Scalable Integrated Services Architecture for Computer Networks

Tech ID: 10180 / UC Case 2000-303-0

BACKGROUND

These deterministic guarantees can be provided by a network that reserves the required bandwidth and other resources. This reservation paradigm prompted the Internet Engineering Task Force (IETF) to propose the Intserv architecture and the RSVP signaling protocol. However, a major concern with this architecture is that the soft-state mechanism it uses to maintain consistency of reservation state may not be scalable to high-speed backbone networks. This can cause the refresh messages (apart from consuming memory, processing power, and bandwidth) to experience significant queuing delays and prevent correct functioning of the soft-state mechanism because of the large number of flows. For the refresh mechanism to function properly, the reservation state size must be either eliminated or drastically reduced.

TECHNOLOGY DESCRIPTION

Scientists at the University of California, Santa Cruz have developed a new scalable services architecture for computer networks that replaces the per-flow reservation state in the routers with a small, bounded aggregate state. The size of this aggregate state and the complexity of the refresh mechanism are determined by network parameters, such as size and class, rather than the number of end-user flows. The invention incorporates a "shaper-battery" (a set of token-buckets arranged in the form of a tree) for aggregating flows into classes defined using the newly developed notion of "burst-drain-time" or "burst ratio". The consistency of aggregate reservations is maintained using AGRE, the first reservation protocol to use diffusing computations for this purpose.

APPLICATIONS

- Network routing: maintains reservation state thereby maintaining incoming and outgoing traffic
- Maintains the reservation state in a network router to maintain rates of incoming and outgoing traffic

ADVANTAGES

- Acts as middle ground between the stateful Intserv and a published stateless architecture (SCORE)
- Easily scalable while providing delays similar to the Intserv architecture

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,027,449	04/11/2006	2000-303

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Queue-Sharing Multiple Access Protocol

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OTHER INFORMATION

KEYWORDS

Internet architecture, Intserv architecture, networks, communication networks, computer networks, integrated services, network routing, router, reservation state, network traffic, Cat3

CATEGORIZED AS

- **Communications**
  - Internet
  - Networking
  - Other
  - Wireless
- **Computer**
  - Other
  - Software

RELATED CASES

2000-303-0

- Loop-Free and Multi-Path Network Methods
- Differentiating Congestion Vs. Random Loss: A Method For Improving TCP Performance Over Wireless Links
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- Interference Management for Concurrent Transmission in Downlink Wireless Communications
- Tree-Based Ordered Multicasting in Computer Networks

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