


## FASTER THAN THE FUTURE IN THE 100G ERA

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Producers of network management and security applications will need to address numerous analysis challenges in order stay ahead of the data growth curve as they enter the 100 Gbps era. In order to stay faster than the future, network equipment manufacturers will need to provide next-generation solutions can not only scale, but can also deliver and understand data, as well as accelerate application performance.

The background features a complex network of thin, brown lines connecting small dots, resembling a data or communication network. This network is overlaid on a background of soft, horizontal bands of color, transitioning from yellow and orange at the top to light blue and teal at the bottom, suggesting a horizon or a sky. The overall aesthetic is modern and technological.

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Data delivered in the right way creates insights that enable actions. Being able to understand all the data within networks ensures apps run quickly, videos stream smoothly and end user data is secure. Yet, as volume and complexity of data increase, processing it all becomes increasingly difficult. Producers of network management and security applications will need to address numerous analysis challenges in order stay ahead of the data growth curve as they enter the 100 Gbps era.

Financial, telecom, corporate and government networks are experiencing exponential growth in data volume, variety and velocity. By 2017, Cisco predicts global IP traffic will reach 1.4 zettabytes a year, or 120.6 exabytes per month. This relentless increase in data is being driven by consumers using mobile devices that are increasingly using data heavy applications, such as streaming video and peer-to-peer file sharing. Traffic from wireless and mobile devices will exceed traffic from wired devices by 2016.<sup>1</sup>

Cisco also projects that global mobile traffic will increase nearly 11-fold between 2013 and 2018 and mobile network connection speeds will increase two-fold during the same period. Over two-thirds of the world's mobile data traffic will be video by 2018.<sup>2</sup>

As a result of this rapid growth in data traffic, connectivity speeds will also need to increase. High-bandwidth applications such as video on demand and high-performance computing, as well as server virtualization and high-speed applications in data centers will continue to drive adoption of 40 Gbps and 100 Gbps connections.

Network equipment manufacturers must find a way to reliably increase performance at connections up to 100 Gbps while reducing risk and time-to-market. They must also effectively

manage and secure networks while still handling a varied portfolio of 1, 10, 40 or even 100 Gbps products. Network services are agnostic to connection speeds and analysis will have to be performed at the same level across speeds ranging from 1 Mbps to 100 Gbps.

In order to stay faster than the future, network equipment manufacturers will need to provide next-generation solutions that can not only scale, but can also **deliver** and **understand** data, as well as **accelerate** application performance.

## SOLUTIONS FOR THE 100G ERA

### DELIVER

#### GUARANTEED DATA DELIVERY

High-speed solutions must be able to capture network traffic at full line rate, with almost no CPU load on the host server, for all frame sizes. Full line-rate packet capture with zero packet loss, frame buffering and optimal configuration of host buffer sizes removes the bottlenecks that can cause packet loss. It also reliably delivers the analysis data that network management and security solutions demand. Zero-loss packet capture is critical for applications that need to analyze all the network traffic in real time.

Frame buffering is a feature that can absorb data bursts, ensuring that no data is lost. It can also remove application limitations, allowing frames to be transferred once the burst has passed. PCI interfaces provide a fixed bandwidth for transfer of data. This can limit the amount of data that can be transferred from the network to the application. Frame buffering is a critical feature for high-speed network analysis.

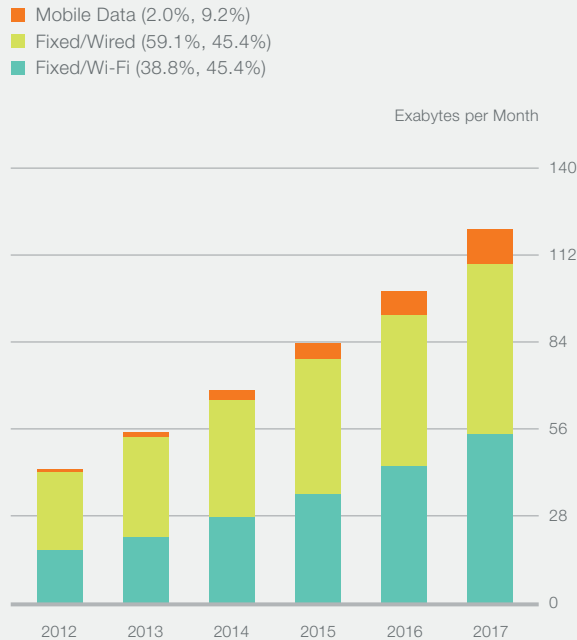
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<sup>1</sup> Cisco Visual Networking Index: Forecast and Methodology, 2012–2017

<sup>2</sup> Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2013-2018.

