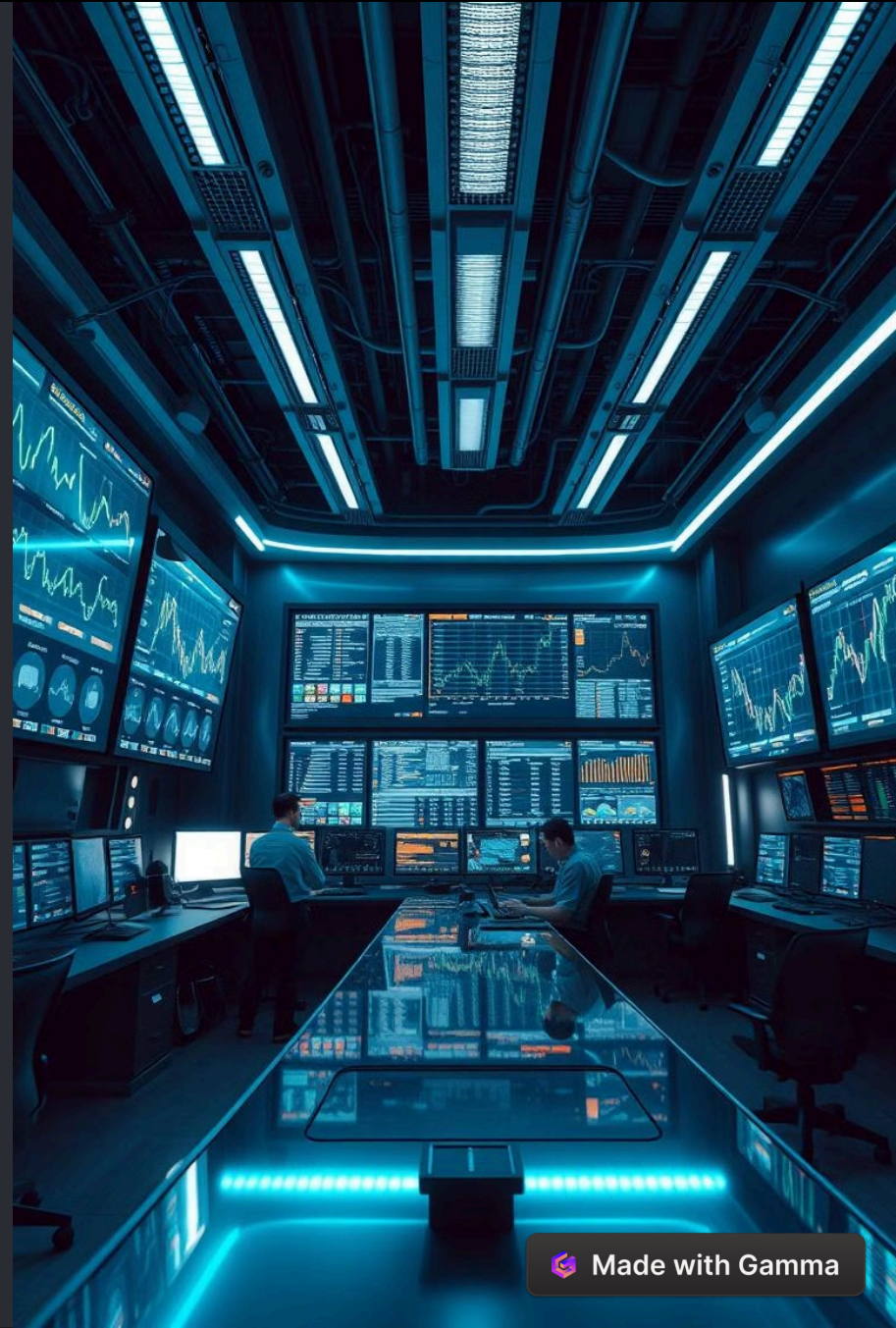
Admission Control in Computer Networks

Admission Control is a critical network mechanism employed by routers to determine whether to accept or reject a packet flow based on specified criteria. This technique is vital for Quality of Service (QoS), ensuring efficient network resource use and preventing congestion. It evaluates the capacity to handle new flows without impacting existing ones, guided by flow specifications to maintain network stability and performance.



The Importance of Admission Control

1 Prevents Network Overload

Admission Control is essential to prevent network overload and congestion, ensuring a stable environment. This proactive approach maintains a consistent and reliable user experience.

2 Fair Resource Distribution

It ensures fair distribution of network resources like bandwidth and buffer size, allocating resources effectively and equitably among different users and applications.

3 Guarantees QoS Requirements

Admission Control guarantees Quality of Service (QoS) requirements for existing traffic, prioritizing critical applications and preventing performance degradation for established connections.

Key Flow Specification Parameters

Bandwidth Availability

The router checks if it has enough bandwidth to handle the new flow, ensuring there is sufficient capacity to support the additional traffic without causing congestion.

