



# Maestro Product Family



## Overview:

Leading analysts agree that application performance presents one of the most important challenges facing IT organizations today. Crescendo Networks' Maestro Application Front End (AFE) addresses this challenge by offloading and consolidating a critical set of data center

tasks, allowing servers to focus on timely application content delivery. Maestro has been independently validated in third party tests as the clear performance leader in the AFE market, delivering performance levels which are orders of magnitude above the competition. Real world deployments have shown that Maestro delivers:

- ▶ Application Acceleration (up to 10 times)
- ▶ Faster End User Experience (up to 5 times)
- ▶ Increased Security and Application Assurance
- ▶ Dramatically Reduced Data Center Expenditures

# Benefits and Technology

## Key Benefits:

### ▶ Application Acceleration (up to 10 times)

Maestro delivers the industry's highest level of application acceleration at multi-gigabit rates with unmatched application response time, scaling to handle more customer requests per second than any other solution.

### ▶ Faster End User Experience (up to 5 times)

Maestro delivers the fastest, most reliable application environment to your customers.

### ▶ Increased Security and Application Assurance

Maestro blocks malicious attacks and mediates flash crowd events. By removing the impact of peak-time periods on application response times, the customer experience is assured and consistent.

### ▶ Dramatically Reduced Data Center Expenditures

Maestro offloads critical server functions, increasing server efficiency by up to 10 times and reducing outbound bandwidth by up to 70%. This data center optimization decreases existing and planned CAPEX and OPEX, delivering clear and immediate ROI.

load balancing, compression, and SSL acceleration, are implemented in purpose built hardware, with dedicated memory provided for each functional component. This unique architecture allows Maestro to accelerate applications to levels unattainable by any other vendor's solution.

Crescendo's patent pending **Short Lived Transaction (SLT)** technology (which leverages the power of Maestro's architecture) is principally responsible for high performance application delivery. SLT provides:

- ▶ Advanced **Connection Management Algorithms** for offloading TCP overhead from servers by consolidating many connections into a few
- ▶ A unique **Request Processing Algorithm** which enables request and response buffering during the transaction flow, for optimal content delivery
- ▶ **Response Optimization** whereby Maestro completely shields servers from WAN-based TCP overhead (dropped packets, congestion, etc), allowing them to deliver content at maximum throughput

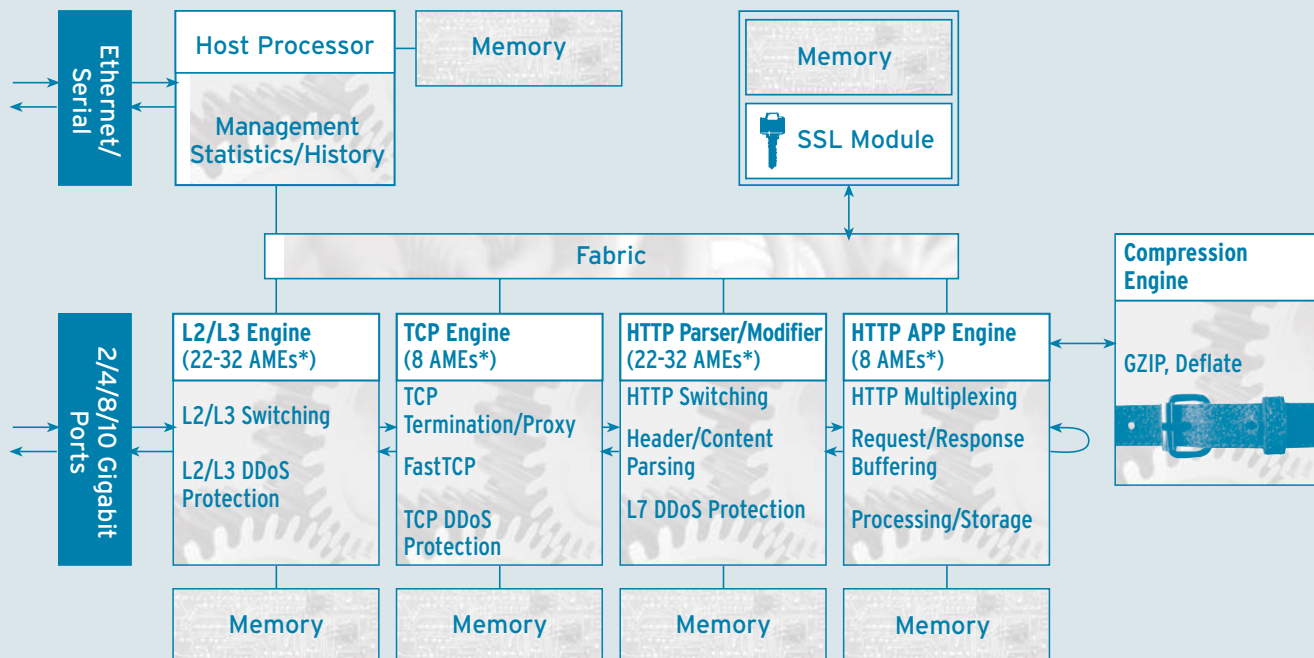
## Technology and Architecture:

