



Solution Brief

Embedded Security Software

Intel® Atom™ Processor

Sensory Networks* Software Acceleration Solutions



SENSORY
N E T W O R K S

Securing Next-Generation Internet Devices

High performance security software runs on low power wireless devices

Convenient wireless Internet access is becoming commonplace all around the world, available at many coffee shops, bookstores, airports and hotels. But some of these connections are to non-secured, non-preferred networks which put laptop computers and other wireless devices at risk. These devices, looking for the strongest signal, may connect indiscriminately to networks that lack encryption or other controls needed to protect users' data.

With access to more open networks, internet devices may actually be more vulnerable to security threats than desktop PCs. They have different security demands than PCs and require small footprint security software capable of securing large downloads from the Internet. Security software packages that ship on standard PCs typically support a wide variety of features which make them too 'heavy' for next-generation internet devices.

The challenge is to provide wireless devices with robust network security, which in the past has been relegated to high end platforms, while keeping the software footprint and CPU utilization at optimal levels. This has been achieved by Sensory Networks*, whose security software runs on the latest Intel® Atom™ processors and inspects packets as fast as 400 megabits per second. The software, which scales from high-end systems down to small portables, benefits from the same Sensory Networks acceleration technology deployed on enterprise security appliances.

Now consumers can have a more secure Internet experience with incredible mobile performance, wireless connectivity and long battery life using a device that fits in their pocket. For example, Mobile Internet Devices (MIDs) based on the Intel Atom processors allow people to more safely connect, entertain, stay informed and be productive wherever they go. This solution brief describes how Sensory Networks software and Intel Atom processors bring exceptional security performance to low power wireless devices.

	Network Layer	Function
Host layers	7 Application	Network process to application
	6 Presentation	Data representation and encryption
	5 Session	Interhost communication
	4 Transport	End-to-end connections and reliability (TCP)
Media layers	3 Network	Path determination and logical addressing (IP)
	2 Data link	Physical addressing (MAC & LLC)
	1 Physical	Media, signal and binary transmission

Note: Layer 1 is hardware-only and cannot be infiltrated by cybercriminals.

Table 1. Open Systems Interconnection (OSI) Basic Reference Model

Securing the Network Stack

Security attacks are becoming more dynamic, which necessitates deeper packet inspection and preventative strategies across all network layers, as shown in Table 1. Every layer of the network stack is susceptible to attacks, but most commercially available client security software provides content inspection only for Layers 3-7, and sometimes just Layers 3-4. This means that systems are generally susceptible to Layer 2 attacks, at a minimum.

Another issue with PC-based security software is that most packages are not optimized for content inspection performance, which is needed to quickly download large files from the Internet. These programs often inspect packets at a rate of 5-8 megabits per second, which is relatively slow. Deep packet inspection can prevent attacks that masquerade as legitimate application layer traffic and get past traditional firewalls that focus on network layer access.

Sensory Networks Software Acceleration Solution

Sensory Networks, a leading provider of acceleration technology for network security applications, offers toolkits, software libraries and application programming interface (API) hooks that enable original equipment manufacturers (OEMs) to easily integrate security functions. Sensory Networks software libraries accelerate functions such as antivirus (AV), intrusion prevention (IPS) applications and content filtering, as shown in Figure 1. This middleware speeds up the management and inspection of packets.

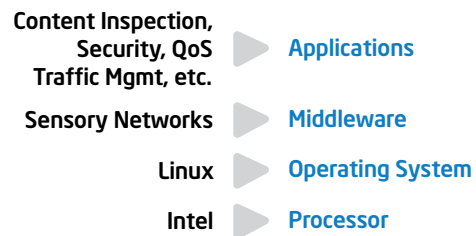


Figure 1. Sensory Networks Security Middleware

Sensory Networks Software Libraries

Sensory Networks software libraries provide exceptional performance because the security code is very small and usually runs in processor cache memory, which dramatically increases performance. Sensory Networks HyperScan* Literal, a literal pattern matcher for content inspection, is about 40 times faster than typical PC security software. It supports approximately 400 megabits per second¹ running on the Intel Atom processor, as shown in Figure 2**. The throughput results, with and without HyperScan, are shown in Figure 3. The comprehensive regular expression library supports millions of simultaneous patterns and checks traffic running at multi-gigabit per second throughput rates.

