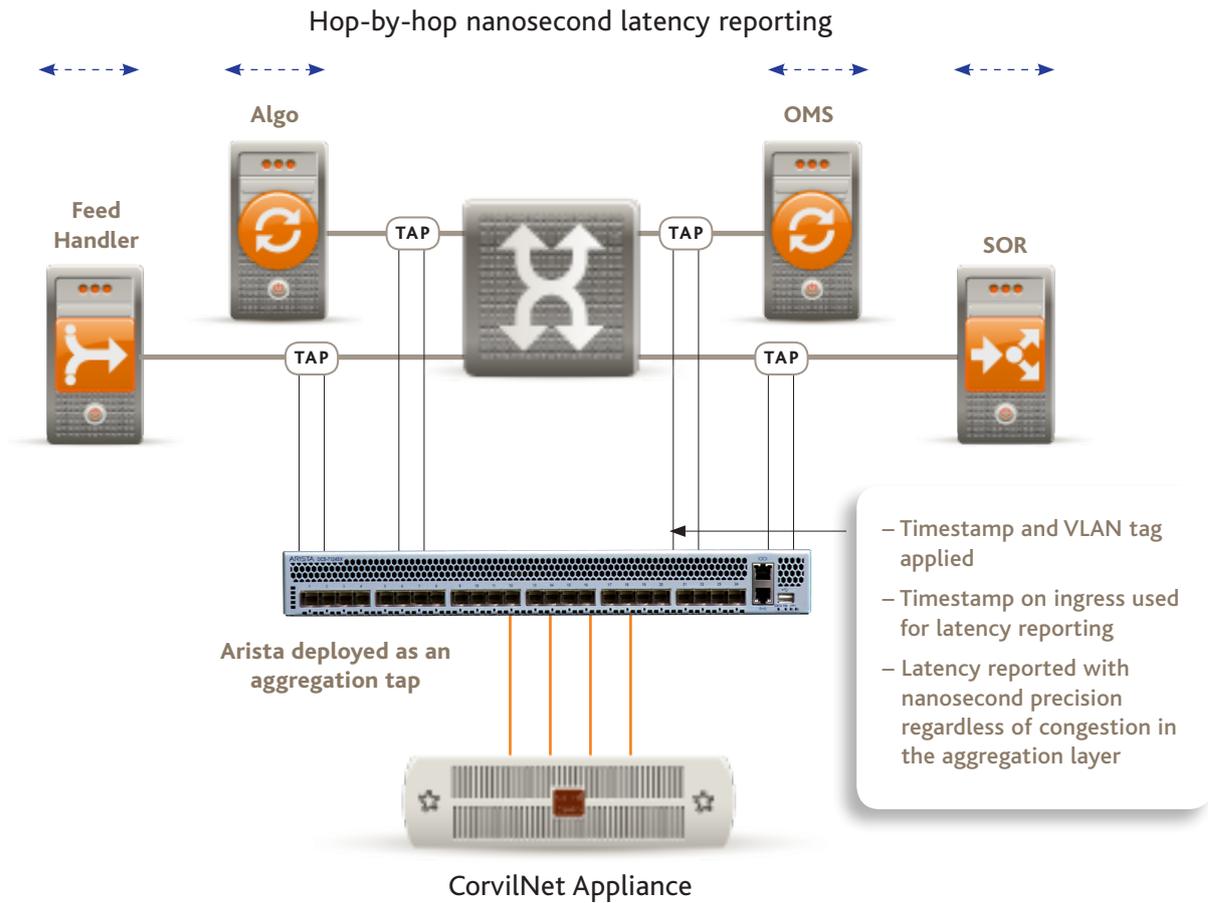# CorvilNet

Arista DANZ Integration

CorvilNet is a performance monitoring system for global Fortune 2000 enterprises. Clients use CorvilNet for precision monitoring, troubleshooting and reporting of their application and network performance. CorvilNet provides unprecedented visibility into short timescale events that contribute to the underlying cause of many end user experience issues. Clients want to gain the visibility provided by CorvilNet across every hop or tier in their LAN, MAN and WAN environments. CorvilNet instrumentation at each hop requires the following characteristics:

