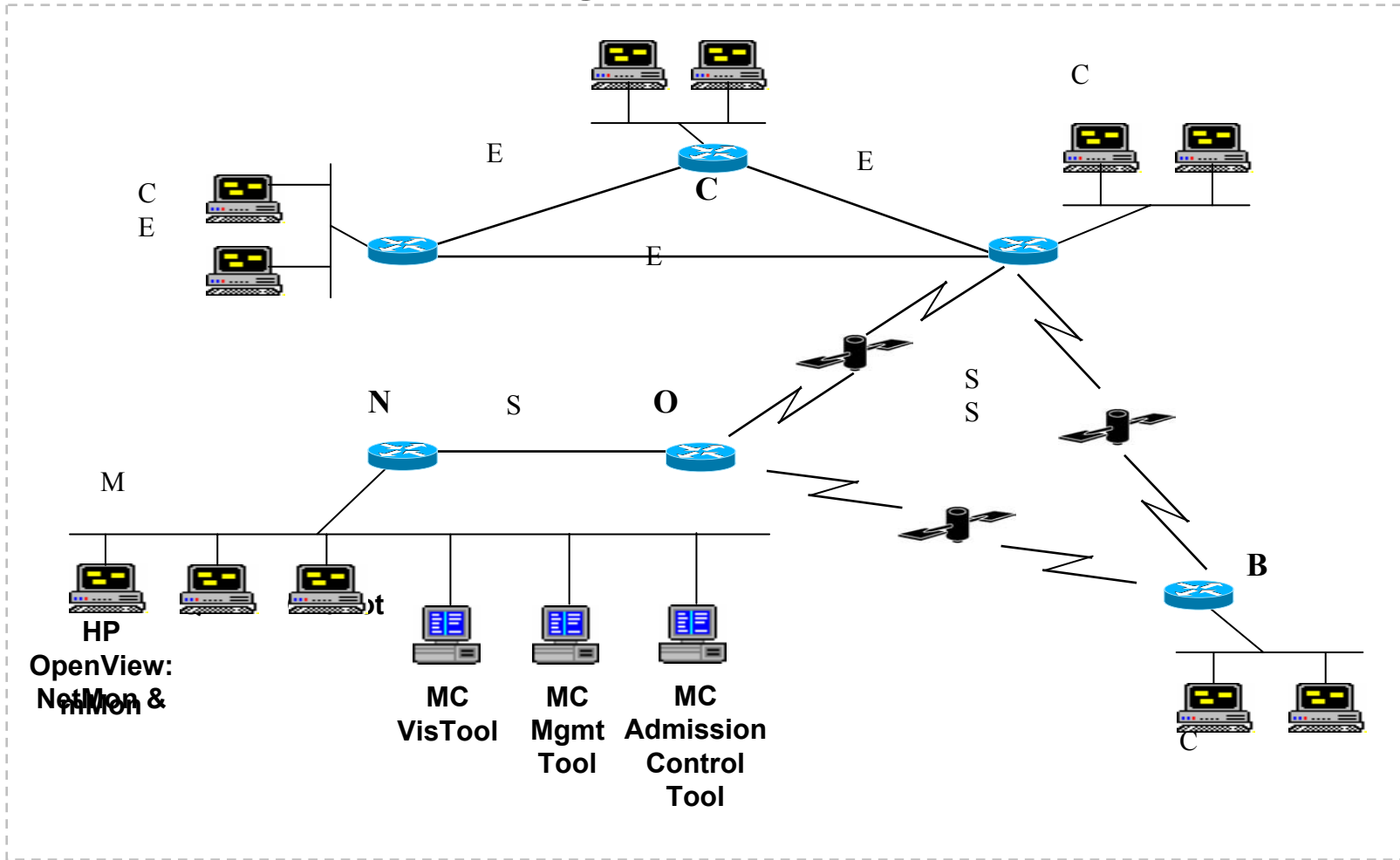
Time	GroupID	Incoming Interfaces	Volume (bytes/s)	Outgoing Interfa
63.81	224.0.1.40	NA, e1/1		0e0/0, e1/1
63.81	224.0.1.40	NA, e1/1		0e0/0, e1/1
123.99	224.0.1.40	NA, e1/1		0e0/0, e1/1
123.99	224.0.1.40	NA, e1/1		0e0/0, e1/1
184.11	224.0.1.40	NA, e1/1		0e0/0, e1/1
184.11	224.0.1.40	NA, e1/1		0e0/0, e1/1
244.24	224.0.1.40	NA, e1/1		0e0/0, e1/1
244.24	224.0.1.40	NA, e1/1		0e0/0, e1/1
304.38	224.0.1.40	NA, e1/1		0e0/0, e1/1
304.38	224.0.1.40	NA, e1/1		0e0/0, e1/1
364.5	224.0.1.40	NA, e1/1		0e0/0, e1/1
364.5	224.0.1.40	NA, e1/1		0e0/0, e1/1
424.64	224.0.1.40	NA, e1/1		0e0/0, e1/1
424.64	224.0.1.40	NA, e1/1		0e0/0, e1/1

Highlight



Demonstration

Multicast Management Tool Demonstration



Impacts

- **Realization of the potential of multicast traffic for more efficient utilization of network resources**
- **An enabling capability for many new applications (collaboration, multimedia, etc.)**
- **A major step towards eliminating barriers prohibiting the use of multicast traffic on some present-day large-scale networks**
- **Opportunity to provide timely feedback to vendors and the IETF on multicast requirements**

Future Plans

- **Evolution of multicast visualization tool as a network diagnostic tool for operational use**
- **Examination of alternative technologies for supporting controlled and synchronized User Datagram Protocol (UDP) transmissions (underlying protocol used by multicast)**
- **Study of approaches to de-conflicting policies in multicast group prioritization (where conflicting overlap occurs)**
- **Integration in JEFX '02 (TBD)**