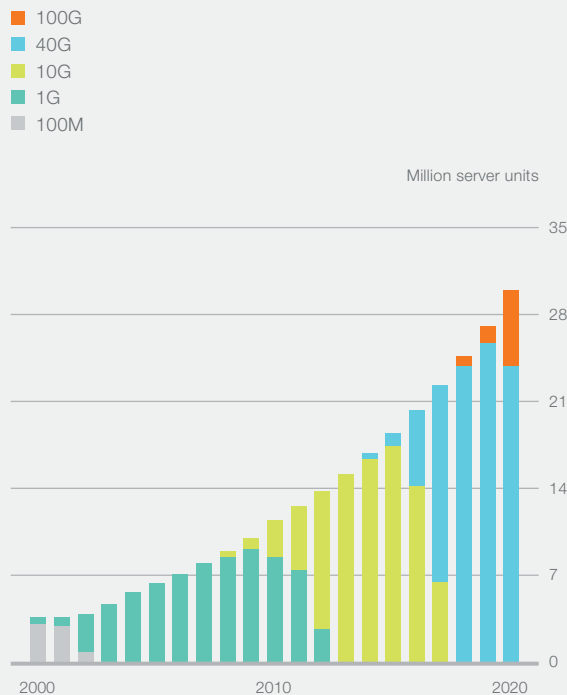
**FIGURE 1**  
Global IP Traffic, 2012 - 2017

Source: Cisco VNI, 2013. The percentages within parenthesis next to the legend denote the relative traffic shares in 2012 and 2017.



**FIGURE 2**  
40/100G Ethernet Adoption

x86 Servers by Ethernet Connection Speed  
Source: Cisco, Intel, Broadcom.



## UNDERSTAND

### FRAME PROCESSING

Next-generation network analysis requires understanding and insight. With frame classification, details on the type of network protocols being used can be provided. For users that want to monitor the network traffic in the most efficient way, it is important to be able to recognize as many protocols as possible, as well as extract information from the layer 2-4 network traffic. Header information for the various protocols transported over Ethernet must be made available for analysis. This includes encapsulation and tunneling protocols.

### TIME PRECISION

Knowing when something happened and the amount of delay in the network is important for many high-speed analysis applications. Assuring quality of time-sensitive services and transactions is often essential and requires high precision. In 100 Gbps networks nanosecond precision is essential to assure reliable analysis. At 10 Gbps, an Ethernet frame can be received and transmitted every 67 nanoseconds. At 100 Gbps, this time is reduced to 6.7 nanoseconds.

Nanosecond precision time-stamping is essential for uniquely identifying when a frame is received. Precise time-stamping of each Ethernet frame allows frames to be merged in the correct order. The result is a significant acceleration of performance as Ethernet frames can now be grouped and analyzed in an order that makes sense for the application and is not restricted by hardware implementations.

### FLOW IDENTIFICATION

Analyzing individual Ethernet frames provides insight into activity at a single point in the network. Network applications must be able to examine flows of frames that are transmitted between specific devices (identified by their IP addresses) or even between applications on specific devices (identified i.e. by protocol and UDP/TCP/SCTP port numbers used by the application).

In high-speed networks up to 100 Gbps, it is important to identify and analyze flows of data to gain an overview of what is happening across the network and then control amount of bandwidth services are using. It also allows for intelligent flow distribution, where frames are distributed to up to 32 CPU cores for massive parallel processing.

## ACCELERATE

### PACKET CAPTURE ACCELERATION

High-speed solutions must provide guaranteed delivery of real-time data for analysis with information that allows quick and easy analysis. What will distinguish these is the

ability to accelerate the performance of analysis applications. This can be achieved by reducing the amount of data to analyze, ensuring that applications are not overwhelmed and only processing the frames that need to be analyzed. One of the main challenges in analyzing real-time data in high-speed networks is the sheer volume of data. Reducing this amount of data can often accelerate the performance of analysis applications. This can be accomplished through features such as frame and flow filtering, deduplication and slicing.

### **PROCESSING ACCELERATION**

100 Gbps solutions must provide acceleration features that enable appliance vendors to maximize the performance of their analysis applications. These features must off-load data processing that is normally performed by the analysis application. Some examples of off-loading features are: intelligent multi-CPU distribution, cache pre-fetch optimization, coloring, filtering and checksum verification. These free up CPU cycles, allowing more analysis to be performed faster.

### **TUNNELING SUPPORT**

Tunnels have been used to transport information reliably and securely across networks that are often outside of the control of the sender. Tunneling provides challenges because the data to be analyzed is encapsulated in the tunnel payload and must first be extracted before analysis can be performed. This is an extra and costly data processing step. By off-loading recognition of tunnels and extraction of information from tunnels, high-speed solutions can provide a significant acceleration of performance for analysis applications.

This is especially true in mobile networks, where all subscriber Internet traffic passes through one point in the network, namely the GPRS Tunneling Protocol (GTP) tunnel between the signaling and gateway serving nodes. Monitoring this interface is crucial for assuring quality of service. Next generation solutions will open up this interface, providing visibility and insight into the contents of GTP tunnels. Analysis applications can use this capability to test, secure and optimize mobile networks and services.

### **NT100E3-1-PTP ACCELERATOR**

As we enter the 100 Gbps era, network equipment manufacturers will need products that can help them stay one step ahead of the data growth curve brought on by the explosive growth in trends such as mobile data traffic, cloud computing, mobility and big data analysis.

