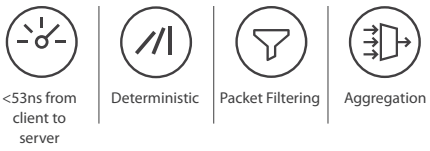
MultiAccess

Low latency, multi-user connection sharing in 53 ns



MultiAccess is a network application that combines low-latency packet multiplexing with the ability to segregate traffic between individual clients, or groups of clients, via configurable filters.

Arista MultiAccess enables the creation of a shared, low-latency infrastructure ideal for managed service providers or brokers providing direct access to clients .

The MultiAccess application optimizes the paths for many-to-one environments where it is critical that clients maintain segregation of traffic between each endpoint. These paths are further enhanced to allow the processing to occur at the fraction of the latency of a Layer 2/3 switch.

Filtering is accomplished via configurable access control lists (ACL). Packets may be streamed through the filter using an aggressive cut-through technique, allowing for a very low latency of <100 ns. The filter logic determines whether the packet should be permitted or denied and, if the latter, the packet transmission is aborted.

Optimized for

- Arista 7130L and LB devices

FEATURES	BENEFITS
Low latency, multi-tenant multiplexing	Aggregate client-to-server streams in as low as 53 ns and filter server-to-client streams in 89 ns* .
Connection sharing	Take advantage of a cost-effective alternative to dedicated exchange links, WAN links or other shared services.
Flexible ACLs	ACLs support permit/deny rules based upon source/destination IP address/port number. IP addresses may be extended using wildcards with CIDR style notation.
VLAN features	Supports 802.1Q Tunneling (Q-in-Q) by performing VLAN insertion toward the host port, and stripping toward the client ports.
Ingress filtering	Ingress filtering is available in 2x23_if and 1x47_if modes that allows small ACLs to be applied to traffic from clients to the server.
Storm Control	Monitor per-port network bandwidth or packet rate, and drop packets to maintain rates lower than pre-defined limits.
Multifunctional	Tapping – allow access port traffic to be replicated and sent out for monitoring/ capture to Arista's MetaWatch application Dynamic patching – easily reconfigure client or destination ports Media conversion – convert from fiber handoffs to local direct attach copper with no impact on latency
Extensive packet statistics	Record extensive telemetry information for MultiAccess and L1+ switch operation e.g. per-port counters and per-queue depths; for monitoring, diagnosis and troubleshooting. Statistics are available via CLI, InfluxDB and other telemetry mechanisms.

FEATURES	BENEFITS
Deterministic	Know and rely upon your system's latency for fairness, or implement an ideal execution environment for your orders. Without contention, the MultiAccess aggregation latency varies by only +/- 6 ns.
Easy to monitor and manage	Arista provides a complete range of additional features including: • A comprehensive set of Ethernet counters on each port • An integrated Linux management processor • Streaming telemetry to a remote InfluxDB database • Command-line interface (CLI) via secure shell (SSH), Telnet, serial connection • Local and remote logging via Syslog • JSON-RPC API • Simple network management protocol (SNMP) v1, v2, v3

* based on lowest latency configuration

Latency Tables

Low Latency Modes

Low latency modes are highly optimised for low latency. Features that increase the latency are disabled in these modes, including VLAN support, ingress filtering, and large ACL scale:

Mode	Board Standard	Min (ns)	Average (ns)	Max (ns)
1x47_ll	E	56.9ns	61.9ns	68.4ns
1x47_ll	L	47.8ns	52.7ns	58.5ns
1x47_ll	LB	48.3ns	52.9ns	58.9ns
2x23_ll	E	49.3ns	54.3ns	60.6ns
2x23_ll	L	47.6ns	52.6ns	58.3ns
2x23_ll	LB	47.7ns	52.5ns	58.6ns

Table 1.1 Client to Server path – Low Latency modes

Server to Client latency in Low Latency modes is similar to regular MultiAccess modes, however only ACLs up to 8 rules deep are supported:

Mode	Board Standard	Min (ns)	Average (ns)	Max (ns)
1x47_ll	E	109.1ns	116.5ns	126.8ns
1x47_ll	L	101.3ns	108.9ns	118.8ns
1x47_ll	LB	103.3ns	111.0ns	120.8ns
2x23_ll	E	103.2ns	110.1ns	129.1ns
2x23_ll	L	101.3ns	109.0ns	119.6ns
2x23_ll	LB	101.3ns	108.6ns	118.9ns