- Passive instrumentation that does not introduce additional performance or risk into the production path

- The instrumentation must be "on the wire" such that it represents an independent and complete view of all application activity (versus, for example, a software log)

- A nanosecond timestamp of every packet/message copied from the wire to report latency and other performance measurements at the required level of granularity

The Arista 7150 deployed passively as an aggregation tap delivers all of these characteristics. Leveraging Arista's port density of 52 10G/1G ports in a 1U chassis, many critical hops can be instrumented with a single Arista switch combined with a single CorvilNet appliance. Each of the ports on the Arista switch supports hardware timestamping of all packets off the wire with nanosecond granularity. The switch can aggregate these packets to a CorvilNet appliance, which uses the timestamps applied at ingress to ensure accurate performance and visibility into all application and network performance issues.

Why CorvilNet + Arista DANZ

- Hardware timestamping on Arista ports lowers the cost of instrumentation and extends the visibility and reach of your CorvilNet deployment with no loss in the reporting fidelity and granularity

- One-way latency, loss and jitter can be reported across LAN, MAN and WAN environments. CorvilNet's auto-synchronization protocol works with Arista timestamps for environments without time synchronization capabilities

- Where PTP is available, CorvilNet can provide time synchronization packet captures based on Arista timestamps on all ingress ports

- CorvilNet can leverage the Arista LANZ reporting to correlate network congestion across the production environment with application performance issues

Hop-by-hop nanosecond latency reporting

Arista deployed as an aggregation tap

CorvilNet Appliance

– Timestamp and VLAN tag applied

– Timestamp on ingress used for latency reporting

– Latency reported with nanosecond precision regardless of congestion in the aggregation layer

CorvilNet Leveraging Arista 7150 Deployed as an Aggregation Tap

Figure 1 shows a typical deployment involving an Arista 7150 deployed to passively instrument the hops in a trading environment and aggregate the traffic to a CorvilNet appliance. CorvilNet uses the timestamps applied at each ingress port on the 7150 to report hop-by-hop latency across the feed handler, trading algorithm, order management system (OMS) and a smart order router (SOR).

Figure 2 shows in detail an example of the Arista 7150 deployed to forward a copy of packets on the SOR ingress and egress ports. First a copy of an order on ingress to the SOR is forwarded to CorvilNet with a timestamp applied. Similarly on egress the corresponding order is also timestamped and forwarded. CorvilNet correlates the ingress order with the egress

Figure 1

CorvilNet and Arista Timestamping:
Data Center - Arista deployed as an aggregation tap

order and reports the "wire to wire" latency across the SOR with nanosecond granularity.