Buffer Space

It determines if there is enough buffer memory to temporarily store incoming packets, preventing packet loss due to overflow and maintaining data integrity.

CPU Processing Power

Admission control ensures that processing new packets does not slow down existing traffic, preserving overall network responsiveness and efficiency for all users.

How Admission Control Works: A Step-by-Step Guide

1 **New Flow Arrives**

A new packet flow arrives at the router, initiating the admission control process to determine its eligibility for network resources.

2 **Check Flow Specifications**

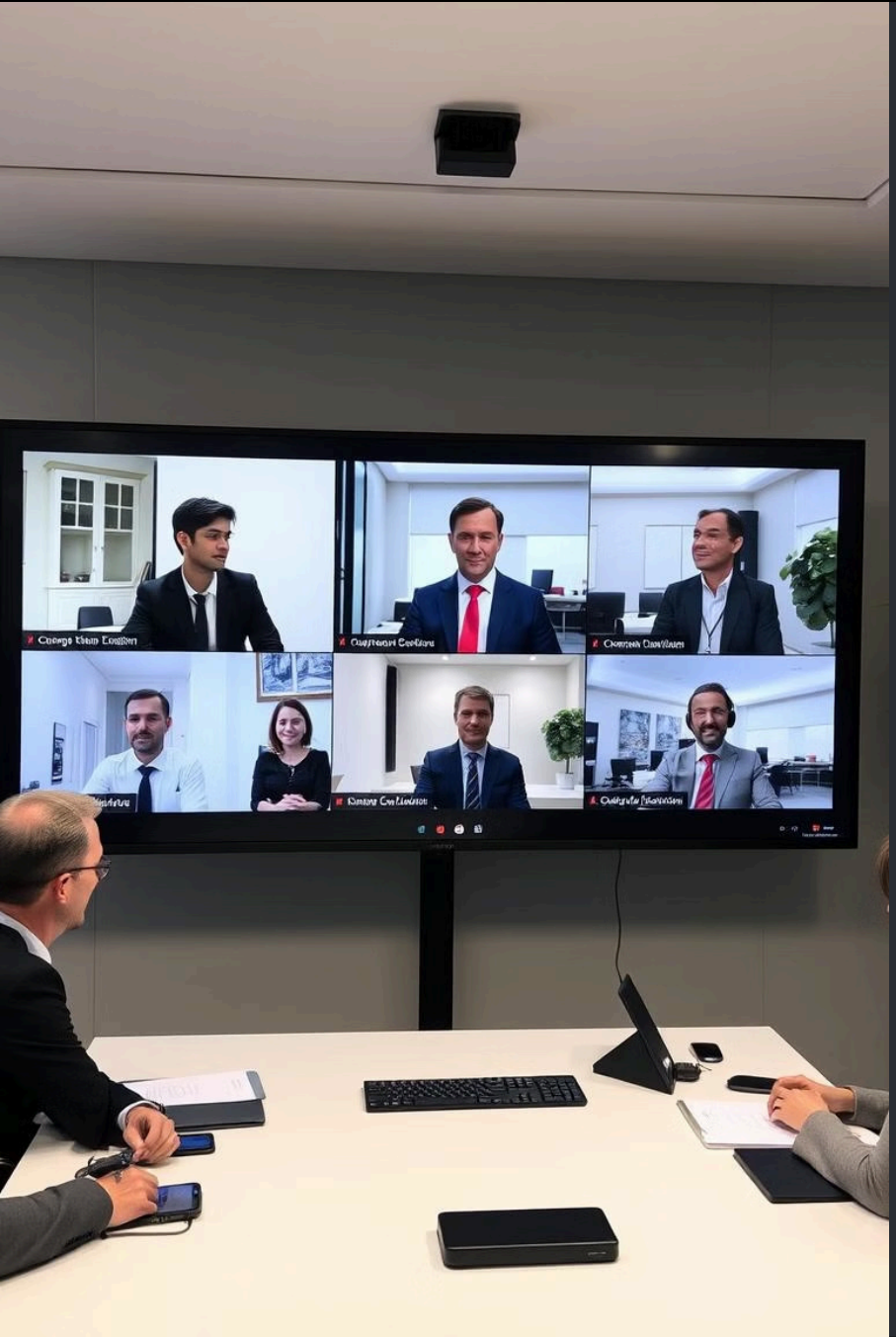
The router verifies whether the packet meets predefined conditions, ensuring compliance with established network policies and resource allocation guidelines.

3 **Evaluate Resource Availability**

The router assesses its bandwidth, buffer, and CPU capacity to determine if it can accommodate the new flow without disrupting existing traffic.

4 **Decision is Made**

Based on the evaluation, the router either accepts the flow, forwarding the packets, or rejects the flow, preventing network overload and maintaining QoS guarantees.