Crescendo's Maestro Platform is the only solution in the industry that implements Layer 2-7 functionality in dedicated hardware.

All functions, including TCP termination/offload/acceleration,

Maestro's unique architecture provides a superior level of **Feature Concurrency** by allowing all features to be enabled simultaneously without affecting the performance of any single feature or that of the platform as a whole.

## Maestro CN-5XXX Series Architecture



\* AMEs - Application Micro Engines

# Features and Capabilities

## TCP Offload, Multiplexing and Acceleration:

By acting as the TCP termination point for client connections, Maestro removes the connection setup, teardown and management burdens that normally consume valuable server resources. All incoming requests are received by Maestro over many client-side connections, and then multiplexed and redirected to the optimal server resources over a controlled number of persistent server-side connections. This significantly reduces the TCP overhead on servers and dramatically accelerates application content delivery.

For client connections, Maestro's TCP engine employs a unique set of algorithms collectively known as FastTCP. FastTCP speeds up TCP's standard slow-start algorithm, allowing each connection to reach maximum capacity quickly. FastTCP also employs an optimized congestion avoidance algorithm that not only maximizes the bandwidth of each connection, but also minimizes dropped packets.

## Content Compression:

Maestro compresses content in real time at speeds up to 1 Gbps., with zero latency. Maestro can compress content by up to 70%, which improves client response times and significantly reduces application bandwidth requirements. The compression engine also offloads this processor intensive task from servers

that would have otherwise had to compress the data themselves. HTTP compression schemes provide an asymmetric approach to application acceleration, as data is automatically decompressed by common Web browsers.

## SSL Offload and Acceleration:

Maestro offloads SSL processing from servers, making the servers more productive and the site faster and more economical. Maestro handles both SSL session setup and bulk data encryption tasks, employing dedicated hardware that accelerates both of these resource intensive processes.

## Server Load Balancing:

Load balancing provides high availability for server resources and shields users from server failures. Maestro provides load balancing on a request by request basis, determining the optimal server for each request based upon actual HTTP load.

## Application Assurance and Availability:

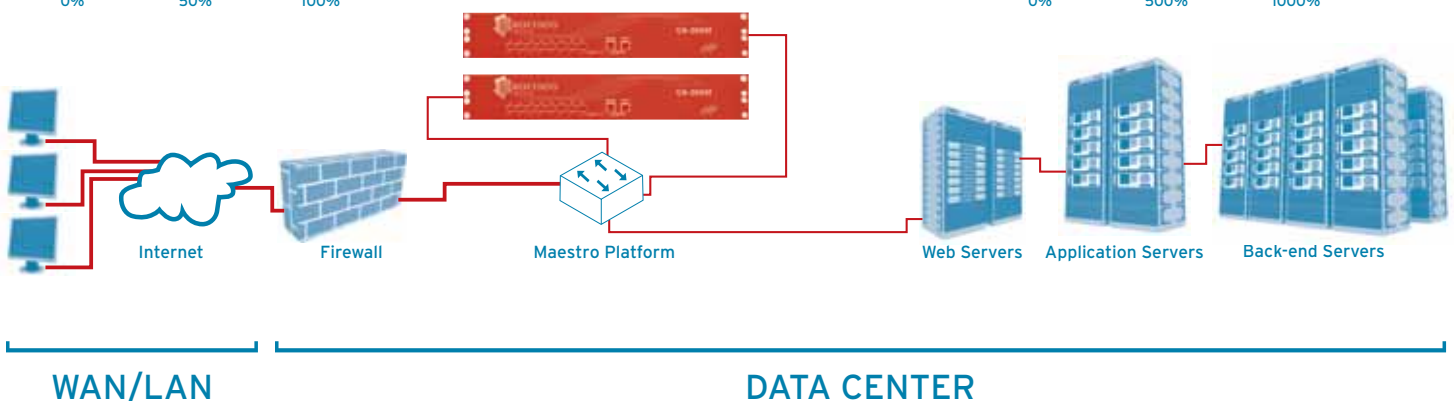
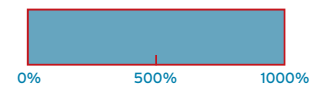
Servers react negatively to severe changes in user patterns, traffic spikes, and other traffic anomalies. Maestro maintains a normalized operating environment, shielding servers from erratic client behavior, as well as malicious attacks (DDoS) and flash crowd events.