Table 1.2 Server to Client path modes

Full Featured Modes

Latency for the Client to Server path for modes supporting VLANs, ingress filtering, and larger ACLs on the return path. Using 7130-LB with 10G client and 10G server port configuration as a representative sample:

Mode	Min (ns)	Average (ns)	Max (ns)
1x47	93.2ns	99.4ns	106.1ns
2x23	83.5ns	89.8ns	96.5ns
4x11	83.6ns	89.8ns	96.7ns
6x7	80.4ns	86.8ns	93.4ns

Table 1.3 Client to Server path modes – larger ACLs

Latency for the Server to Client return path for modes supporting larger ACLs on the return path. Using 7130-LB with 10G client and 10G server port configuration as a representative sample:

Mode	Min (ns)	Average (ns)	Max (ns)
1x47	114.1ns	120.7ns	127.9ns
2x23	111.4ns	117.6ns	124.5ns
4x11	111.4ns	117.6ns	124.4ns
6x7	111.4ns	117.6ns	124.8ns

Table 1.4 Server to Client return path modes – larger ACLs

Arista MultiAccess for Managed Service Providers & Brokers

Lower-latency Exchange Access

Managed Service Providers and Brokers offer their clients access to financial exchanges and can use MultiAccess to provide significantly lower latency than typical network switches.

Arista MultiAccess allows these firms to share the connection to the exchange with more than one client, while maintaining isolation between the clients. MultiAccess hence provides an ideal solution combining multiplexing (aggregation) functionality with a high-performance return path; filtering the return-path individually per client. The latter benefit from significantly lower latency in their trading connectivity as well as smaller variation in that latency.

Arista MultiAccess implements a number of features which enhance this use case, for example implementing ACL filters on ingress before multiplexing, and storm control, which can avoid specific clients using an unfair amount of the network capacity.