Example Scenario: Video Conferencing System

Check Bandwidth

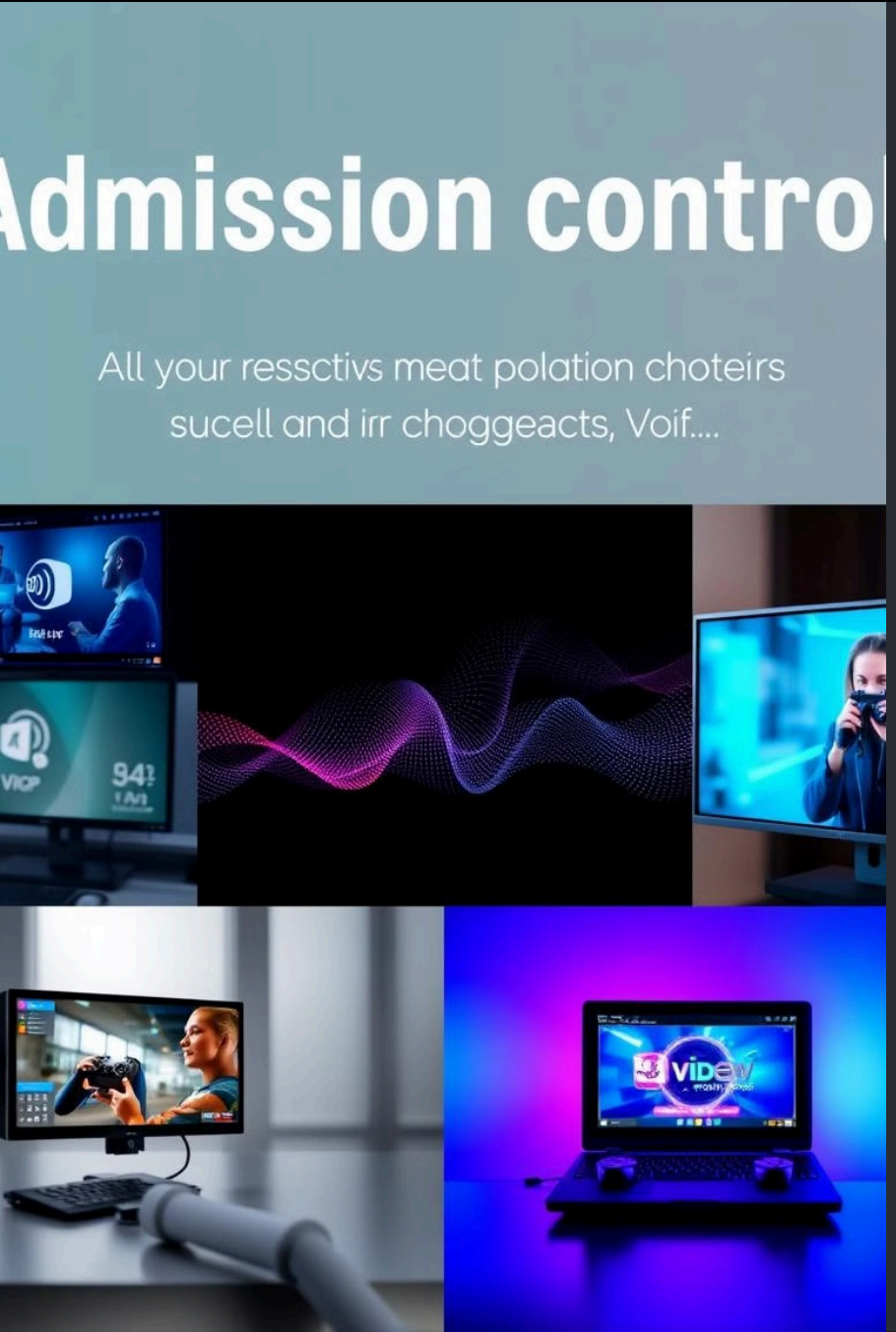
The router checks if it has enough bandwidth to support the new video stream, ensuring smooth and uninterrupted video transmission for all participants.

Ensure Buffer Size

It ensures that the buffer size can handle the extra load, preventing packet loss and maintaining video quality during the conference.

Verify CPU Processing

The router verifies that its CPU processing is not overwhelmed, guaranteeing that the video conference does not negatively impact other network activities.



Real-World Applications

VoIP (Voice over IP)

Ensuring call quality by managing network traffic to prevent delays and interruptions.

Video Streaming

Maintaining smooth playback by allocating sufficient bandwidth to prevent buffering and ensure high-definition viewing experiences.

Online Gaming

Reducing latency and preventing lag by prioritizing gaming traffic to provide a seamless and responsive gaming environment.

Conclusion: Maintaining Efficient Network Performance

Admission Control plays a vital role in maintaining efficient network performance. By ensuring that only manageable traffic flows are accepted, it helps in reducing congestion, preventing packet loss, and maintaining QoS standards. This technique is widely used in real-time applications where stable and reliable network performance is essential.