This type of deployment can be extended to distributed environments that are commonly encountered across most enterprise environments. CorvilNet can use its patented auto synchronization protocol with Arista timestamps to measure latency, jitter and loss end-to-end across a distributed environment without the need for any external timing sources such as GPS or PTP. Figure 3 shows an Arista 7150 deployed as an aggregation tap in two data centers. The CorvilNet appliance uses the Arista 7150 timestamps for synchronization of the clocks over the CorvilNet peer-to-peer protocol to report one-way latency, jitter and loss across the service provider infrastructure to determine SLA compliance.
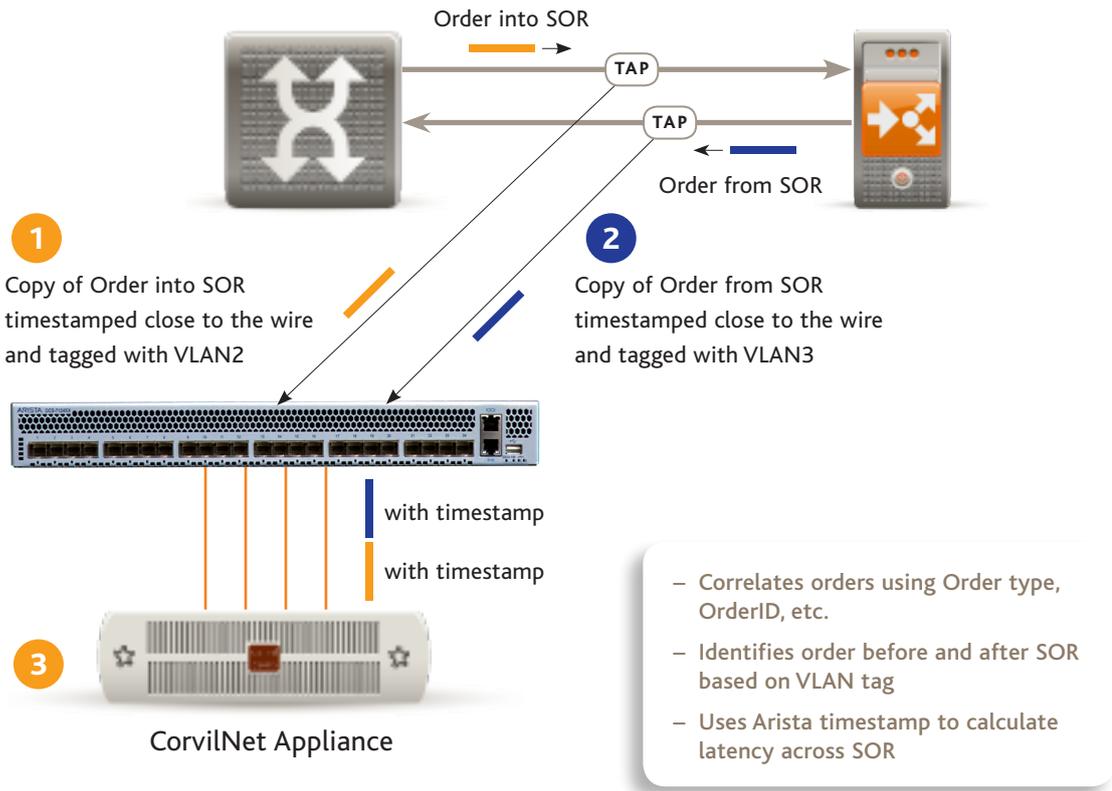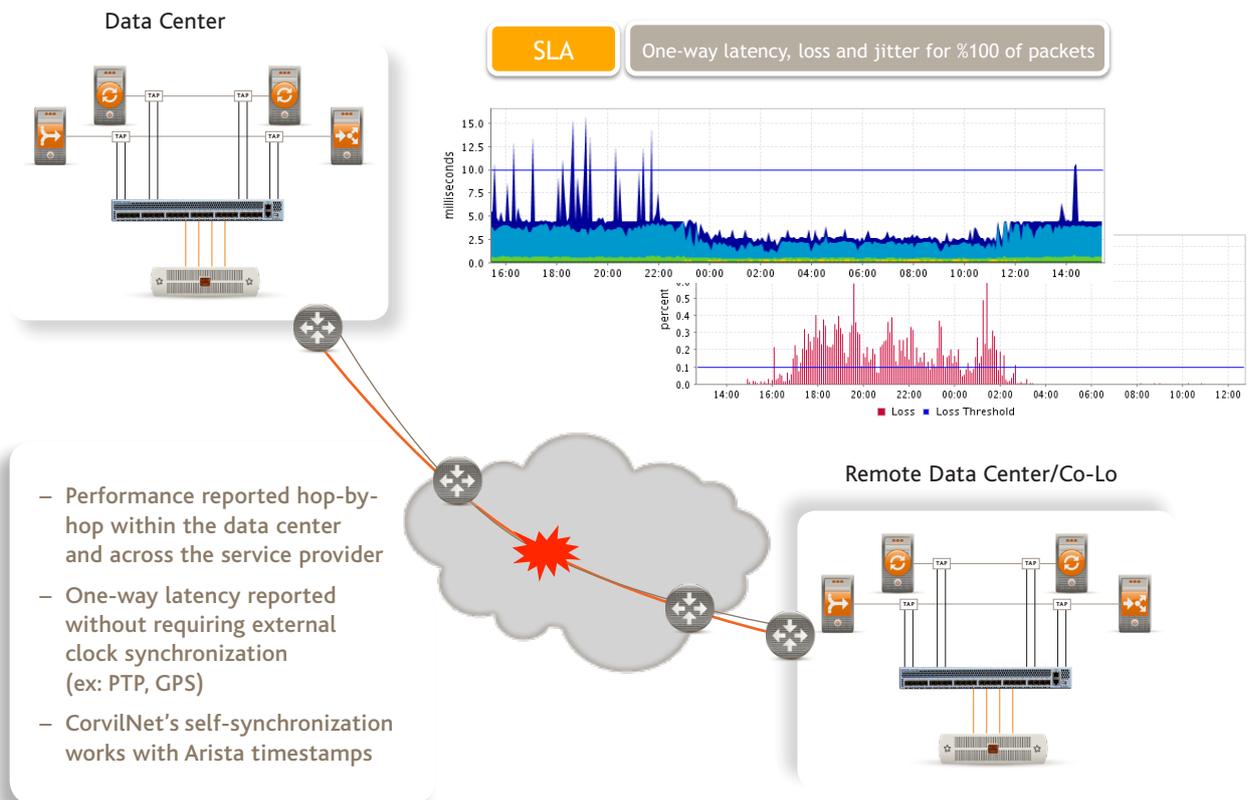
Order into SOR