NT100E3-1-PTP provides a reliable hardware platform for development of 100 Gbps analysis products. Our 100 Gbps

accelerator intelligently manages the data that is presented for analysis, providing extensive features for managing the type and amount of data. Slicing and filtering of frames and flows, even within GTP and IP-in-IP tunnels, significantly reduces the amount of data. Deduplication features that can be extended in analysis software also ensure that only the right data is being examined.

Napatech Software Suite provides data sharing capabilities that enable multiple applications running on the same server to analyze the same data. When combined with intelligent multi-CPU distribution, this allows the right data to be presented to the right analysis application, thus sharing the load. Intelligent features for flow identification, filtering and distribution to up to 32 CPU cores accelerate application performance with extremely low CPU load.

In addition, our accelerator is the only PCI-SIG® compliant product of its kind and will fit into any commercial-off-the-shelf server. This allows our customers to focus their development efforts on the application, not the hardware.

A common Application Programming Interface (API) allows applications to be developed once and used with a broad range of Napatech accelerators. This allows combinations of different accelerators with different port speeds to be installed in the same server.

Our 100 Gbps accelerator is a reliable product that helps our customers manage the ever-increasing data loads without compromise. Napatech is committed to producing high performance, low risk solutions with fast time-to-market. By scaling with increasing connectivity speeds, as well as accelerating network management and security applications, we enable our customers to stay faster than the future.

### **COMPANY PROFILE**

Napatech is the world leader in accelerating network management and security applications. As data volume and complexity grow, the performance of these applications needs to stay ahead of the speed of networks in order to do their jobs. We make this possible, for even the most demanding financial, telecom, corporate and government networks.

Now and in the future, we enable our customers' applications to run faster than the networks they need to manage and protect.

### **Napatech. FASTER THAN THE FUTURE**

**Heat Exhausts**  
The carefully designed exhausts on the front of the accelerator ensure that the warm air exits the accelerator without increasing the temperature within the appliance or server housing.



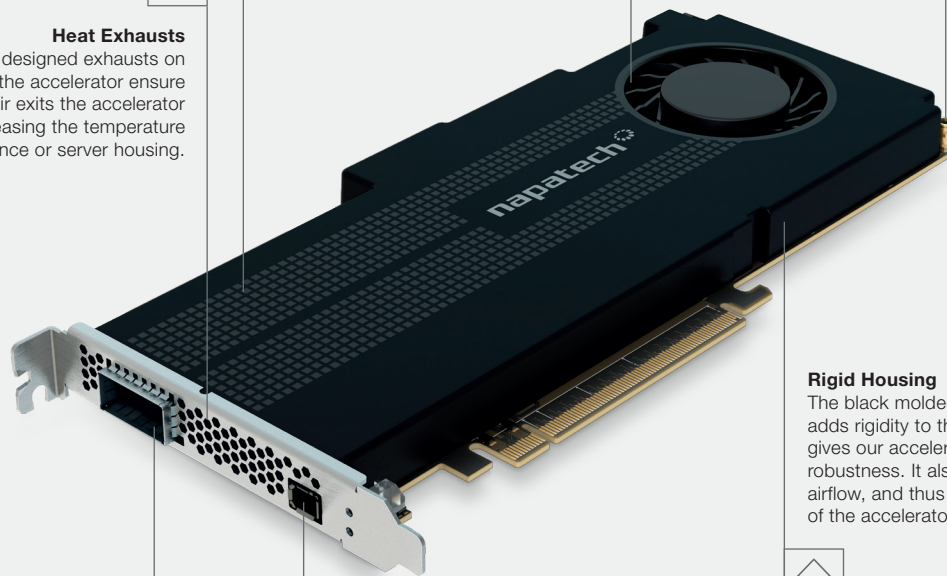
**State-of-the-Art Monitoring**  
The monitoring system keeps tabs on air temperature, voltage and power consumption. It includes an early warning system to ensure your investment is always protected.



**Double Cooling**  
To generate and control our airflow, we designed a blower that can take in air from the top and the bottom of the accelerator. This doubles the amount of air that can be channeled through the product, ensuring superior cooling.



**Time Syncing Within an Appliance**  
We offer the ability to time synchronize multiple accelerators with nanosecond precision within the same appliance.



**Rigid Housing**  
The black molded encapsulation adds rigidity to the structure and gives our accelerators unmatched robustness. It also helps control airflow, and thus the temperature, of the accelerator.



**High Speed**  
The PCI-SIG® compliant NT100E3-1-PTP accelerator can be used for packet capture and analysis of Ethernet LAN data at 100 Gbps for all frame sizes as well as for in-line application acceleration using two NT100E3-1-PTP accelerators.



**Time Syncing Anywhere**  
We support nanosecond accurate time synchronization between multiple applications in multiple locations, no matter where they are located in the world.



**FIGURE 3**  
NT100E3-1-PTP Accelerator

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AND AFRICA**

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