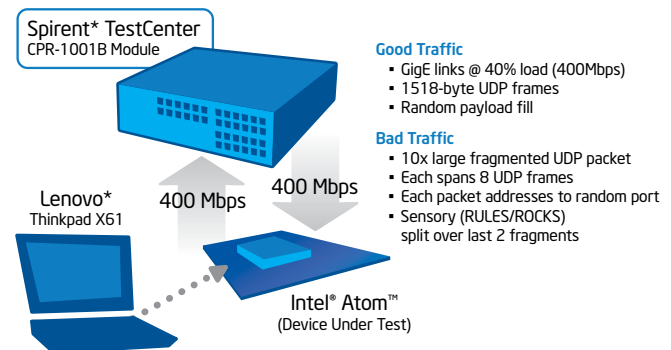


Figure 2. Test Set-Up
**Source: Sensory Networks, July 2008

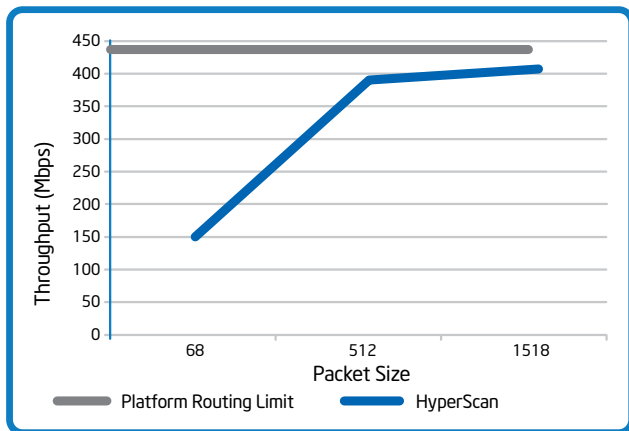


Figure 3. Sensory Networks HyperScan* Performance on the Intel® Atom™ Processor

“The Intel® Atom™ processor is our smallest processor designed for low power consumption and intended for a new wave of internet devices and simple, low-cost PC’s,” says Siva Balasubramanian, ECG Business Alliance Manager, Intel Corporation. “Given these devices represent the future of mobile Internet networking, providing high performance content inspection and security protection on these products is important. It is impressive to see Sensory’s software provide these capabilities.”

The Sensory Networks solution is a suite of performance-optimized software plug-in modules that enable high-speed security content processing and application support for both low and high end systems. These plug-in modules may be implemented across the entire network stack, Layers 2-7, and they include:

Plug-in Module	Function
FastChannel*	a load-balancing solution for network applications
HyperScan* Literal	a literal pattern matcher for content processing
HyperScan PCRE	a Perl-compatible regular expression (PCRE) engine with full regular expression support

Table 2: Sensory Networks Plug-In Modules

Applications:

- > Intrusion Prevention
- > Deep Packet Inspection
- > Application Identification
- > Traffic Management

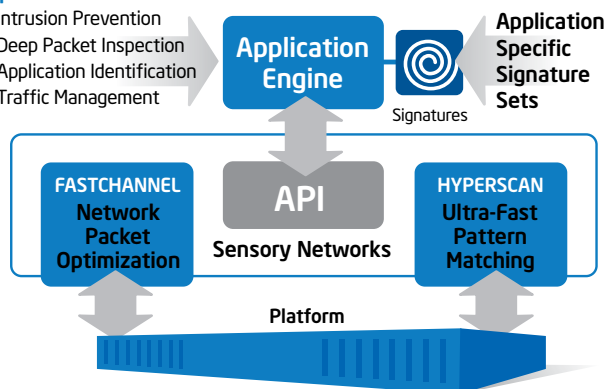


Figure 4. Applications Plug-In Modules Using an API

It’s easy to integrate these software engines and the mechanisms for updating virus signatures. Both HyperScan and FastChannel*, while normally used in combination, can also operate mutually exclusively to provide super-linear scalability ranging from an entry-level single core CPU footprint to complex high-end multicore architectures. This software solution can be applied to virtually any networking or security application where there is a need to significantly improve its content inspection capabilities and price/performance value proposition.

Security Software Scalability

The Sensory Networks plug-in modules are optimized for Intel® architecture and scale from the ultra low-end devices to high-end multi-core processor-based systems. Applications, such as intrusion prevention, deep packet inspection and traffic management, access Sensory Network’s plug-in modules using an API, as shown in Figure 4.

“To demonstrate the high level of scalability and flexibility our software provides, we’ve shifted gears to the ultra low-end of the market.” Sab Gosal, VP of Marketing for Sensory Networks

Industry-Standard Security API

As part of the Intel® QuickAssist Technology initiative, Intel is collaborating with industry leading security vendors to develop a standard API to access software and hardware security accelerators. This API scales across the full range of Intel architecture-based processors and allows applications using accelerators to run on different platforms with little or no software modification. As a result, programs using the API are insulated from advances in accelerator technology or changes in security vendors.

The API can decrease vendors’ software development time and effort and reduce end-user implementation and testing costs. For example, Sensory Networks implements this API and runs its security software on both Intel® Core™2 Duo and Intel Atom processors using a common code base. Using the Intel® QuickAssist Technology API, Sensory could run its security software on both Intel Core 2 Duo and Intel Atom processors using a common base code. As a result, there is a high level of software reuse which increases the return on development investments.

Conclusion

People on the go are finding it necessary to be online more of the time. As they roam around looking for wireless connectivity, they need security software that will protect their internet devices and laptops from security attacks. Responding to this challenge, Intel and Sensory Networks are enabling low power, small form factor devices that can help guard against the latest emerging threats.

Benefits of Intel® Atom™ processors in Security

The Intel® Atom™ processor 200 series delivers the benefits of Intel® architecture for small form factor, thermally constrained embedded applications. Coupled with the Intel® 945GC Express Chipset, this computing platform supplies the processing performance and features required by small form factor security appliances:

- **Low power processor, 4 watts TDP¹ at 1.6 GHz¹**
 - > Enables low cost, small form factor designs.
- **512K on-chip L2 cache memory**
 - > Decreases the time to perform deep packet inspection.
- **Integrated graphics, audio, PCI Express* and USB support**
 - > Delivers a full complement of features.
- **Wired and wireless connectivity**
 - > Supports 802.11 b/g Wi-Fi and 10/100 Ethernet LAN



Figure 5. The Intel® Atom™ Processor N230

In addition to these architecture advantages, equipment makers typically find maintaining software code for general purpose processors, like the Intel® Atom™ processor, is easier than for application specific hardware. This is because Intel® processors are supported by a broad ecosystem offering a wide range of mature development tools.

TDP: Thermal Design Power

For more information about the Embedded Intel® Processors, please visit <http://www.intel.com/products/embedded/index.htm>.

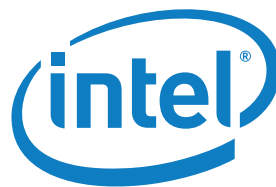


About Sensory Networks

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