TAP

TAP

Order from SOR

1

Copy of Order into SOR
timestamped close to the wire
and tagged with VLAN2

2

Copy of Order from SOR
timestamped close to the wire
and tagged with VLAN3

with timestamp

with timestamp

3

CorvilNet Appliance

– Correlates orders using Order type,
OrderID, etc.

– Identifies order before and after SOR
based on VLAN tag

– Uses Arista timestamp to calculate
latency across SOR

Figure 2 (above)

CorvilNet and Arista Timestamping:

Data Center – Arista deployed as an aggregation tap

Figure 3 (below)

SLA Compliance:

Inter-Datacenter – Arista deployed as an aggregation tap

Data Center

SLA   One-way latency, loss and jitter for %100 of packets

Remote Data Center/Co-Lo

– Performance reported hop-by-
hop within the data center
and across the service provider

– One-way latency reported
without requiring external
clock synchronization
(ex: PTP, GPS)

– CorvilNet's self-synchronization
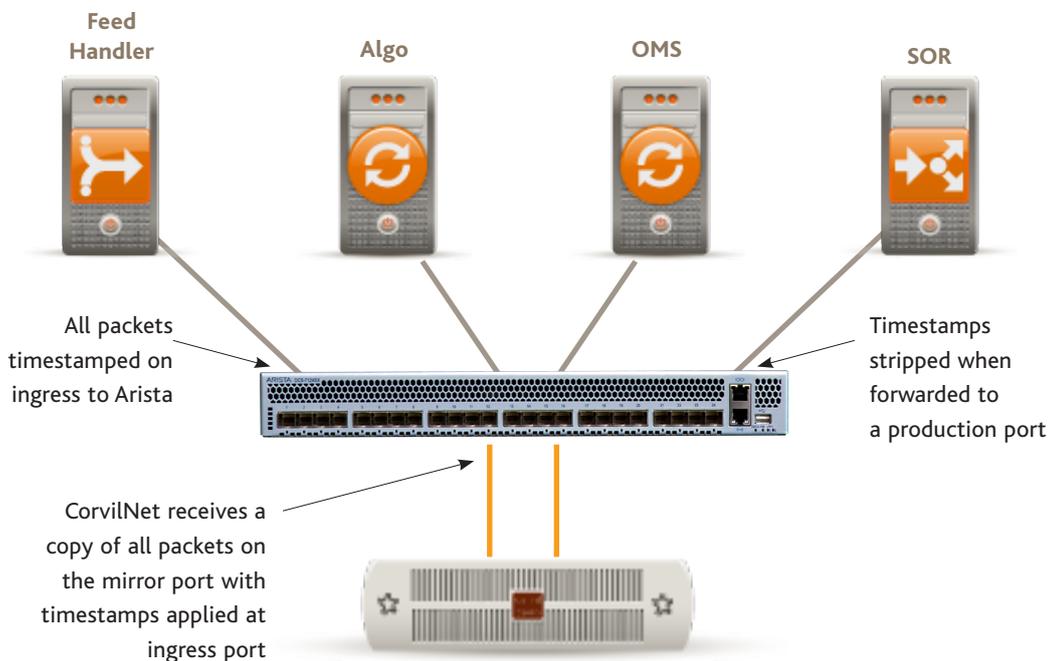works with Arista timestamps

