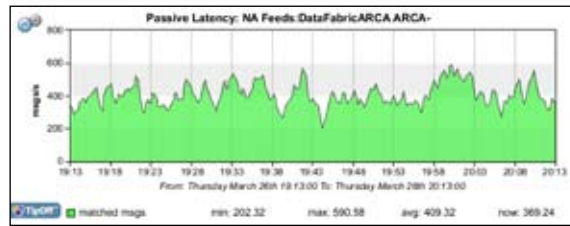
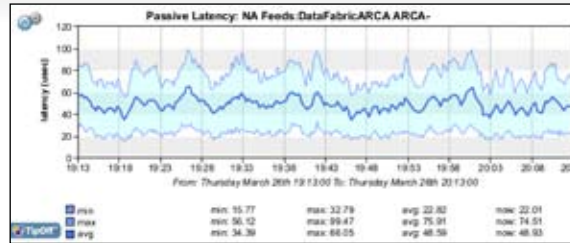


## Middleware Intelligence™

TipOff™ is a real time middleware analysis and passive latency monitoring appliance that delivers Middleware Intelligence™ across all standards based and vendor proprietary middleware stacks.

Middleware Intelligence™ has become critically important to enterprises whose business processes rely on the timeliness and integrity of complex middleware infrastructures.



## Passive Latency Monitoring

TipOff™ supports passive latency monitoring of market data and transaction flows. By decoding packet streams in real time through all layers from network up to application message content, TipOff™ can monitor both packet and message latency, accounting for retransmission latency in the reliability layer. A single multi-hop flow may comprise several different middleware stacks or protocols. TipOff™ supports flows that undergo transformations through order aggregation, trading engines and execution venues.

## Multidimensional Middleware Analysis

TipOff™ captures all observed middleware traffic, categorising statistics according to source, destination, namespace and layer. This data can be drilled down in multiple dimensions. Metrics can be used for middleware tuning, capacity planning, troubleshooting, and proportional chargeback of shared infrastructure usage.

## TipOff™ Latency Feed

TipOff™ is able to republish latency and other middleware statistics as a real time meta-data feed enabling trading applications to share a common view of data latency by leveraging their existing market data API connection. TipOff™ supports a range of both push and pull API for integration with other monitoring tools and products.

## Latency Root Cause Analysis

TipOff™ supports latency root cause analysis by leveraging its thorough analysis of the middleware stacks that comprise each hop in a data flow. The most significant source of latency is retransmission latency resulting from lost packets. TipOff™ monitors the internal operation of reliability layers within protocols such as TCP, RV, LBM and RRCP, providing protocol specific statistics and early warnings of operational conditions that result in increased latency.

## Application Behaviour Validation

TipOff™ tracks message streams published by applications, monitoring the quality of the data for signature signs of application code that has been poorly optimized for bandwidth minimization. Such applications are often the greatest source of operational issues within complex middleware infrastructures.

## Packet Capture

- Wire speed packet capture
- Guaranteed zero packet loss
- 1 Gig and 10 Gig Ethernet
- Precise time stamping @ 10ns
- External time synchronisation
- PPS & PTP master & slave
- pcap and nano pcap format
- Export to Wireshark, etc

## Real Time Decode

- Decode layers 1-7
- Retransmission analysis
- Protocol internal chatter
- Application message content

## Latency Analysis

- Non-invasive / passive
- Price and transaction flows
- Multi-hop multi-protocol
- Link transaction to price
- Prime broker latency
- Differential exchange latency
- Execution venue latency

## Middleware Analysis

- Extensive middleware support
- Capacity planning
- Troubleshooting tools
- Proportional chargeback
- Application behaviour

## Retro Analysis

- Decode & re-analysis
- Troubleshooting tools
- Microburst audit trail
- Multicast storm root cause
- Drill down to packet level

## Timed Replay

- Replay captured data
- Controlled rate replay
- Timed release replay
- Testing of trading apps
- Testing of infrastructure

## High Performance

- FPGA packet processor
- ASIC gzip acceleration
- PCIe peer-to-peer operations
- Kernel mode optimisations
- Multi-threaded design



### Supported Protocols

Originator	Protocol
29 West	LBM
ActivFinancial	ActivMiddleware
FPL	FIX FAST
IETF	UDP TCP IGMP
NYSE Technologies	Wombat TCP/RV/LBM/WDF
Solace Systems	SMF - Solace Message Format
Thomson Reuters	RMDS RRCP RMDS RRMP RMDS SSL/RSSL TIB MDDS
TIBCO	EMS Rendezvous
Voltaire	VMS (RDMA)
Data Vendors	RDF, RDF-Direct, IDC PlusFeed
Exchanges	Various equity/derivative exchanges and FX data feeds
Others	By customer request

### Network Connectivity

TipOff G5 Variant	Capture Ports
1 Gig Ethernet	4 or 8 x RJ-45 or SFP
10 Gig Ethernet	2 or 4 x XFP
InfiniBand	SDR/DDR/QDR

### Integration Options

Originator	Protocol
IETF	CSV SNMP
ITRS	Geneos, NetAgent
UserLand Software	RSS SOAP XML-RPC
W3C	HTTP
MDDS Vendors	Various market data APIs

### Physical Characteristics

<b>Model</b>	TipOff G5
<b>Form Factor</b>	19" 2U rack mount
<b>Dimensions</b>	756mm x 447mm x 86mm
<b>Weight</b>	35 kg
<b>Power</b>	Dual 750W PSUs, 350W nominal load
<b>CPU</b>	2 x quad core Xeon 5500 Nehalem
<b>Memory</b>	16-64GB DDR3
<b>Disk</b>	8 x 146GB 2.5" SAS15K RPM RAID5 Higher capacity storage options available