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Evaluating the Advantages and Disadvantages of Transition Technologies for IPv6 in the Context of IPv4-as-a-Service

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Abstract

The shift towards IPv6 has led to the emergence of various IPv4-as-a-Service (IPv4aaS) transition technologies that allow the provisioning of IPv4 connectivity over IPv6 networks. The six main IPv4aaS mechanisms – 464XLAT, DS-Lite, Lightweight 4over6, MAP-E, MAP-T, and D4across6 – are compared in this study. We assess these protocols' performance under a range of network situations using detailed simulation modeling in the ns-3 network simulator. With 100 nodes, we simulate an ISP-scale network architecture. We then configure several routing protocols, traffic patterns, connection

random seeds are used for each simulation run, and variables like packet sizes, routing protocols, and traffic loads are varied. The key performance parameters that are gathered are protocol overhead, packet loss, delay, and throughput. Important insights into the workings of each mechanism and how they tackle the problems of coexisting IPv4 and IPv6 under various network circumstances are provided by our thorough examination. The findings demonstrate how much better 464XLAT and D4across6 perform in most situations in terms of low latency, high throughput, minimal packet loss, and low overhead. This site may help network operators locate IPv4aaS solutions that meet their requirements and implementation procedures. Networking must alter transition technologies. This study improves comprehension of IPv4aaS protocols via trustworthy simulations.

KEYWORDS: IPv4aaS IPv6 Transition mechanisms Dual stack Access networks

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ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

This research does not involve human subjects, animals, or ethical considerations that require approval or consent.

CONSENT FOR PUBLICATION

The author (sole contributor) consents to the publication of this manuscript in Frontiers in Computer Science.

AUTHORS' CONTRIBUTIONS

collection, analysis, and manuscript preparation.

Disclosure statement

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The data used to support the findings of this study are available from the author upon request.

Additional information

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