CorvilNet Leveraging Arista 7150 in Production Environments

Alternatively, the Arista 7150 may also be deployed as the production switch. In this deployment example (see figure 4), Arista's ability to timestamp on ingress and send a copy to a mirror port where CorvilNet is connected enables the same hop-by-hop latency and performance reporting. For packets being forwarded in the production path, the 7150 can strip the timestamp from the packet such that there is no impact on the downstream application.

Figure 4

CorvilNet + Arista Timestamping: Arista deployed in production (independent of timestamping support)

Feed Handler Algo OMS SOR

All packets timestamped on ingress to Arista

Timestamps stripped when forwarded to a production port

CorvilNet receives a copy of all packets on the mirror port with timestamps applied at ingress port
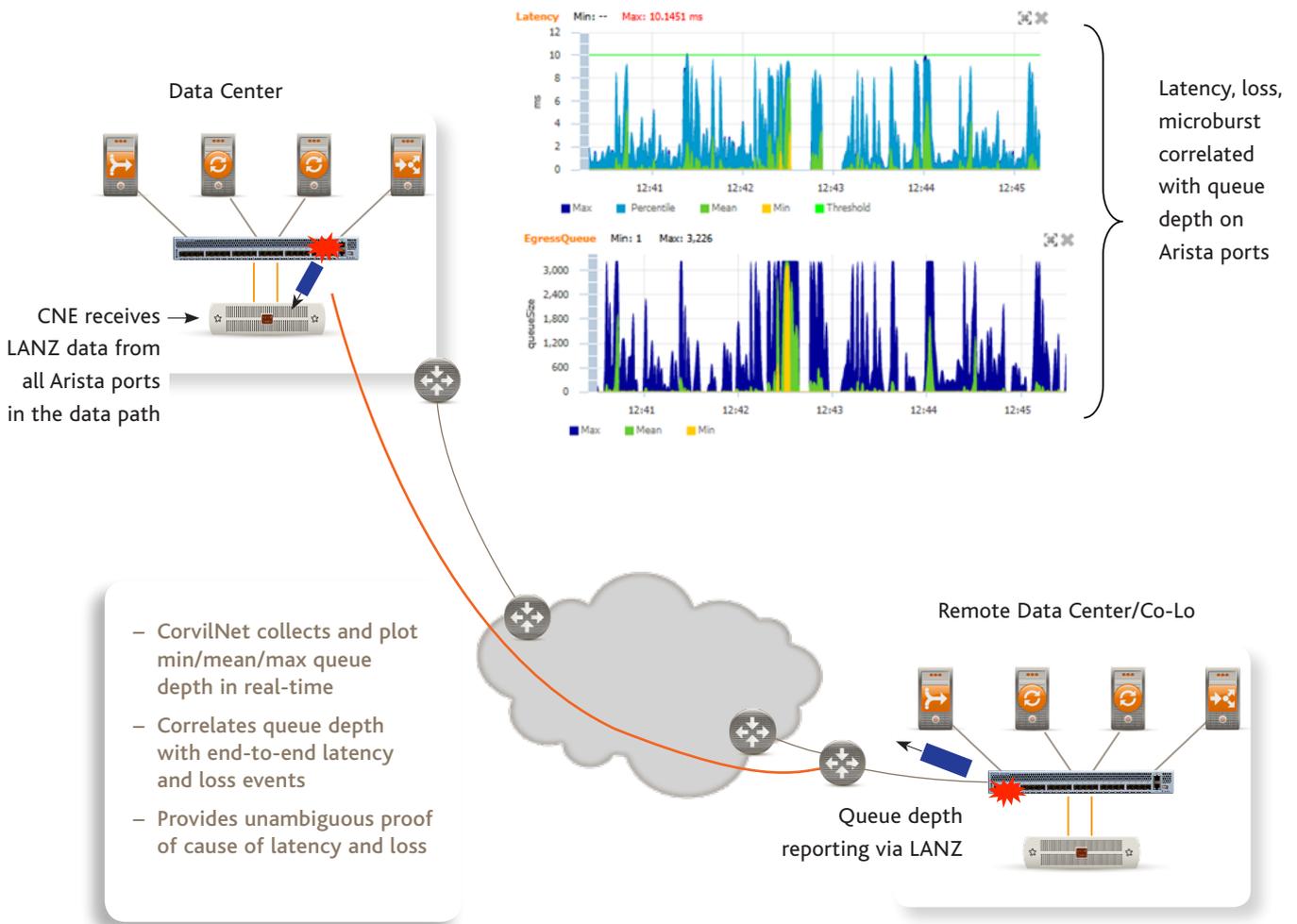
CorvilNet Leveraging Arista LANZ for Isolation Performance Issues