**Maestro integrates seamlessly into existing data center, providing multi-gigabit application acceleration**

### Application Latency (Reduced up to 5 Times)



### Server Acceleration (Up to 10 Times)



*Performance Beyond Expectation*



## Feature Summary:

### Application Acceleration:

- ▶ True TCP termination/offload/acceleration
  - Server Side: eliminates the overheads of connection setup and tear down, handles a large number of client connections, and multiplexes requests to a controlled number of persistent server connections
  - Client Side: FastTCP for transmission acceleration and packet loss prevention
- ▶ Compression
  - Real time compression
  - Supports Gzip, Deflate (decompressed by Web browser)
  - Hardware-based, zero latency
- ▶ SSL
  - Hardware based SSL offload for session setup and bulk data transmission
  - Client side and server side SSL functionality
- ▶ Load Balancing (Layer4 and Layer 7)
  - All decisions made at the request level
  - Flexible layer 7 rules: URL, file-type, headers, etc.
  - Best server selection based on actual server load
  - Supports application level client persistence
  - Supports L4 load balancing with TCP acceleration

### Application Protection:

- ▶ Protected from DDoS attacks such as: SYN Flood, Land, Teardrop, Smurf, Ping Of Depth, Open/Close, ICMP Unreachable,

ICMP Redirect, Looping UDP Ports, Fraggle, UDP Flood, TCP Flood

- ▶ Application Assurance: Guarantees application operation under any load
- ▶ Redundancy/High Availability
  - Active/Passive for hot standby
  - Active/Active for Load-Sharing

## Management:

Crescendo's Maestro product line can be managed through a comprehensive and user friendly set of interfaces. Highlights include:

- ▶ Remote configuration and management
- ▶ Web GUI
- ▶ Command Line Interface (CLI)
- ▶ Telnet/SSH
- ▶ RS232 serial console
- ▶ SNMP compliant
- ▶ Event reporting through event logs, or syslog
- ▶ Dual images, multiple configurations

## Performance:

- ▶ 1 Million Total Connections
- ▶ 2.4 Million Syns/Second \*
- ▶ 500K Connections/Second \*
- ▶ 120K Transactions per Second
- ▶ 10K SSL Handshakes per Second \*
- ▶ 1 Gbps Bulk Encryption Throughput \*
- ▶ 1.5 Gbps Compression Throughput \*
- ▶ 6 Gbps Optimized Throughput \*

\* Model Dependent

## System Specifications:

### System Interfaces

- ▶ CN-5020: 2 x SFP GbE ports (optical or copper)
- ▶ CN-5080: 8 x SFP GbE ports (optical or copper)
- ▶ CN-5504: either 4 x SFP GbE ports (optical) or 4 triple speed, 10/100/1000 ports (copper)
- ▶ CN-5510: either 10 x SFP GbE ports (optical) or 10 triple speed, 10/100/1000 ports (copper)
- ▶ Management interfaces: RJ-45 serial port, RJ-45 10/100 Ethernet

### Power

- ▶ AC Input
- ▶ Voltage:
  - 90-250 VAC @ +6%, -10%
  - Frequency: 50-60 Hz
- ▶ Maximum current: 3.0 A
- ▶ Dual power supply (optional in CN-55xx)
- ▶ Heat dissipation:
  - Maximum AC: 200W, 682Btu/hr

### Certifications

EMC:  
EN 55022  
EN 55024  
FCC part 15, Sub-part B  
ICES-003A  
VCCI 2002

### Safety:

EN 60950  
IEC 60950  
UL 60950  
CSA CS22.2 No. 950

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