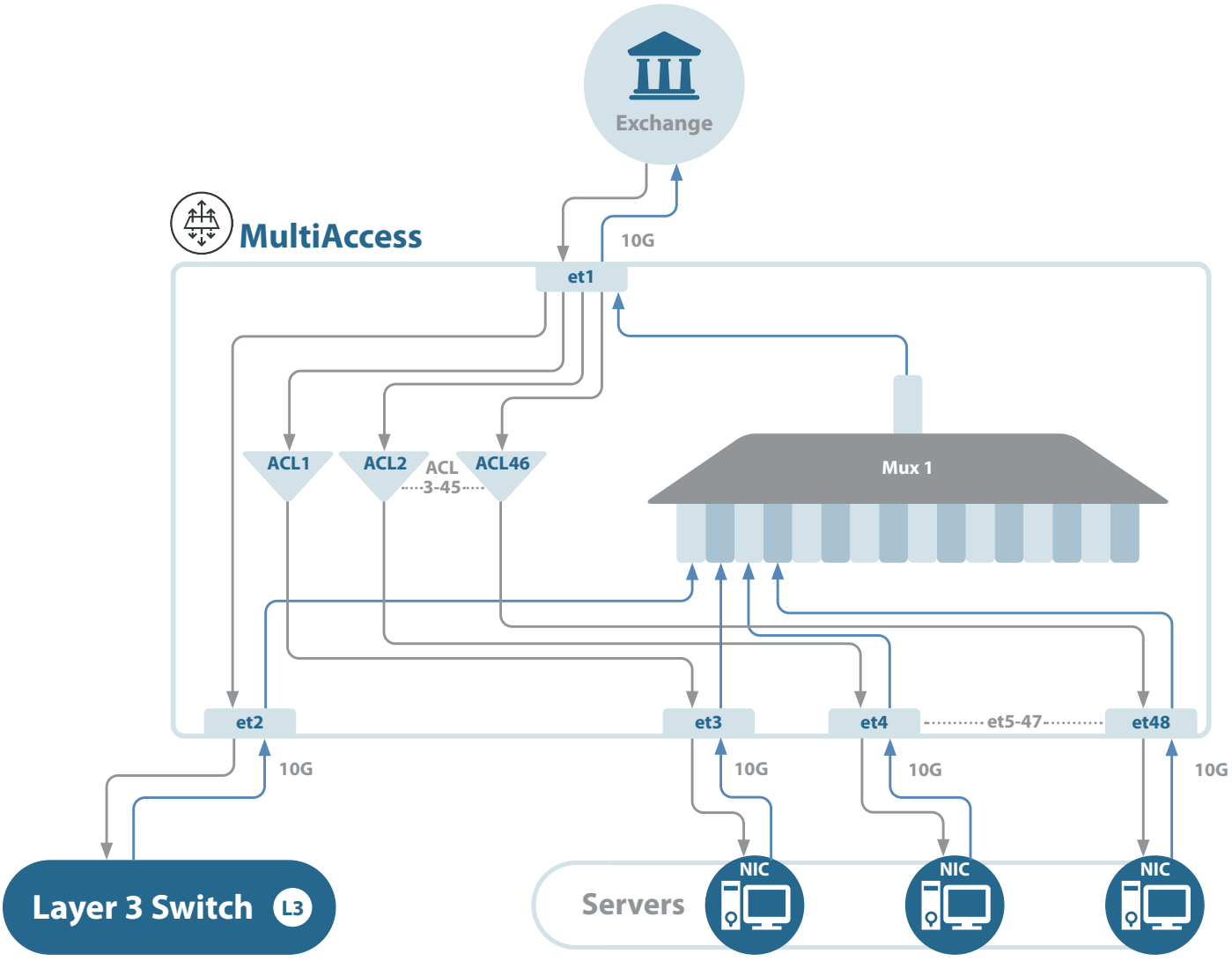


Figure 1.4 Low latency exchange access

WAN Link Multiplexing

Arista MultiAccess can be used to aggregate several sources of network traffic into a WAN link and, optionally, de-multiplex from a WAN link. Often these links can be bandwidth limited (e.g. 1 GbE) with MultiAccess being able to provide a low-latency translation to and from the bandwidth-limited link. The layer 1 functionality in the Arista 7130 can be used to tap those links.

To reduce the traffic volume transmitted, Arista MultiAccess can filter market data down a single, bandwidth-limited (1GbE) line.

VLAN tagging and stripping can be used to multiplex multiple independent layer 2 links into a single VLAN trunk to be transmitted and then de-multiplexed. The link partner may be a traditional VLAN-aware switch, or another instance of MultiAccess.

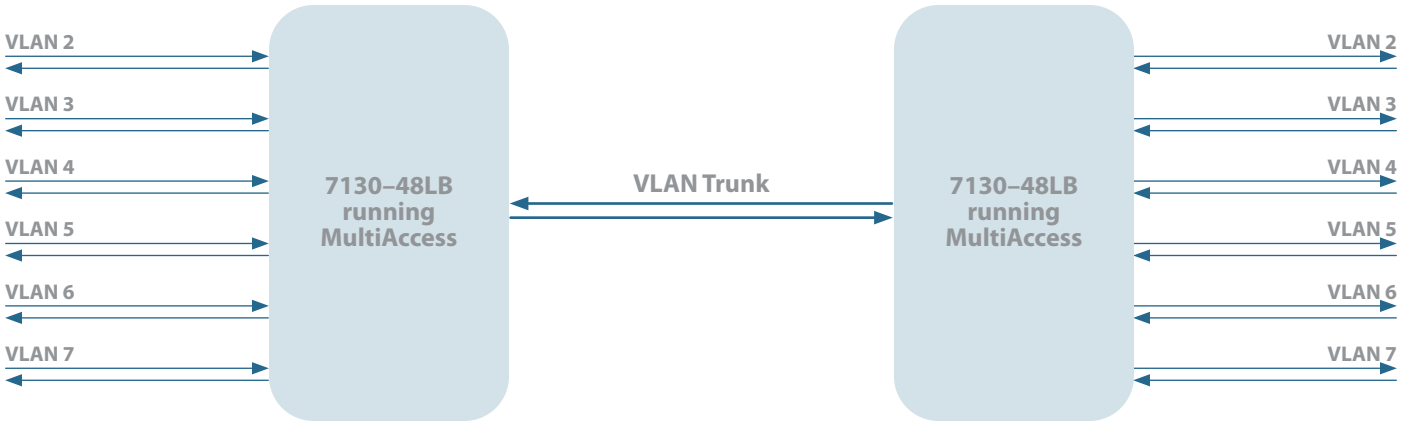


Figure 1.5 WAN Link Multiplexing

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