Arista LANZ functionality supports real time microsecond reporting of queuing congestion on the switch. This data can be streamed to CorvilNet to be correlated with application performance and end user experience. For example, CorvilNet reports a drop in application response time alongside the end-to-end latency and loss performance of the application session. The Arista LANZ data allows a CorvilNet user to quickly resolve the issue by correlating the drop in response time and the latency/loss issues with queuing congestion at the switching layer.

Figure 5 shows Arista switches deployed in a distributed data center environment. CorvilNet has been instrumented to measure end-to-end network latency, jitter and loss and report the application performance. CorvilNet additionally collects the LANZ data to report in real-time a plot of the minimum, mean and maximum queue depth for each Arista port in the

Data Center

CNE receives
LANZ data from
all Arista ports
in the data path

Latency, loss,
microburst
correlated
with queue
depth on
Arista ports

- CorvilNet collects and plot
  min/mean/max queue
  depth in real-time
- Correlates queue depth
  with end-to-end latency
  and loss events
- Provides unambiguous proof
  of cause of latency and loss

Remote Data Center/Co-Lo

Queue depth
reporting via LANZ

product path. In a single real-time view,
CorvilNet enables the user to quickly correlate
application performance issues with network
latency, jitter and loss and any queuing
congestion at an Arista port.

Summary

The cost of instrumenting many components
for hop-by-hop application performance
reporting can be lowered when the Arista 7150
is deployed as an aggregation tap with a
CorvilNet appliance. The Arista 7150 offers up
to 52 ports in a 1U chassis all with nanosecond
timestamping capabilities. CorvilNet's auto-
synchronization protocol also works with Arista

Figure 5

**CorvilNet and Arista LANZ: Arista deployed in production
(independent of timestamping support)**

timestamps. This enables easy measurement of
one-way latency, jitter and loss across LAN,
MAN and WAN environments without requiring
a PTP or GPS deployment.

Finally, CorvilNet correlates application
performance with the underlying network
infrastructure performance. For example, end
user experience issues can be correlated with
latency, jitter, loss and congestion at the
network layer. CorvilNet leverages Arista's
LANZ+ capabilities to report per port conges-
tion at each switch hop in the production path.

Corvil